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WETENAGAMI RIVER AREA, RALLEAU, EFFIAT AND CARPIQUET TOWNSHIPS

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PROVINCE OF QUEBEC, CANADA

Department of Mines

Honourable Jonathan ROBINSON, Minister

A.-O. DUFRESNE, Deputy Minister

DIVISION OF GEOLOGICAL SURVEYS

I. W. JONES, *Chief*

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GEOLOGICAL REPORT 28

**WETETNAGAMI RIVER AREA**

**RALLEAU, EFFIAT, AND CARPIQUET TOWNSHIPS**

**COUNTY OF ABITIBI EAST**

by

H. W. Fairbairn.



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1946

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RALLEAU, EFFIAT, AND CARPIQUET TOWNSHIPS

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## WETETNAGAMI RIVER AREA

### RALLEAU, EFFIAT, AND CARPIQUET TOWNSHIPS

#### COUNTY OF ABITIBI EAST

by H.W. Fairbairn

#### INTRODUCTION

##### Location and General Statement

The Wetetnagami River area is about seventy miles northeast of Senneterre, one of the principal towns on the Canadian National Railway line serving the Western Quebec mining region. The area mapped and described in the present report extends from 49°00' to 49°10' north latitude, and westward for twenty-seven miles, from 75°50' to 76°25' west longitude. It comprises, from west to east, the three townships, Ralleau, Effiat, and Carpiquet, of which only the northern and southern boundaries have as yet been surveyed<sup>x</sup>.

One of the main purposes of the investigation was to establish the continuity of a belt of volcanic rocks already mapped to the west by Longley (1) and to the east by Milner (2). Although no prospecting has been done in the Wetetnagami River area, there has been intermittent search for mineral deposits in these adjoining districts. The mapping of the intervening section of the volcanic belt will be helpful in the event of possible future prospecting in this general area.

A preliminary report, accompanied by a map at a scale of two miles to one inch and giving the main results of this investigation, was published in December, 1940. It bore the same title as the present report and appeared as Preliminary Report No.151 of the Quebec Department of Mines.

##### Means of Access

The area is not readily accessible except by air. The best canoe and overland route starts from Rouleau siding, on the Canadian National railway sixty miles east of Senneterre. It follows the Kekek, Mégiscane, and St-Cyr rivers northward to Barry lake and from there continues westward over a mile and a quarter portage to lac aux Loutres. From the head of a finger-like bay at the northern end of this lake, a portage little more than 200 yards long leads westward to

<sup>x</sup> At the time the investigation described in this report was made, the southern boundary of the map-area formed the boundary between Abitibi territory, to the north, and Abitibi county, to the south. Subsequently, in 1944, Abitibi county was divided into the counties of Abitibi East and Abitibi West, and the boundary between Abitibi East and Abitibi territory now lies about ninety miles north of this map-area.

(1) (2) Numbers within brackets refer to bibliography at end of report.

the headwaters of Panache river, from which all parts of the Wetetnagami River area may be reached. By this route, the distance from Rouleau siding to Panache river is well over 100 miles, and, under average conditions, the journey takes nearly a week.

From the west, the map-area may be approached from Senneterre via Bell river and Kamshigama lake. Eastward from this lake, canoe travel is difficult. The route follows Wilson river and Wilson lake, which is just west of the area, and then turns eastward along a passable creek which enters O'Sullivan river near the northwest corner of the map-area. This route was not explored by the writer and, according to Longley (1), it has little to recommend it. The total distance from Senneterre is about the same as for the Barry Lake route, but progress would be considerably slower.

Travel within the area is moderately difficult. Panache, Wetetnagami, Périgny, and O'Sullivan rivers are the main waterways. There are a number of small lakes within the area, but access to many of these is possible only by portaging or by travel on small, tortuous creeks. The north line of the townships was surveyed during the summer of 1940 and it is still useful for east-west travel. The south line was surveyed a number of years ago and is no longer easy to follow. In 1935, a hurricane which swept the southern part of the area totally destroyed an east-west strip of forest averaging about one mile in width. Travel in this belt is extremely slow and difficult.

#### Field-work and Acknowledgments

The field-work on which this report is based was carried out in 1940. Pace-and-compass traverses, spaced about half a mile apart, were made over the entire area, and canoes were used in examining the geology along the shores of lakes and streams. These surveys were transferred to a base-map at a scale of half a mile to one inch, compiled by the Department of Mines at Quebec from a map supplied by the Bureau of Topography and Geology, Ottawa, and from stream and line surveys of the Department of Lands and Forests, Quebec. Aerial photographs, taken for the Royal Canadian Air Force, were used to advantage in the field-work, during which, in places, some details were added and minor adjustments made to the map.

The writer is indebted to R.B. Graham, chief assistant, for efficient co-operation in the preparation of the map and in the examination of thin sections of the rocks. Alan Watson, Charles Dumas, and Elmer Villeneuve, other members of the party, performed their duties in a highly satisfactory manner. Dominion Skyways, Limited, through its Senneterre office, co-operated in many ways in addition to transporting camp equipment, provisions, and mail.

#### Topography and Drainage

The region has little relief. Extensive glacial deposits control the topography and direct the drainage. The principal waterways, excepting one long stretch of Panache river, trend approximately north-south and intersect the bed-rock trend at about 90°. The map illustrates this feature very clearly. Low, rounded hills are fairly common but rarely

attain a height of 200 feet above the surrounding country. A few esker-like ridges were noted.

Lakes and streams abound but none of them are large and in practically all of them the water is murky and has a brownish colour. The three principal water routes within the area follow the Panache and Wetetnagami rivers, Périgny river, and O'Sullivan river. These rivers are moderately easy to navigate. East-west travel from one to the other is more difficult, however, due to the inadequacy of the connecting waterways. Many of these are tortuous creeks whose navigability depends entirely on the rainfall.

Swamps and muskegs are common, even in dry seasons. They are evidence of the poor drainage characteristic of many parts of northwestern Quebec.

#### Timber, Game, and Fish

The map-area is almost everywhere heavily forested. Spruce is the commonest tree, with jack pine, balsam, tamarack, poplar, and birch in lesser abundance. Much of the timber is of commercial size. Bush fires within the area have been relatively small and infrequent in recent years and the dense forest cover hinders geological work.

Pike and pickerel are the only common fish. The abundance of the former, coupled with the shallowness of the lakes and the nature of the water, makes conditions unfavourable for trout.

Moose are abundant everywhere and the area, if closer to main transportation routes, would undoubtedly be attractive to sportsmen. Bear and other smaller animals were seen less often, but from evidence left behind by trappers there is reason to believe that fur-bearing animals are not scarce.

#### Previous Work

The Wetetnagami River area is off the main travel routes and is therefore seldom referred to in early geological reports. The first account of geological exploration is in Robert Bell's report for 1896 (3). His assistant, R.W. Brock, travelled north through Wetetnagami lake (just south of the map-area) and O'Sullivan river to Waswanipi lake, about twenty miles north of the map-area. He followed the same route travelled in 1894 by the surveyor H. O'Sullivan after whom, presumably, O'Sullivan river is named. Apparently, Brock surveyed Wetetnagami river as well and established that it flowed into Waswanipi river.

In 1916, Cooke (personal communication) travelled north on the Wetetnagami en route to Opawika and other lakes to the northeast. This reconnaissance is shown on the Nottaway eight-mile sheet which he later compiled (4).

In 1936, Sproule (5,6) included most of the Wetetnagami River area in a reconnaissance survey of a large region to the north and west. In the same year, Longley (1) mapped the Grevet (Kamshigama Lake) area already referred to. In 1939, Milner (2) completed the Barry Lake area to the east. The gap between Longley's and Milner's maps is the subject of the present report.

GENERAL GEOLOGY

All the consolidated rocks of the area are of Precambrian age. Classified as to type and age relationship they are as follows:

Table of Formations

Pleistocene and Recent		Gravel, boulders, sand, silt, clay
Major unconformity		
Precambrian	Post-Keewatin(?)	Diabase dykes
		Intrusive contact
	Keewatin(?)	Quartz diorite, diorite, granodiorite Unclassified granitic rocks Pegmatite and feldspar porphyry dykes
		Intrusive contact
Keewatin(?)	Gabbro and meta-gabbro	
	Intrusive contact	
	Tuff, greywacke, breccia Andesite, meta-andesite (hornblende schist), agglomerate, ellipsoidal lavas	

Keewatin(?)

Under this heading are grouped most of the dark-coloured rocks of the area. Of the type commonly termed 'greenstones', they form an east-west belt, two and a half to six and a half miles wide, extending through the centres of the townships, and are older than the light-coloured granitic rocks which bound them on the north and south. The rocks are predominantly of volcanic origin, for the most part representing andesitic flows with which, locally, there are associated beds of tuff. Some gabbroic rocks of intrusive origin are also classified with this series; they occupy few and limited areas. All the rocks are typically schistose. Hornblende is the most conspicuous mineral in hand specimens. Despite considerable metamorphism, the origin of the various types is seldom in doubt.

Because of their resemblance lithologically and in mode of occurrence to rocks which, elsewhere in the Canadian shield, are classified as Keewatin, the rocks of this belt are believed to be of that age, but in view of the uncertainty in long-range correlation of rocks of this type they may best, for present purposes, be referred to as rocks of Keewatin type.

#### Andesite and Meta-andesite

There are few rocks in the lava belt fresh enough to be classified as andesite. Only four such occurrences were noted in the area: (1) nearly four miles south and half a mile west of the northeast corner of Effiat township; (2) close to the northern volcanic contact a mile and a half east of Périgny river; (3) a quarter of a mile west of the north end of Périgny lake; and (4) on O'Sullivan river, at the northern margin of the belt.

Hand specimens are fine-grained, dark to greenish-grey, and show an intimate intergrowth of feldspar and hornblende crystals. A thin section of one of the freshest specimens shows (in per cent): hornblende, 60; plagioclase, 30; clinzoisite, 5; and quartz, carbonate, magnetite, chlorite, and pyrite, 5. The hornblende prisms average about 0.13 mm. in length and show partial alteration to chlorite. The plagioclase is andesine of composition  $Ab_{56}An_{44}$  and occurs in well developed laths ranging between 0.12 mm. and 0.30 mm., and averaging 0.24 mm., in length. It is partially altered to small grains of clinzoisite. There is a small amount of untwinned plagioclase. The quartz is interstitial and may have been introduced.

Most of the meta-andesite may be described as hornblende schist. This schist presents abundant evidence, both textural and mineralogical, of its origin as a lava of andesitic composition. Amygdaloidal, agglomeratic, and ellipsoidal structures are common. Epidote, carbonates, and quartz were among the minerals identified in the field as filling the amygdules, which average less than half an inch in diameter. Ellipsoidal structures have not been mapped as separate units because of their discontinuous distribution. Three localities where they are well exposed are: (1) nearly four miles south and one and a quarter miles west of the northeast corner of Effiat township; (2) about 16,800 feet south and 12,700 feet west of the northeast corner of Effiat township; (3) about 2,000 feet south of the northern margin of the belt, at a point about 3,000 feet west of Wetetnagami river, in Effiat township. The pillows are elongate parallel to the strike of the schists and vary in length from one to three feet. Tops and bottoms of flows could not be certainly determined from the ellipsoids.

Schistosity is well developed in the meta-andesite and strikes east-west, parallel to the trend of the belt. In places, there is a tendency for the hornblende prisms and other minerals of the rock to lie in parallel orientation on the planes of schistosity. The rocks are dark greenish-grey to grey and are generally even-grained; in places, however, they are porphyritic, with small feldspar phenocrysts.

For petrographic description, the meta-andesites may be sub-divided into three groups or types, based on the amount of hornblende present:

- (1) More than 60 per cent hornblende
- (2) Between 40 per cent and 60 per cent hornblende
- (3) Less than 40 per cent hornblende

Type 1.—The typical rock is dark greenish-grey and contains 65 per cent hornblende in prisms varying in length between 0.5 and 1.0 mm. The hornblende is partly replaced by carbonate. Patchy, discontinuous layers of plagioclase grains make up about 25 per cent of the rock. The layers average 0.25 mm. in width and, in addition to twinned andesine, they contain grains of untwinned, recrystallized oligoclase. The andesine is in part replaced by carbonate, which forms about 5 per cent of the rock as a whole. Interstitial quartz and chlorite make up the remaining 5 per cent. Two localities where these hornblende-rich schists may be seen are: (1) about 4,200 feet east of the west edge of the map-area, at a point about 11,200 feet south of the northern boundary; and (2) half a mile south of the large gabbro body in the western part of Carpiquet township.

Type 2.—The meta-andesites of type 2 are lighter grey-green than those of type 1. They are uniformly fine-grained and schistose, and show an inconspicuous porphyritic texture, with plagioclase phenocrysts usually not exceeding one-sixteenth of an inch in diameter. A typical locality is one and a half miles east of O'Sullivan river, close to the northern margin of the belt. A thin section from this exposure shows mineral proportions as follows (in per cent): hornblende, 45; plagioclase, 25; biotite, 15; quartz, 10; and epidote-clinozoisite, titanite, chlorite, and leucoxene, 5. One completely altered phenocryst, presumably of original plagioclase, consists of an aggregate of epidote and clinozoisite; and the section contains a few nests of minute quartz crystals. The groundmass consists principally of oligoclase, hornblende, biotite, and quartz in grains averaging about 0.06 mm. Hornblende prisms are arranged in sub-parallel position and are replaced in part by biotite.

Type 3.—The low-hornblende meta-andesites are lighter in colour than those of types 1 and 2 and are less widely distributed. Schistosity is well developed and the texture is fine and generally even. The typical rock is exposed a few hundred yards east of the locality noted above for group 2. A thin section was found to contain (in per cent): plagioclase, 35; quartz, 25; hornblende, 20; biotite, 10; and chlorite, sericite, magnetite, apatite, and epidote-clinozoisite, 10. The plagioclase is andesine, considerably altered to sericite, the grains averaging 0.25 mm. in diameter. The quartz grains are much smaller, averaging 0.1 mm. The hornblende is in prisms up to 0.85 mm. in length which are mostly arranged in parallel position. It is partly replaced by biotite, some of which, in turn, is altered to chlorite.

Agglomerate.—The agglomerate is discontinuous in occurrence and is not mapped as a separate unit. A few typical localities are as follows: (1) one mile northwest of the north end of Périgny lake; (2) in the northwest corner of Ralleau township, close to the northern margin of the belt; and (3) 3,000 feet west of Wetetnagami river, at a point 2,000 feet south of the northern margin of the belt. The fragments are rounded to sub-angular and are not as a rule more than three inches in diameter. Pale green and grey colours predominate.

The matrix may in general be classified on the basis of hornblende content and is not substantially different from the non-agglomeratic hornblende schist. However, there is a compositional difference between the fragments and the matrix which merits special mention. The plagioclase of the matrix is oligoclase or andesine, corresponding to that of the normal meta-andesite. The plagioclase of the fragments, on the other hand, is labradorite, accompanied by the usual secondary minerals, such as clinozoisite, sericite, and carbonate. The reason for this difference in composition of the plagioclase is not known.

The three types of meta-andesite do not follow a regular pattern of distribution within the 'greenstone' belt and they are not shown separately on the accompanying map. All that can be said is that the hornblende-rich type appears to be more abundant than the hornblende-poor type.

#### Tuff, Greywacke, and Breccia

Tuff, greywacke, and breccia (chiefly agglomerate) are exposed along a belt half a mile wide in Ralleau township, extending eastward for four and a half miles from the north end of lac Novellet, through Sheilann lake, and beyond, almost as far as Périgny river. Critical exposures are sparse, but in most of those seen the rock is banded and has a higher content of quartz than the rocks of the main belt of meta-andesite. The tuff and greywacke are fine-grained and are grey rather than greenish-grey in colour. The banding is due to layers alternately rich in light-coloured and dark-coloured minerals. The bands average an inch or so in thickness and may be much narrower than this. The breccia is an agglomerate similar to that associated with the meta-andesite; it is discontinuous and not widespread within the tuff-greywacke band.

The strike of the banding is parallel to the regional trend of the meta-andesite. The dip is northward, but, it is not known whether the tops of the beds face north or south.

A thin section of one of the dark-coloured bands of tuff from the northwest corner of Sheilann lake was found to contain (in per cent): hornblende, 20; chlorite, 30; plagioclase, 40; apatite, carbonate, quartz, and sericite 10. The hornblende prisms show a criss-cross pattern and contain abundant, small inclusions of quartz and plagioclase. They average about 0.6 mm. in length and, characteristically, they have ragged boundaries and are replaced, in part, by chlorite. The latter appears as shreds and grains averaging 0.17 mm. in length. The plagioclase is oligoclase or oligoclase-andesine, in grains averaging 0.2 mm. in diameter; untwinned as well as twinned grains were seen in the thin section.

A thin section of a highly siliceous band of tuff from an outcrop about half way along the southwest shore of Sheilann lake contained (in per cent): quartz, 35; hornblende, 25; an unidentified black, opaque mineral (probably magnetite), 15; biotite, 20; sericite, epidote, leucoxene, pyrite, and carbonate, 5. The quartz occurs in stringers, as fine-grained aggregates, and as larger 'augen' which give the section a somewhat porphyritic appearance. The hornblende is in skeletal crystals up to 0.5 mm. in length.

On a prominent hill close to the north shore of Sheilann lake, interbedded lavas and tuffs, exposed over a width of a few hundred feet across the strike, indicate a transition from volcanics to sediments. The tuff layers weather buff, but on fresh surfaces the rock is grey and indistinguishable from that of the main zone to the south.

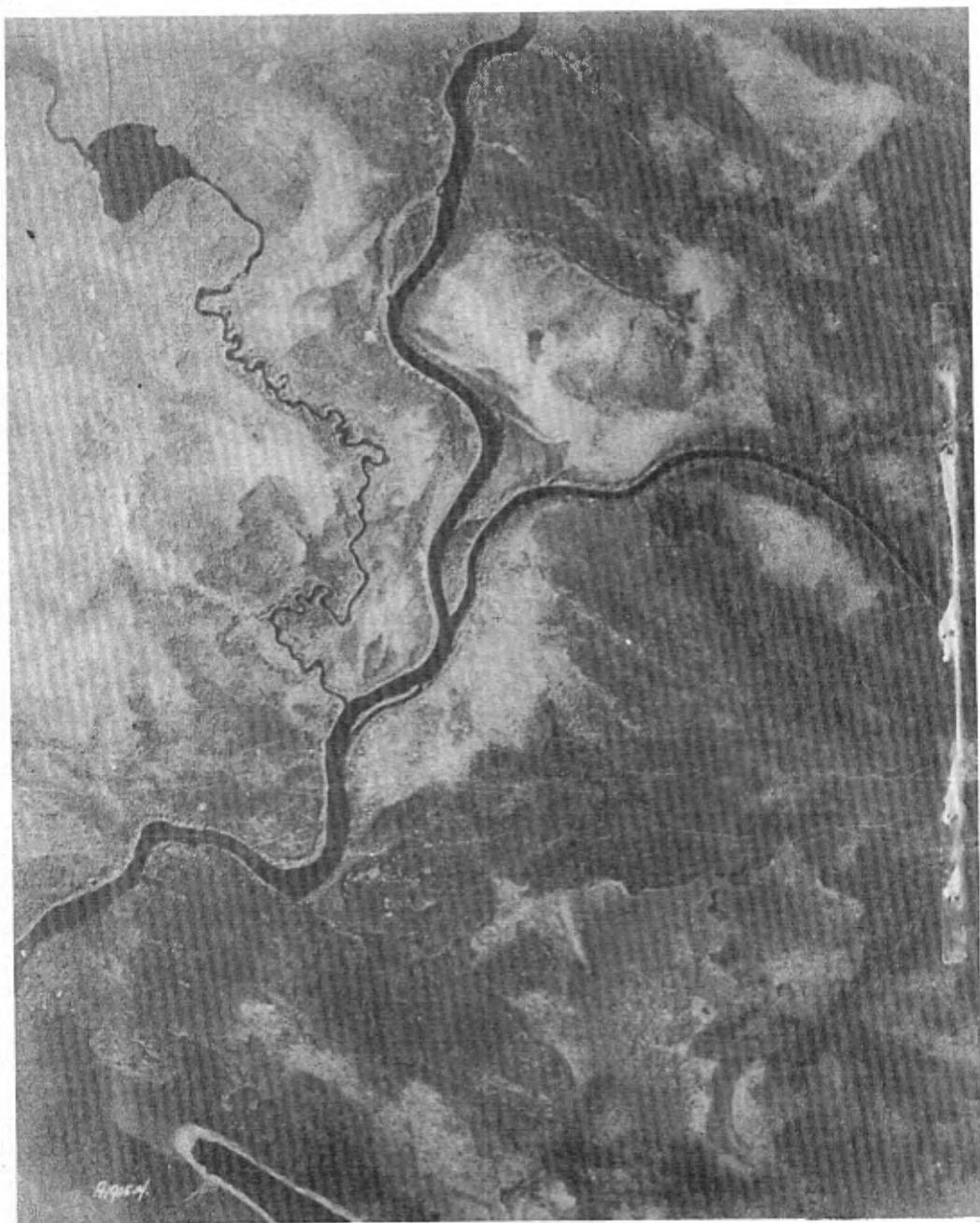
Near the junction of Panache and Fortier rivers there are exposures of banded tuff and greywacke which mark the western limit of a band of sedimentary rocks mapped by Milner (2) in the area to the east. This zone may possibly continue west for another mile and a half into Carpiquet township, and on the accompanying map it is shown as extending westward for that distance. There is some doubt, however, concerning the true nature of the rocks in these more westerly exposures, and it is possible that the sedimentary band actually terminates much nearer to Panache river than is indicated on the map.

Between these eastern occurrences and Périgny river, twenty-five miles to the west, no outcrops were observed that would warrant correlating the sedimentary band mapped by Milner with that in Ralleau township.

#### Gabbro and Meta-gabbro

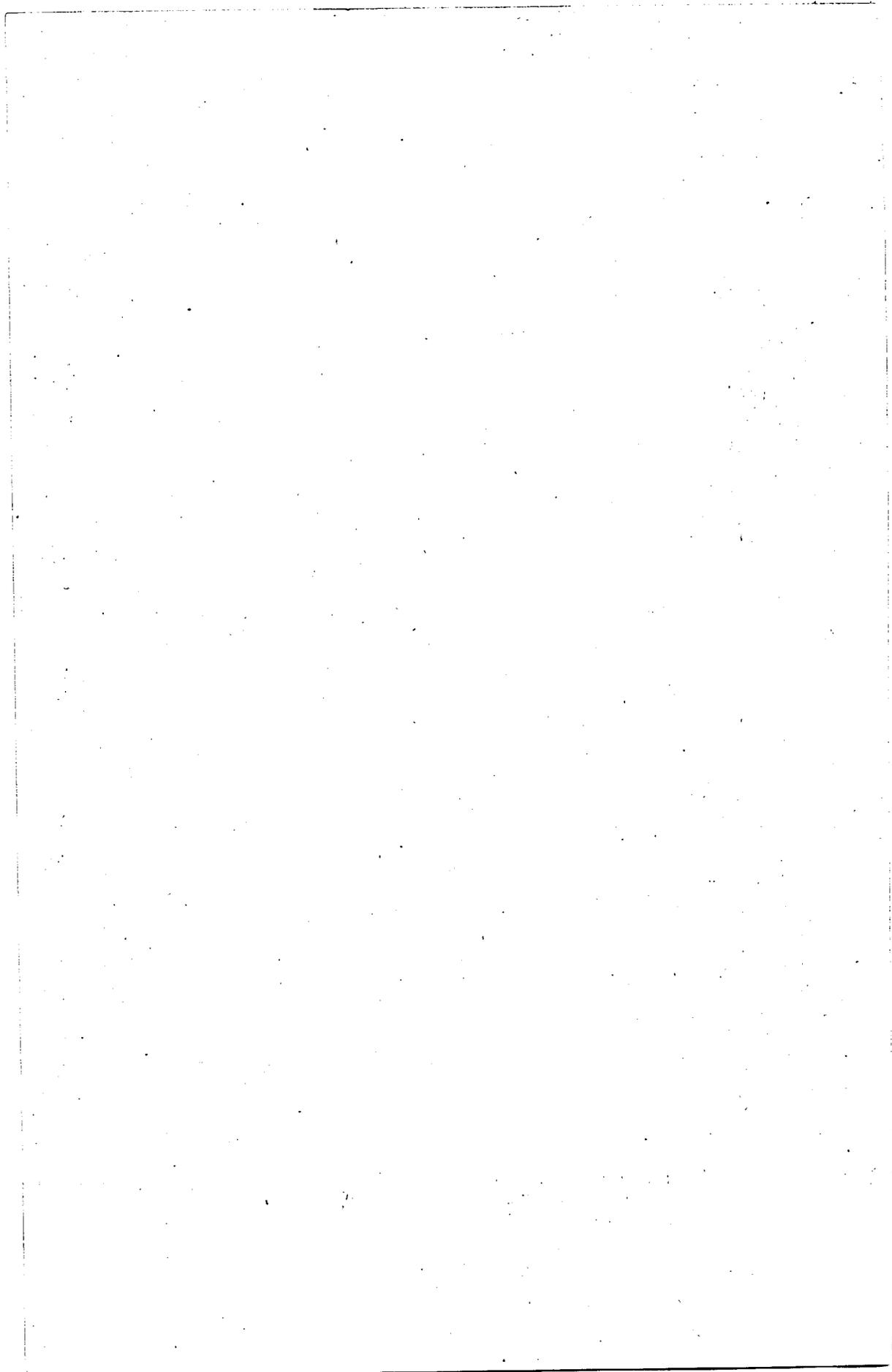
Three relatively small bodies of gabbro and meta-gabbro lie within the belt of Keewatin(?) rocks. The locations of these are as follows: (1) just east of the boundary between Effiat and Carpiquet townships, two miles south of Panache river - this is the largest of the three bodies, with an outcrop area of about one square mile; (2) on the boundary between Ralleau and Effiat townships, about three miles south of the northern boundary of the map-area; and (3) half-a-mile to one mile east of Périgny river, a mile and a half south of the northern boundary of the map-area. A fourth body of a similar rock, of quite small dimensions, occurs at a point a mile and a half northwest of the northern end of Périgny lake. On the accompanying map, the boundaries of these bodies have been sketched in to give an elongate dimension parallel to the trend of the lavas; as outcrops are few, however, this may not be justified. Intrusive relations with the lavas may be seen at one point on the north side of the body in locality (1), but elsewhere in this and the other localities mentioned, exposures are isolated and consist of gabbro alone. However, in some places, dykes of gabbro, one to two feet wide, may be seen intruding the hornblende schists of the volcanic belt. Two such localities are: (1) two miles west-northwest of the northern end of lac Novellet; (2) half a mile southwest of the small granite body which lies just west of O'Sullivan river, or about two miles southeast of Sheilann lake. These dykes, too small to be shown on the accompanying map, commonly strike parallel to the schistosity of the rocks of the belt and they are indistinguishable from the gabbro in the three main bodies.

The gabbro and meta-gabbro are medium-grained, massive rocks, dark green to grey-green in colour, and, in poor exposures, not unlike the lavas. However, the lack of schistosity, coarser texture, and absence of ellipsoidal and other extrusive structures, are usually sufficient to identify them. They are chiefly hornblende gabbros and are almost invariably altered to some degree. A thin section of a relatively unaltered specimen from the body which straddles the boundary



*R. C. A. F. Photo.*

Plate —Topographic features at the junction of the Panache and Wetetnagami rivers, showing wooded ridges and swamps trending about north-south, and a typical winding creek.



between Ralleau and Effiat townships was found to contain (in per cent): hornblende, 50; plagioclase and clinozoisite, 35; biotite, 10; chlorite, sericite, quartz, apatite, epidote, and magnetite, 5. The hornblende crystals average 0.8 mm. in length and are partly replaced by biotite, which in turn is partially altered to chlorite along cleavage cracks. The plagioclase is labradorite (An<sub>62</sub>) and occurs as euhedral and subhedral grains averaging about 1.0 mm. in length. Much of it is altered to clinozoisite and sericite. The few quartz grains noted are small, averaging not over 0.06 mm. Apatite occurs in well formed crystals up to 0.4 mm. in cross-section. Magnetite is mostly confined to fractures in the rock.

In the same gabbro body, but closer to the assumed contact with the lavas, meta-gabbro predominates. Examination of a thin section of the rock showed that its original hornblende and plagioclase have been almost completely replaced by secondary minerals, little but the outlines of the crystals remaining as evidence of their former presence. The section contains about 55 per cent hornblende and chlorite, 40 per cent plagioclase and epidote-clinozoisite, and 5 per cent titanite, quartz, and sericite. The chlorite has developed at the expense of hornblende, forming a fine, fibrous mat scattered through the rock. The original plagioclase laths are almost completely replaced by epidote-clinozoisite.

It is noteworthy that the gabbro and meta-gabbro bodies are all fairly close to the northern margin of the belt of volcanics. This might suggest that the gabbro is a hybrid rock developed by interaction of the intrusive granitic rocks and older lavas. There is no field evidence to support this speculation, however, and the occurrence within the lavas and tuffs of small dykes of gabbro which are unrelated to the granitic rocks might be urged as evidence against it.

#### Post-Keewatin(?) Intrusives

##### Granitic Rocks

The belt of Keewatin(?) volcanic and sedimentary rocks is bounded on the north and south by rocks of granitic appearance. Within the limits of the area mapped, these granitic rocks have a width on either side of the belt of about half a mile to five or six miles, but they are known to extend far to the north and south. Four small bodies of granite occur within the belt, all of them in the vicinity of Périgny lake and Périgny river.

Intrusive relations between the granitic rocks and the hornblende schists and lavas may be seen in a number of localities, as for example two miles east of Périgny lake at a sharp turn in the contact, and half a mile west of the lake at a deep indentation in the contact. No contacts between granite and gabbro or meta-gabbro were observed.

Although these rocks would normally be termed 'granite' in the field, especially by the prospector, microscopic examination reveals that they are in reality granodiorite, quartz diorite, and diorite. Sufficient thin sections were not examined to permit complete delineation on the map of areas occupied by each of the several facies of the granitic intrusives, but the localities in which it has been possible to identify the various types are indicated.

The rocks are medium- to coarse-grained, with range in colour from pink to white or light grey. Dark minerals are not abundant; where present in appreciable quantity they give a mottled appearance to the rock. Gneissic structure is common and strikes parallel to the main trend of the lava belt. It is shown chiefly by alternation of biotite and quartz-feldspar layers; in places, hornblende substitutes for the biotite.

It is not unlikely that in places, and especially near contacts with the 'greenstone', these rocks have been chemically and mineralogically influenced by the lavas they intrude. Local accumulations of dark minerals, inclusions of unidentified xenoliths, and uneven texture, suggest this condition. No straightforward field relations were found, however, to confirm this surmise. Petrographic examination in such cases does not furnish convincing evidence unless substantiated by clear field evidence.

On the basis of mineralogical composition, the granitic rocks may be subdivided as follows:

- (1) Granite: potash feldspar (orthoclase and/or microcline) in excess of plagioclase.
- (2) Granodiorite: potash feldspar less than plagioclase.
- (3) Quartz diorite and diorite: feldspar all plagioclase.

Granite.—None of the rocks selected for this section examination fall in group 1, and it is doubtful if any true granite occurs in the entire area, apart from pegmatite dykes, which are mentioned later.

Granodiorite.—A typical gneissic biotite granodiorite was examined from an exposure near the west boundary of Effiat township and two and a half miles north of the southern boundary of the map-area. It was found to contain 40 per cent oligoclase, in subhedral crystals averaging 0.4 mm. in diameter; 20 per cent microcline, in grains of about the same size; 25 per cent quartz, in anhedral averaging 0.5 mm. in diameter; and 5 per cent biotite, in flakes from 0.5 mm. to 1.5 mm. long. The remaining 10 per cent of the section is composed of garnet, epidote, and magnetite, in grains smaller than the average for the major constituents of the rock. Vermicular intergrowth of quartz and plagioclase is not uncommon.

Quartz Diorite.—A granitic rock regarded as typical of the grey quartz diorites occurs on the southwest side of Panache river, one and a quarter miles south and three-quarters of a mile west of the northeast corner of Effiat township. In this section it shows (in per cent): andesine, 45; quartz, 20; biotite, 15; hornblende, 15; and epidote, sericite, magnetite, and apatite, 5. The plagioclase crystals are subhedral to euhedral and average over 1 mm. in length; they are partially sericitized. Quartz anhedral vary greatly in size but average smaller than 1 mm. The hornblende and biotite are closely associated, the latter replacing the hornblende, and each averaging about 1 mm. in length. Both contain inclusions of plagioclase.

Diorite.—Diorite is apparently less common than the other types of granitic rock. One occurrence noted, a horn-

blende diorite, is on O'Sullivan river at the northern lava contact, or one and a quarter miles upstream along the river from the northern boundary of the map-area. The rock is speckled green and greyish-white, and is coarse grained. Hornblende makes up 30 per cent of the thin section examined; plagioclase, clinzoisite-epidote, and sericite, 55 per cent; biotite, 10 per cent; and apatite and magnetite, 5 per cent. The hornblende prisms average 0.5 mm. long and are partly altered to biotite. The plagioclase is andesine, in grains averaging 0.1 mm.; it is considerably altered to epidote-clinzoisite and sericite. The biotite is intimately intergrown with magnetite, and occurs in flakes averaging 0.2 mm. in length. This is one of the rocks which, if continuous exposure across the main contact were available, could probably be found to be a hybrid rock, formed by interaction of the acidic intrusives with the lavas.

#### Pegmatite

Coarse, pink, pegmatite bodies are fairly common, especially in the granitic rocks south of the belt of volcanics. They may be seen to advantage one mile southwest of the south end of Périgny lake, and in a large exposure just northwest of the southernmost falls on Wetetnagami river, one mile from the southern boundary of the map-area. Potash feldspar crystals up to 2 inches in diameter dominate the pegmatites. They are associated with coarse-grained, interstitial, milky quartz, with muscovite flakes as large as two inches in diameter, and in places with small black tourmaline crystals, about a quarter of an inch in cross-section. The pegmatite bodies have irregular contacts, no constant trend or elongate form, and they range in size from small, dyke-like masses six inches across up to bodies twenty feet in width. They are not shown on the accompanying map.

#### Feldspar Porphyry

Several feldspar porphyry dykes were noted in the lava belt close to its northern contact with the granitic rocks. Three localities are: (1) one and a half miles east of Périgny river, at the northern boundary of the lava belt; (2) one mile west of Wetetnagami river and about two and one-eighth miles south of the northern boundary of the map-area; and (3) one and a half miles west and three-quarters of a mile north of the junction of Panache and Fortier rivers. These dykes clearly intrude the schists of the lava belt, but their age relationship to the other intrusive rocks is not known. They are classified with the post-Keewatin(?) intrusives because of their proximity to the belt of granitic rocks, and because similar granitic rocks elsewhere in the Precambrian Shield commonly have feldspar porphyry apophyses intruding adjacent rocks. The dykes are rarely more than three feet in width and are sub-parallel to the trend of the schists. The contacts with these may be straight or irregular. Phenocrysts of greyish-white sodic plagioclase are numerous and conspicuous in hand specimens, and range in size from two to five millimeters. They are set in a fine, dark grey ground-mass which has a much altered appearance. No thin sections of the rock were examined.

#### Diabase

Two diabase dykes, cutting both the granitic and volcanic rocks, were observed in the area and are shown on

the accompanying map. The wider one has been traced south from Panache river for three miles, in a direction approximately parallel to Wetetnagami river and about a half to three-quarters of a mile east of it. Its maximum width is about 500 feet. The other dyke, two and a half miles and more east of this, crosses Panache river and the northern end of the boundary between Effiat and Carpiquet townships. Outcrops believed to be part of the same dyke have been traced over a distance of five and a half miles. The average width of the dyke is less than 100 feet, and its strike is about 60° east of north.

The large dyke is coarse grained and greenish-grey, with a pronounced ophitic texture. It weathers brownish, and has fine-grained contacts against the intruded rocks. Four outcrops outline the trend of the dyke. These are spaced at fairly uniform intervals and show no significant variation in texture, colour, or mineral composition. Examination of a thin section from the southernmost exposure showed that the dominant plagioclase is andesine rather than the usual labradorite, even though the principal dark mineral is pyroxene. There is no generally accepted name for a non-porphyrific dyke rock of this mineral composition. It is here designated diabase principally because it has the ophitic texture and dyke form characteristic of that rock. The andesine laths average 2 mm. in length and make up 55 per cent of the rock. They contain inclusions of epidote-clinozoisite and chlorite. The pyroxene (30 per cent) is in short euhedral to subhedral crystals having an average length of 1.4 mm. It is in part altered to actinolite and chlorite, which together make up 5 per cent of the rock. Other accessory and secondary minerals present in minor amount are apatite, epidote, titanite, magnetite, pyrite, hematite, ilmenite, and leucoxene.

The smaller dyke is a quartz diabase and the feldspar it contains is the usual labradorite. The rock has a pronounced ophitic texture and is medium rather than coarse grained. In two of the three localities where it has been mapped, it has chilled contacts against the intruded rocks. In the third, northernmost, locality, north of Panache river, the outcrop is isolated from its wall rock. A thin section of the diabase from the most southerly exposure was found to consist essentially of labradorite (60 per cent) in laths which average over 1 mm. in length, and pyroxene (35 per cent) in subhedral grains 0.7 mm. in cross-section. Minor constituents are quartz, pyrite, and magnetite. The plagioclase is slightly altered to epidote.

#### Pleistocene and Recent

Unconsolidated glacial material mantles much of the map-area and is particularly widespread in the southern half of Effiat and Carpiquet townships. The heavy forest growth prevents examination of these deposits in detail, but where observed, which was chiefly along lake shores and creek beds, they consist for the most part of boulders, gravel, sand, and silt. Clay was noted in a few localities, but does not seem to be of common occurrence.

Glacial striae trending 20° west of south were observed in only one locality, in the extreme southwest part of the area. This direction corresponds fairly well with the general

north-south topographic trend noted previously in this report. It also supports the observation that topographic features in the area are in general independent of the rock structure.

On many of the small, irregular hills, no rock is exposed, and it is an open question whether or not their cores are rock or are composed entirely of glacial material. Their relief of about 100 feet is not incommensurate with the possible maximum thickness of glacial débris. Moreover, these low hills do not conform to any lithological or structural features of the area and thus they might well be in large part of detrital origin.

#### STRUCTURAL GEOLOGY

No detailed structural picture of the area is available from the work done so far. The east-west trend of the volcanic belt conforms to the trend in the adjoining areas. In general, dips are steep, and the dip surface is always a schistosity surface. In the tuff-greywacke-breccia zone in Ralleau township, the compositional banding probably represents original bedding; its strike and dip coincide, however, with the prevalent schistosity. Along the southern border of the lava belt, and in the central zone, dips are predominantly north. Along the northern margin there are many south as well as north dips. In the Grevet area to the west, Longley (1) reports steep dips which, over most of the area, are more commonly north than south. In the Barry Lake area to the east, Milner (2) has some evidence for a synclorium. The Wetetnagami River area furnishes no clear supporting evidence for either of these structural pictures. Ellipsoidal (pillow) structures are not uncommon in places, but the evidence for top and bottom of the flows is fragmentary and inconclusive. In consequence, folds and fold axes are undetermined quantities and correlation with those in adjoining areas is unsuccessful.

Most of the rocks of the area have schistose or gneissic texture. Except in the vicinity of Périgny lake, the strike of the schistosity parallels the generally east-west contact between the lavas of the belt and the granitic rocks to north and south of it. East of this lake there is a three-mile-wide southward embayment in the contact (on the south side of the volcanic belt), and here the northwest strike of the schistosity in the lavas and granitic rocks is inclined at a high angle to the contact. It seems likely that severe east-west shearing in this section of the area produced a bulge in the normal east-west contact and bent the schists out of their east-west position. It is altogether probable that this deformation was accompanied by major faulting, but the present mapping, depending as it does on scattered outcrops, shows no evidence of this around Périgny lake, or elsewhere in the area.

The two diabase dykes referred to on an earlier page strike at a fairly high angle across the trend of the schistose rocks they intrude. Judging by what is known concerning similar dykes occurring elsewhere in the general region, it is possible that these diabase dykes were emplaced in tension fractures related to the regional deformation. Unexplained, but possibly significant, is the indentation in the northern boundary of the volcanic belt which parallels the longer of the two dykes.

PETROGRAPHIC CORRELATION WITH THE

GREVET AND BARRY LAKE AREAS

A detailed petrographic study of thin sections of rocks from the adjoining Grevet and Barry Lake areas was undertaken by Graham (8) for the purpose of a comparison with the corresponding rocks of the Wetetnagami River area. It was found that most of the rocks described in the present report can be duplicated in these two adjacent areas. Andesite occurs in the western part of the Barry Lake area but has not been identified definitely in the Grevet lava belt. Milner believes that some of his 'greenstone' is derived from basalt, but this does not appear to be true of any of the greenstone in the present area. Acidic lavas have been described from both the Grevet and Barry Lake areas, but were not found in the Wetetnagami River volcanic belt. Altered lavas in the form of hornblende schists are common to all three areas; high hornblende content is characteristic of the Barry Lake schists. The tuff described from the Grevet area is more acidic than any in the present area. The banded tuff and greywacke on the west side of Milner's map just enters the area covered by the present report; it is not appreciably different from the zone mapped across Sheilann lake.

No gabbro is reported in the Grevet area. In the Barry Lake area, fine-grained gabbro occurs, but not in large enough amount to be mapped as a separate unit.

The granitic rocks of Longley's area were not studied in sufficient detail for subdivision as granodiorite, quartz diorite, etc. The Barry Lake area provided more information. Although Milner describes his post-Keewatin(?) rocks as 'soda granites', they seem to be identical with the rocks described as granodiorite and quartz diorite in the present report. Disregarding the relatively unimportant matter of nomenclature, it is significant that, in both areas, these intrusives are characterized by high soda rather than high potash, and are not 'granites' in the petrographic sense. This feature of granitic rocks in Precambrian terranes has been noted repeatedly in recent years, so much so that the term 'granite' has lost its precise meaning when used in the field.

ECONOMIC GEOLOGY

No gold or base-metal mineralization has been reported in the Wetetnagami River area. There are small, scattered, quartz veins in the central lava belt, much too small and discontinuous for mapping on the scale used. In places, fracture surfaces in these are coated with a thin film of pyrite or pyrrhotite, but for the most part they are barren. These sulphides occur also as minor accessory constituents in the volcanic rocks. In a vertical exposure of hornblende schist at the south end of Périgny lake, a ten-inch barren quartz vein is cut by two pegmatitic granite stringers, each about an inch wide, which carry a small amount of sulphide. This occurrence suggests the possibility that the barren quartz veins are, in general, pre-granite, and that later veins, genetically related to the granitic rocks, may be found that carry sulphide or other metallic mineralization.

As far as known, no systematic prospecting has been carried on anywhere in the map-area. This is not surprising in view of its relative inaccessibility, the discouraging lack of outcrops, and the heavy forest cover. Since practically no rock outcrops along the streams, there is little to suggest to the casual traveller that a continuous belt of 'greenstones' extends east-west across the area. Possible future prospecting along this belt may be guided by its assumed boundaries, as shown on the map accompanying this report. Exposures are most numerous in the vicinity of Périgny lake (Ralleau township), and the irregularity here in the boundary of the lava belt indicates considerable deformation. This neighbourhood is probably the best that the area can offer to the prospector.

#### BIBLIOGRAPHY

1. LONGLEY, W.W., Grevet (Kamshigama Lake) Map-Area, Abitibi Territory; Que. Bur. Mines Ann. Rept., Pt.B, 1936.
  2. MILNER, R.L., Barry Lake Area, Abitibi County and Abitibi Territory; Que. Dept. Mines, Geol. Rept. No.14, 1943.
  3. BELL, Robert, Geol. Surv. Can., Ann. Rept., Vol.IX, 1896, p.68A.
  4. COOKE, H.C., Nottaway Sheet (Map 190); Geol. Surv. Can., 1927.
  5. SPROULE, J.C., East Half Waswanipi Map-Area; Geol. Surv. Can., Paper 37-5, 1937.
  6. SPROULE, J.C., Puskitamika Lake; Geol. Surv. Can., Map 570A, 1940.
  7. RETTY, J.A., and NORMAN, C.W.H., West Half Chibougamau Sheet; Geol. Surv. Can., Map No.398A, 1938.
  8. GRAHAM, R.B., Petrographic Correlation of the Wetetnagami River Area with Adjacent Areas; unpublished thesis, Dept. of Geol., Univ. of Toronto, 1941.
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