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Preliminary report on Lanaudière river map-area, east part of Duparquet township, Abitibi-West county

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PRELIMINARY REPORT

ON

LANAUDIÈRE RIVER MAP-AREA EAST PART OF DUPARQUET TOWNSHIP ABITIBI WEST COUNTY

BY

R. BRUCE GRAHAM



QUEBEC 1946

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LANAUDIERE RIVER MAP-AREA

EAST PART OF DUPARQUET TOWNSHIP

ABITIBI WEST COUNTY

by R. Bruce Graham

INTRODUCTION

The geology of an area in the eastern part of Duparquet township, Abitibi West county, comprising some fifteen square miles, was mapped by the writer during the summer of 1945. The area is bounded on the east by the Destor - Duparquet township line and extends westward into Duparquet township for three miles. From south to north it includes ranges IV,V,VI,VII, and VIII. Rock outcrops were mapped to the scale of 500 feet to one inch. This map-area forms a part of the Beattie-Galatea Mines (1) and the Destor (2) map-areas, and it includes part of the Palmarolle (3) and the Duparquet (4) sheets. Immediately to the east is the Duquesne map-area (5).

⁽¹⁾ O'Neill, J.J., Beattie-Galatea Mines Map-Area,
Parts of Duparquet and Destor Townships;
Que. Bur. Mines, Ann. Rept., Part C, 1933.

⁽²⁾ Buffam, B.S.W., Destor Area, Abitibi County,
Quebec; Geol. Surv. Can., Sum. Rept., Part
C, 1925, Map No. 2105.

⁽³⁾ Map No. 293A, Palmarolle Sheet, Abitibi County, Quebec; Geol. Surv. Can., 1934.

⁽⁴⁾ Map No. 281A, Duparquet Sheet, Abitibi and Témiscamingue Counties, Quebec; Geol. Surv. Can., 1933.

⁽⁵⁾ Que. Dept. Mines, P.R. No. 189.

On the accompanying map is also shown the geology of lot 1, ranges IV to VII, of Destor township, with slight modifications from that indicated on Map No. 611. These modifications are but minor adjustments of assumed contacts and faults to assure continuity of structures or formations, and they require no further comment.

The Beattie road crosses the area from east to west near the north boundary of range V, and it is closely paralleled by the Beattie railway. Another road follows the northern limit of the map-area eastward as far as lot 52. This one joins the Duparquet-Palmarolle highway. Moreover, several trails, though generally poorly marked, lead south from this road, whereas from the Beattie thoroughfare they branch off both to the north and south.

Extensive sections of the area were swept by forest fires in the spring of 1944. As a consequence, exposures of bed-rock were markedly increased, and it was possible to obtain much new information on the rocks and structures in the area. The more wide-spread exposures should be of considerable aid to future prospecting during the next three or four years.

GENERAL GEOLOGY

The consolidated rocks are all of Precambrian age. The oldest are a series of volcanics composed of altered rhyolite, trachyte, dacite, and andesite with related diabasic intrusives. Locally, these have been metamorphosed to hornblende, chlorite, and sericitic schists.

A small body of altered gabbro, presumed to intrude the volcanics, is exposed near the east-central margin of the map-area.

Later than, and unconformably overlying, the volcanics and related intrusives are beds of conglomerate and arkose, which are exposed as a belt extending from the west-central edge of the map-area to a point two miles eastward, where it forks out, with one branch following the Beattie road, and the other paralleling it 1,600 feet farther south.

A zone of faulting about a mile and a half wide, marked by numerous shear zones, crosses the southern portion of the area. This is a part of what is known as the 'Destor break' (1) or 'Destor-Porcupine fault' (2). Intruded along this zone are numerous bodies of quartz porphyry, quartz-feldspar porphyry, and feldspar porphyry. They are later than the major fault movements, but have been locally sheared owing to subsequent movements along the shear zones. Also present are several small dykes of lamprophyre which lie in the volcanics in ranges VI and VII.

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

⁽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

Fleistocene			Muskeg, forest loam,	
and Recent			gravel, sand, silt, clay, till	
Great unconformity				
	Algoman (?)	Minor mineralization 'Younger' faulting Mineralization Faulting		
Precambrian			Lamprophyre, feldspar porphyry dykes	
		Minor faulting and mineralization		
			Quartz porphyry and quartz-feldspar porphyry	
	Intrusive contact Major faulting Folding			
	Temiscam- ian-type	Duparquet sediments	Conglomerate, arkosic greywacke	
	Unconformity Folding			
	Keewatin- type		Cabbro Diabase and quartz diabase Andesite, trachyte, dacite, tuff, agglo- merate, breccia, rhyo- lite; related horn- blende schist, chlor- ite hornblende schist and sericitic schist.	

Keewatin-Type

The Keewatin-type rocks of the area are rhyolite, grey trachytes, dacites, and green andesitic lavas. Flow breccia occurs as narrow beds in the lava flows and pyroclastics occur in the dacites along the southern border of the maparea. These are intruded by numerous diabasic dykes and sills which are customarily termed 'diorite' by those who work in the area.

Rhyolite:

Along the north edge of the map-sheet, in lots 50 to 53, is a body of rhyolite with associated agglomerate and tuff. Only part of the southern edge of this body lies in the map-area and its full extent is not known.

The rhyolite weathers light grey, and on fresh surface is light greenish-grey and fine grained. Glassy quartz 'eyes' up to one-eight of an inch in diameter occur in the fine-grained groundmass and may form as much as 5 per cent of the rock. Locally, phenocrysts of grey to pinkish feldspar, about the same size as the quartz eyes, are sometimes present, and may even predominate the quartz.

Hornblende Schist, Hornblende Chlorite Schist, and Sericitic Schists:

Separating the rhyolite from the massive trachytes and dacites to the south is a band of schistose rocks about 1,000 feet wide. These are essentially hornblende and hornblende chlorite schists and some sericitic schist apparently derived from associated rhyolite, dacite and trachyte. The contact of these schistose rocks with the rhyolite to the north and the trachyte and dacite series to the south is gradational.

Buffam (1) has included these rocks as part of the contact zone of the Palmarolle granite to the north. On the other hand, a shear zone of considerable magnitude, possibly representing extensive faulting, has been reported to strike east-west through Lois lake to the northeast of the map-area. This zone is believed to strike towards the south contact of the Palmarolle granite to the west, and it might be of interest to note that the zone of schistose rocks in the present map-area lies along its projected strike. This is significant because an area of relatively massive rhyolite lies between the schistose rocks and the granite. If this were a contact zone it too should be similarly affected.

Dacite and Trachyte:

Lavas termed dacite and trachyte predominate from within a quarter of a mile of the northern boundary of the map-area southward to within about one-half mile from the Beattie road. After a distance of approximately two miles to the south, they again reappear to extend to the southern boundary of the area.

As far as can be determined from the structure, as it is now known, they represent the oldest exposed rocks in the map-area.

The dacitic and trachytic lawas have not been differentiated from each other on the accompanying map. They are light grey on fresh surface, weathering brown or, occasionally, grey. Generally, they are fine to very fine grained and compact, sometimes breaking with a sub-conchoidal fracture. Toward the centre of the thicker flows, the grain size becomes coarser and the rock has a greenish tinge. The flows commonly have well-

⁽¹⁾ Op. cit., p. 100.

developed pillow structure. Amygdules are not common but may be developed around the margins of the pillows.

Interbedded with the dacite and trachyte flows in range VI and in the southern part of range VII, lots 58 to 62, are two bands of 'spotted' lavas which are usually massive, but may also show pillowed phases. The spots are probably the result of alteration from original feldspar phenocrysts. Except for their porphyritic texture, they look no different from other pillowed or massive flows or sills in the area. The spots are composed of microcrystalline zoisite.

Andesite:

Green andesitic lavas predominate for half a mile north of the central conglomerate band and for two-thirds of a mile south of this Beyond these limits, both to the and south, occasional, narrow bands of andesite are interbedded with dacitic and trachytic flows. Some of these bands which are shown on the accompanying map lie in the northeast part of range VI and in range VII, lots 58 to 62. Farther west, the flows thin and diminish but increase again two miles west of the township line. Here the flows are narrow and erratic in distribution owing both to faulting and to pinching out along the strike. This complex of lavas has not been differentiated on the accompanying preliminary map.

The andesites, like the dacites and trachytes, weather brown. On fresh surface, they are dark greyish-green to olive-green and, except where sheared, they have a fine-grained, compact texture.

Tuff, Breccia, and Agglomerate:

A few narrow bands and lenses of flow breccia are present in the northern part of the

area, associated with pillow lavas. More common than the flow breccia are beds of finely-banded, white-weathering siliceous tuff. These occur in widths ranging to ten feet, though they rarely exceed a thousand feet in length, averaging 300 to 500 feet. Commonly, they occur between adjacent flows and are valuable horizon markers for determining the displacements, usually only a few tens of feet, along the numerous north-south trending joint-like faults. The siliceous tuff and agglomerate form only a small fraction of the exposed formations.

Beds of tuff are associated with the rhyolite to the north. These are well bedded and made up of bands varying from one-quarter to one-half an inch in thickness and from yellow to greenish-grey in colour. Agglomerate occurs as irregular lenses along the contact between the tuff and the massive rhyolite.

Along the southern border of the area there are scattered, widely-spaced outcrops which tuffaceous agglomerate predominates existing dacite and trachyte. This zone has a maximum width in the map-area of 1,000 feet is known to persist from the Macamic road westward to the western border of the map-area, a distance of approximately five miles. The fragments of the agglomerate are of various sizes. up to about four feet in diameter. They are of two types: white-weathering dacite, often porphyritic, and greenish-weathering andesite, often amygdular. The matrix surrounding the fragments is of a tuffaceous nature. In the beds which are dominently tuffaceous, there has been a certain amount of sorting of the constituent fragments. No agglomerates were found associated with the lavas north of the central conglomerate band.

Basic Intrusives:

Intruding the lavas and fragmental rocks and dykes and sills of intermediate to basic composition. They usually have a diabasic texture but are conventionally termed 'diorite' by those who have worked extensively within the area. They were mapped separately in the field, but are not differentiated from the lavas on the accompanying preliminary map. Their close association with the lavas and their absence among younger rocks of the area warrant the conclusion that they represent feeders and sills genetically related to the flows.

These intrusive bodies, like the lavas, are rusty -brown on the weathered surface, which is often slightly pitted from the weathering out of ferro-magnesian minerals. On fresh surfaces, the rock is grey-green to olive-green in colour and similar in appearance to the massive, thick flows, except that the diabasic texture is more pronounced. It exhibits chilling effects at its contacts with the latter, but elsewhere the rock is medium to coarse grained.

Gabbro:

A narrow sill-like remnant of altered gabbro, approximately 3,000 feet long and 400 feet wide, extends westward from within 500 feet of the Duparquet side of the township line. It is bounded on the north by andesite and on the east, west, and south by quartz-feldspar porphyry. It is probably the western extension of the northern gabbro body described by Graham (1).

⁽¹⁾ Graham, R.Bruce, <u>Duquesne Map-Area, West Part</u>
of Destor Township, Abitibi County; Que.

Dept. Mines, P.R. No. 189, 1915.

Temiscamian-Type

Conglomerate and Arkose:

Unconformably overlying the formations described in the preceding paragraphs is a series of sedimentary rocks in which the conglomerate predominates, but which includes interbedded arkose. At the western edge of the map-area the sediments have a thickness of 3,700 feet, the northern limit outcropping a few hundred feet south of the power line. Approximately two miles farther east, however, the band splits, one band following the Beattie road and railway, and the other paralleling it about 1,600 feet farther south. The southern band has a width of 3,000 feet and extends eastward into the Duquesne maparea. The northern band is the smaller of the two and has a width varying from 250 to 750 feet.

Usually, pebbles and boulders make up 75 to 80 per cent of the volume of the conglomerate. They range up to three feet in diameter and, except locally, they are poorly sorted. Rock types represented include acidic to basic volumics, granite, porphyry, greywacke, jasplite, chert, and amphibolite. The matrix consists of arkosic material.

In occurrences of the conglomerate near sheared porphyry, the boulders tend to be distinctly angular, but, in general, they are rounded to slightly elongated. Near and in zones of shearing, the ratio of length to width may be as high as 3 to 1.

The arkose beds are generally lenticular. In some places they show cross-bedding and grain gradations, which afford means of determining their attitude. On the basis of such observations, a synclinal axis in the southern

conglomerate band has been traced westward for a distance of one and a half miles from the boundary line between Destor and Duparquet townships. From here to the western limit of the map-area, evidence is insufficient to determine the position of the axis, but it is assumed that the continuation is in the same general direction.

At some places, arkose beds predominate along narrow, persistent zones up to 500 feet in width. Where these occur, they offer valuable horizon markers with which to determine the detailed structure. One of these wider bands has been shown on the map as it serves to reveal the nature of the displacements along the 'younger' faults, and marks the approximate position of the synclinal axis.

Algoman (?)

Quartz-Feldspar Porphyry and Feldspar Porphyry:

Quartz-feldspar porphyry, with a few associated bodies of feldspar porphyry, is distributed along two east-west zones. One zone lies just south of the Beattie road; the other, along the south border of range V. Between these two zones are scattered several small lenticular bodies of quartz-feldspar porphyry.

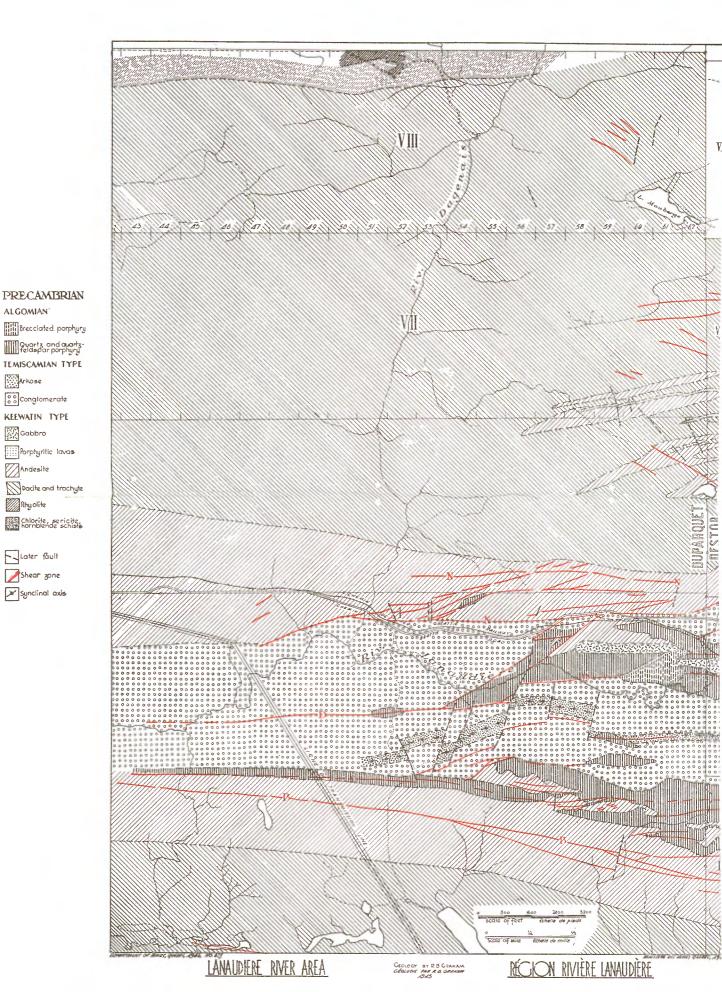
The porphyries are usually irregular and lens-like, occuring along or at the intersection of the more pronounced shear zones, and are themselves often sheared and shattered. They pinch and swell both in horizontal and vertical extent, and bodies which do not appear at the surface have been encountered in diamond drilling.

The quartz-feldspar porphyry is a grey to dark grey rock, light grey to pink on weathered surfaces. The grain of the matrix is very fine

to cherty, and there is a wide variation in the relative amounts of quartz and feldspar which cocur as phenocrysts and also of altered mica which occurs as books up to one-third of an inch across. The phenocrysts vary from one-sixteenth to onequarter of an inch in diameter. Where they tain their maximum dimensions, they are most abundant and impart an apparent, overall, coarsegrained appearance to the rock. The relative abundance of feldspar and quartz phenocrysts varies widely from exposure to exposure and, locallv. either one or the other may be lacking. This has resulted in small areas which may be mapped as quartz porphyry or feldspar porphyry. These have all been grouped under the one heading for the present preliminary report. The porphyry commonly contains fine. sparsely disseminated pyrite and some chalcopyrite.

Along the northern zone, the porphyry is continuous for at least a mile and a half from the eastern edge of the map-area, where it disappears under drift. To the east it continues into the Duquesne map-area. Typically, this body is massive, but in the vicinity of the Golconda showing and for one-half mile to the east it is brecciated, silicified, carbonatized, and locally sheared. The brecciated, silicified, carbonatized, and sheared portions are mineralized with disseminated pyrite and a small amount of chalcopyrite.

The southern zone of porphyry is the continuation of a porphyry zone in the Duquesne map-area and it stretches westward one mile and a half to a point on the Pitt property where it has been intersected by drilling. It has not been traced farther west ewing to sparsity of outcrops. Two other small lenses of porphyry occur about 1,000 feet west of the Destor-Duparquet



ALGOMIAN'

Arkose

∰ Gabbro

Andesite

Rhy olite

township line. One lies a few hundred feet north of the south boundary of range V, and the other is found 500 feet farther north. These bodies are locally sheared and silicified, carbonatized and mineralized with sparsely disseminated pyrite.

Lamprophyre and Feldspar Porphyry Dykes:

Several lamprophyre dykes were noted in the area. They are confined to the volcanics and related rocks in ranges VI and VII.

A number of dykes of feldspar porphyry, not shown on the accompanying map, were noted in the southern porphyry zone described above. They weather dark red and, on fresh surface, are dark red to greenish red. They also have a fine grain, with feldspar phenocrysts varying from pink to grey. In general they are not sheared.

Field evidence is lacking to determine the age of the lamprophyre relative to the porphyry, sediments, or gabbro.

STRUCTURE

An easterly-plunging syncline crosses the map-area from west to east, its axis passing through the southern band of conglomerate and arkose. It is apparently part of a synclinorium which continues eastward into the adjoining Duquesne map-area. The north limb dips from vertical to 70° south; the south limb, from 15° to 40° north. An east-west fault, zone A, truncates the south limb and, near the fault, dips are from 80° north to vertical.

Faulting and shearing within the area are very complex. Four east-west zones of composite shearing cross the area. Two of the zones lie north of the synclinal axis and the other two

occupy the area south of it. For the sake of clarity, these have been designated as zones N, D, A, and B on the accompanying map. Together, these form a part of what has been termed the 'Destor break' or 'Destor-Porcupine fault'.

Zone N.- This is just north of the Bexttie road and from 1,500 to 2,000 feet wide. It consists of a number of east-west shears, more or less parallel and linked together by northeast-erly trending shears. It is traceable from the Destor-Duparquet township line westward for two miles where it disappears under drift. There is an apparent horizontal displacement of 2,000 feet along the northeast shear just east of the power line, the northwest side having moved toward the southwest. Elsewhere, the amount or direction of displacement could not be determined.

Zone D.- This zone lies about 1,000 feet south of the Beattie road. It varies from less than 100 to 1,500 feet in width, and is similar in nature to zone N. It continues into the Duquesne map-area to the east, whereas toward the west, about 3,000 feet east of the power line, it disappears under drift.

Zone A.- Zone A closely follows the southern boundary of range V from the township line to 2,000 feet east of the power line, where it disappears under drift. Numerous, closely-spaced but discontinuous east-west shears, linked by northeast shears, are characteristic of this zone. It lies, for the most part, in porphyry and is representative of the nature of such zones where porphyry is the dominant rock, because it occurs as shattered and brecciated zones rather than well-defined shear zones.

Zone B.— This zone is poorly exposed, being located on only two or three outcrops which

lie about 1,000 feet south of zone A. It has been projected from the Duquesne map-area along the above-mentioned outcrops into the extensive drift-covered portion which overlies most of the western part of the present map-area. The general trend of the zone indicates that it should join zone A a short distance west of the Lanau-dière river near the southern boundary of range V. Close to the eastern border of the area, it splits, where one branch continues on the original strike, and the other trends in a more southerly direction.

North of the Beattie road. numerous southeasterly trending faults occur in the volcanics. Displacements are less than 500 feet. and irregular in direction. A zone of schistose rocks outcropping in the northern part of range VIII has been described on page 6, where it was suggested that it might represent a zone of shearing and, possibly, of extensive faulting. However, the area mapped in the preparation of this report is not large enough to provide the necessary evidence that would warrant any definite conclusion. In the southwest corner of the map-area, a shear zone trending slightly south of east passes over the southern boundary about a mile east of the western border. This zone, where exposed, is about fifty feet wide and is the probable continuation of the shear in lot 5, range III, in the Duquesne map-area(1).

Younger Faulting:

There are many small faults in the area with a general trend varying from 30° west of north to 30° east of north. They are apparently related in some manner to the jointing which is

⁽¹⁾ Op. cit., p. 14.

common in the area and which has similar strikes. Steep dips and joint-like planes, along which movement has taken place, characterize their habitual mode of occurrence. They have been observed to displace the east-west and northeast sets of shearing in the volcanics in the central part of the map-area and in the sediments south of the Beattie road. Apparent, horizontal displacements rarely exceed 500 feet and are usually only a few feet or less. They have no regularity in the direction of their displacements, and probably represent some compensation adjustments after the major faulting and intrusions of granite and porphyry ceased.

ECONOMIC GEOLOGY

Gold-bearing mineralization and some disseminated chalcopyrite have been discovered in several localities within the area. Values in gold, grading more than one ounce per ton, have been noted from some of the more favourable sites, but no assays in copper above 0.03 per cent have been reported. At the Beattie mine, which lies a few miles west of the present map-area, arsenopyrite is a relatively abundant constituent of the ore. In the area itself, arsenopyrite is a comparatively rare constituent of the general sulphide mineralization. Molybdenite has been reported from the Beattie and the Duquesne mines.

The gold-bearing mineralization has been found chiefly in silicified breccia zones associated with shear zones in the porphyries or close to them. Consequently, the porphyry bodies are important in any programme of systematic prospection.

Within the area mapped, the bodies of porphyry are found, almost without exception, in the immediate vicinity of shear zones and at in-

tersections of such zones. Since shear zones have a fairly predictable strike over short distances, they should be important guides to prospectors in their search for bodies of porphyry, and possible associated gold mineralization, in areas that are largely drift-covered. Projection of the lines of strike of converging shear zones or of points where shear zones show a sharp change in strike should indicate the places most favourable for the occurrence of porphyry or gold-bearing mineralization. However, a porphyry body may occur anywhere along a shear, whether or not it is joined by others.

Golconda Mines, Limited:

This Company holds claims on both sides of the Destor-Duparquet township line. The property has been previously described (1) but a brief description of the main showing will be included here. It lies about a mile west of the eastern boundary of the map-area, and about 1,000 feet southeast from the company's camp on the Beattie road. Here, between zones N and D. already referred to, pits and trenches along a porphyry greenstone contact have opened a northeasterly trending zone of shearing. brecciation, and mineralization for 1,000 feet. This zone is apparently one of several shear zones which join zone N with zone D. Assays of samples taken in the trenches are reported to have yielded interesting values in gold, but the results of subsequent diamond drilling were disappointing. Material of ore grade was encountered in several of the holes, but distribution of the gold was 'spotty'.

⁽¹⁾ Op. cit., p. 16.

Pitt Group:

This group was previously described under the heading of the Fleming Thompson Group (1). It is situated two and a half miles west of the Destor-Duparquet township line and about a mile south of the Beattie road.

The property is largely covered by drift, but drilling has outlined a shear zone about 100 feet wide striking N.80°W. in an eastwest trending, lens-like porphyry body, up to 300 feet wide. The porphyry intrudes, and lies near, the southern margin of the band of conglomerate and arkose which crosses centrally through the area. On the south, the porphyry is bordered by a narrow width of sediments which, in turn, are bordered on the south by volcanics.

Up to the fall of 1944, drilling disclosed an ore shoot in the porphyry where a shear, striking N.65°E., intersects the main shear. During the summer of 1945, drilling was continued to test the vertical and lateral extension of this shoot. Continuation at depth was established up to October, 1945, but no further lateral extension was found.

Independent Mining Corporation, Limited:

Independent Mining Corporation controls a group of claims on both sides of the Destor-Duparquet township line, just south of the present map-area.

⁽¹⁾ Op. cit., p. 18.

Prospecting on the property has indicated an east-westerly trending shear zone up to 300 feet wide in a tabular body of quartz-feld-spar porphyry with a minimum length of two miles and a width of about 1,000 feet. Some areas have been found to contain finely disseminated pyrite.

American Metal Company of Canada, Limited:

This group of claims lies a short distance north of the Beattie road in range VI. It extends westward from close to mile-post III-IV to a short distance beyond the map-area.

The claims are underlain by dacite, trachyte, andesite, related diabase, and a few narrow bands of siliceous tuff. A magnetometer survey was carried out in June and July of 1945, and was followed that September by a drilling programme. This was intended to explore some of the anomalies outlined and to test the eastern extension of the Beattie structure. At the time the writer left the field results were inconclusive.

Ottmann Gold Mines, Limited:

The Ottmann group straddles the Beattie road westward from the Golconda property to beyond the western boundary of the map-area. It lies on a probable extension of zone N, which marks the northern contact between sediments and volcanics. There is an apparent northeasterly-trending fault in the eastern part of the property, with a displacement of the contact 2,500 feet to the southwest.

Some trenching has been done just south of the road, about midway between mile-posts II-

III and IV-V. Two small bodies of feldspar porphyry have been exposed in schistose, chloritized and amphibolitized andesite.

In the summer of 1945, Teck-Hughes took an option on the property and that fall commenced drilling to cross-section the property from the road southward.

Duquesne Mining Company, Limited:

The property of Duquesne Mining Company, Limited, extends from near the boundary between range III and IV northward to the porphyry-conglomerate contact. Its eastern boundary is beyond the limit of the map-area, and it extends as far west as the Pitt property. It straddles zone D which diverges at the eastern border to form two other shear zones, as well as the continuation of the original zone.

Considerable trenching has been done in the porphyry where brecciated or sheared outcrops have been exposed. Mineralization, with scattered values in gold, has been encountered in several places. The main showing lies to the east of the present map-area, just west of the Macamic road in lot 28. Drilling up to October, 1945, has outlined an orebody with a minimum length of 720 feet and a width in core-length of between eight and twenty inches. It has been explored for a further 600 feet to the west with good, scattered values in gold.