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PRELIMINARY REPORT, SOUTHWEST QUARTER OF VERNEIL TOWNSHIP

GOUVERNEMENT DU QUÉBEC
DEPARTMENT OF NATURAL RESOURCES
MINES BRANCH

MINERAL DEPOSITS SERVICE

GEOLOGY OF THE

SOUTHWEST QUARTER OF VERNEUIL TOWNSHIP

PRELIMINARY REPORT

by

Marc Van de Walle

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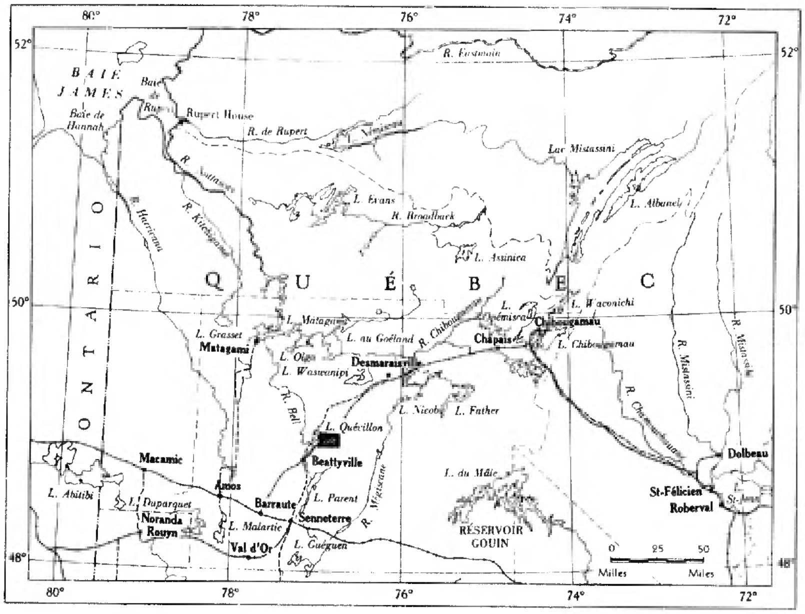

QUEBEC 1970

P.R.-591

Preliminary Geological Report

on

THE SOUTHWEST QUARTER OF VERNEUIL TOWNSHIP*

by

Marc Van de Walle

INTRODUCTION

The southwest quarter of Verneuil township was mapped at the scale of 1 inch to 1,000 feet during the summer of 1968. The area, included within west longitudes 76°46'00" and 76°52'15" and north latitudes 49°00'30" and 49°04'20", covers 25 square miles.

The area immediately east of Quévillon lake and approximately 5 miles east of Lebel-sur-Quévillon. This town is 53 miles north of Senneterre along the Senneterre-Chibougamau highway.

The area mapped is almost totally accessible from Lebel-sur-Quévillon on roads of the Domtar company. The C.N. railroad crosses obliquely the northwest angle of the quarter township. In 1936, W.W. Longley mapped the area at the scale of 1 inch to the mile.

PHYSIOGRAPHY

The greater part of the area is of low relief, the differences of elevation being less than 100 feet. The stronger reliefs are in the northwest part and in the southeast corner of the area where differences of elevation are of the order of 300 feet. An abrupt ridge oriented in a NE.-SW. direction adjoins a diabase dyke at the eastern boundary of the

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* Translated from French

quarter township. Its northwestern flank rises in a single step to about 150 feet above the surrounding plain. Its southeastern side is characterized by a relatively gentle slope covered with glacial debris.

The drainage is westward by Wilson creek in the north and by Kiask river in the south. The former empties into Quévillon lake and from these into Bell river by way of Quévillon river. Kiask river joins Tonnancourt (Cuvillier) river, which is another affluent of Bell river.

GENERAL GEOLOGY

With the exception of glacial deposits of the quaternary, all the bedrock formations are of Precambrian age. About 75% of these rocks are volcanic in origin and are represented in the following decreasing order of abundance:

- trachytes and trachyandésites
- tuffs of intermediate composition which may be subdivided into fine-grained tuffs and crystal-bearing tuffs
- agglomerate
- lavas and pyroclastic rocks of rhyodacitic composition
- dioritic rocks in sills.

Mention may also be made for the record of the metamorphic facies of some of the above-mentioned works which take the form of amphibolites and micaschists. These rocks outcrops in particular at the extreme south of the quarter township. Three intrusive granite masses cross the formations named. Of these, two are only partly included within the area: the granite mass of Lodge island in the northwest and the Holmes gneissic granite mass at the south extremity. The third mass is a small stock fitting almost completely in the large loop drawn by Wilson creek some two miles before entering Quévillon lake. It will be called the Wilson granite mass.

A few rock types in the form of small intrusions must be mentioned; granodiorite, lamprophyre, feldspar and quartz porphyries, and diabase. The order of stratigraphic succession is not certain in the south and west portions of the area. Some top determinations seem to indicate that the tops face southward in the region located southeast of the Loop mass.

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Volcanic Rocks

Trachyte and Trachyandesite

The trachytic rocks cover nearly one-third of the area and constitute a band 1 to 3 miles wide. They are grouped under this heading because they contain more felsic minerals than an andesite and less quartz than a dacite. In one way or another, the original minerals are too highly obliterated to serve for precise classification, and the term metatrachyte would be more appropriate.

The fresh rock is green to pale green, and its most distinctive character in the field is its mottled appearance. The dark spots are lenticular aggregates of chlorite 3 to 10 mm. long and likely are the result of the alteration of ferromagnesian minerals. The surfaces exposed to alteration become whitish pink to the point of resembling a truly felsic rock. The abundance of disseminated chlorite varies from one outcrop to the other and may thus give the rock a more or less mafic appearance (trachyandesitic tendency). Thin sections reveal principally chlorite assembled in flakes and clinozoisite constituting the background of the rock and issued from plagioclase, which is itself rarely visible. The quartz which is not abundant could be secondary. One may observe an abnormally high proportion of secondary carbonate, often in idiomorphic crystals, in most of the samples.

The elongation of the chlorite spots gives a foliated appearance to these rocks and makes them resemble crystal-bearing tuffs, especially when the chlorite agglomerates to form lighter spots reminiscent of feldspar fragments.

Some poorly defined pillow structures are noted. Important horizons of pyroclastic rocks (crystal-bearing tuffs) may possibly be included and mapped in this rock group, the outcrops being scarce and very badly exposed.

Some lenses of trachyandesitic lavas, recognizable by their pillow structures, are intercalated within the tuffaceous formations surrounding the Wilson granite mass.

Porphyritic Andesite

The porphyritic lavas are represented mainly to the south of Kiask river along a discontinuous band of 1,500 feet maximum width and generally oriented E.-W. Similar rocks occupy a somewhat limited extent in the northeast part of the area.

The color of the rock ranges from gray to light green, and the feldspar phenocrysts appear in highly variable concentration. Their size is rarely over ½ inch. Their geometric form is obliterated by dynamo-metamorphic action in most places. The rock may, in such cases, be confused with an amygdaloidal lava. Moreover, it is almost certain that these rocks change laterally into amphibolites at such places where they cross the "amphibolite" facies isograd. They are, however mapped as porphyritic ansedite as long as the feldspar phenocrysts remain visible. The metamorphism occurring here is in all probability related to the Holmes granite batholith.

A thin-section shows the complete transformation of the feldspars into microcrystalline aggregates (zoisite?);

in the mesostasis, the amphibole elements are readily discernable and relatively abundant. Chlorite is present in smaller amount.

Rhyodacite

An assemblage of effusive and pyroclastic siliceous rocks forms a crescent-shaped band in the northwest portion of the area. The maximum width of this band is of the order of 2,000 feet, whereas the observed length is slightly more than 2 miles.

It was not possible to map separately the lavas and pyroclastic rocks, distinguishing criteria being non-existent on most of the outcrops. It may be said, however, that banded tuffaceous rocks predominate in the eastern and western portions of the zone, whereas the massive rhyodacite is found mainly in the center. It must be noted, however, that some formations, tuffaceous in appearance, show fluidal structures in thin-section. The color of the rock is highly variable from withish to dark gray.

The thin-section shows from 20 to 40% microcrystalline quartz, apparently resulting from the devitrification of the lava. The plagioclase, rarely twinned, is, in many places, altered and difficult to determine. Biotite is abundant, compared with chlorite. Blue amphibole is less seldom seen. Epidote is the most common mineral after quartz. Calcite is locally abundant and is secondary.

On outcrops, much of the rhyodacite exhibits numerous irregular fractures, accompanied by more or less intense rubedity. At certain points the rock resembles a breccia, but the exposures are generally poor that it is impossible to draw conclusions. The hardness and the resistance to erosion of the rhyodacite formations are illustrated by a pronounced relief of more than 300 feet.

Fine-grained Tuffs

These tuffs, which are the most common, have a fine-grained texture that gives them, in some places, the appearance of cherts. Their color ranges from light green to light gray. The bedding is rarely visible and, when it is, it appears parallel to the foliation. In addition to chlorite and felsic minerals, idiomorphic carbonate and very finely disseminated pyrite are seen in many places.

Crystal-bearing Tuffs

Inside the fine-grained tuff formations and at different levels, coarse-textured rocks are characterized by the presence of crystals and crystal fragments of feldspar ranging in length from 1 to 5 mm. Because of their discontinuity, it is not possible to map them separately from the fine-grained tuffs.

The rock, non-foliated, resembles a porphyritic lava. The only distinctive criterion is generally the environment of the rock. The foliation is often very highly pronounced and may reach the shearing stage. In the latter case, the felsic elements are stretched, which results in a rock of finely banded appearance.

The similarity of certain trachyandesitic lavas showing felsic spots with the crystal-bearing tuffs described above has already been mentioned. A certain kinship could exist between these rocks which are spatially associated in many cases. The crystal-bearing tuffs are found only in the tuffaceous bands surrounding the Wilson Creek and Kamichigama masses.

Banded Tuffs

The banded tuffs extend over a rather limited area at the extreme south of the quarter township, near the contact with the Holmes granite mass.

It is a felsic tuffaceous rock showing cream-colored bands 1 inch to more than 1 foot in thickness. The method of formation of the rock is conjectural. The banding could correspond either to lit-par-lit aplitic injections or to a process of alternating sedimentation.

Agglomerate

The agglomerates show an intimate kinship with the trachyandesitic lavas, not only by their spatial association but also by their striking petrologic resemblance. These rocks are composed of the same elements as the trachyandesitic lava, but angular or rounded fragments of similar rocks are lighter in the former.

The difference in tone, which is more or less pronounced, is only the result of varying proportions of chlorite or of felsic material. The rock is generally foliated and the elongation of the fragments is parallel to this foliation. These can be quite widely dispersed, and, when the outcrops are small, the rock may be taken for a trachyandesitic lava.

The outline of the agglomerates is not rigorous. The conglomerates are present in the form of folded lenticular masses within the trachyandesitic lavas at various stratigraphic levels.

A slighty different type of agglomerate outcrops along the railroad at the west border of the township. The agglomerate is of a more classical type and is made up of densely crowded fragments of diverse origin (heterogeneous agglomerate) included in a very fine grained groundmass, which constitutes less than 30% of the rock. It forms the eastern extremity of an agglomerate band extending southwestward over a distance of more than 5 miles into Quevillon township.

Metamorphic Rocks

At the contact of the Wilson Creek and Holmes granite masses, some rock bands of volcanic origin have undergone transformations attributed to metamorphism.

Amphibolites

A very poorly exposed amphibolitized band of little extent is located at the west contact of the Wilson Creek granite mass. The rare outcrops are highly laminated rocks rather reminiscent of amphibole schists in which the chlorite seems still to be represented.

Another well-developed amphibolitized band has an east-west orientation and follow the contact of the Holmes granite mass near the south boundary of the area.

The rock is dark and much of it is coarsely crystalline. The amphibole crystals in places constitute more than 80% of the rock, which seems hardly compatible with the generally intermediate composition of the volcanic rocks in the area. Certain zones within the volcanic rocks appear to be preferentially amphibolitized even at a certain distance from the granite. The tuffs seem to be impervious to amphibolitization. The porphyritic andesite is locally affected and one outcrop even shows an intermediate stage of this process. It consists of a fine-grained amphibolite in which the feldspar phenocrysts with diffuse outlines are still visible.

In the poorly exposed rocks, it is possible to confuse laminated gabbro-diorite with fine-grained amphibolite.

Amphibolite and hornblende schists are noted by Longley in the adjacent area of Holmes township.

Magnetite Micaschists

A very special type of rock is developed along the southwest contact of the Wilson Creek mass. This rock is dark in color and basaltic in appearance, and shows, in places, white amygdules composed of quartz and calcite. The thin-section reveals that the dark tint is due mainly to the abundance of biotite and magnetite in very fine grains. Each of these minerals can be present in the proportion of 20%. The other minerals are feldspar (plagioclase), clinozoisite, chlorite, sericite and quartz. The rock would resemble a lamprophyre were it not amygdaloidal. A blue amphibole is, in places, associated with the biotite. One sample even shows a predominance of amphibole which could indicate that the micaschists change laterally to amphibole.

The mode of formation of the magnetite micaschist seems to imply the removal of certain chemical elements of the original volcanic rock and their replacement by other elements, especially potassium, likely emanating from the granite.

The rock is definitely magnetic which is detectable with a magnet. This property is faithfully reflected on the aeromagnetic map (1434 G), where a contrast of 400 gammas is seen with the ajoining granite.

Intrusive Rocks

The three granitic masses of the area are clearly intrusive in the volcanic rocks. The dioritic rocks show less clear relations with the latter. They could be penecontemporaneous intrusions with the volcanic extrusions.

Diorite*

The dioritic intrusions are in elongated masses more or less in conformity with the volcanic rocks structures. They can then show characteristics of dikes or sills. Their length may be greater than 1 mile but their width is everywhere less than 500 feet.

The exterior appearance of the rock varies with the intensity of shearing. The unaltered diorite shows dark amphibole grains on a light gray-green background of saussuritized feldspars. The quartz and chlorite are visible only in thin-section, and biotite is present in some places. Secondary carbonate gives a pinkish tint to the rock.

* These rocks have often a composition between a gabbro and a diorite.

The sheared and saussuritized diorite shows all stages of ouralitization. However, the transformation of the amphibole is rarely complete, as observed in the lavas. This type of diorite takes a uniform dark greenish tint reminiscent of andesite. A slight foliation conforming to the surrounding structures is visible.

The locally cristalline character of the rock presupposes an intrusive emplacement, but the other characters described above (foliation and conformity) imply that the emplacement is prior to the Kenorian orogeny.

Quartz Porphyry

A quartz porphyry forms a small lenticular mass, a little more than 2,000 feet long within the tuffs in the southwest part of the quarter township. It is a whitish rock showing quartz grains 2 to 3 mm. in diamater dispersed in a fine-grained mass of quartz-feldspar showing a lamination parallel with the general structural directions observed in the tuffs. For that reason, this intrusion may be considered as pre-Kenorian.

Metagranodiorite

Metagranodiorite outcrops at two locations less than 1,000 feet apart. The lamination is too intense to determine its nature with the naked eye. The thin-section reveals about 60% plagioclase, 15% micrographic quartz, 15% sericite and 10% chlorite.

The name quartz diorite could possibly be applied to this rock, which has an intrusive character but is of pre-Kenorian age.

Lamprophyre

A small outcrop within agglomerates consists of a very fine grained dark rock. The thin-section reveals about 30% biotite. The rest of the rock is made of feldspar, zoisite, sericite, calcite and opaque minerals. The age of this rock is undetermined.

Feldspar Porphyry

A dike of porphyritic rock of unknown thickness (minimum 10 feet) cuts the rhyodacitic volcanic formations west of the C.N. railway.

The thin-section shows plagioclase (oligoclase) and microcline phenocrysts with reaction zones in a finer grained groundmass make up of biotite, feldspar, quartz and muscovite. Remnants of rounded, highly corroded, quartz phenocrysts are seen at some places.

Holmes Granite Mass

More than 95% of the Holmes granite body, considered by Longley as gneisso-dioritic, is located in Holmes township.

The rare outcrops observed at the southern border of Verneuil township show granitic rocks having just one common characteristic: the scarcity of ferromagnesian minerals.

The rock assumes various aspects showing either a coarse grain or a fine texture. The quartz and microcline may be abundant or just about lacking. Thin-section observations are required for a more adequate description of the rock, which does not seem to correspond to the granite of Holmes township described by Longley. The latter describes the rock as a dioritic gneiss rich in quartz and biotite. The metamorphic aureole is important as shown by the width of the amphibolite bands observed on its northern periphery. This intense metamorphism is probably related to the size of the Holmes batholith but possibly also to the proximity of the Grenville front. It must be noted that all the rocks situated southeastward are gneisses and hornblende micaschists, according to the map by Longley.

The Wilson Creek Granite Mass

This body, clearly defined to the south, east and west, has not been delimited northward. It possibly joins on this side with a large mass occupying the whole northeastern corner of Verneuil township, which has rocks resembling the Wilson Creek at many points. The latter is a porphyritic granite with massive texture. The porphyritic character is more pronounced at the center of the mass than on its edges. The phenocrysts are not more than ½ inch long.

The thin-section shows that the phenocrysts are generally potash feldspars. The matrix being composed mostly of plagioclase, there is only a slight predominance of K-feldspar over the plagioclase, but the name of granite is justified nevertheless. The other common minerals are quartz and green biotite. Hornblende is less common. The accessory minerals noted are sphene, epidote, apatite and allanite.

In the field, outcrops are rare and the contact of the granite with the country rock is rarely visible. However, numerous granite dike intrude the volcanic rocks all around the Wilson Creek mass. Locally, the metamorphism reaches the stage of amphibole and biotite on the west border of the mass. Topographically, this granitic area is characterized by low relief and much of it is covered by glacial deposits.

Kamichigama Granite Mass

This biotite granite mass, located in the northwest corner of the quarter township, is centered on Kamichigama island in the center of the eastern lobe of Quévillon lake. Outside of this island, the granite outcrops only on the lake shore.

It is a biotite granite of some resemblance to that of Wilson but having no apparent porphyritic texture. The contact with the tuffs is sharp, and the effects of metamorphism appear insignificant.

Diabase

The diabase occurs in the form of dikes having a length in one case apparently more than 5 miles and widths of the order of 50 to 200 feet. The two main dikes are oriented approximately N.45^{o}E. At some places, the diabase outcrops form escarpments of rocky crests.

The rock texture is quite coarse, but, near the walls, the diabase is, in many places, aphanitic and more rarely porphyritic.

Surface alteration gives a slight rusty tint and a rough appearance to the rock. In thin-section, the ophitic texture is the more characteristic. Pyroxene and plagioclase (andesine-labrador) constitute 90% of the rock. The quartz is interstitial and everywhere in the form of micropegmatite. A little biotite is associated with magnetite. The pyroxene is generally surrounded by a reaction rim composed of another type of pyroxene or by amphibole.

The rock is magnetic and is locally shown on the aeromagnetic map.

A few fractured zones are accompanied by intense epidotization, which gives the rock a pistachio-green color.

Unconsolidated Deposits

The unconsolidated deposits covering the area are represented mainly by eskers, fluvioglacial deposits and lacustrine deposits.

Boulder gravels are generally associated with elevations of rocky subsoil. Their thickness is thus variable, and numerous rocky points are seen.

In one case, the accumulation of rocks covers only the sheltered side of a rocky diabase crest located in the southeastern part of the quarter township.

It is interesting to note that almost all the boulders are of granite porphyry with large phenocrysts coming from a batholith which occupies the northeast angle of Verneuil township and the southeast angle of Grevet township. This would indicate a source in the northeast.

The direction of a few glacial striae measured on Highway 107 (near Camp II) is N.30°E.

The author has been able to outline a zone of argillaceous deposits in the lower basin of Kiask river. At some places, the shores of this river are made up of small cliffs of varved clays, some 15 feet in thickness.

STRUCTURAL GEOLOGY

The main structural features are conditioned essentially by the three large intrusions described above. The foliation in the lavas and the stratification in the tuffs surround them faithfully. The dips are generally subvertical, but, south and southwest of the Wilson Creek mass, several more moderate dips northward were measured. The graded structures indicate that the tops face southward in this region and that the observed formations occupy the overturned north flank of a syncline, the axis of which would be along the valley of the Kiask and would branch out to the west and east of the Wilson Creek mass.

Even though the formations are everywhere foliated and laminated, the author could not find any important fault or shear zone. A minor shear zone is located at the extreme west of the region near the railroad. The sheared rock is in an agglomerate formation which extends outside of the mapped area.

The lack of outcrop does not allow any extension of this zone toward the east.

ECONOMIC GEOLOGY

Some tuffaceous and amygdaloidal horizons of certain lavas are mineralized with disseminated pyrite. An analysis of the amygdaloidal rock gave only insignificant values in gold and copper: 0.001 ounce of gold per ton and 0.02% copper.

Pyrrhotite is commonly seen in the magnetite mica-schists and particularly in the amphibolites near the Holmes granite. A few samples of amphibolite contain pyrrhotite associated with octahedral magnetite.

The rhyodacitic band northwest of the railroad contains very fine grained chalcopyrite. Malachite staining is associated with it in many places.

A little chalcopyrite is found in the fractured porphyritic andesite south of Kiask river near a diabase dike.

A few, more or less carbonatized quartz veins, rarely more than a foot thick, appear sterile and show no sign of sulfides. The alteration of a ferrous carbonate is the only reason for the rusty staining associated with these veins. The analysis of a sample showed no trace of precious metals.

Moneta Porcupine Mines Ltd.

Moneta Porcupine staked, in 1948, a group of claims situated southeast of the wide loop drawn by Wilson creek, 6 miles above its entrance into Quevillon lake.

According to a company map, the bedrock under the glacial cover is composed mainly of tuff, diorite and andesite. The author considers as a crystal-bearing tuff the diorite described as porphyritic.

Auriferous quartz lenses were found by the company. These were too small, too discontinuous and too widely spaced to be of economic interest. The shear and laminated zones of the county rock have no interesting mineralization.

It is no longer possible to find the precise location of individual workings.

Midrim Mining Company

This company did some drilling on a group of four contiguous claims previously held by Moneta Porcupine. These are numbered C100425, claims 4-5, and C100427, claims 4-5.

Six holes, totaling 3,228 feet, were drilled on the approximate site of the old Moneta Porcupine workings. The formations encountered are mainly diorite, tuffs and lavas of intermediate composition. The presence of amygdaloidal lavas, ottrelite schists and lamprophyres are locally noted.

The drilling revealed two types of mineralization: gold in the tourmaline ankerite quartz veins in the central part of the property; silver and low values in lead - zinc in the silicified zones in the northwest corner of the property.

In the gold-bearing band, the best values obtained in one drill hole are as follows:

Depth (feet)	Au (oz./ton)	Ag (oz./ton)
77-82	0.15	0.07
140-142	0.27	0.06
468.5-469.6	2.28	0.33

In the silver-bearing band, one drill hole encountered a silicified zone with a total thickness of 13.5 feet containing 0.934 ounce of silver per ton. Over 1.5 feet in this same zone, 2.75 ounces of silver, 0.18% lead and 0.07% zinc were obtained. The silver mineralization is associated with small amounts of galena and sphalerite. The same zone is probably met in a drill hole located 200 feet to the northeast. It is a sheared and silicified zone with the following values: 0.58 ounce of silver per ton, 0.07% lead and 0.60% zinc over 2.5 feet.

Another hole located to the southwest cuts a deeper stratigraphic zone containing 2.90 ounces of silver per ton over one foot. It must be noted that, in these holes, stratigraphic correlations based on lithologic characters are impossible even at distances of only 200 feet.

Southwest Potash Corporation (Amax Exploration Inc.)

This company held a block of 10 claims east of Wilson creek, near the north boundary of the quarter township.

The geophysical work done in 1965 consisted of magnetometric and electromagnetic surveys. Drilling was then recommended over a magnetic anomaly of 600 gammas and over two conductors. In 1966, an induced polarization survey delineated a more precise target.

One or more holes were drilled, but the results were not reported. Granite cores were found in the field. A company mentiones "greenstone" outcrops, but we were unable to locate them.

Brossard Claims

Two shallow holes are said to have been drilled in 1956 near the loop of Wilson creek. These would have encountered andesite and non-mineralized quartz-calcite veins. There is unfortunately no record of their location.

Gaspesie Mining Company

Gaspesie Mining Company held a group of claims straddling the western part of the wide loop of Wilson creek. Work performed during the year 1964 was apparently limited to mere surface prospecting with maybe, a few trenches. No record of the results of this work is available.

GEOCHEMISTRY

During the survey, 59 samples were collected from soils rich in organic materials in small streams. The results of analysis are given in the following table and on the accompanying map.

BIBLIOGRAPHY

Longley, W.W. - The Grevet Map-area, Abitibi District; Bureau of Mines, Quebec, Annual Report 1936-B.

Longley, W.W. - Tonnancourt-Holmes Map-area, Abitibi County; Que. Department of Mines, G.R. 24, 1946.

Sample No. on the map	Code No. of sample in files of Dept	RESULTS OF ANALYSES IN P.P.M.													
		Cu	Zn	Pb	Mo	Ni	U	Co	W	Mn	Sn	Au	Ag		
1	210	10	90	20	0	35	2	23	0	905	0	0	0.6		
2	129	10	40	20	0	38	0.5	25	0	665	0	0	0.4		
3	130	30	40	16	0	60	1	18	0	635	0	0	0.8		
4	138	16	50	20	0	43	1	20	0	740	0	0	0.6		
5	124	30	60	16	0	60	1	25	0	605	0	0	0.6		
6	211	16	90	20	0	55	1	28	0	635	0	0	0.4		
7	121	24	60	16	0	35	1	20	0	485	0	0	0.5		
8	122	30	60	16	0	55	2	23	0	760	0	0	0.6		
9	123	20	75	20	0	45	1	25	0	690	0	0	0.5		
10	125	30	50	20	0	45	0.5	28	0	695	0	0	0.6		
11	126	20	60	20	0	43	1	28	0	940	0	0	0.5		
12	204	16	75	16	0	35	1	18	0	885	0	0	0.4		
13	109	16	60	16	0	38	2	25	0	615	0	0	0.5		
14	127	10	50	16	0	45	1	25	0	635	0	0	0.6		
15	111	20	60	20	0	43	1	13	0	245	0	0	0.8		
16	115	10	60	20	0	38	1	18	0	480	0	0	0.4		
17	116	20	60	20	0	35	1	18	0	810	0	0	0		
18	210	10	90	20	0	35	2	23	0	905	0	0	0.6		
19	102	10	60	20	0	35	1	25	0	2950	0	0	0.6		
20	108	10	60	20	0	30	1	10	0	620	0	0	0.4		
21	101	6	40	20	0	13	0.5	15	0	295	0	0	0.5		
22	302	2	25	16	0	23	0.5	5	0	97	0	0	0		
23	200	6	50	10	0	18	1	10	0	300	0	0	0.5		
24	201	2	25	20	0	15	0.5	8	0	185	0	0	0.4		
25	103	4	50	16	0	23	0.5	18	0	165	0	0	0		
26	105	24	60	20	0	35	1	13	0	240	0	0	0.4		
27	112	10	50	16	0	20	1	18	0	950	0	0	0.4		
28	113	4	40	20	0	13	0.5	18	0	5800	0	0	0.3		
29	119	4	40	10	0	18	0.5	10	0	1400	0	0	0		
30	301	4	50	20	0	33	1	13	0	670	0	0	0.3		
31	104	4	60	16	0	18	0.5	18	0	850	0	0	0		
32	203	6	60	20	0	33	0.5	20	0	390	0	0	5		
33	107	4	50	20	0	25	0.5	15	0	245	0	0	0.5		
34	206	2	15	10	0	10	1	5	0	53	0	0	0.4		
35	207	4	50	16	0	33	1	20	0	405	0	0	0.4		
36	208	10	60	16	0	33	1	18	0	430	0	0	0.5		
37	100	6	60	16	0	25	0.5	18	0	300	0	0	0.4		
38	137	10	40	16	0	28	0.5	13	0	385	0	0	0		
39	136	16	50	10	0	35	1	20	0	670	0	0	0		
40	106	10	50	16	0	25	0.5	13	0	170	0	0	0.6		
41	133	6	50	10	0	18	0.5	10	0	330	0	0	0.3		
42	114	4	40	16	0	25	1	13	0	405	0	0	0		
43	117	6	50	16	0	33	0.5	13	0	260	0	0	0		
44	120	6	40	6	0	18	0.5	8	0	145	0	0	0		
45	141	10	60	16	0	30	0.5	13	0	430	0	0	0.3		
46	205	16	60	16	0	38	1	18	0	475	0	0	0.4		
47	110	10	50	10	0	30	0.5	18	0	335	0	0	0.3		
48	140	20	60	20	0	40	0.5	18	0	505	0	0	0.5		
49	139	16	50	20	0	33	0.5	15	0	1075	0	0	0.4		
50	138	16	90	16	0	95	0.5	50	0	5175	0	0	0.6		
51	214	40	40	10	0	25	0.5	5	0	350	0	0	0.4		
52	135	10	60	16	0	28	0.5	13	0	685	0	0	0		
53	134	10	60	10	0	35	1	18	0	585	0	0	0.6		
54	213	6	40	16	0	33	0.5	18	0	665	0	0	0.6		
55	132	10	90	16	4	33	0.5	38	0	–	–	–	–		

Sample No. on the map	Code No. of sample in files of Dept.	RESULTS OF ANALYSES IN P.P.M.													
		Cu	Zn	Pb	Mo	Ni	U	Co	W	Mn	Sn	Au	Ag		
56	212	10	50	16	0	20	0.5	30	0	–	–	–	–		
57	209	6	60	10	0	18	1	5	0	93	–	0	0.4		
58	208	4	50	16	0	13	0.5	5	0	260	0	0	0		
59	131	6	25	20	1	–	0.5	–	–	–	–	–	–		

0 No determination

– Element not detected