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PART OF NORTHWEST QUARTER OF BEAUCHASTEL TOWNSHIP, ROUYN-NORANDA COUNTY

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GEOLOGICAL REPORT 30

PART OF NORTHWEST QUARTER

of

BEAUCHASTEL TOWNSHIP

ROUYN-NORANDA COUNTY

By

W. G. Robinson



POUR CONSULTATION SEULEMENT
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PART OF NORTHWEST QUARTER, BEAUCHASTEL TOWNSHIP

ROUYN-NORANDA COUNTY

by W.G. Robinson

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Map No.617.--Part of Beauchastel Township ... (in pocket)

PART OF NORTHWEST QUARTER, BEAUCHASTEL TOWNSHIP

ROUYN-NORANDA COUNTY

by W.G. Robinson

INTRODUCTION

General Statement

During the field season of 1940, the writer mapped the geology of the part of Beauchastel township extending eastward from lot 1 to lot 22, inclusive, of ranges VI (north half), VII, VIII, and IX. Rock outcrops were mapped by plane table on the scale of 400 feet to one inch.

The map-area is adjoined on the east by the Halliwell Mine area (14)* and on the south by the Arntfield-Aldermac Mines area (11). At the north, the eastern half of the area, from lot 10 to lot 22, range IX, overlaps for a width of about a quarter of a mile the south boundary of the Flavrian Lake map-area (16).

Gold has been found on two mining properties in the area and not far to the south are the Aldermac, Arntfield, and Francoeur mines.

Trails lead northward to the area from the Arntfield and Aldermac mines, and westward from the road that follows the range line VIII-IX as far west as lot 29. By canoe, the area can be reached from Kanasuta, a station on the Nipissing Central railway, over a route that passes through Desvaux, Dasserat, and Arnoux lakes. Range lines and a number of trails assist travel within the area, but in places the thick brush makes walking difficult.

Topographic relief is low and few of the hills are more than 150 feet high. Some stands of first-growth timber remain, but parts of the area have been swept by forest fires in recent years. There has been no cultivation, but certain sections are well covered with soil and may be suitable for agriculture.

Arnoux lake projects for a short distance into the area, along its western boundary, and two small lakes lie, respectively, in lots 18 and 19 of range VIII, and in the northern part of lot 23, range VII. Numerous small streams cross the area and drain into Arnoux lake. Several of these unite with the stream carrying slimes from the Aldermac mill and form a large creek which drains into the southeast corner of Arnoux lake. This creek may be travelled by canoe as far as the camp of Les Mines d'Or Provencher, on lot 1, range VII.

* Numbers within brackets refer to Bibliography, p.4.

Acknowledgments

The managements of the Aldermac, Arnfield, and Francoeur mines, and the owners of the Morgan-Piché property, gave the writer access to their surface maps. The location of some of the outcrops in the southeast corner of the map was taken from plans of the Aldermac mine. Les Mines d'Or Provencher allowed the party the use of their camp buildings as headquarters for the summer's work, and the Aldermac management permitted the use of their office. The writer desires to record his appreciation of these generous services.

Capable assistance in the field was given by Maurice Michaud, Henri Gagnon, and W.N. Ingham, respectively students of L'Ecole Polytechnique, Laval University, and the University of Toronto, and by Jos. Lanthier as cook.

The Department of Geology at the University of Saskatchewan allowed the writer facilities for writing this report.

Bibliography

The following reports and maps have information concerned with the map-area:

- (1) Cooke, H.C., Opasatika Map-Area, Timiskaming County, Quebec; Geol. Surv. Can., Sum. Rept., 1922, Part D, pp.19-74.
- (2) Cooke, H.C., James, W.F., and Mawdsley, J.B., The Geology and Ore Deposits of the Rouyn-Harricana Region, Quebec; Geol. Surv. Can., Mem.166, 1931.
- (3) Gunning, H.C., The Syenite Porphyry of Boischatel Township, Quebec; Geol. Surv. Can., Bull.46, 1927, pp.31-41.
- (4) James, W.F., Duparquet Map-Area, Quebec; Geol. Surv. Can., Sum. Rept., Part D, 1922, pp.75-96.
- (5) Wilson, M.E., Larder Lake and Eastward; Geol. Surv. Can., Sum. Rept., 1909, pp.173-179.
- (6) Wilson, M.E., Kewagama Lake Map-Area; Geol. Surv. Can., Mem. 39, 1913.
- (7) Wilson, M.E., Timiskaming County; Geol. Surv. Can., Mem. 103, 1918.
- (8) Opasatika Map Sheet; Geol. Surv. Can., Map 240A, 1933.
- (9) Duparquet Map Sheet; Geol. Surv. Can., Map 281A, 1933.
- (10) Rouyn-Bell River Area; Geol. Surv. Can., Map 328A, 1936.

The following publications have information on the nearby district:

- (11) Bruce, E.L., Arntfield-Aldermac Mines Map-Area, Beauchastel Township; Que. Bur. Mines, Ann. Rept., 1932, Part C, pp.29-87.
- (12) Gussow, W.G., Petrogeny of the Major Acidic Intrusives of the Rouyn-Bell River Area, of North-Western Quebec; Roy. Soc. Can., Trans., Vol.XXXI, 1937, Sec. IV, pp.129-161.
- (13) MacKenzie, G.S., Fortune Lake and Wasa Lake Map-Areas, Dasserat and Beauchastel Townships; Que. Bur. Mines, Geol. Rept. No.5, 1940.
- (14) MacKenzie, G.S., Halliwell Mine Map-Area; Que. Bur. Mines, Geol. Rept. No.7, 1941.
- (15) Malouf, S.E., Geology of the Arntfield Gold Mine; Can. Min. Jour., Vol.59, No.8, August, 1938, pp.427-434.
- (16) Robinson, W.G., Flavrian Lake Map-Area; Que. Bur. Mines, Geol. Rept. No.13, 1943.
- (17) MacDonald, M.V., The Aldermac Syenite Porphyry Stock, Quebec; unpublished thesis, McGill University, 1938.

GENERAL GEOLOGY

General Statement

The consolidated rocks of the area are all of Precambrian age and resemble those of adjoining areas. Keewatin-type volcanics have been intruded by intrusive rhyolite, quartz diorite, syenite and syenite porphyry, feldspar-quartz porphyry, quartz porphyry, lamprophyre, and diabase.

Structural determinations on the shape of lava pillows and in a few localities on beds of tuff indicate that, in general, the volcanics strike a little south of east, dip steeply south, and have their tops facing south, from which it is concluded that all the formations in the area are on the south limb of an anticlinal fold.

Gold has been found on the Morgan-Piché and Les Mines d'Or Provencher properties, but no commercially-exploitable orebodies have been developed. Zones of disseminated pyrite with minor associated chalcopyrite were seen in several places in the area.

Table of Formations

Pleistocene and Recent	Boulder clay, sand, gravel
<u>Great unconformity</u>	
Precambrian	Diabase Quartz veins Mica Lamprophyre
	<u>Intrusive contact</u>
	Syenite and syenite porphyry Feldspar-quartz porphyry
	<u>Intrusive contact</u>
	Quartz porphyry
	<u>Intrusive contact</u>
	Quartz diorite
	<u>Intrusive contact</u>
	Keewatin-type volcanics

Keewatin-type Volcanics

The fine-grained meta-volcanic rocks of the area range in composition from rhyolite to basalt. For mapping purposes, those of basic and intermediate composition were grouped together as a unit. This unit therefore includes the two groups shown as K₁ (greenstones) and K₄ (light green lavas or pyroclastics) on map No.510 (16), and those designated K₁ (basic lavas, chiefly andesite) and K₃ (lavas and fragmentals intermediate in composition) on map No.492 (14).

Flows of Basic and Intermediate Composition

On the northern part of lots 7 to 16, range IX, the volcanics are light green and resemble those of the adjacent part of the Flavian Lake area. The rock in some outcrops is a breccia, but none was seen with definite pillow structure. In places, most commonly where the rocks have been rendered schistose, irregular, elongated streaks

are seen on the weathered surfaces. These may be the elongated fragments of a breccia, or they may be the remains of greatly deformed pillows. Thin sections of these rocks examined under the microscope show crystals of hornblende and feldspar in various stages of alteration, and a little quartz. The most altered specimens consist of a granoblastic aggregate of quartz, albite, and chlorite. The proportion of quartz increases with the degree of re-crystallization.

On lots 3 and 4 of range IX, north of the large band of quartz diorite referred to on a later page, the flows are of intermediate composition. Some outcrops are so siliceous as to resemble rhyolite, but they have distinct bun-shaped pillows and do not contain much quartz. The rocks on the southern part of lots 1 to 5, range IX, are similar in appearance. In most of the exposures they are ellipsoidal, but the pillows are relatively small, averaging a foot and a half and rarely exceeding three feet in length. Most of them have a bun shape, occur in a linear arrangement, and are well suited for determining the attitude of the flows. Pillow lavas of similar appearance outcrop in the southern part of lots 7 to 9 of range IX, and in the northern part of lots 8 to 10 of range VIII.

Whitish-grey weathering lavas exposed on the northern part of lots 1 and 2 of range VIII contain abundant hornblende and probably approach andesite in composition. The pillows in these rocks are larger than those in the more acidic flows.

A band of porphyritic andesite, about a mile wide, trends eastward in ranges VII and VIII from lots 9 and 10 to lot 16, where it terminates against the Aldermac stock. East of the stock, on lots 19 and 21 of range VIII, there are outcrops of a band of similar rock which has a width of 1,500 feet. A few outcrops of porphyritic andesite were seen also in the southeastern corner of block 57. In this rock, numerous small, white crystals of feldspar, from one-eighth to one-quarter of an inch long, contrast with a dark green groundmass. Thin sections show phenocrysts of plagioclase in a groundmass of feldspar, hornblende, chlorite, and epidote. Many of the outcrops exhibit ellipsoidal structure, with pillows of irregular contour. This irregularity may result from the pillows being exposed on horizontal, eroded surfaces of flows having shallow dips. Where these coarse-grained flows have no pillows, it is difficult to distinguish them from intrusive rocks.

In the southern half of range VII, the flows are light-green weathering and non-porphyritic; they are probably of intermediate composition. In these rocks flow breccias are common, but only a few pillows were seen.

Acidic Lavas

The Flavrian Lake report (16, pp.7-8) describes a complex of rhyolitic rocks and suggests three possible origins for parts of the complex: by extrusion, by intrusion, and by metasomatic replacement. Rocks of similar appearance to those in the Flavrian Lake area occur near the central part of lots 7 and 8, range IX; in the northern part

of lots 10 to 22, range IX; in the central part of lots 15 and 16, range IX; in lots 17 to 22, range IX, where they are the predominant type encountered; and in the northern part of lots 10 to 13, and in lots 19 to 22, range VIII. The distribution of these outcrops suggests that they represent a continuation of the Flavrian Lake rhyolite complex. In most of the outcrops, the rock is microcrystalline, but in some its component crystals of quartz and feldspar can be seen by eye. In one outcrop in the northern part of lot 13, range VIII, near the contact of the rhyolite with the porphyritic andesite, angular fragments of the latter rock are included in a rhyolitic matrix, and there is a similar occurrence in the central part of lot 8, range IX. Also, in an outcrop in lot 22, range VIII, near the southern boundary of the lot, a block of tuff was seen included in rhyolite. These occurrences suggest that the rhyolite was intruded, but they are not conclusive evidence, since the inclusions may be blocks of older rocks which became engulfed in lava flows. Bedded tuffs were seen in two places, so that some parts of the complex must have been extrusive.

A possible hypothesis is that the area occupied by the complex was a centre of volcanic activity from which the flows were dominantly acidic. Bodies of intrusive rhyolite could have been forced from the volcanic vent into openings near the surface and have quickly cooled, which would account for their fine grain. Vapours given off from the magma chamber and the volcanic vent could have caused the alteration of the light-green volcanics of the Flavrian Lake area, and of the rocks adjoining the rhyolite complex in the Halliwell area.

An easterly trending band of acidic volcanics was traced across the northern half of lots 1 to 13, range VI, and thence across the southern part of blocks 16 and 15 into the northwest corner of block 20. A half-mile width of these rocks was seen in the map-area, and the work of Bruce (11) has shown that they continue farther south for nearly a mile. A few small basic flows are interbedded with the rhyolites. The regularity in outline of the band, the presence of occasional beds of pyroclastics, and the lack of intrusive features indicate that in this band the rocks are predominantly, if not wholly, of extrusive origin.

Another band of rhyolitic rocks, about 800 feet wide, trends easterly across the northern half of lots 9 to 16, range VII, lying to the south of the wide band of porphyritic andesite referred to on page 7. On lots 15 and 16, the rhyolite is partially chloritized, which may result from alteration associated with the intrusion of the nearby Aldermac stock.

Small bodies of rhyolitic rock were seen elsewhere in the area. Many narrow bands of rhyolite occur in the porphyritic andesites. Some have regular outline and may be interbedded flows, but others are irregular and are probably intrusive.

Pyroclastics

Small outcrops of bedded tuff occur at several places in the map-area, but these could only be traced for

short distances. Near the southern boundary of lots 7 and 8 of range VII, three outcrops were seen of a rhyolitic rock consisting of angular siliceous fragments in a fine-grained matrix. In both the fragments and the matrix there are small, dark 'eyes' of quartz, and the rock is probably an acidic agglomerate.

Similar rock occurs in blocks 16 and 20, along the northern edge of the band of rhyolite. No bedding was recognized in this rock but it may be a pyroclastic and equivalent to the rock described in the above paragraph.

Post-Keewatin Intrusives

Quartz Diorite and Related Rocks

These rocks, which form some prominent hills in the area, intrude the volcanics and are intruded by syenite and feldspar-quartz porphyry. They weather dark green and have a speckled appearance, with feldspar, hornblende, and occasionally quartz, visible in hand specimens. The grain size is from medium to coarse and in some of the larger bodies there are irregular patches of pegmatitic material with crystals from one to two inches long. Examined under the microscope, the rock is seen to consist of hornblende and chlorite, which together make up about 50 per cent of the rock, with feldspar, and a little quartz and epidote. The feldspar is highly altered and no reliable determinations could be made from the sections which were studied. Because of the alteration of the feldspar, and the doubt that exists in some cases as to whether the hornblende is an original constituent of the rock, precise classification of these rocks is difficult. On the basis of their macroscopic similarity, and conforming with the views of earlier geologists, they are here grouped together under the general designation "quartz diorite".

A large band of the quartz diorite, with a maximum width of 3,200 feet, trends southeast, south, and southwest from the northwest corner of the map-area. The boundaries of the mass in lots 1 to 7, range IX, and in lots 5 to 7, range VIII, have been fairly closely established, but in lots 1 to 8, range VII, outcrops are so rare and widely scattered that the distribution of the formations is highly speculative and the possible southward extension of the mass could not be mapped. Another band trends easterly in range VII from lot 9 to lot 16. What is probably a continuation of this band on the east side of the Aldermac stock was traced to the boundary of the map-area, and MacKenzie (14) has mapped it as continuing for another mile eastward. The quartz diorite in the central part of lots 2 and 3 of range VII may be the westerly continuation of the same band. Three bodies of quartz diorite of moderate size were seen in lots 19 to 22 of range VIII, and smaller bodies occur in many parts of the map-area.

Quartz Porphyry

A few small bodies of quartz porphyry occur near the eastern boundary of the map-area, on lots 21 and 22 of range VIII, and in blocks 57 and 63. These resemble the quartz porphyries described by MacKenzie (14, pp.12-13) and are probably related to the Flavrian stock of granite.

Syenite and Syenite Porphyry

The Aldermac stock of syenite and syenite porphyry lies almost wholly in the map-area. This stock has a length, north to south, of about three miles and an average width of three-quarters of a mile. It has the form of two irregular lobes joined by a waist which, at its narrowest point, at the south end of lot 18, range VIII, has a width of only slightly more than 800 feet. The southern lobe occupies most of block 63, part of blocks 20, 17, and 57, and most of lots 17 to 19, range VII. The northern lobe underlies part of lots 14 to 19, range VIII, and extends northward into the southern part of lots 15 to 17, range IX.

The stock is a composite intrusive composed of irregularly-shaped bodies which vary from acidic, light-coloured material to basic, nearly black varieties, and from fine-grained facies to rocks having crystals of feldspar several inches long. The petrography and petrogeny of the intrusive have been discussed at length by H.C. Gunning (3, pp.31-41) and M.V. MacDonald (17). MacDonald describes the common, intermediate types as being composed of phenocrysts of potassic feldspar, with some of albite, in a groundmass of biotite, aegirine-augite, and, more rarely, soda-amphibole. He found that the more basic varieties are composed of pyroxene and potash feldspar in about equal amount, and the most acidic facies of potassic feldspar, albite, and quartz.

The several bodies that make up this composite stock have distinct boundaries, but chilling effects at their margins are rare. They show no evidence of differentiation in place. Where dykes of one facies intrude a body of an earlier facies, it was observed that there is a tendency to parallelism of the phenocrysts in the two rocks, suggesting that their intrusion was nearly contemporaneous and that the phenocrysts were oriented by a stress operating while both rocks were still in a partially liquid or plastic state.

A basic border phase, 400 to 600 feet wide, extends along the east edge of the stock, in blocks 63 and 57. Irregularly-shaped patches of this basic facies occur elsewhere in the southern part of the stock and are intruded by more feldspathic types. In a geophysical survey of the Aldermac property, it was found that the basic facies of the syenite gave higher magnetic anomalies than the more acidic types. These latter form the northern part of the stock, but outcrops are few and widely scattered. Gunning (3, pp.32, 40) concluded that the basic facies was the first to be intruded, that succeeding facies were lighter coloured with a progressively lower content of ferromagnesian minerals, and that the final dykes were still more acidic, consisting of phenocrysts of potassic feldspar and quartz in a groundmass of nearly pure albite and quartz.

Feldspar-Quartz Porphyry

The Twin Lake mass of feldspar-quartz porphyry underlies large parts of lots 10 to 14, range IX, and extends for a short distance beyond the map-area. It adjoins the Aldermac stock and, near their contact, the two rocks

are quite similar in appearance. In mapping, those rocks having no visible quartz were included with the syenite.

In the feldspar-quartz porphyry, phenocrysts of feldspar and quartz are distributed through a microcrystalline groundmass of albite and quartz. Most of the feldspar phenocrysts are about half an inch long and those of quartz about a quarter of an inch. A few small dykes were seen intruding the Twin Lake mass and they apparently differ from the latter only in being fine grained. Thin sections show that the feldspar phenocrysts are fresh microcline.

Following is a bulk analysis of six samples of the porphyry taken at random along the northern margin of the Twin Lake body (16, p.11):

Twin Lake Feldspar-Quartz Porphyry

(Analysis by Que. Bur. Mines)

SiO ₂	72.04	K ₂ O	7.47
Al ₂ O ₃	15.64	H ₂ O-.....	Trace
Fe ₂ O ₃	0.54	H ₂ O ⁺	0.31
FeO	Nil	TiO ₂	Nil
MgO	0.05	P ₂ O ₅	0.02
CaO	Nil	MnO	Nil
Na ₂ O	4.17		100.24

On account of the high content of alumina and alkalis, this rock is of possible interest for use in the glass or ceramic industry if the tenor of iron can be reduced by a magnetic separation.

The proximity of the Twin Lake stock to the Aldermac stock, and its petrographic similarity to the youngest, acidic facies of that stock, suggests that the two are genetically related and that the Twin Lake stock represents one of the end phases of differentiation of the magma which gave rise to the rocks of the Aldermac stock.

Mica Lamprophyre

On lot 21, range VIII, a small dyke of mica lamprophyre intrudes an outcrop of andesite, and also cuts a dyke of syenite in the andesite.

Diabase

A nearly vertical dyke of diabase, averaging about 80 feet wide, traverses the entire map-area diagonally, from the northwest to the southeast corner. This dyke is known to extend for many miles northwestward beyond the boundaries of the map-area.

Pleistocene and Recent

Most of the area is covered with Pleistocene and Recent deposits of sand, gravel, and clay. A large hill of gravel on lots 5, 6, and 7 of ranges VI and VII

was probably deposited as glacial moraine. Another hill of gravel was seen in block 63. Deposits of sorted and rounded pebbles of uniform size on the sides of a large hill of quartz diorite on lots 12 and 13 of range VII are probably part of a raised beach of a post-glacial lake.

STRUCTURAL GEOLOGY

Faults

The presence of a fault trending east of north on lots 11 and 12 of range VII is suggested by the strong fracturing and the metallic mineralization in the adjacent rocks. A prominent cliff face on lot 12, on the large outcrop of quartz diorite west of the presumed fault, may be a fault-line scarp. Where the large diabase dyke crosses lot 12 its trend changes from southeast to south and then again to southeast, but apparently it is not faulted. However, it is possible that the fault postulated displaced the fracture along which the dyke was later intruded, and the diabase may have then come up along the displaced parts of the fracture and along a connecting cross-fracture. If such be the case, the horizontal displacement of the fracture is about 400 feet, west side north.

A small valley trending east of north in the southeast corner of block 16 may mark the position of another fault. Crossing this valley is a band of acidic volcanics, possibly pyroclastics, which are characterized by small, dark 'eyes' of quartz and occasional included rock fragments. Where it crosses the valley from the western to the eastern side, this band has apparently been displaced about 300 feet horizontally to the south.

A third fault, which roughly parallels the two described and dips eastward at a shallow angle, displaces one of the orebodies at the Aldermac mine. Its surface projection would be in the north-central part of block 63. This fault is not shown on the map.

The band of porphyritic andesite in ranges VII and VIII, and the band of acidic lavas in the northern part of range VI, trend easterly on the west side of the Aldermac stock. East of the stock, the southern boundary of the porphyritic andesite is about 4,000 feet farther south than the same boundary on the west of the stock. Also, the northern contact of the band of acidic volcanics is shown on the Wasa Lake sheet (13, Map No. 464) as being 4,000 feet farther south than is the corresponding boundary on the west side of the stock. This lack of alignment may be the result of either faulting or folding.

The Demin Lake Syncline

From structural determinations in the volcanics around Washusk and Ogima lakes and around the south end of Dasserat lake, Cooke (1, p. 32) concluded that an axis of synclinal folding passes through the south end of Dasserat lake and across the south end of Uwass (Demin) lake. Evidence obtained by later work in Dasserat and Beauchastel

townships by G.S. MacKenzie (13, pp.14-15) and the writer substantiates Cooke's conclusion as to the presence of this synclinal fold.

In the West Beauchastel map-area, most of the data on the attitude of the volcanic formations were obtained from pillows in flows of intermediate or basic composition, but a few flow contacts and a few thin beds of tuff were seen. The data obtained show that, almost everywhere, the volcanic formations strike a little south of east, dip south, and have their tops facing south, indicating that the area is on the north limb of the synclinal fold mapped by Cooke. Locally, however, there are exceptions to this easterly trend of the volcanics. Thus, on the southern part of lot 8 of range IX, the elongation of the pillows and the attitude of the beds of tuff indicate that the formations strike north and south. These, and other deviations from the general easterly trend of the formations, occur near the larger intrusive bodies, and were probably caused by a crumpling of the volcanics at the time of intrusion.

On the Francoeur and Arntfield properties, the formations dip and face north. MacKenzie (13, p.14) found north-facing pillows in the basic lavas south of Demin lake, and Cooke (2, p.94) reported south-facing pillows at the north end of the lake. These observations indicate that an easterly-trending axis of synclinal folding passes through Demin lake. MacKenzie mapped the rocks around this lake as basic lavas, with acidic volcanics to the north and the south. Bruce's map (11, Map No.218) shows acidic volcanics east of Demin lake, with no continuation of the basic lavas. A westerly pitch of the synclinal axis which passes through the lake would explain the V-ing out of the basic lavas to the east. Near the centre of lots 3 and 4 of range VI, Beauchastel township, diamond drilling on the Morgan-Piché claims indicated a band of basic lavas which may be a continuation of those at Demin lake.

Just beyond the limits of the map-area, a short distance south of the centre of lot 12, range VI, an outcrop of andesite has pillows at its north end whose tops appear to face south, and pillows at its south end whose tops appear to face north. These determinations are based on only a few pillows and are not conclusive. Bruce mapped this outcrop as part of a band of andesite which is some 600 feet wide, trends about N.60°W., and has acidic volcanics to the north and south. This band may be the locus of the synclinal axis and may belong to the same horizon as the basic lavas at Demin lake.

MacKenzie's map of the Wasa Lake area (13, Map No.464) shows northerly dips in the lavas in the northern part of lots 23, 24, and 25, range V, Beauchastel township. The writer observed south-facing pillows in outcrops in the southeast corner of block 57 and in the northeast corner of block 63. Thus it is probable that the synclinal axis lies in the band of acidic volcanics which occurs between these two localities or in the thin band of basic lavas infolded with the rhyolites. The axis of folding could not be north of the acidic band, as no equivalent formation was seen by the writer in the northern part of Beauchastel township. Also favouring the presence of the synclinal axis within

the acidic band is the fact that, on the Francoeur property, a band of coarse-grained acidic pyroclastics underlies the band of rhyolite along its southern margin*, and, on lots 7 and 8 of range VII, some outcrops showing pyroclastics and rhyolite in similar relationship were seen by the writer along the northern edge of the rhyolite band.

Attitude of the Intrusives

The Twin Lake and Aldermac intrusive stocks are discordant with the attitude of the volcanics. In the underground workings at the Aldermac mine, the southern edge of the syenite stock dips north.

Most of the bodies of quartz diorite are dykes and are discordant with the volcanics. The large band of quartz diorite in range VII, which has been mapped as continuing southwesterly to the southern end of Dasserat lake (8), may be a sill. Some of the lenticular bodies of quartz diorite may be in old fissures through which the lavas were erupted.

The large dyke of diabase which trends northwesterly across the area swings to a northerly direction just beyond its northern boundary, in range X. Within the area, numerous offsets occur along the strike of the dyke. Some of these may result from displacement along small faults, as was seen in two places, on lot 13, range VII, and on lot 7, range VIII. Others probably result from the dyke occupying en échelon tension cracks.

A northeasterly trending vein of white quartz up to 85 feet wide cuts acidic volcanics in lot 8, range IX, and pinches out to the southwest. A similar vein, having the same strike, crosses the same outcrop about 200 feet to the southeast of the first vein and also appears in a second outcrop 1,400 feet to the southwest. This would suggest that the quartz is filling en échelon tension cracks in the volcanic formations, but here the tension cracks have a trend quite different from those occupied by the diabase dyke referred to in the preceding paragraph.

Easterly trending shears, such as those with which the Francoeur and Arncliffe orebodies are associated, and such as are common in the region to the south, near contacts between Temiscamian- and Keewatin-like rocks, are not in evidence in the present map-area.

ECONOMIC GEOLOGY

No commercial deposits of gold or other metals have been developed in the map-area, but trenching and diamond drilling have shown the presence of gold in small amount on two properties, and sulphide mineralization has been noted at several localities along and near the diabase dyke that passes diagonally across the area.

* S.E. Malouf, oral communication.

It is worthy of note that, in its southeasterly extension beyond the limits of the present map-area, this dyke passes within 1,400 feet of the Aldermac orebodies, and at numerous localities, both to the northwest and to the southeast, over a distance of seventy miles sulphide mineralization has been reported in or near the dyke. Further prospecting along and in the vicinity of the dyke in the present area appears warranted.

Description of Mining Properties

Les Mines d'Or Provencher

This property may be reached by a wagon trail which runs north and west from the Arntfield mine to the camp, which is near the centre of the eastern boundary of lot 1, range VII.

Exploration has been confined chiefly to a dyke of quartz diorite which trends easterly across lots 2, 3, and 4 of range VII. This dyke is at least 200 feet wide and is exposed for 1,500 feet. North of it are outcrops of a glassy, grey rock in which dark 'eyes' of quartz and some angular fragments of more siliceous material are distributed through a rhyolitic matrix. This rock somewhat resembles an acidic agglomerate, but in one place it appears to intrude a patch of andesite and so is classed as intrusive quartz porphyry. One specimen which was examined microscopically was found to consist chiefly of quartz and carbonate. The quartz porphyry was seen in contact with the quartz diorite in two places but age relationships could not be determined. On lot 2, a wedge-shaped mass of andesite lies between the quartz diorite and quartz porphyry.

Along the southern edge of the dyke, the quartz diorite has been highly altered and is very rich in silica. Examination of thin sections shows that the degree of alteration increases from north to south across the dyke and involves the breaking down of hornblende to chlorite and epidote, saussuritization of the feldspars, and the introduction of quartz, albite, and possibly magnetite.

Within the dyke, a zone of carbonate alteration, trending N.40°E., is exposed for a length of about 200 feet, with a maximum width of thirty feet. The rock contains white carbonate and a little disseminated pyrite and has a rusty weathered surface. The zone has been trenched and three diamond-drill holes were put down to intersect it. Samples taken by the writer* assayed from nil to 0.051 oz. gold per ton.

On lot 4, a pit along the southern edge of the quartz diorite ridge exposes a silicified zone with disse-

*All samples taken by the writer were assayed in the laboratories of the Bureau of Mines. Samples were taken to test for presence of gold and not to evaluate the deposits.

minated pyrite. A sample taken by the writer across 6.3 feet assayed 0.01 oz. gold per ton. Another trench, on lot 3, exposes a stringer of quartz which strikes about N.70°W. and is 0.9 feet wide. A grab sample contained 0.099 oz. gold per ton.

Morgan-Piché Property

The Morgan-Piché property can be reached from the wagon trail to Les Mines d'Or Provencher. In 1938, the property was optioned by the International Mining Corporation who explored it by trenching and diamond drilling. The option was then relinquished.

The work was concentrated on a silicified zone with disseminated sulphides near the centre of lots 3 and 4 of range VI. Scattered mineralization occurs here over an east-west length of about 500 feet and over a maximum width of about 280 feet. South of a few outcrops of andesite is a band of silicified rhyolitic rock with a minimum width of 150 feet. A band of basic volcanics, about 60 feet wide, succeeds this on the south, and is followed by another band of rhyolite.

The northern band of rhyolite is intruded by a dyke of syenite porphyry, in which widely scattered phenocrysts of feldspar are distributed through a microcrystalline groundmass. Both the rhyolite and the syenite are mineralized with pyrite, and, because of this and their altered condition, they are difficult to distinguish, except where the rock has been blasted. In two north-south trenches, 50 feet apart, the dyke is 40 feet and 25 feet wide, narrowing to the east, and still farther east a small width of syenite is exposed at the surface.

Drilling indicated that the northernmost contact of the rhyolite and andesite strikes N.72°E. and dips 50° south. One drill hole intersected the contact of the southern band of rhyolite with the andesite, which dipped north. The two most westerly holes did not intersect rhyolite.

In one small outcrop, a band of acidic agglomerate is in contact with both andesite and rhyolite, the andesite occurring as a wedge between the rhyolite and the agglomerate. In another outcrop, an inclusion of andesite occurs in the rhyolite. These relationships, together with the irregular boundaries of the bands of rhyolite, suggest that the rhyolite may, in part, be intrusive.

According to records of the property owners, assays of samples taken from the two trenches across the northern band of rhyolite gave an average gold content of 0.039 oz. per ton over a length of 110 feet, and 0.025 oz. per ton over 125 feet, respectively. Samples of the rhyolite and the syenite porphyry taken by the writer assayed 0.049 oz. and 0.053 oz. gold per ton, respectively. A vein of white quartz cuts across the northern edge of this rhyolite band, with strike N.72°E. and dip 60° south. It is exposed for a length of 110 feet and is from 6 to 18 inches wide. A chip sample taken by the writer contained 0.002 oz. gold per ton. Two trenches about 15 feet apart

across the southern band of rhyolite expose a few small quartz stringers but less disseminated pyrite than in the northern band. Records of the owners show that samples from the trenches contained 0.074 oz. gold per ton over 20 feet, and 0.096 oz. over 15 feet, respectively. A sample of the better mineralized material taken by the writer returned 0.238 oz. gold per ton.

Six holes were diamond drilled to explore the northern band of rhyolite. The four easterly holes intersected rhyolitic rock of similar appearance and gold content to the surface showings, but mineralized over a lesser width.

Other Mineral Occurrences

The basic and intermediate lavas in the southern part of lots 15 and 16 of range VII are much altered and are spotted with greyish-weathering, rounded aggregates of minerals which stand out on the weathered surfaces. This alteration extends over an area of about thirty acres and is partly on the Chance claims and partly on the MacDonell claims. The 'spots' somewhat resemble those in the altered rock around the orebodies at the Amulet mine, but they are not as white and hence are less conspicuous than those in the Amulet rock. Specimens examined microscopically show a crystalloblastic texture with only a few relicts of the original feldspars discernable. The 'spots' are aggregates of albite and quartz in a groundmass that is chiefly sericite and chlorite.

Trenches and pits in this altered zone expose fractured rock traversed by narrow quartz veinlets which contain pyrite and a little chalcopyrite. Assays of two samples containing sulphide minerals, taken by the writer, gave only a 'trace' in gold. In the winter of 1940-41, two holes were diamond drilled to explore this zone. The alteration was reported to continue to depth, but no mineralization of commercial importance was intersected.

Near the middle of lots 7 and 8 of range VI, a zone of sulphide mineralization trends about N.50°E. in the rhyolite, has a maximum width of 150 feet, and is exposed for a length of 200 feet. A 40-foot trench has been blasted along this zone. The sulphides occur finely disseminated and in small seams and pockets, and the mineralization dies away to the north and south. Pyrite predominated but some chalcopyrite was seen. Four chip samples taken by the writer gave nil, trace, trace, and 0.003 oz. gold per ton. About 500 feet east of here, near the centre of lot 8, a similar zone of sulphide mineralization in the rhyolite trends N.80°E., is 40 feet wide, and is exposed for 200 feet.

On the southern part of lot 9, range VII, four outcrops of lavas in an area about 600 feet square have sulphide mineralization and rusty oxidized surfaces. The lavas appear to be of intermediate composition and contain fragments of more acidic material. Pyrite and a little chalcopyrite occur both disseminated and in small pockets in the rock. Assays of three samples of the sulphides gave a 'trace' in gold.

On lot 10, range VII, a short distance north of the band of quartz diorite, a zone of sulphide mineralization about 20 feet wide, which trends N.85°W., is exposed in two trenches fifty feet apart. Pyrite and a little chalcopyrite are disseminated in a lava of intermediate composition, whose weathered surface is oxidized and rusty. A sample taken from the westerly trench contained no gold.

A rusty zone of disseminated pyrite in quartz diorite was seen near the centre of lot 12, range VII, a short distance from the diabase dyke, and on the west side of the assumed fault. A sample from a trench in this zone had no gold. Four hundred feet south and east of here, on the east side of the assumed fault, a zone of sulphide mineralization occurs at the contact between the rhyolite and the quartz diorite. Assay of a sample returned no gold. A short distance north of this, on the west edge of an outcrop of quartz diorite, a vein of white quartz containing a little pyrite is exposed in a pit for a length of seven feet. The attitude of the vein could not be determined. A sample taken by the writer assayed 0.002 oz. gold per ton.

The outcrop of rhyolite on lot 12, near the VIII-IX range line, has considerable disseminated pyrite along its southern edge. A few trenches were seen. Assay of a sample taken by the writer gave 0.001 oz. gold per ton.

On the south part of lot 8, range IX, a vuggy vein of white quartz in the lavas is exposed for a length of 20 feet, striking about N.5°E. The vein is four inches to two feet wide and contains small amounts of pyrite, chalcopyrite, galena, and specularite. A grab sample returned a negative assay for gold.

A trench across an outcrop of rhyolite in block 57, a short distance south of the quartz diorite, exposes some pyrite mineralization. Assay of a grab sample gave 0.003 oz. gold per ton. A trench across the contact of rhyolite and andesite in this block exposes sulphide mineralization over a width of one foot. A sample taken by the writer gave 0.005 oz. gold per ton.

A vein of white quartz with a maximum width of 85 feet is exposed in two outcrops 1,400 feet apart on lots 7 and 8 of range IX. It strikes N.30°E. and appears to be the continuation of a large quartz vein which was traced for more than a mile in the Flavrian Lake area.

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