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SOUTH HALF OF PERRON TOWNSHIP, ABITIBI-OUEST COUNTY

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SOUTH HALF OF PERRON TOWNSHIP

Abitibi-Ouest County

GEOLOGICAL REPORT - 143

RONALD BOGOCH

1971

G.R.-143

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INTRODUCTION

The area designated as the South Half of Perron Township comprises 50 square miles in Abitibi-West county, between latitudes 49°00'33.8" and 49°04'55" and longitudes 79°17'57.4" and 79°31'04". It is bounded to the west by the Quebec-Ontario boundary, to the south by Demeloizes township, and to the east by Rousseau township.

The cities of Rouyn and Noranda lie 60 miles to the southeast of this area and the town of Normétal is one mile to the south.

No ore deposits have, as yet, been discovered in Perron township, although the area has been explored intermittently since the discovery of the Normetal mine in 1925. The southwest part of the area, being on the extension of the Normetal zone, seems particularly favorable to ore deposition.

Mapping was carried out in the summer of 1966 at a scale of 1 inch to 1,000 feet. Topographic maps supplied by the Department of Natural Ressources were used as field base maps, and excellent field guides were provided by air photographs.

Means of Access

Access to the area is facilitated by a paved road from Rouyn to Normétal. The Canadian National Quebec-Cochrane railway passes through Dupuy, 12 miles south of Normétal, and Normetal Mining Company operates a private railway, which connects with this line.

A gravel road leads north from Normétal into the map-area between lots 48 and 49 up to range V. From there, a truck road extends around the eastern part of Pajégasque lake to the northern limit of the area. Colonization roads provide excellent access to the eastern part of the area. Tractor roads and trails are numerous, particularly in the east.

The south-central part and the southwestern corner may be reached from Normétal by good gravel roads.

All the range-lines and the township central line were cut and chained in 1965.

Topography and Drainage

The area is topographically similar to most of the "greenstone belts" of the Superior Province of the Canadian Shield. It is characterized by generally flat ground, sluggish streams, swamp, muskeg, and light and heavy forest. The terrain is somewhat more rugged in granitic areas.

The eastern part of the area, drained by Boivin river, is relatively flat and partly covered by swampy ground. The average elevation here is 950 feet above sealevel and outcrops are scarce. This is the most extensively farmed area, although several fields have been abandoned in recent years. Water-control channels to aid in land reclamation have been dug in the southeast.

In the central portion, west-to northwest-trending ridges overlook swampy or forested lowlands. The highest point, which is 1,325 feet above sealevel, is in the south of lot 38, range I. The western part of the area is characterized by the Abitibi Hills, which stand about 200 feet above the level of Poison and Altura lakes. This part is the most heavily wooded. A constant 1,100-foot summit level in the western part of the area suggest a former peneplane surface.

The drainage of the area is generally of low density and is typical of glacial terrain. Beaver dams in the west have formed several elongated lakes, which present traversing difficulties.

The two largest lakes are in range V. Both are shallow and muddy.

Rock Exposures

Bedrock constitutes approximately 8% of the area. The largest area of outcrops (mostly granitic rock) is in range IV just south of Pajégasque lake, but bedrock is also in the northwestern and western uplands.

Exposures of volcanic rock commonly are in long, low, and somewhat rounded ridges. Resistant mafic dikes stand clearly above their surroundings.

Outcrop observation was supplemented by diamond drill-hole information, and the examination of core still available in the field.

Glacial Geology

Surficial deposits are mainly clays of Glacial Lake Barlow-Ojibway, along with some apparently reworked sand and gravel of glacial origin. Observed striae trend N. 20° W. There are a few esker-like ridges in range II.

Natural Resources and Industry

The land is in part tillable and hay and some cereals are cultivated. Dairy farming is parcticed.

Logging is the most important industry, although it is done on a relatively small scale. Two or three local syndicates operate primarily during the winter season. Commercial timber stands were observed at three locations: just north of Poison lake, lots 1 to 20 in ranges I to II, and as isolated islands of trees in the western part of ranges III and IV.

The forested areas are composed mostly of a new growth of spruce, jackpine, poplar, birch, and the ever-present alder. Black spruce and tamarack occur around swamps and muskegs. Moss and Labrador tea are the main ground cover.

Sand and gravel in the south have been used for fill by the Normetal Mining Company but this exploitation has been abandonned because of inherently poor qualities.

Animals seen by party members were moose, black bear, rabbit, beaver, skunk, fox, and a variety of fowl, wolf, muskrat, and marten have been reported by residents.

Fifty or more summer cottages are located on the shores of Pajégasque lake, and are owned by residents of Normétal and other nearby towns.

Earlier Geological Work

The area was in part described by Mawdsley (1930) in his study of the Desmeloizes area, and is included in the Geological Survey of Canada Map 483-A by Flaherty (1936).

Ranges I and II, lots 32 to 61, were mapped by Tolman (1951) as part of a larger project.

The area to the south was mapped by Gilman in 1961. Lumbers (1963) mapped the adjacent section in Ontario.

Acknowledgements

Thanks are due to the assistants S.C. Greig, M.S. Kearns, and J.M. Robert, and the cook, R. Boisclair of Normétal.

Early in the field season, several members of E. Dimroth's field party joined the Perron group for 21/2 weeks.

J.I. Sharpe, resident geologist of the Quebec Department of Natural Resources, in Rouyn, advised the writer during the field season.

GENERAL GEOLOGY

The south half of Perron township lies in the west-central part of the largest belt of Archean metavolcanic-sedimentary rocks in the Superior Province. The formations in this band trend approximately east-west and are intruded by intermediate to silicic batholitic bodies.

A metavolcanic assemblage of lavas and pyroclastic rocks is exposed in the south- and north-central parts of the area. Mafic volcanic rocks are overlain to the south by dacites and rhyolites with felsic pyroclastic interbeds.

Metasedimentary rocks are generally restructed to narrow interbeds within the intermediate to mafic metavolcanic rocks, and to remnants in the Patten River pluton. Graywacke outcrops in the northwest corner of the area.

The volcanic and sedimentary rocks have been metamorphosed to the greenschist facies but approach the amphibolite facies near intrusive bodies. East of Altura lake, a zone of garnet amphibolite indicates a still higher grade of metamorphism.

Rhyolitic dikes and mafic stills intrude the volcanic rocks in the southern part of the area.

Large and small plutons of metagabbro intrude the volcanic rocks in several localities and a dioritic body is preserved as a roof pendant in the Patten River pluton west of Altura lake.

The Mistawak batholith is exposed in the east, and the Patten River pluton in the west of the area. The latter generally has a composition of quartz monzonite and the former, of granodiorite.

Relatively fresh diabase dikes cut all other rock types.

TABLE OF FORMATIONS

CENOZOIC	RECENT AND PLEISTOCENE		Swamp deposits, clay, sand, gravel, boulders
PRECAMBRIAN	LATE		Diabase dikes
	EARLY	Felsic intrusive rocks	Patten River pluton: quartz monzonite Mistawak batholith: granodiorite Rhyolite dikes
		Mafic intrusive rocks	Diorite Gabbro Epidiorite, metadiabase
		Sedimentary rocks	Quartzite, graywacke iron-formation, chert
		Pyroclastic rocks (agglomerate)	Coarse — and fine — grained tuff, lapilli tuff
		Effusive rocks	Rhyolite, dacite, andesite

VOLCANIC ROCKS

General Statement

Volcanic rocks underlie about 60% of the area. Although they are everywhere metamorphosed, a general classification into original types has been attempted. It is necessary to stress that this classification is wholly the result of field studies. Owing to metamorphism, many thin-sections show almost exclusively very fine grained alteration products whereby a distinction between the different types becomes nearly impossible. On the other hand, surface weathering and alterations tend to enhance the primary textural and compositional variations. Andesite, for instance, generally weathers dark gray-green and dacite brownish to greenish gray. The ofservation of fresh specimens tended to corroborate these field distinctions.

The mafic members are apparently more uniform in general composition than the felsic members, although textural variations are apparent. Flow types predominate.

The more felsic members contain abundant intercalated pyroclastic rocks. Because of greater compositional and textural variations, their correlation is more difficult. The flows apparently were not of great lateral extent, and several units "pinch out" or grade laterally within a short distance into other varieties.

Andesite generally grades into dacite, but the latter has sharp contacts with the silicic flow rocks and the pyroclastic rocks.

Andesite

An andesite formation borders the Mistawak batholith in the eastern part of the area and extends to where it is cut off by the Patten River pluton. Its thickness may exceed 8,000 feet in the north-central portion.

The andesite is dark gray, dark green, or rarely light brown on the weathered surface, and dark gray to green on the fresh surface. It ranges in texture from very fine grained near its flow boundaries to medium grained (0.5 to 2mm.) near the centers. Porphyroblastic amphibole (possibly an iron-rich hornblende), 2 to 3mm. in diameter, near the intrusive contacts, plagioclase (50%) and biotite (10%).

Locally augite (50%) and plagioclase (40%) predominate and the rock approaches a basalt in composition. Chlorite, biotite, amphibole, and epidote make up the remainder of the rock

In places, as in an outcrop in lot 51, range I, the andesite is so completely altered that percentage estimates are impossible. It appears to be composed of hornblende, chlorite, epidote, and biotite.

In lot 47, just to the south of range-line I-II, a muscovite-rich (35%) band occurs. Hastingsite-hornblende (45%) is the other major constituent. Carbonate veinlets are in part impregnated with graphite. Scapolite is an accessory mineral.

An amygdaloidal variety is weel exposed east of the quartz monzonite contact near Altura lake, where it is an important marker bed, and forms an

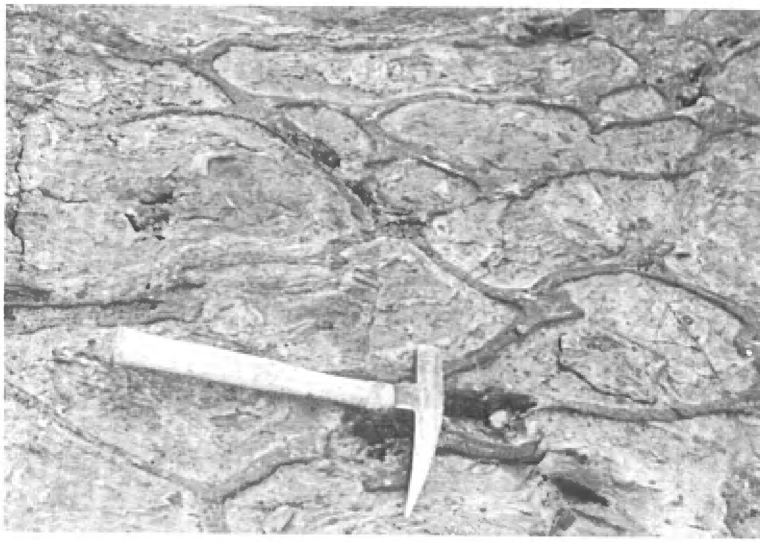


Plate I — Pillows in andesite.
Top towards the square end of the hammer.

Plate II — Edge of andesite flow enclosed in rhyolite.

800-foot-wide band which extends into lot 32, range IV. Its amygdules are filledwith crushed quartz grains or more rarely deformed homocrystalline plagioclase.

The andesite is locally pillowed, as in lots 20 to 35, range III, where tops to the south are indicated. In general these pillows are considerably deformed. One of the better exposures is shown on Plate I.

In lots 51 through 60, range I, the andesite contains numerous bleb-like inclusions of a greenish siliceous rock (composed essentially of very fine quartz grains), possibly the result of late segregation. This feature is also observed to a lesser extent northwest of Domène lake.

Narrow interbeds of iron-formation and sandstone are irregularly exposed throughout the andesite.

All exposures of andesite are schistose to varying degrees. The fact that the foliation bends around the porphyroblasts may indicate a pre-tectonic origin of these crystals. This is supported by the fact that many porphyroblasts are roken and elongated parallel to the direction of schistosity.

The andesite is everywhere metamorphosed to the greeschist facies except near Altura lake where, together with sedimentary rocks, it was converted into chlorite-garnet and amphibole-garnet schists. These rock types are distinguished on the map as unit MA on lots No. 27 to 29, between ranges IV and V.

Dacite

Dacite forms a prominent band both north and south of the silicic volcanic-pyroclastic sequence. It is also intimately intercalated with rhyolite units and, to a lesser extent, with the pyroclastic rocks. Its weathered surface is brown-gray to greenish gray and the fresh surface is gray to light green.

The dacite generally has gradational contacts with andesite but sharp boundaries with the silicic rocks. Although outcrops appear relatively homogeneous, drill core left in the field dispays more complexity. Various thicknesses of intermediate, mafic, and silicic volcanic rocks may alternate, with sharp or gradational contacts.

The northern band is distinguished by its clear quartz amygdules, which are 2 to 15mm. in diameter and make up about 40% of the rock. The quartz is accompanied by some chlorite and carbonate. The groundmass is a very fine-grained intimate mixture of plagioclase laths or microlites with variable amounts of biotite, chlorite, muscovite, carbonate, and accessory epidote. Nearly all exposures exhibit low to medium schistosity.

In the southern part of the area the rock has been moderately to highly schisted and more intensely altered. Quartz amygdules are less common and may contain some amphibole, partly altered to chlorite. Chlorite is the dominant constutuent mineral and is accompanied by plagioclase, carbonate, and accessory magnetite or more rarely hematite.

In lots 57 and 59, range II, the rock is a quartz-feldspar-mica schist. It is banded on a very fine scale with more quartz and feldspar in the lighter bands and a concentration of calcite and sericite in the darker areas. There is some elongation of minerals parallel to the primary foliation.

In lot 27, range I, a blasto-mylonite occurs in an area of more intense shear. It is composed of broken porphyroblastic quartz aggregates, in a groundmass of chlorite, quartz, and feldspar.

Most of the dacitic rocks appear to be flow products. However, narrow bands which are intimately associated with silicic pyroclastic rocks may be of pyroclastic origin.

Feldspathic lava - Some lavas are composed almost entirely of feldspar, with traces of chlorite and biotite. Feldspathic areas occur both within dacite and andesite units. The rock is light gray on the fresh surface and light green where weathered. Such feldspathic areas are local; they do not constitute definite horizons. They are indicated on the map by the appropriate symbol (VPf or VAf).

Both the normal dacite and the feldspathic rock exhibit in places good pillow structures 1 foot to 3 feet in diameter. Clear flow contacts are found in some places where the lava is vesicular.

Rhyolite

Rhyolite within the area commonly is exposed in long, low, narrow ridges it is easily distinguished by its light-colored weathered surface with shades of gray, pink, or white, and by its nearly uniform light gray fresh surface. A waxy luster is common.

This rock appears to be remarkably homogeneous. The bulk of the rhyolite is in the south-central part of the area, associated with felsic pyroclastic rocks. The rhyolite-pyroclastic unit is underlain and overlain by dacite.

Most exposures are highly schistose, but in places this is obscured by later silicification, yielding a massive fine-grained, almost aphanitic rock. Where the schistosity is intense, the rock breaks into large slabs.

Petrographically, the rhyolite may be termed a quartz sericite schist. Opalescent blue ovoids of quartz are plainly visible to the naked eye, in the northern exposures. Thinsections make it apparent that phenocrysts and amygdular aggregates composed mainly of quartz occur throughout most of the rhyolitic sequence. These range in size from slightly larger than the groundmass to 3 to 4 mm. in diameter and may make up 60% of the rock. Plagioclase and muscovite occur to a lesser extent in the aggregates. The groundmass is composed of intimately associated quartz, sericite, albite, biotite, and chlorite in variable amounts with, in some specimens, carbonate veinlets containing hematite, magnetite, and a few grains of phlogopite. Pyrite is sporadic.

A pink, more classic variety of rhyolite, containing primarily quartz, sericite, and potash feldspar occurs in the southern part of the rhyolitic band. It grades laterally into the light gray variety.

In lot 40, range I, a large bomb-like mass (Plate II) of andesitic composition is completely enfolded by rhyolite schist. The foliation in the rhyolite follows the outline of the andesite. This block may represent a two-dimensional expression of a tongue of andesite within the rhyolite sequence.

Locally, what appears to be a porphyroblastic muscovite-albite schist is developed. Carbonate, muscovite, albite, and traces of phlogopite make up the groundmass.

Small, highly deformed pillows are exposed in the southeastern part of the sequence, but other primary structures are generally lacking.

Pyroclastic Rocks

Pyroclastic rocks make up about one third of the central silicic unit. They trend N. 60° W.

Three types of pyroclastic rocks of similar composition were differentiated in the field on the basis of grain size. The most abundant type consists of ash deposits, some exposures of which show relict clastic textures. The second type, a coarser tuff which contains visible mineral fragments 1 to 3 mm. in diameter, covers relatively small areas. The third type is an agglomerate or lapilli tuff. Bombs 6 inches to 2 feet are widely scattered in a fine grained schistose matrix, the schistose material bending around them. The bulk of this rock-type, however, is composed of lapilli-size fragments in a similar matrix.

A differentially weathered light gray-white to light brown surface is diagnostic of the pyroclastic rocks. Nevertheless, they are difficult to distinguish from highly sheared rhyolite. In general, quartz is more abundant in the pyroclastic rocks than in the rhyolite.

It is possible that varying amounts of clastic sedimentary particles are intimately intermixed with the fine-grained pyroclastic material. With the uniform metamorphism, however, this is not discernable.

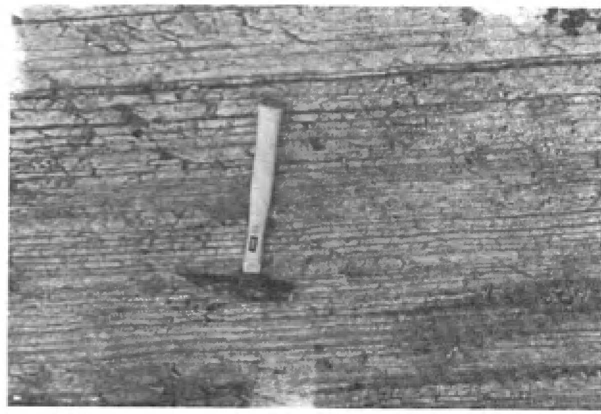
The ash unit is a pelitic quartz-sericite schist, containing varying amounts of biotite and feldspar.

Minor flow breccia and tuff of dacitic composition are interbedded with the dacite flows and to a lesser extent with the silicic pyroclastic rocks. Andesite tuff is found as 1- to 5- foot bands in lot 24, range III, and a 20- foot-wide band is exposed in lot 27, range I.

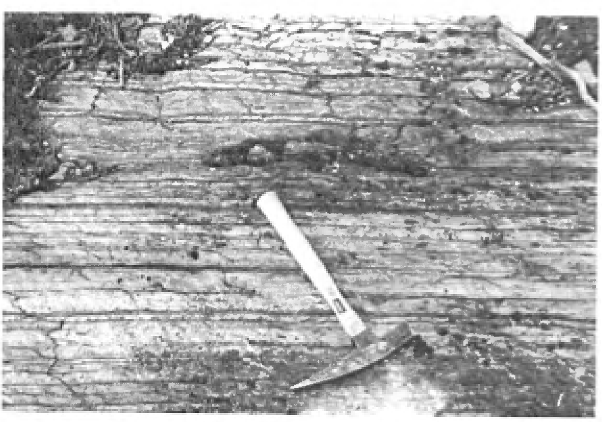
Exposures in lot 37, range I, on the south rangeline indicate increased shearing on rhyolitic and pyroclastic rocks and a gradational contact between the two types of rock. Plate III-B shows a more highly sheared tuff and the banding is less regular. More sericite is developed. Plate III-C indicates a sheared rhyolite, the darker bands being sericitic concentrations.

A banded fine-grained pyroclastic rock with large fragments is shown on Plate IV; the primary trend of the schistosity here is at a large angle to the banding and the secondary schistosity.

Plate III



A – Banded, weakly sheared tuff.



B – Banded, moderately sheared tuff.

C – Sheared metarhyolite. Photographs III-A, B, C are from the same outcrop. The rocks are gradational into one another.

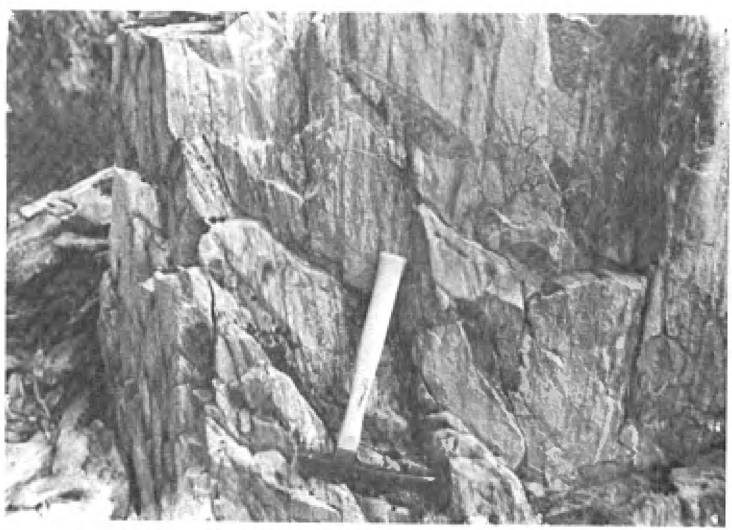


Plate IV – Banded fine-grained pyroclastic rock
with ejected fragment.

SEDIMENTARY ROCKS

Iron-formation and Chert

Magnetite iron-formation is widely distributed throughout the northern andesite unit and in the dacite to the south. In lot 27, rangeI, 1- to 5-foot bands of iron- formation are intimately interlayered with fine-grained clastic sedimentary rocks and dacite through a thickness of 60 feet. The northwest corner of the area contains the largest occurence. Narrow intersections of iron-formation were noted in water holes, drilled by the Department of Colonization and Agriculture, in the south of lot 53, range III, and on lot 60, range I.

The iron-formation is composed of 20 to 40% magnetite with finely interlayered granular quartz. It is easily distinguished by its brown weathering resulting from limonitic staining, In the andesite, a chlorite schist composed essentially of chlorite, with scattered magnetite crystals, is very commonly associated with the iron- formation. No occurence of economic potential was observed.

In lots 20 to 22, range II, a layer 70 feet wide of bedded chert is well exposed across five separate outcrops. It borders fine-grained pyroclastic rocks which are themselves cherty. Nevertheless, the contact is fairly distinct.

Clastic Sedimentary Rocks

Narrow bands of clastic sedimentary rocks are interbedded with the volcanic rocks of the area. The largest single continuous occurence is in lots 3 and 4, range V. The composition ranges from nearly pure white quartzite to altered graywacke. The clastic sedimentary rocks, which are easily recognized in the field, weather varying shades of light brown to white. The fresh surfaces are nearly identical in color to the weathered counterparts.

In the north-central andesite zone, the sedimentaries are composed of 40 to 60% granular quartz, 10 to 20% amphibole, with variable amounts of biotite, albitic plagioclase, and chlorite. The rock, which is poorly banded, appears in thin-section to be less metamorphosed than the enclosing andesites.

In the northwest corner of the area, the sedimentary rocks outcrop on a rounded hill. They are composed of amphibole and plagioclase, with lesser quartz and a trace of chlorite. Although they are weakly to moderately schistose, relict bedding is still observable. Grain-size gradations indicate that the tops are facing south.

The sedimentary rocks near the diorite in range V are impure quartzites. Well-aligned, thin flakes of biotite indicate the primary bedding.

Near Altura lake, some of the sedimentary rocks are metamorphosed to chlorite-garnet schist, chlorite being the major constituent. Quartz, epidote, and traces of magnetite are minor constituents. The chlorite is distinctly bent around the garnet, possibly indicating a pre-tectonic origin of the garnet. Inclusions of chlorite and quartz are found in some of the garnets. Away from these areas of higher metamorphism, are quartz-rich metagraywackes which grade in places into the garnet- bearing rocks. These are composed of quartz, biotite, albitic feldspar, with magnesium hornblende and sericite. In thin-section, the two cleavages are indicated by sericite flakes.

INTRUSIVE ROCKS

Epidiorite and Metadiabase

Strongly foliated mafic sills intrude the dacitic and rhyolitic lavas in lot 21, range II, and lots 18 and 27, range I. They weather gray-green but are pale brown on the fresh surface.

The mineral components are alkalic plagioclase, chlorite, amphibole, and a minor amount of biotite. A pale green alteration of the plagioclase is attributable to the development of epidote and some chlorite. The intrusions generally have sharp contacts and are concordant but locally they have cross-cutting relationships.

The rocks has apparently undergone considerable mineralogic change owing to metamorphism, and the term "epidiorite" as used here is not indicative of mineralogic composition.

The two metadiabase sills which outcrop in lots 25 to 27, range I, are dark green and brown weathering, and composed of saussuritized plagioclase and pyroxene. The sills are foliated parallel to the regional trend.

Gabbro

There are two areas of gabbroic intrusion with similar composition and texture. The larger is in lots 55 to 59, ranges II and III. The outline of the northern part of this intrusion is based on aeromagnetic interpretation. The gabbro is commonly dark green on both fresh and weathered surfaces, but, where feldspar is the major constituent, the fresh surface is light green. As observed in thin-section, the rock is composed of plagioclase, amphibole, some biotite, and accessory magnetite. The amphibole is an iron-rich hornblende with a porphyroblastic appearance.

The rocks ranges from fine to coarse grained varieties, the latter being more clearly foliated. Tolman (1951) suggests that the textural and compositional similarity of these rocks to the andesites, as well as their alteration, may indicate a common magmatic source. Small lamprophyre dikes, possibly genetically related to the gabbro in this area, cut the andesite.

Northeast and east of Altura lake, small irregularly shaped bodies and dikes of coarse-grained, apparently porphyroblastic gabbro intrude the andesite-sedimentary sequence. The aeromagnetic maps show anomalies which suggest the presence here of two large, rounded plutonic bodies. These intrusions were possibly the cause of the garnet-amphibole metamorphism of the country rock. Certainly the garnet content in the metasedimentary bands increases toward the zone of gabbroic intrusions.

Diorite

A large, quartz-dioritic, roof pendant within the Patten River pluton outcrops in lots 13 to 15, range V. It has a medium-grained (2-6mm.) and a coarse-grained (5-15 mm.) facies, the medium-grained facies being more abundant. Contacts between the two are distinct, the coarse facies occuring as stringers, dikes, and small irregularly shaped masses. The medium-grained rock is dark gray; the coarse-grained variety is light gray to buff. Both weather to medium gray.

The diorite is composed of hornblende (50%), plagioclase (40%), and quartz (8%), with some epidote and traces of magnetite. Much of the plagioclase (An10-20) is partly altered to chlorite and sericite. The epidote has a small zoisite center and a clinozoisite outer rim. Traces of pyrite and chalcopyrite occur locally.

Widespread jointing in a variety of directions is characteristic of this rock. Coarse-grained light gray monzonite dikes 2-10 feet wide intrude the diorite. Small xenoliths of andesite occur within the pendant.

Mistawak Batholith

Rocks of the Mistawak batholith occupy much of the east and northeast parts of the area. The typical rock is a medium-to coarse-grained granodiorite. Other varieties include a fine-to medium-grained biotite granodiorite, ubiquitous dikes of white and pink aplite, one pegmatite dike, and, in lot 48 of range V, a coarse-grained muscovite granodiorite.

The major unit is gray to light gray whether fresh or weathered. The mineralogical composition of a sample from range II, as determined by Rosiwal analysis, is given in Table I. Farther north, the quartz content is somewhat lower, and the sericite, and apatite are rare. The plagioclase is saussuritized, particularly near the contact with diabase dikes. Epidote is the most common alteration product. Quartz is commonly pale blue and opalescent; unlike that of the rhyolite it is euhedral. Pyrite, as small euhedral crystals in quantities everywhere less than 1% of the rock, is a common accessory. Modal analyses of rocks of the Mistawak batholith, as reported by Lumbers (1953) in the adjacent area in Ontario, show a similar composition but a greater content of potash feldspar.

Near its contact with andesite the granodiorite is amphibolitized and the quartz is less abundant than in the normal rock. Near Pajégasque lake, the contact is marked by intimate interfingering. The edge of the batholith over a width of 100 feet contains xenoliths of highly altered andesite. These generally are small (average diameter about 1 foot) and angular. Intrusive breccias occur locally and an isolated patch of migmatite outcrops in lot 52, range V.

The fine- to medium-grained biotite granodiorite has a composition similar to that of the normal granodiorite but contains 10% or more biotite. In most occurences it has gradational contacts with the medium-to coarse-grained variety. It may be of the same relative age. A few dikes, representing later fractures, cut the normal granodiorite but are too small to be mapped.

Aplite intrude the granodiorite, andesite, and gabbro, but rarely extend more than 100 feet away from the granodiorite mass.

The only observed pegmatite outcrop covers about 25 square feet in lot 43, range IV. The pegmatite is composed of alkali feldspar with an average grain size of 2 cm. and smaller interstitial quartz.

The muscovite granodiorite occurence shows about 15% coarse (5-8mm.) muscovite plates and booklets.

The granodiorite is generally foliated but the foliation is less apparent in the more leucocratic varieties. It is exhibited by an aligment of the biotite. Much of the jointing parallels this foliation.

Patten River Pluton

The bulk of the Patten River pluton is in the west part of the map-area. Two facies of the pluton outcrop here: a massive, homogeneous, medium- to coarse-grained variety in the central part, and a more leucocratic variety bordering the intrusion in the south.

According to Lumbers (1963), in the adjacent area in Ontario the rock has the composition of a granodiorite. In Perron township, however, potash feldspar appears to make up 15 to 20 % of the composition, and quartz, plagioclase, and biotite are the major components of what is teemed a quartz monzonite. The plagioclase is zoned and is littered with specks of sericite. This feldspar is generally the largest mineral and locally gives the rock a porphyritic appearance.

The potash feldspar content appears to increase towards the borders of the pluton as the amount of biotite decreases. The only observed area of foliation is in the southwest part of the intrusion, in a coarse-grained facies. Thus, the moderately to intensely foliated border adjacent to the surrounding metavolcanic rocks reported by Lumbers (1963) is not general in the present area.

The contact with the metavolcanic rocks, regardless of their composition,is sharp. Little or no alteration is apparent. Unlike the Mistawak batholith, the Patten River pluton, contains very few xenoliths near its border. Whether or not this is due to complete assimilation of the volcanic xenoliths is uncertain. The quartz monzonite near its contact with andesite is locally quite leucocratic, showing no evidence of mafic assimilation. The andesite is itself less altered than at its contact with the Mistawak batholith.

The quartz monzonite is slightly amphibolitized near the diorite. Otherwise, the rock is weakly altered. Biotite is locally altered to chlorite and the plagioclase is partly epidotized throughout. In places epidote is conspicuous, and it may represent a primary constituent.

Aplite dikes are common near the edge of the body and intrude the andesite. Monzonite migmatite is present in pyroclastic rocks south of the contact in lot 9, range III.

Quartz Veins

Quartz veins are particularly abundant and widespread in rocks of the Mistawak batholith, but somewhat less so in the Patten River pluton and the volcanic sequence. In general, most veins are no more than 2 feet wide, and average about 8 inches. Numerous white, unmineralized quartz veins occupy a large area in lot 42, range IV.

Rhyolitic Dikes

Northeast-southwest-trending dikes of rhyolitic composition intrude (with sharp contacts) andesite and feldspathic volcanic rocks in lot 36, range II. They are fine grained and massive and no signs of alteration are found at the contacts (Plate V).

Porphyry Dike

A nodular dike (Plate VI) with a fine-grained, schistose matrix outcrops in lot 49, range III. About 70% of the dike is composed of highly altered, egg-shaped nodules, composed of 45% plagioclase, 55% chlorite, and very minor calcite. The nodules appear to be composed of corroded or deformed homocrystalline plagioclase crystals with a pseudoperthitic texture caused by the array of chlorite. The andesitic composition of the groundmass suggests a common origin with the andesite which the dike rock cuts sharply.

Plate V — Rhyolitic dyke (light color) in contact with andesite.

Diabase Dikes

Diabase dikes with two prominent trends, north-south and northeast-southwest, traverse the area throughout. Outcrops are generally rounded ridges standing 25 to 40 feet above the surrounding terrain.

Four types of dikes were observed: normal diabase, quartz diabase, olivine diabase, and epidote diabase.

All the diabase dikes weather brown to light brown and have greenish gray fresh surfaces. The larger ones are characterized by chilled margins with medium-grained central parts (2-7 mm.) The small dikes are fine grained throughout. The northeast-trending dikes may be younger, but the evidence is not conclusive.

The northeast-southwest-trending dikes are the most magnetic, and the largest ones are, therefore, easily traced from the aeromagnetic maps

The composition of the normal diabase is approximately as follows: 35% orthopyroxene (enstatite?), 30% augite, 35% plagioclase, and in some specimens 3 to 5% magnetite. Accessory minerals or minor alteration products are apatite and sphene. The texture is typically diabasic.

A quartz diabase dike (Abana Dike of the Normetal Mine area) outcrops near lot-line 45-46, range I. Only traces of quartz were observed in the field. Rocks of similar composition with north-south trends outcrop in the western half of the area. A Rosiwal analysis is given in Table I. From palaeomagnetic studies, Strangway (1964) reports an age of 1.95 billion years for the Avana dike.

Only one dike of olivine diabase was mapped. It trends east and is 125 feet wide (lots 43 to 45, range I) (see Table I).

Light gray siliceous material (Plate VII) cuts the 200 - to 300-foot diabase dike at two locations in ranges I an II.

Table I — Rosiwal Analyses

	A	B	C	D
Quartz	38.3	------	2.2	------
Plagioclase	40.8	51.6	55.1	68.7
K-feldspar	12.7	------	------	------
Biotite	8.3	trace	trace	trace
Hornblende	------	7.5	trace	------
Augite	------	38.6	39.1	18.0
Olivine	------	------	------	10.2
Magnetite	------	2.3	3.6	3.1
Apatite	------	trace	------	trace

A— Sample from Mistawak batholith (after Tolman, 1951); 75 feet south of range-line I-II, lots 43

B— Large diabase dike, range II

C— Quartz diabase (Abana dike) — Normetal Mine

D— Olivine diabase, large east-west dike, east half, range I.

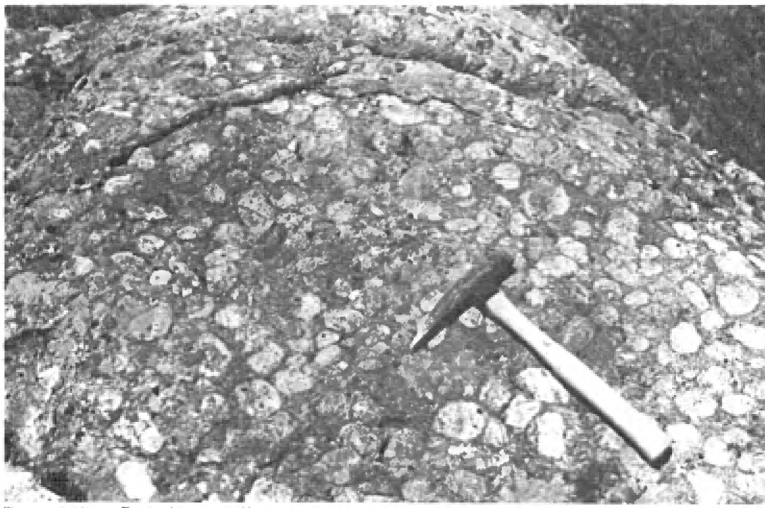


Plate VI — Porphyry dike rock.

Plate VII — Light gray siliceous material in diabase.

STRUCTURAL GEOLOGY

All the volcanic and sedimentary rocks are more or less schistose. They generally exhibit at least two cleavages, which are generally within 30° of the observed bedding.

Determinations based on pillow structures vesicular flow contact, and (rarely) graded bedding indicate that the tops face south. This corresponds with determinations in adjacent areas. Locally, vertical isoclinal folding is apparent.

The upper volcanic rocks in the southern part of the area trend N.65°W. throughout and dip vertically or steeply to the north. Underlying flows form a large basin-like structure concave to the north, which could be partly topographical and partly tectonic in nature.

The silica content in the pyroclastic units increases towards the south, whereas the phenocryst content is apparently greater to the north. The work by Lipman et al. (1966) indicates that a silica increase with a corresponding phenocryst decrease is a normal trend toward the bottom of an ash flow unit. Thus, either this trend is not valid in the area, or the pyroclastic unit or possibly the flows face north.The very few possible south-facing top determinations in the area may have been taken on the south limbs of isoclinal folds. If so, the structure is in fact a paleo-topographic high, perhaps representing a volcanic center. Not enough information is available, however, to prove or disprove this hypothesis.

It appears that the pyroclastic rocks are isoclinally folded and then refolded into a N.30° E. to N.70°E. trend. Schistosity, which might be a result of the cross-folding, is stronger in the volcanic rocks north of Poison lake. The other plane of schistosity, where visible in these rocks, parallels the N. 65° W. to east-west trend of the major cleavage in the upper flows.

The foliation trend in the andesites adjacent to the Mistawak batholith is generally the same as the foliation in that pluton. The andesites show a primary cleavage trend approximately northwest-southeast, just to the west of the Mistawak batholith but nearly north-south next to the Patten River pluton. A vertical band of amygdaloidal andesite about 800 feet wide trends approximately parallel to the northwest-southeast trend. Assuming that it represents primary layering, the present north-south foliation within the band is possibly the result of movement during the emplacement of the Patten River pluton and later cross-folding.

Two parallel transverse faults strike N.20°W. across the western half of the area. The observed horizontal left-hand displacement on the northeast-striking diabase dike is 500 feet. A north-south-trending diabase dike apparently disappears against the westernmost fault.

A fault trending N.55°W., possibility a thrust, crosses the southern part of lots 8 to 11, range II. It is assumed from a change in lithology, in the trend of schistosity, and, most conclusively, from the drill hole records. The core is reported to be increasingly sheared and broken toward the fault, where some could not be recovered. South of this fault, a N.45°E.-trending fautlt is assumed from the change in lithology and cleavage directions.

There is little doubt that other faults were not observed. Certainly, the presence of mylonite in the north part of lot 19, range I, is evidence of movement parallel to the prevailing N.65°W. trend.

ECONOMIC GEOLOGY

Exploration within the map-area began with the discovery of the Normetal orebody in 1925, but since then no other deposits of significance have been found.

Pyrite is the principal metallic mineral. It occurs as stringers or narrow lenses in the volcanic and pyroclastic rocks. Although widespread, no large concentrations were noted. A typical occurence in deformed andesite pillows is shown on Plate VIII. Pyrite and, more rarely, traces of chalcopyrite are disseminated in the granitic rocks.

Many samples containing pyrite were submitted for assay by the writer but only minimal values in gold and base metals were reported. Pyrrhotite, commonly associated with pyrite, forms very thin, conformable veins in the volcanic units but is not widespread.

Iron-formation is present but nowhere in commercial quantities.

Plate VIII — Pyrite bleds rimming deformed andesitic pillows.

Areas of Observed Mineralization

1— Northeast corner of lot 47, range I: three trenches in highly schistose andesite contain lenses of a maximum size of 1 foot by 4 inches of massive pyrite with some pyrrhotite. A 3-foot sill of amphibolite is parallel to the sulphide zone from which minimal gold is reported.

2— North half, lot 52, range I: small (1-3inches) lenses of pyrite with traces of chalcopyrite and pyrrhotite are found in andesite adjacent to a diabase dike.

3— Lot 38, range II: immediately north of the range-line, mineralization of pyrite and pyrrhotite was noted in an 80-foot band of pyroclastic rock adjacent to the large northeast-trending diabase dike. The minerals are disseminated in a siliceous fine-grained tuff.

4— Lot 45, range IV: one sample from a pyritiferous quartz vein in granodiorite assayed 0.001 ounce of gold per ton. Similar quartz veins in the granitic rocks of the Mistawak batholith were not assayed.

5— Center of lot 28, range V: a shaft 48 feet deep and several trenches were excavated on the former property of Altura Mines Ltd., about 1928. More recently Norcopper and Metals Corporation drilled a few holes here. Pyrite, pyrrhotite, and chalcopyrite with some sphalerite were encountered in a garnetiferous andetite with interlayered quartzites. Samples taken by the writer assayed 0.03% copper (Ref.: P.R. 390, p.67.)

6— Lot 20-21 boundary, range III: just north of the rangeline, massive pyrite mineralization was observed in a rhyolite flow. Two trenches have been dug within 50 feet of the north-south diabase dike. Traces of copper and gold were determined in an assay submitted by the writer.

7— South half, lot 16, range IV: (3-6 inches) pyrite and pyrrhotite lenses were observed in a large andesite xenolith in the patten River pluton. Assays gave traces of gold, copper, and zinc.

8— Lot 47, range V: a drill hole on the shore of Pajégasque lake (Que. Dept. of Agriculture and Colonization) encountered 2 feet of pyrrhotite and chalcopyrite mineralization at a depth of 80 feet in the altered andesite. Reports of the assay for the 2 feet were 0.13% Cu, 0.01% Ni, and a trace of gold.

9— Lots 3 to 4, range V: pyrite and pyrrhotite lenses are associated with the iron-formation in the graywacke outcrops.

Description of Mining Properties

Beaupré Base Metals

(Radnor, Harrison Claims, Bellevue Gold Mines Ltd. and Donmaque Gold Mine Ltd.) Ref.: Que. Bur. Mines, Summary Rept. Part C. 1928; Q.D.M.P.R. 330. p. 73

The Perron property of Beaupré Base Metals included, at the time of mapping, the south half of lots 8 to 10, range III, the north half of lots 8 to 12, and 15 and 16, range II, and lots 17 and 18, range II.

The area is underlain by feldspathic lavas, felsic pyroclastic rocks, and some granite to the north.

Nearly 15,000 feet of diamond-drilling was done in the early 1950's on this property and on adjoining ground formerly held by Beaupré Base Metals. Most holes in the siliceous tuffaceous units cut pyrite mineralization. A sphalerite chalcopyrite occurence with values in zinc, copper and silver is reported in the north part of lot 9, range II.

The property of Beaupré Base Metals was optioned for one year by Mining Corp. in 1955. Since that time no work has been reported. The ground has been dropped and in 1967 was in part held by New Metalore Mining Co. Ltd.

New Metalore Mining Co. Ltd.

(Arnoth Prospecting Syndicate, Metalore Mining Co.)

Ref.: Q.B.M. Min. Oper. 1928, pp. 108-9;
Q.D.M. Min. Ind. 1943, p. 91; 1944, p. 61; P.R. 374, p. 12.

The New Metalore Mining Co. has holdings in Desmeloizes township and in ranges I and II of Perron Township. The Perron sector of the property includes the south half of lots 8 to 16 of range II, lots 21 to 31 of range II, the north half of lot 25 of range I, lots 26 to 30 of range I, the south half of lots 38 to 42 of range I, and the north half of lot 40 of range I.

Since 1942, Melatore and New Metalore have completed 36,000 feet of diamond drilling in areas underlain by felsic pyroclastic rocks, rhyolite, and some dacite. A north-south diabase dike traverses the property in lot 21, range II. Traces of copper associated with pyrite occur in several of the drill cores. On the whole, results have been inconclusive.

Normetal Mining Corp.

The Normetal Mining Corp. holds lots 31 to 37, range I, the north half of lots 38 to 40, range I, the south half of lots 42 to 54, range II, the north half of lot 41, range I, and lots 42 to 61, range I. Since mapping, the company has acquired some more ground.

A 14-inch-long lens of pyrite lies in the agglomerate in lot 35, range I. Smaller lenses and stringers of pyrite are widespread on this outcrop.

Geophysical work and geological mapping on the eastern property were followed in 1967 by the drilling of eight holes.

GEOCHEMISTRY

Samples of stream sediments were taken during some of the geologic mapping. They were analysed for copper, zinc, lead, molybdenum, and uranium. The values which appear on the preliminary map (Bogoh, 1967) do not indicate significant anomalies.

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