

RP 232(A)

Preliminary report on part of the west half of Hébécourt township, Abitibi-West county

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PRELIMINARY REPORT
ON
PART OF THE WEST HALF
OF
HEBECOURT TOWNSHIP
ABITIBI-WEST COUNTY

BY

R. BRUCE GRAHAM



QUEBEC
1949

PRELIMINARY REPORT

ON

PART OF THE WEST HALF

OF

HÉBÉCOURT TOWNSHIP

by

R. Bruce Graham

During the summer of 1948, the writer mapped the geology of 20 square miles in the western part of Hébécourt township, Abitibi-West county. The area is bounded on the east by the north-south centre line of Hébécourt township and on the west by the Quebec-Ontario interprovincial boundary. From north to south it includes ranges V, VI, VII and VIII. Rock outcrops were mapped on a scale of 500 feet to 1 inch. This map-area is included in part of the Palmarolle (1) and Duparquet (2) sheets. Immediately to the east is the Hébécourt Lake Map-Area (3).

The area is reached by road from the town of Duparquet, which is 8 miles to the east. The road is part of the highway under construction passing through range VII to the Ontario boundary. At the time of leaving the field the road was passable by car as far west as lot 25. When completed, it will join the highway being constructed eastward from Timmins, Ontario. Access to the north part of the area is difficult. It may be reached from lot 38, range VIII, by a trail extending west from the end of the road along the north boundary of the range. It may also be reached by striking north from the highway, or from a trail which leaves the highway in lot 30 and crosses the northern part of range VII in a general westerly direction, as far as lot 8. The southern part may be reached by an old lumber road, which leaves the highway in lot 36 and crosses the area in a general southwesterly direction. Trails lead away from this road both to the north and south. It may also be reached by a trail leading south from the highway in lot 21.

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- (1) Map No. 293 A, Palmarolle Sheet, Abitibi County, Quebec; Geol. Surv. Can., 1934.
 - (2) Map No. 281 A, Duparquet Sheet, Abitibi and Témiscamingue Counties, Quebec; Geol. Surv. Can., 1933.
 - (3) Graham, R. Bruce, Hébécourt Lake Map-Area; Que. Dept. Mines, P.R. No. 216, 1948.

GENERAL GEOLOGY

The consolidated rocks are all of Precambrian age. They consist of a series of volcanic flows comprised of rhyolite, trachyte, dacite, andesite, basalt and flow breccia, together with a few horizons of tuff and agglomerate. Included in this complex are sills of related diabasic intrusives. Scattered bodies of diorite and gabbro intrude the volcanics.

Numerous shear zones occur throughout the area. They are most abundant in the north half of range VII, where they comprise part of what is known as the "Destor break" (1) or the "Porcupine-Destor fault" (2). Intruded along these shear zones are a few scattered bodies of feldspar porphyry and quartz-feldspar porphyry. They are later than the major fault movements but have been locally sheared as a result of subsequent motion along the faults into which they were intruded. Later than the porphyry intrusives is a set of northerly trending joint-like faults with small displacements. A few dykes of lamprophyre, diabase, gabbro and diorite occur in ranges V, VI, and VII. These are believed to be still younger than the northerly trending faults.

Following is a chronological table of the geological and structural data as determined in the area:

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- (1) Bannerman, H.M. Lépine Lake Area, Destor Township, Abitibi County, Que. Bur. Mines, Geol. Rept. No. 4, 1940.
 - (2) Ambrose, J.W. Preliminary Map, Duparquet-Larder Lake-Rouyn Region, Ont. and Que.: Geol. Surv. Can., Paper 44-29, 1944.

Table of Formations

Pleistocene and Recent		Muskeg, forest loam, gravel sand, silt, clay, till.
Great unconformity		
PRECAMBRIAN	Keweenawan (?)	Dykes of lamprophyre, diabase, gabbro, diorite
		"Younger" Faulting
		Intrusive Contact
	Algoman (?)	Mineralization Minor faulting
		Quartz-feldspar porphyry Feldspar porphyry
		Intrusive contact Major faulting Folding
	Post Keewatin-type	Diorite and gabbro (possibly post-folding)
		Intrusive contact
Keewatin-type	Diabase, quartz diabase, diorite, gabbro Trachyte, dacite, andesite basalt, flow breccia, tuff, agglomerate, rhyolite, related hornblende schist, chlorite schist and sericite schist.	

Keewatin Type

The Keewatin-type rocks of the area are composed mainly of trachyte, dacite, andesite and basalt. Spherulitic flows of intermediate to basic composition occur sporadically in ranges V, VI, and VII. A rhyolite band outcrops in ranges V and VI. Narrow bands of flow breccia occur throughout the area. Beds of tuff and agglomerate occur in places and are most extensive in the south-central part of range V. The volcanics are intruded by numerous di-basic and gabbroic dykes and sills, which are customarily termed "diorite" by those who work in the area.

Rhyolite

A prominent band of rhyolite butts against diorite just north of the west arm of Hébécourt lake, in range VI. It may be followed by scattered outcrops southwestward for $2\frac{1}{2}$ miles to the middle of range V where it disappears under drift. The rhyolite has an average width of 1,600 feet. It has a regional strike of north 63° east and dips from vertical to 80° south.

Outcrops of rhyolite weather light grey to greenish-grey in colour. Tiny quartz eyes are well developed and slender laths of grey feldspar are visible on the weathered surface. On the fresh surface, the rhyolite is fine grained and greenish grey. It consists predominantly of feldspar, quartz and greenish ferro-magnesian minerals.

Trachyte

Three main horizons of trachyte are exposed within the map-area. The first enters the area from the east in the north-central part of range VIII. It extends west as far as lot 10, a distance of about $3\frac{1}{2}$ miles, where it pinches out. This band has an average width of 1,000 to 1,400 feet, a regional strike of north 80° west, and a dip of vertical to 85° north. The second horizon of trachyte is exposed for a length of 3 miles. It enters the area from the east in the south half of range VIII and extends westward with a regional strike of north 80° east crossing the north boundary of range VII in lots 16 to 20. It disappears under drift in lot 14, range VII. This band has an average width of 1,000 to 1,200 feet. The third horizon of trachyte is first exposed about 3,000 feet west of the west arm of Hébécourt lake, 1,300 feet south of range-line V-VI. It gradually increases in width to the southwest, until, $1\frac{1}{4}$ miles from the interprovincial boundary, it has a width of 3,000 feet. This trachyte horizon has a regional strike of north 65° east.

Outcrops of trachyte weather light-grey to ash-grey and in places reddish-brown in colour. On the fresh surface the trachyte is light to medium grey. In places, it breaks with a sub-conchoidal fracture. It is fine grained to aphanitic and has a massive to trachytic texture.

Dacite and Andesite

Flows of dacite and andesite are widely distributed and occur closely intermingled with flows of basaltic composition. They occur most abundantly in the southern part of the area. Their general distribution is shown on the accompanying map.

Dacite and andesite weather reddish-brown to green, and, except where they are sheared, have a fine-grained compact texture. Dacite is

distinguished from andesite only by the presence of minute quartz eyes. The two rocks were grouped together for mapping purposes.

Basalt

Basalt, like the dacite and andesite, is widely distributed throughout the map-area. Descriptions of the numerous basaltic horizons are beyond the scope of this report. Basalt predominates in the northeast corner of the map-area, in the south half of range VIII from lots 1 to 10, in the north half of range VII, and in the north part of range VI. The majority of the basaltic horizons have been distinguished on the accompanying map.

Like andesite, basalt weathers reddish-brown to green. On the fresh surface, it is fine to medium grained and dark green to olive green in colour. Pillow structures are common. The basalt is distinguished from andesite mainly by its darker colour and higher specific gravity.

Spherulitic Flows

Seven separate horizons of spherulitic flows have been distinguished on the accompanying map. These all lie to the south of the "Destor-Porcupine fault". Three of these lie in range VII between lots 19 and 31 and three lie in the north part of range VI in the eastern half of the area. The other outcrops about 1,200 feet south of the north boundary of range V between 1 and 3 miles west of the eastern border of the map-area. These horizons vary in width from 100 to 1,000 feet and strike from north 65° east to north 80° east.

The spherulitic flows vary from basalt to andesite in composition. They weather reddish-brown to green. Pillow structures are well developed with the margins of the pillows containing a zone of spherules up to 4 inches in width. The spherules themselves are round to elliptical in shape and vary in size, but rarely exceed 1 inch in diameter.

Flow Breccia

Horizons of flow breccia may be found in flows of all types represented within the map-area. Only occasionally are they extensive enough to be shown separately on the map. The largest of these is exposed along the south shore of the west arm of Hébécourt lake. It occurs in andesite. Other bands of flow breccia may be seen in andesite in the middle of range VI, along the south edge of the rhyolite band in range V, and in basalt in the southeast corner of the map-area.

The fragments are angular to sub-angular, rarely exceed 6 inches in diameter and have the same composition as the underlying flow. Generally the fragments are more easily discerned on the weathered surface than on the fresh surface.

Tuff and Agglomerate

Beds of tuff are met with frequently in the volcanic complex. They rarely exceed 5 feet in width and due to poor exposures are difficult to trace. Consequently they are not indicated on the accompanying map. Agglomerate when present is associated with tuff and the two together occasionally form

horizons large enough to warrant mapping. The most extensive area of tuff and agglomerate occurs along the south border of the map-area, 2 miles west of the eastern border. It occurs as three separate horizons exposed for lengths up to 800 feet and between 250 and 300 feet wide. They have a regional strike of between north 80° west and north 60° west. Several other beds of tuff and agglomerate occur along the north border of the map-area between lots 24 and 26 and also in the north part of range VII and the north part of range VIII between lots 24 and 31. Other bands of tuff and agglomerate have been intersected by diamond drilling but are not exposed on surface.

The composition of the agglomerate varies from place to place but is composed of fragments stratigraphically lower in the volcanic series. The fragments are angular, rarely exceed 3 inches in diameter and are enclosed in a tuffaceous matrix.

Keewatin Type Intrusives

Intruding the lavas are dykes and sills of diabase, quartz diabase, diorite and gabbro. These varieties are all loosely termed diorite by those who have worked extensively within the area. Their close association with the lavas warrant the conclusion that they represent feeders and sills genetically related to the flows.

These intrusives, like the lavas, are rusty-brown on the weathered surface, which in places is slightly pitted from the weathering of ferro-magnesian minerals. On the fresh surface, the rock is greenish-grey to olive-green in colour and similar in appearance to the massive thick flows, except for the common development of a diabasic texture. These sills and dykes exhibit chilling effects at their contacts, but elsewhere the rock is medium to coarse grained.

Post-Keewatin-type Intrusives

Several widely scattered bodies of diorite and gabbro occur within the map-area. They are distinguished from the Keewatin-type intrusives by their larger size, their generally coarser grain, and the sporadic occurrence of banding, which apparently results from differentiation. A diabasic texture is locally developed, but it is not so common as in the Keewatin-type intrusives.

Diorite

Diorite occurs as dykes, sills, and plugs in ranges V and VI. The largest body lies along the north side of the west arm of Hébécourt lake and extends west of the lake for about 900 feet. This diorite represents the western termination of the large diorite body in the Hébécourt Lake Map-Area. Within the present map-area it has a maximum width of 2,900 feet at the eastern border and pinches out 5,800 feet farther west. It has a regional strike of north 75° east. A small plug of diorite lies 1,000 feet south of the west of the above-mentioned body just west of Hébécourt lake. Another body may be seen along the south border in the middle of the map-area. This latter diorite body is exposed for a length of 1,800 feet and a width of 300 feet. The area immediately surrounding it contains several dykes of diorite which probably represent offshoots from the larger body. A sill of diorite intrudes the rhyolite band in range VI. It may be traced by scattered outcrops for a length of 2,500 feet and is exposed for a width of 300 feet. This diorite sill has a regional

strike of north 70° east. Several other small sills and plugs of diorite are exposed in the map-area. They are shown on the accompanying map.

The diorite has a granitic texture and the grain size is from medium to coarse. The typical coarse-grained diorite contains about equal proportions of grey feldspar and ferro-magnesian minerals. A few gabbroic facies are present, but occur as bodies too small to be mapped.

Gabbro

Two sills of gabbro outcrop within the map-area. One is exposed along the south shore of the west arm of Hébécourt lake and extends southwest from the lake for a distance of 2,900 feet. It has a width of 100 feet and a regional strike of north 70° east. The second body lies about 1,000 feet east of the first. It has been traced for a distance of 1,400 feet, has an average width of 200 feet and strikes about north 80° east. A northeasterly trending fault intersects the sill about 100 feet west of its eastern end and displaces the west end about 200 feet to the south. These two sills and the small diorite plug which lies nearby are probably all apophyses of the large body of diorite which lies a short distance to the north.

Gabbro outcrops weather brown and are speckled with greenish-black ferro-magnesian minerals from 1/10 to 1/2 inch in diameter. Where a diabasic texture is developed, the feldspar occurs as well developed grey laths in a brownish matrix. On the fresh surface the rock is variable in colour and grain size. The composition varies from 80% greenish feldspar and 20% ferro-magnesian minerals to 95% ferro-magnesian minerals and 5% greenish feldspar. The grain size in the coarser-grained phases averages about 1/4 inch in diameter, but in the finer-grained portions it is considerably smaller and the gabbro itself is difficult to distinguish from the massive flows.

Algoman (?)

Quartz-Feldspar Porphyry

Two bodies of quartz-feldspar porphyry are exposed within the area. The first lies 1,000 to 1,400 feet south of the north boundary of range VII in lots 16 and 17. It intrudes sheared basalt and is itself carbonatized and locally sheared. The porphyry is exposed for a length of 1,100 feet and a width of 100 feet. It strikes approximately east-west. It is intersected near lot-line 16-17 by a northerly trending fault which has displaced the west side 200 feet to the south. The second body of quartz-feldspar porphyry outcrops in range V, 3,600 feet west of the eastern limit and 1,800 feet north of the southern limit of the map-area. Exposures indicate that this body is lenticular in outline with a length of 800 feet and a width of 300 feet. It strikes about north 80° west. It too is intersected by a northerly trending fault near its eastern end. This fault has an apparent horizontal displacement of west side south for 200 feet. This body of porphyry lies along the strike of a carbonate zone extending west from Hébécourt lake.

The quartz-feldspar porphyry is a grey to sea-green rock, light grey on weathered surfaces. Stubby feldspar phenocrysts form about 40 per cent of the rock, whereas rounded to squarish quartz phenocrysts form about 1 per cent. The phenocrysts average from 1/4 to 1/16 inch in diameter. The porphyry

contains some books of mica, which have been altered to chlorite, and are up to 1/3 inch across. The matrix is aphanitic and consists of quartz, sericite and feldspar.

Feldspar Porphyry

Exposures of feldspar porphyry were not observed within the map-area, but it has been intersected in places by diamond drilling. Such a body lies in lots 9 and 10, range VII, about 1,800 feet south of the north boundary of the range. It is bounded on the north by a zone of shearing and on the south by andesite and spherulitic flows. It has been intersected by drilling elsewhere in range VII in the zones of shearing related to the "Destor-Porcupine fault". However the feldspar porphyry occurs only as dyke-like bodies too small to be shown on the accompanying map.

This variety of porphyry is similar in appearance to the quartz-feldspar porphyry, except that quartz phenocrysts are absent. It is believed from the evidence of previous field work that this porphyry is a phase of the quartz-feldspar porphyry.

Keewenawan (?)

Dykes of diabase, lamprophyre and fine-grained gabbro and diorite intrude the lavas of the map-area. They rarely exceed 10 feet in width and their strike is confined to two well defined directions, namely, north 15° to 30° west and north 30° to 35° east. Because these directions correspond closely to those occupied by the younger faulting, and the dyke of gabbro in the northwest corner of range VI cuts across a younger fault without any displacement, these dykes are believed to be younger than the younger faulting. They are tentatively correlated as Keewenawan. The diabase dyke shown in range VII does not outcrop on surface. It was intersected in two drill holes from which its strike was obtained. A magnetometer survey indicated an anomaly about 41 feet east of this dyke which had the same strike as the dyke. The profiles on this anomaly suggest a dyke-like body. This anomaly was assumed to represent the course of the dyke.

Structure

The formations dip vertically with local variation of 10° to the north or south. With the exception of the southeast corner of the map-area the tops of the formations all face to the south.

The strike of the formations which lie to the north of the "Porcupine-Destor fault" differs from the strike of those which lie to the south. Those to the north strike into the area from the east with a bearing of slightly south of west. Towards the west they gradually swing to a strike of east-west and leave the area, to the west, with a strike of slightly north of west. The formations south of the break strike from north 50° to north 70° east, except towards the western border where they swing to a strike of north 80° east.

Folding

Except in the southeast corner of the map-area, there were no anticlines or synclines recognized. In the southeast corner there is some indication of the extension westward of the syncline in the Hébécourt Lake Area and an anticline about 1,200 feet farther south. The presence of these folds is indicated by only two top determinations. These show the tops of the formations to be north along the westward extension of the south flank of the syncline in the Hébécourt Lake Area. Eight hundred feet south of the most southerly top determination the formations again face south indicating an anticlinal axis somewhere in the intervening area. Because the evidence for these two folds depends on only two top determinations, their axes are shown on the accompanying map with a question mark.

Faulting

Two ages of faulting have been recognized within the map-area. The older faults favour two directions - north 60 to 70° east and from north 70° west to east-west. These faults are characterized by zones of shearing. The younger faults offset the older and strike from 30° east of north to 30° west of north. Their fault planes are inconspicuous and, when they are exposed, are seen to consist of narrow slickensided joint-like planes.

Older Faults.- Most of the movement appurtenant to the older faults occurred before the Algoman (?) intrusions. Subordinate movement took place along these faults after the intrusion of the feldspar and quartz-feldspar porphyries. These were sufficient to fracture and shear them, but displacements were insignificant. This period of faulting finished before the intrusion of the basic Keewenawan (?) dykes.

A zone of intense shearing, which is believed to represent the main zone of the "Destor-Porcupine fault", enters the area from the east 1,000 feet south of the north boundary of range VII. From there to lot 29, it strikes east-west, but between lots 29 and 21 it is arcuate in outline with its convex side towards the north. Between lots 21 and 17 it strikes approximately east-west again. In lot 17 it swings to the northwest with a strike of north 75° west and continues in this direction to lot 10. From lot 10 to the western border of the map-area it changes strike to slightly south of due west and leaves the area 1,600 feet south of the north boundary of range VII. This shear zone has been designated as zone 'A' on the map. Zone 'A' has been found exposed on only one small outcrop in the bed of a creek near a trapper's cabin, 400 feet from the western border of the area. Its course has, however, been traced by diamond drilling. The zone, as observed from drill core, is from 50 to 100 feet wide and consists of carbonatized and locally bleached and silicified chlorite, talc and sericite schists, which in places contain green mica. It dips from 65 to 80° to the south. To date, no displacements have been measured along zone 'A'.

Subsidiary faults branch from zone 'A' both to the north and south. Between lots 16 and 20, exposures to the north of zone 'A' contain numerous zones of shearing. The shearing strikes north 70° east and dips from vertical to 65° to the south. This shearing occurs at the east end of the southeasterly trending flexure of zone 'A'. At the west end of this flexure, in lots 10 and 11, two shear zones strike away from the north side of

zone 'A' in a north-easterly direction. They apparently die out in range VIII, curving from northeast to east-west as they become more distant. These two branches are not exposed on surface, but they have been intersected in diamond-drill holes. Their dip is not known. The zones of shearing in lots 16 to 20 apparently are connecting links between zone 'A' and the branch shear which leaves zone 'A' in lot 11.

Two shear zones were found which branch away from the south side of zone 'A'. Near zone 'A' they have a strike of 60 to 70° south of west gradually swinging to a more east-westerly strike as their distance from zone 'A' is increased. One of these shear zones leaves zone 'A' in lot 31 and has been traced as far as Dancès lake by means of a pronounced foliation along outcrops which form the south side of the valley in which the fault lies. From Dancès lake west the position of the fault is inferred from geophysical evidence. This zone dips from 70° to 80° to the north. The other shear zone branches from zone 'A' in lot 32 and has been traced southwestward to within $\frac{1}{4}$ mile of the western border of the area. This zone has been traced by exposures of sheared rock, by topography and by foliation developed in exposures along the flanks of valleys occurring along the strike of the fault. It dips 75 to 85° to the south.

Several other shear zones have been mapped to the south of zone 'A'. These zones are not so strong as the two described above, but they strike parallel or sub-parallel to them and are believed to belong to the same set. They are shown on the accompanying map.

Younger faults.- The faults which are included here are later than the faulting previously described. They all have a general trend which varies from 30° east of north to 30° west of north. Steep dips and joint-like planes, along which movement has taken place, characterize their habitual mode of occurrence. Apparent horizontal displacements are usually only a few feet or less but occasional, larger displacements are found. It has been observed that, when these faults strike northeast, the movement is usually left-handed and, when they strike northwest, the movement is usually right-handed. Reversals of this rule have been observed in places. Twenty-eight faults of this type are shown on the accompanying map. Many more were too small to be indicated and there is little doubt that many larger ones were not observed due to lack of exposure.

Alteration

The regional alteration within the area is low grade. Primary textures and structures are well preserved. Along the shear zones the rocks have been altered to chlorite, sericite and talc schists. Here the rocks have also been carbonatized and silicified and bleached to varying degrees. Around some of the diorite intrusives the formations have undergone a particular type of alteration. For descriptive purposes and until this type of alteration has been studied more carefully it is tentatively termed "dioritization".

Carbonatization

Carbonate, in the form of calcite, ankerite and ferruginous dolomite, is found extensively along zone 'A' and along the shear zones which branch away from zone 'A' to the northeast. It has also been observed along

a zone 120 feet wide which lies on the promontory on the south shore of Hébécourt lake near the eastern border of the map-area. This zone strikes slightly north of east. Two thousand four hundred feet farther south is a shear zone which has also been strongly carbonatized. These zones have been indicated on the map. Other local zones have been observed, but were too small to warrant mapping.

Silicification

Silicified zones are locally distributed along zone 'A'. They may consist of a network of narrow quartz stringers or, as in the vicinity of bodies of quartz-feldspar porphyry, as a soaking of the rock by siliceous solutions. These areas of silicification are not extensive and are not distinguished on the map from zones of carbonatization.

Bleaching

This type of alteration is confined to zone 'A'. Within the area it has been recognized only in drill core and locally in the sheared outcrops north of zone 'A' in lots 17 to 19. This type of alteration results in the bleaching of the greenish colour of the rocks to a pale-grey. It is often associated with silicification. Bleaching accompanies the Beattie and Donches-ter ore bodies in the Duparquet Lake Map-Area. It has been more fully described in the report on the Hébécourt Lake Map-Area (1).

"Dioritization"

This type of alteration is most intensively and extensively developed in the south-central part of the map-area. It occurs as an aureole up to 1,500 feet across surrounding two nearby diorite intrusions. It also occurs less extensively and in milder form along the north and south contact of the diorite body outcropping along the north shore of Hébécourt lake, along the south contact of the diorite plug which lies south of the west end of this body, and along the south contact of the most southerly gabbro sill in the northeast corner of range V.

The "dioritized" lavas are characterized by blistery protuberances on the weathered surface. These blisters are densely crowded in the highly altered rock and widely scattered, more or less isolated in the less altered rock. The blisters vary in size, but are generally of the order of $\frac{1}{2}$ inch by $\frac{1}{4}$ inch and about $\frac{1}{8}$ to $\frac{1}{4}$ inch high. On the fresh surface, the altered lavas are difficult to distinguish from normal diorite. The alteration grades into normal lavas through a phase that is marked by flecks and metacrysts of grey and sometimes pink feldspar. This phase shows no definite contact with the unaltered flows.

(1) Graham, R. Bruce, The Hébécourt Lake Map-Area, East Part of Hébécourt Township, Abitibi-West County, Québec Department of Mines, P.R. No. 216, 1948, P.17.

ECONOMIC GEOLOGY

Gold

Most of the prospecting in the area has been confined to range VII along some of the shear zones which comprises the "Porcupine-Destor fault". A few assays showing ore grade tenors of gold have been reported, and, since the "Porcupine-Destor fault" zone is essentially a gold-bearing belt, this mineral is the one most likely to be found in commercial quantities within the area. By analogy with the several producing ore bodies to the east, the following recommendations are suggested as important guides to prospecting.

A careful examination of all bodies of syenitic feldspar porphyry, quartz-feldspar porphyry and feldspar porphyry, and their immediate vicinity should be made for finely disseminated sulphides, which are frequently gold-bearing. Furthermore, any silicified breccia zones which may be found in these areas are especially favourable for the deposition of gold. In searching for the porphyry bodies themselves, it is of value to note that they occur along shear zones, and, in greater detail, may occur where two shear zones converge or where shear zones change abruptly in strike.

In the past, much time and money have been spent in prospecting the intensely carbonatized areas occurring along zone 'A'. To date, the results have been disappointing. The sterility of carbonate zones with regard to gold mineralization is a regional feature, and one would be well advised to consider this fact carefully before doing extensive work on these admittedly attractive-looking zones.

Copper

Two zones, mineralized with chalcopyrite, pyrrhotite and pyrite, occur in agglomerate and tuff in the aureole of alteration which surrounds the diorite in the south-central part of the area. The largest of these occurs on a hill 1,800 feet north and $2\frac{1}{2}$ miles west of the southeast corner of the map-area. It strikes north 78° east and the containing formations dip 75 to 80° south. It is exposed for a strike length of 700 feet but disappears under drift at either end. It has a width of 250 feet. The mineralization is sufficient to cause the outcrops to weather rust-coloured in many places. This weathering extends to a depth of about $\frac{1}{2}$ inch. The mineralization is disseminated and rarely exceeds aggregates $\frac{1}{8}$ inch in diameter. On the whole it is sparse, occurring in the matrix between the fragments and sometimes in the fragments themselves. A grab sample selected and submitted by the writer for assay gave 0.01 per cent copper, 0.018 oz. gold per ton, and traces of nickel. This sample did not represent the most strongly mineralized portions of the zone.

The second mineralized zone is similar to the first. It outcrops 900 feet north and $2\frac{1}{2}$ miles west of the southeast corner of the map-area. It is exposed for a strike length of 150 feet, disappearing under drift at either end. It is exposed for a width of 50 feet, but its south contact is covered by drift.

PROPERTIES

Donmaque Gold Mines, Limited

The Donmaque property comprises lots 24 to 29, range VII, Hébécourt township. It was formerly known as the Hyland-McNalley group. The work done on the property consists of a magnetometer survey and 7 diamond-drill holes consisting of some 5,500 feet of drilling. A trench was noted in lot 27 just west of the middle of Dancès lake and some stripping was done along a foliated zone on the northeast end of the hill in the middle of range VII, lot 29. No commercial values of gold were reported from the drilling or the trenching.

Zone 'A' passes across the northern part of the property and has been located in 5 of the 7 drill holes. North of zone 'A', the property is largely covered by drift. South of zone 'A', the formations consist of basalt, spherulitic flows, some andesite and medium-grained gabbro related to the flows. The distribution of these horizons is shown on the accompanying map. Two northeasterly striking shears cross the property to the south of zone 'A'. One of these joins zone 'A' at the east end of the property and the other joins it one lot farther east. These shears are also shown on the accompanying map.

Nemrod Mining Co. Limited

The ground held by this company consists of lots 15 to 23, range VII, Hébécourt township. The earliest recorded work was done by Ventures and Noranda in 1939, under a joint option. Considerable trenching was done on the high ground between lots 17 and 20 along the zones of shearing which lie 1,200 feet south of the north boundary of the range. This was followed by diamond drilling 13 holes for a total of 5,149 feet. The ground was staked again in 1943 by Leo Brossard and taken over by a joint option agreement by the Consolidated Mining and Smelting Company of Canada, Ltd., Nipissing Mines, Co., Ltd., Leitch Gold Mines, Ltd., Miami Copper Company, Ltd., and Siscoe Gold Mines, Ltd. A magnetometer survey and 7 diamond-drill holes totalling 3,263 feet of drilling were carried out between June, 1945, and March, 1946. The drilling was confined to zone 'A' and for 1,000 feet to the north. The rocks drilled consisted of sheared, carbonatized and occasionally bleached and silicified lavas containing occasional small dykes and lenses of feldspar and quartz-feldspar porphyry. The following year, the property was taken over by the Nemrod Mining Co., Ltd., but to date no further work has been done.

The "Destor-Porcupine fault" passes centrally across the property. Several northeasterly striking shears branch away from the north side of the fault and cross the northern part of the property. A lense of carbonatized quartz-feldspar porphyry intrudes the lavas in lots 17 and 18, 1,100 to 1,300 feet south of the north boundary of range VII. From north to south the formations consist of trachyte, basalt, spherulitic flows, basalt, andesite and then basalt again. In places diorite sills are present. An idea of the thickness, distribution and attitude of these flows may best be obtained by examining the accompanying map.

Scattered values up to 0.30 oz. gold per ton have been reported from the trenches and up to 0.15 oz. gold per ton for 2-foot widths from the drilling.

The most favourable remaining zone to be explored is in the quartz-feldspar porphyry body and along the shear zone which lies in a valley immediately north of this body.

The Brossard Group of Claims

The Brossard group is comprised of lots 1 to 14, range VII, Hébécourt township. This group was optioned by Leitch, Nipissing, Miami Copper, Consolidated Mining and Smelting, and Siscoe in 1945. A magnetometer survey from lots 7 to 14 was carried out in 1946. A diamond-drilling programme was carried out in 1945 and 1946. Seven holes were drilled totalling 5,558 feet of drilling. The drilling was carried out on lots 9 to 14 along zone 'A'.

The geology of the property is essentially the same as on the Nemrod group immediately to the east. Very few outcrops occur. Several small bodies of quartz-feldspar porphyry and feldspar porphyry were intersected in the drilling. A northwesterly trending dyke of diabase was intersected in two drill holes.

Two intersections of 0.06 oz. gold per ton over 3.5 feet and 0.11 oz. gold per ton over 3.5 feet were reported from the drilling on this property.

East Bay Gold, Limited

The ground held by this company consists of 6 claims in Duparquet township and 8 adjoining claims in Hébécourt township. The group is situated near the north end of Duparquet Lake in range VI.

The work done by the company has been concentrated on and around Beattie island which contains the original gold find of the district made by John Beattie. This discovery was in a vein opened by a pit in trachyte on the northwest shore of the island. The vein is composed of milky fractured quartz. It is about 2 feet wide and dips from 15 to 30° north but has numerous rolls which change the dip from place to place. It is mineralized with coarse chalcopyrite and pyrite in the fractures in the quartz. A more detailed description of the geology of the island is given in the preliminary report on the Duparquet Lake Map-Area (1).

Two samples were collected by the writer. They consisted of a number of chips taken at random from both the hanging and footwall of the vein and gave \$1.96 and \$19.74 in gold per ton. The vein where exposed has a small amount of gossan associated with it. Some of the gossan was panned by the writer and yielded a tail of gold. The concentrate of 3 pans weighing 1,685.3 milligrammes was assayed in the laboratories of the Quebec Department of Mines and yielded 0.746 milligrammes of gold and 0.628 milligrammes of silver.

(1) Graham R. Bruce, Preliminary Report on Duparquet Lake Map-Area, West Part of Duparquet Township, Abitibi-West County, Quebec Department of Mines, P.R. No. 206, p.23.

During the winter and spring of 1948, 9 holes were drilled amounting to 3,020 feet of drilling. The drilling intersected several quartz veins and shear zones cutting gabbro trachyte and andesite. The drilling was done from the footwall side of the Beattie vein zone and directed towards it. The collars of the holes dipped between 40° and 62° to the north. The vein dipped 15° to 30° to the north. The Beattie vein was not recognized in the drill core and it is quite possible that it was missed in the drilling. It is quite possible that it could be located by drilling from the north side of the vein towards the south.

Several intersections of gold mineralization of commercial value were obtained in the drilling. Values of interest ranging up to 2.5 feet in core width were 0.75 oz., 0.145 oz., 0.199 oz., in gold per ton. Three 20-foot sludge samples gave values of 9,002 oz., 0.182 oz. and 0.379 oz. gold per ton.

Palermo Gold Mines, Limited

This company holds a group of 10 claims on the south shore of Duparquet lake, one mile north of the southeast corner of Hébécourt township. A boss of dark-red syenitic porphyry intrudes both massive coarse-grained amphibolite and a shear zone striking 10° north of east. This porphyry lies approximately in the middle of the property. A more detailed description is given in the preliminary report on the Hébécourt Lake Map-Area (1), under the heading of the Kellar Group.

Records dating back to 1933 report the presence of gold in a fractured zone in the porphyry opened up by trenching. Values in gold up to 0.814 oz. per ton have been obtained. Drilling done in the summer of 1947 gave several drill intersections with values from 0.12 to 0.20 oz. of gold per ton over 5-foot widths. With these favourable indications, Palermo Gold Mines drilled thirteen diamond-drill holes totalling 5,000 feet. The results were disappointing and at present the property is idle.

(1) Graham, R. Bruce, Preliminary Report on Hébécourt Lake Map-Area, East Part of Hébécourt Township, Abitibi-West County, Que. Dept. of Mines, P.R. No. 216, 1948, p. 24.

PRECAMBRIAN-PRÉCAMBRIEN

KEEWENAWAN (?) KEEWENAWIEN (?)

Dykes of diabase, gabbro, diorite and lamprophyre
Dykes de diabase, gabbro, diorite et lamprophyre

ALGOMAN (?) ALGOMIEN (?)

Syenitic porphyry
Porphyre syénitique

Quartz-feldspar porphyry, Feldspar porphyry
Porphyre à quartz et à feldspath, Porphyre à feldspath

POST KEEWATIN-TYPE

POST TYPE-KEEWATIN

Diorite
Diorite

Gabbro
Gabbro

KEEWATIN-TYPE

TYPE-KEEWATIN

Quartz diabase, gabbro, diorite
Diabase quartzifère, gabbro, diorite

Tuff and agglomerate
Tuf et agglomérat

Flow breccia
Brèche volcanique

Mainly spherulitic flows
Coulées en majeure partie sphérolitiques

Mainly basalt, some andesite and trachyte
Basalte en majeure partie, andésite et trachyte

Mainly andesite, some basalt and trachyte
Andésite en majeure partie, basalte et trachyte

Trachyte
Trachyte

Rhyolite
Rhyolite

ZONES OF ALTERATION

ZONES D'ALTÉRATION

Carbonatization, silicification
Carbonatation, silicification

Dioritization
Dioritisation

Synclinal Axis-Axe synclinal

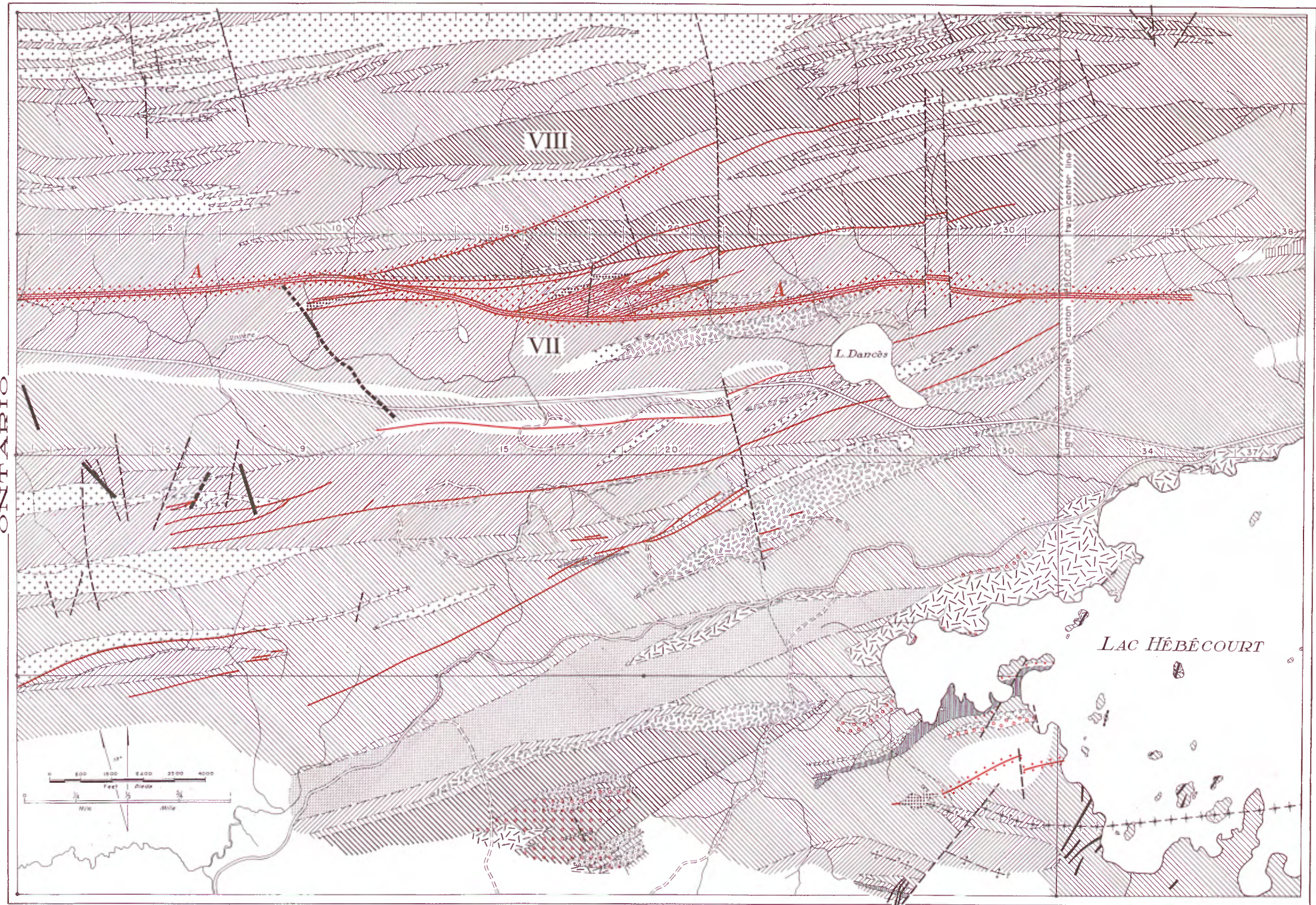
Anticlinal Axis-Axe anticlinal

Younger fault
Faille récente

Older fault and shear zone
Faille plus ancienne et zone de laminage



Geology by R. Bruce Graham 1948.
 Department of Mines, Québec 1949
*Géologie par R. Bruce Graham 1948.
 Ministère des Mines, Québec 1949*



PART OF WEST HALF OF HEBECOURT TOWNSHIP
 COUNTY OF ABITIBI WEST
 Preliminary Map

No 770

PARTIE DE LA MOITIÉ OUEST DU CANTON HÉBÉCOURT
 COMTÉ D'ABITIBI OUEST
 Carte Préliminaire