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DEPARTMENT OF MINES AND RESOURCES

MINES, FORESTS AND SCIENTIFIC SERVICES BRANCH

GEOLOGICAL SURVEY OF CANADA

PAPER 48-19

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**CAMSELL RIVER MAP-AREA,**  
**NORTHWEST TERRITORIES**

(REPORT AND MAP)

BY

W. H. PARSONS

Camsell River Silver Mines Ltd OCT 20 1948

International Cerium Mining Co Ltd Silver  
Uranium

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GEOLOGICAL SURVEY OF CANADA

Paper 48-19

CAMSELL RIVER MAP-AREA,

NORTHWEST TERRITORIES

(Summary Account)

By

W.H. Parsons

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OTTAWA  
1948

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Preliminary map - Camsell River, N.W.T.....	In envelope
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# CAMSELL RIVER MAP-AREA, N.W.T.

## INTRODUCTION

### LOCATION AND ACCESSIBILITY

The Camsell River map-area includes about 3,950 square miles bordering on the southeast shore of Great Bear Lake. It lies between latitudes 65 and 66 degrees and longitudes 116 and 118 degrees, and is about 250 miles north-northwest of Yellowknife.

Access to the area is by float-equipped aircraft from Yellowknife.

### FIELD WORK

Geological mapping of the Camsell River area was commenced in 1946 by C.S. Lord<sup>1</sup> of the Geological Survey, and completed in the

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<sup>1</sup>Lord, C.S.: Camsell River, N.W.T.; Geol. Surv., Canada, Paper 47-4 (1947).

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following year by the writer.

The northwest corner and parts of the west border of the map-area were mapped by Kidd in 1932<sup>1</sup> and 1934<sup>2</sup>.

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<sup>1</sup>Kidd, D.F.: Great Bear Lake Area, Northwest Territories; Geol. Surv., Canada, Sum. Rept. 1932, pt. C (1933).

<sup>2</sup>Kidd, D.F.: Rae to Great Bear Lake, Mackenzie District, N.W.T.; Geol. Surv., Canada, Mem. 187 (1936).

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### TOPOGRAPHY AND DRAINAGE

Elevations above sea-level vary from 560 feet in the northwest corner, near Great Bear Lake, to more than 1,700 feet in the northeast, and from 700 feet in the southwest to 1,100 feet in the southeast.

Wopmay River drains the eastern part of the map-area and flows south and west into Hardisty Lake. Calder and Zebulon Rivers drain the northern and central areas and flow southwest into Camsell River, which drains northerly into Great Bear Lake.

About two-thirds of the map-area is underlain by granite, and consists of rounded hummocks that seldom rise more than 100 feet above the surrounding country. Innumerable, small, irregularly shaped lakes typify the granite areas. Gneissic granite, in the eastern part of the map-area, influences the topography, and long, narrow lakes parallel the gneissosity.

In some places, steep-flanked porphyry ridges trend northeasterly through the area and rise as much as 600 feet above the adjacent terrain.

Areas underlain by sedimentary rocks generally have abrupt linear ridges and contain fewer but larger lakes than the granite areas.

Volcanic rocks underlie high tablelands, which are usually bounded by cliff faces.

#### TIMBER

Low ground in the map-area is generally well wooded, whereas the higher ground is sparsely timbered or barren. Black spruce attains 3- and 4-inch butts, and is very common; white spruce occurs sparsely, and in sandy areas reaches a diameter of 18 inches; white birch occurs in sheltered localities, and some tamarack was seen.

#### GAME AND FISH

Game is not plentiful, but the following animals were seen: moose, black bear, caribou, lynx, wolves, beaver, and muskrat. Caribou are abundant at the end of the summer season. A few ptarmigan, spruce grouse, and water fowl were noted.

Fish are plentiful, and include lake trout, pike, whitefish, and grayling.

#### GENERAL GEOLOGY

##### SUMMARY STATEMENT

Three groups of rocks are represented in the map-area. A narrow belt of the Snare group lies parallel with, and near, the east margin of the area, and a complex of mainly volcanic rocks, outcropping in the western part of the map-area, has been correlated with the Echo Bay group of Great Bear Lake. The general lithology of these two groups is similar; both have basal sedimentary rocks, mainly argillaceous, and upper volcanic formations, and both are probably intruded by the same granite. The two groups may be correlated on this basis, and are probably nearly contemporaneous.

A third group, composed mainly of sedimentary rocks, overlies the Echo Bay group and is lithologically similar to the Cameron Bay group of Great Bear Lake. At Balachey Lake this group probably rests unconformably upon granite that cuts the Echo Bay rocks. Thus the Cameron Bay and Echo Bay groups are probably separated by a period of granitic intrusion as well as by an interval of erosion.

A belt of porphyry cuts the Cameron Bay rocks, and on the east is intrusive into a large mass of granite that, in turn, cuts the Snare rocks in the eastern part of the map-area.

Glacial striae are common, and trend about north 80 degrees west. Sandy plains near the eastern boundary of the map-area are probably composed of glacial outwash. Sand and boulder eskers trend west-northwest, and raised beaches were observed at three levels in the western part of the map-area.

#### DESCRIPTION OF FORMATIONS

##### Snare Group

General. Rocks assigned to the Snare group outcrop in a belt, 4 to 5 miles wide, that trends northerly parallel with Wopmay River, and is a continuation of the belt of Snare rocks that outcrops in the Ingray Lake map-area to the south. The group comprises lower sedimentary members and upper volcanic members. The sequence of the sedimentary strata has not been established, and appears to differ from place to place.

In most places the lowermost exposed rocks are quartzites, and these grade upwards into a thick succession of greywackes, slates, and phyllites. The uppermost sedimentary member is crystalline limestone, and may be as much as 50 feet thick.

A band of chocolate-brown, arkosic conglomerate outcrops west of Wopmay Lake and at intervals for 13 miles north of the lake. It is not clear whether this is interlayered with Snare strata or whether it is a remnant of some other, probably younger, group of formations.

The volcanic rocks are dark green, massive to well-pillowed andesites and dacites, with minor interbedded tuffs. Near Angle, Ellington, and Self Lakes, andesite, rhyolite, and tuffs are interbedded with extrusive feldspar porphyries.

The Snare rocks are intruded by massive biotite granite on the west, and near the granite the sedimentary rocks have been altered to hornfels. The lavas, near the granite, have been altered to rusty weathering, medium-grained rocks of dioritic aspect.

On the east, the Snare rocks are in contact with a gneissic complex, mainly granitic but containing many bands and layers believed to be of sedimentary and volcanic origin, but now exhibiting various degrees of metamorphism and assimilation. Near the granitic gneiss the Snare sedimentary beds are recrystallized to knotted quartz-mica schist containing crystals of andalusite as much as  $1\frac{1}{2}$  inches square.

Sedimentary Rocks. The quartzites are in beds about 2 inches thick; many of them are crossbedded. They are medium- to fine-grained, white to grey rocks in which quartz comprises more than 80 per cent of the mineral assemblage.

The arkosic conglomerate is roughly bedded to massive. It ranges from medium-grained red arkose to arkose-conglomerate containing  $\frac{1}{8}$ -inch pebbles of brown feldspar-quartz porphyry, grey, flaky phyllite, quartzite, some red jasper, and a few of medium-grained pink granite. The matrix consists of grains of quartz and feldspar in about equal proportions.

Phyllites and greywackes comprise more than 75 per cent of the Snare sedimentary strata exposed. The phyllites are soft, smooth-surfaced, light grey rocks, with thin, wavy beds, the planes of which usually have a micaceous sheen. In places the rocks are sandy enough to be called greywackes.

The hornfels, near the massive granite, is a dense, hard, brown weathering rock. In thin section it appears as a mosaic of quartz and albite, with interstitial chlorite, epidote, zoisite, and flakes of pale green actinolite.

The knotted schists, along the eastern margin of the Snare sedimentary band, are lustrous, grey, soft, schistose rocks, with pink to black crystals of andalusite. Under the microscope the rock is seen to consist of brown biotite, muscovite, lenticular grains of quartz, albite, and orthoclase; worm-like knots of chlorite are probably pseudomorphous after andalusite. The crystalline limestone is a bluish grey to buff, coarsely crystalline rock, with rare streaks of hard serpentine. It is roughly bedded to massive.

Volcanic Rocks. The volcanic members of the Snare group are mainly andesites and dacites. The andesites are medium- to fine-grained, dark grey-green rocks that weather rusty brown. In thin section they are seen to consist of felted masses of andesine laths ( $An_{40}$ ) and subhedral plates of augite.



The dacites are massive, grey-green, fine-grained rocks with rare quartz 'eyes'. Under the microscope the feldspar was identified as calcic oligoclase ( $An_{25}$ ).

Structure. Attitudes of the Snare strata suggest that this belt of rocks is probably a tightly folded syncline, the axis of which trends slightly east of north and plunges at a low angle to the south.

In the southern part of the area a belt of volcanic rocks, as much as 4 miles wide, is exposed. On both flanks of this belt narrow bands of sedimentary rocks appear to dip steeply beneath the lavas.

In the north the lavas have been almost completely removed by erosion, and a greater area of the underlying sedimentary rock is exposed. Dips are consistently steep to vertical.

West of Bishop Lake, the Snare rocks are cut by a series of northwesterly trending, left-hand faults, which displace both the sediment-lava and sediment-granite contacts. In places the horizontal displacement is as much as  $1\frac{1}{2}$  miles, with the northeast side moving northwest relative to the southwest side.

#### Echo Bay Group

General. Rocks assigned to the Echo Bay group outcrop both north and south of Camsell River near the west edge of the map-area. These were correlated with the Echo Bay rocks at Great Bear Lake by Kidd<sup>1</sup> in 1936.

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<sup>1</sup> Kidd, D.F.: op. cit.

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In the Camsell River area the Echo Bay group includes a complex of porphyries, mainly extrusive, in which are many fragmental, amygdaloidal, and tuffaceous zones. Andesitic lavas and tuffs outcrop in the vicinity of the property of Camsell River Silver Mines, Limited. Rhyolite tuffs and crystal tuffs are exposed near the granite contact north of Camsell River and at Cruickshanks Lake. Some sedimentary rocks also outcrop at this lake.

All of the Echo Bay rocks are intruded by granite, and near the granite contacts they are metamorphosed and recrystallized.

The succession is probably complicated by the intrusion of a younger feldspar porphyry, which is similar in appearance to some of the Echo Bay porphyries.

Sedimentary Rocks. Sedimentary rocks are exposed in a small area between Eureka and Cruickshanks Lakes. These rocks are mainly conglomerate and argillite; they are intruded by feldspar porphyry.

Conglomerate comprises the greater part of the sedimentary rocks. It is massive to roughly bedded, dark purplish grey, and contains well-rounded pebbles, as much as 2 inches in diameter, of vein quartz, quartzite, and purplish feldspar porphyry in a dark grey, clastic matrix.

Argillite outcrops in some places along the west shore of Cruickshanks Lake. It is thinly bedded and crossbedded, chocolate-brown, and very fine grained, with a few larger grains of quartz and feldspar recognizable in hand specimens.

Volcanic Rocks. Extrusive feldspar porphyries comprise more than 75 per cent of the Echo Bay rocks exposed in the map-area.

In the field an attempt was made to subdivide the porphyries into three main types on the basis of colour; these were red porphyry, purple porphyry, and black porphyry, and one type commonly grades into another.

Both the red and purple porphyries contain much fragmental material, and in places they are amygdaloidal and vesicular. Feldspar porphyry dykes cut older Echo Bay rocks, and thus the porphyry complex is in part intrusive.

Red porphyries are of widespread occurrence, and in hand specimens are seen to contain white and greenish plagioclase laths, about  $1/8$  inch long, in a very fine-grained, cherty, red-brown groundmass. Under the microscope the feldspar was identified as calcic oligoclase ( $An_{25}$ ).

Purple porphyries outcrop along the shore of Conjuror Bay. In places the rock is vesicular and amygdaloidal, with calcite amygdules. Pink, white, or glassy feldspars occur as phenocrysts, with average lengths of  $1/8$  inch; angular phenocrysts of quartz are about half as abundant as the feldspars; and a few flakes of biotite are generally present. The groundmass is dark maroon to purple. In thin section the phenocrysts appear sharply angular; most of the feldspar phenocrysts are seen to be sodic oligoclase ( $An_{10}$ ), but a few are orthoclase. The groundmass shows faint flow lines curving around the phenocrysts.

The black porphyries are relatively rare. They outcrop at a few places near Conjuror Bay, Contact Lake, and Cruickshanks Lake. Hand specimens are seen to contain abundant, milky white feldspar phenocrysts as much as  $\frac{1}{4}$  inch long. The matrix is fine grained and jet black. Under the microscope the feldspars appear as subhedral laths of albite ( $An_4$ ). These rocks are commonly found near intrusive contacts, and may have resulted from the metamorphism of other porphyries.

The rhyolite tuffs are thin bedded, commonly crossbedded, and weather whitish to pale greenish. Fresh surfaces are greenish grey, and a few angular quartz fragments can be recognized embedded in a very fine-grained siliceous groundmass.

Crystal tuffs occur with rhyolite tuffs at Cruickshanks Lake. They are roughly bedded and weather pinkish buff. In hand specimens the rock is seen to consist of coarse feldspar crystals embedded in a brownish matrix.

The andesites are porphyritic, and contain laths,  $\frac{1}{4}$  inch long, of shiny black hornblende in a very fine-grained, dark greenish to black groundmass. Under the microscope the amphibole is seen to be pale greenish actinolite; the groundmass consists of minute laths of andesine ( $An_{30}$ ).

The mineralized rock at the property of Camsell River Silver Mines, Limited, has been described by Kidd<sup>1</sup> as a "massive, dark greenish grey,

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<sup>1</sup>Kidd, D.F.: op. cit., p. 30.

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fine-grained diabase". In thin section this rock is seen to contain subhedral phenocrysts of andesine ( $An_{40}$ ), about 1 mm. long, embedded in a felted mass of minute plagioclase laths; some fibrous amphibole is present. This rock may be a second type of porphyritic andesite, or it may be a highly altered diabase.

Altered tuffs outcrop along both banks of Camsell River near this property. The tuffs are thin-bedded and crossbedded, fine-grained, dark greenish grey rocks. In thin section the feldspar was identified as sodic



andesine (An<sub>30</sub>).

Metamorphic Rocks. The Echo Bay rocks have been recrystallized to massive, cherty, red-brown hornfels near granite intrusions. No sedimentary structures were observed in the hornfelsic contact rocks. In places the hornfels was found to grade into normal feldspar porphyry, suggesting that it is a metamorphosed equivalent of that rock.

Recrystallized, bedded rocks outcrop near the granite 4 miles north of Camsell River. In hand specimens they are finely crystalline, grey rocks, and have the appearance of a feldspathic quartzite. In thin section they are seen to be composed almost entirely of fresh, clear crystals of oligoclase (An<sub>15</sub>); no quartz is present, and its absence suggests that these rocks are of volcanic rather than of sedimentary origin; they may be recrystallized trachyte or crystal tuffs.

Structure. The Echo Bay rocks have a regional trend towards the northwest. Dips are generally less than 30 degrees, but near the granite they are nearly vertical. An open synclinal structure trends about north-northwest, and its trough line passes through the northeast corner of the Camsell River Silver Mines property. The details of the succession were not ascertained, but from the structure it appears that the andesitic rocks are the older and dip beneath the acidic volcanic rocks and porphyry flows.

#### Granitic Intrusions

The large granite mass underlying the central part of the map-area is a medium- to coarse-grained, equigranular to porphyritic, pink, biotite granite with feldspar phenocrysts locally as much as 2 inches long. This massive granite intrudes the Snare rocks in the eastern part of the area.

The granite that intrudes the Echo Bay rocks near the west edge of the map-area is a massive, medium-grained, pink to dark reddish, biotite granite.

Detailed petrographic examinations of specimens show that those granites intruding the Snare and Echo Bay rocks contain similar essential and accessory minerals in about the same proportions and, therefore, provide no evidence to suggest that they were emplaced at different times.

Grey, gneissic granite and banded gneiss outcrop to the east of the belt of Snare rocks.

Several small stocks of granodiorite outcrop at Contact Lake near the property of International Uranium Mining Company, Limited. The granodiorite is a massive, brown, medium- to coarse-grained rock with considerable amounts of amphibole and biotite. Under the microscope it is seen to carry about equal amounts of orthoclase and plagioclase. The granodiorite is in contact with massive, pink, biotite granite on the south and intrudes porphyritic rocks of the Echo Bay group on the north. The age relation between the granite and the granodiorite is not clear. Pink aplite dykes cut the granodiorite, which may, therefore, be older than the pink granite. In places, however, the contact appears to be gradational, suggesting that the granodiorite may be a more basic marginal phase of the central granite mass.

#### Cameron Bay Group

General. A belt, mainly of sedimentary rocks, outcrops west of Balachey Lake. The northwesterly extension of this belt crosses the west border of the map-area immediately south of Conjuror Bay; sedimentary rocks outcropping at Clut Lake are probably its southern extension. These rocks have been assigned to the Cameron Bay group.

In one place these rocks appear to rest on granite; they are intruded by dykes of feldspar porphyry, and are cut off to the south by feldspar porphyries.

This group of rocks was first mapped by Kidd<sup>1</sup> who states

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<sup>1</sup>Kidd, D.F.: op. cit. 1936, pp. 7 and 8

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that "---All these rocks are gently dipping, and the total thickness of sediments above the granite is about 300 feet. --- The sediments consist of 20 feet of breccia, composed at the base of closely packed, angular fragments, up to 2 feet across, of the underlying rock. The breccia grades upward into a normal conglomerate with rounded pebbles of basic granite, andesite, felsite, and various feldspar porphyries. Overlying these rocks is a light brown, pebbly sandstone. Structurally conformable with the sandstone ----- a bedded greywacke occurs and is succeeded upwards by agglomerate, interbedded chert, recrystallized limestone, and chocolate-coloured argillite".

Bedded, crumbly conglomerate and grit, as much as 50 feet thick, overlie the argillite in some places.

Sedimentary Rocks. The breccia at the base of the succession has a bottom layer, up to 2 feet thick, of earthy, ferruginous material free of pebbles. This grades upwards into the massive breccia, which contains closely packed angular boulders, some of them more than 2 feet in diameter. About 50 per cent of the boulders are granite, 30 per cent feldspar porphyry, 15 per cent greenstone, and 5 per cent vein quartz. The matrix of the breccia is black to brown, and appears to be highly ferruginous. Petrographic studies of the granite pebbles identify them with the underlying granite.

The breccia grades upward into cobble-conglomerate, with well-rounded pebbles and cobbles as much as 10 inches in diameter. The pebbly sandstone conformably overlying the conglomerate is roughly bedded, and contains  $\frac{1}{4}$ -inch pebbles of jasper and feldspar porphyry in a sandy, grey matrix.

The greywackes are thin-bedded, very fine-grained, and light to dark grey rocks; the limestones range from white and coarsely crystalline to grey, fine-grained, impure varieties; and the argillites are grey-green and chocolate-brown, thinly bedded rocks.

The conglomerate in the upper part of the succession is well bedded. It contains pebbles, up to  $\frac{3}{4}$  inch in diameter, loosely held in a rusty brown, friable cement. Most of the pebbles are soft and smooth, and may be sedimentary; a few are of medium-grained granite. The pebbles readily weather out of the cement, leaving the weathered surface rough and crumbly.

Volcanic Rocks. A few narrow bands of tuff and agglomerate are interlayered with the middle sedimentary members of the Cameron Bay group.

The tuffs are thinly bedded and fine grained. Most of them weather pale green to buff, and on fresh surfaces are green to black. They are about the composition of dacite.

The agglomerates are a coarser variety of the tuffs, and in addition contain cherty, red fragments as much as  $\frac{1}{2}$  inch long.

Structure. In places the Cameron Bay strata are flat lying; elsewhere they dip gently to the northeast, generally at angles of about 20 degrees and in no place at more than 30 degrees.

Relation to the Underlying Granite. The basal breccia of the Cameron Bay group is in contact with granite near the southern outlet of Balachey Lake. The contact is exposed for 4 feet, but is partly masked by severe weathering and by some shearing. There is no evidence that the granite is intruding the breccia, and the latter contains granite pebbles similar in appearance to the underlying granite. Petrographic investigations of the essential and heavy accessory minerals of the granite pebbles reveal essentially the same minerals in the same proportions as in the underlying granite; thus, probably, these sedimentary rocks are younger than, and rest unconformably upon, the granite.

Correlation. Examination of the lithology suggests that these sedimentary rocks should be correlated with the Cameron Bay group at Great Bear Lake. The most prominent member in both areas is a massive, brown cobble-conglomerate, which contains pebbles of feldspar porphyry, quartzite, argillite, greenstone, and granite; both are cut by feldspar porphyry dykes and sills.

### Minor Intrusions

Intrusive Porphyries. Feldspar and feldspar-quartz porphyries are common throughout the map-area. They have been mapped, on the basis of their structural relationships with adjoining rocks, as intrusive or extrusive porphyries. Most of the extrusive porphyries are thought to form part of the Echo Bay group, and have been described elsewhere.

The intrusive porphyries are large, massive bodies, most of which outcrop in the north-central part of the map-area. These form characteristic, parallel, steep-flanked ridges that trend northeasterly through the granite.

The intrusive porphyries have phenocrysts, ranging from  $1/8$  to  $1/4$  inch, embedded in a felsitic, red-brown to dark brown groundmass. In most places pink, white, and green feldspars are the most abundant phenocrysts. Glassy quartz phenocrysts are commonly present, and in some places are more abundant than feldspar phenocrysts.

The porphyry masses are, for the most part, structureless. At some places definite dykes of porphyry were seen to cut granite; at other places the porphyry appears to grade into granite. Porphyry cuts the Cameron Bay sedimentary rocks at Balachey Lake, and as these strata probably rest unconformably upon granite the porphyry may, at least in part, be much younger than that granite.

Diabase. Diabase dykes and sills are common. In hand specimens they are seen to be fine to coarse grained, and carry about equal amounts of feldspathic and mafic minerals.

The diabase dykes and sills appear to intrude all other rocks in the map-area. They range in width from a few inches to several hundreds of feet; most of them are nearly vertical. A large dyke, or series of dykes, with a gentle, northwesterly dip, trends northeasterly through the centre of the map-area, and was traced for more than 50 miles.

### Giant Quartz Veins

Giant quartz veins are common in the southern part of the map-area. They range in width to as much as 1,000 feet. Some are composed entirely of massive vein quartz; others are stockworks composed of an

interwoven mesh of quartz veinlets. In some places the veins contain abundant specular hematite.

These veins are younger than the granite. Most of them strike northeasterly and are vertical. The largest seen in the map-area outcrops for 25 miles between Lever and Hansen Lakes; it is cut by the large diabase dyke at Hansen Lake.

### ECONOMIC GEOLOGY

#### CAMELL RIVER SILVER MINES, LIMITED

##### General

The Camsell River Silver Mines property lies along the north shore of Camsell River just east of Rainy Lake. The property also includes claims south of the river.

This property was developed originally by White Eagle Silver Mines, Limited, but has not been operated by that company for some years. It was re-staked by A.V. Giague in 1945 and 1946, and a new company, known as Camsell River Silver Mines, Limited, was formed.

The mine was visited in August 1947, and was found deserted; however, there was evidence that a diamond-drilling program had recently been completed.

The main showing, that of the old White Eagle Silver mine, has been described in some detail by Kidd<sup>1</sup>.

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<sup>1</sup>Kidd, D.F.: op. cit. pp. 30-32.

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So far as known, the work done since White Eagle Silver Mines, Limited, ceased exploration comprises surface stripping, diamond drilling, and geological mapping.

The underground workings, left by White Eagle Silver Mines, Limited, include an adit, which leads to No. 1 drift on the same level; a crosscut from No. 1 drift to a two-compartment winze that has been sunk to a depth of 125 feet; and the No. 2 drift at this lower level, which parallels No. 1 drift for 180 feet west of the winze.

No. 2 drift, the winze, the crosscut, and No. 1 drift west of the crosscut, were flooded when visited. A 60-foot shaft has been sunk on the AVG 1 group, 1 mile east of the adit, and some diamond drilling and stripping have been done on the AGX veins south of Camsell River.

##### Geology

The mineralized rock at the Camsell River Silver Mines property is a massive, fine-grained, grey-green rock, described by Kidd as diabase. In thin section this rock is seen to have a rough trachytic structure, with subhedral phenocrysts of andesine (An<sub>40</sub>) embedded in a groundmass of minute plagioclase laths. A few patches of radiating, fibrous amphibole, chlorite, magnetite, and carbonate may represent completely altered pyroxenes. It is not clear whether this rock is an old, altered diabase or an andesitic volcanic rock.

In some places the mineralized rock is in contact with porphyritic andesite. The contact is poorly defined, and in most places is obscured by drift.

The porphyritic andesite is a very fine-grained, dark greenish to black rock, with shiny black amphibole laths as much as  $\frac{1}{4}$  inch long. Under the microscope the amphibole was identified as actinolite, and the feldspars of the groundmass were seen to be andesine ( $An_{30}$ ).

Both the mineralized rock and the porphyritic andesite are cut by dykes of feldspar porphyry along the northern boundary of the property.

Greenstone tuffs outcrop along the river bank a mile east of the adit.

No. 1 'vein' outcrops 30 feet north of the adit portal; its strike varies between north 60 to 80 degrees west, and the dip is about 70 degrees to the northeast. The 'vein' is composed of a network of quartz-carbonate stringers from  $\frac{1}{2}$  inch to 6 inches wide; it pinches and swells from several inches to 2 feet in width. In places it is heavily mineralized with pyrite, chalcopyrite, galena, and silver minerals.

Two smaller 'veins' parallel the strike of No. 1 'vein', and outcrop 200 and 250 feet northeast of the adit portal. They range up to 12 inches in width, dip steeply to the southwest, and are of the same type as No. 1 'vein'.

A fourth vein intersects the above two veins on a strike of north 55 degrees east. It varies in width from 6 inches to 2 feet and carries some pyrite.

A smaller quartz vein outcrops at the edge of a drift valley 400 feet northeast of the adit mouth. This vein strikes north 85 degrees east and dips 60 degrees south; it is composed of quartz stringers  $\frac{1}{2}$  inch to 6 inches wide across a width of  $2\frac{1}{2}$  feet. The vein has been stripped, and in some places is heavily mineralized with chalcopyrite, pyrite, and silver minerals.

A sample taken at the intersection of the adit and No. 1 drift contained 7.38 ounces of silver and 0.226 per cent  $U_3O_8$  to the ton.

The diamond-drilling program, completed in 1947, includes twenty-six diamond drill-holes, aggregating about 1,750 feet.

#### INTERNATIONAL URANIUM MINING COMPANY, LIMITED

##### General

The property of International Uranium Mining Company, Limited, comprises a group of twenty-nine claims on the north shore of Contact Lake, 9 miles southeast of Eldorado.

The claims were first staked for Northern Aerial Minerals Exploration, Limited, in 1931. In 1932 they were acquired by Bear Exploration and Radium, Limited, who operated a 25-ton mill intermittently from late 1936 until June 1939. During this period about 235,000 pounds of concentrate containing about 334,000 ounces of silver and some pitchblende were recovered from 10,079 tons of ore; and considerable silver and pitchblende passed on to the tailings. In 1942, the property was bought by International Uranium Mining Company, Limited. An exploration program was carried out by this company in 1944 and 1945. This included underground development, which continued into 1947, 15,300 feet of diamond drilling, and geological mapping.

A report by Lord<sup>1</sup> describes in some detail the geology and

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<sup>1</sup>Lord, C.S.: Mineral Industry of the Northwest Territories; Geol. Surv., Canada, Mem. 230, pp. 49-55 (1941).

development of the property up to 1939.

### Geology

The mine workings lie within a belt of granodiorite, 1 mile to 2 miles wide, which trends northwesterly. On the southwest, the granodiorite is in contact with massive, pink, biotite granite, part of the large granite mass of the Camsell River map-area, and on the northeast, with porphyries of the Echo Bay group.

The granodiorite is a medium- to fine-grained, brown weathering rock with about 15 per cent quartz, 35 per cent hornblende and biotite, and 50 per cent greenish and reddish feldspars. In this section it is seen to contain about equal amounts of orthoclase and plagioclase.

The granite is a coarse-grained, pink variety, with fresh biotite, quartz, orthoclase, and plagioclase.

The granite-granodiorite contact intersects the north shore of Contact Lake about  $1\frac{1}{2}$  miles southeast of the main shaft; it strikes northwesterly, and passes through the mine camp a few yards north of the shore. The contact is not well defined, and in places appears to be gradational; elsewhere the granodiorite is cut by pink dykes of aplite and fine-grained granite, and may, consequently, be older than the main granite mass.

The complex of porphyries northeast of the granodiorite varies from place to place. Red-brown feldspar porphyry, purplish feldspar-quartz porphyry, and a brown feldspar porphyry, with a medium-grained groundmass, were found; the last appears to be gradational into the granodiorite. In some places the porphyries contain cherty, red fragments, vesicles, and amygdules, and, therefore, are probably extrusive. Near Bay 66, it is reported that a conglomerate outcrops in the porphyry complex. These rocks are lithologically similar to those of the Echo Bay group at Great Bear Lake.

The granodiorite-porphyry contact has been mapped as gradational by the mine geologist. One type of porphyry does appear to be gradational, and its groundmass increases in grain size near the contact. In some places the porphyries appear to be recrystallized near the granodiorite, and in one place porphyry was seen to be cut by dykelets of granodiorite.

### Mineralized Zones

No. 1 Zone. All ore mined has come from No. 1 zone. This is a fracture zone 5 feet wide, with mineralized quartz-carbonate veinlets bearing hematite, pyrite, chalcopyrite, magnetite, bornite, and native silver. The zone strikes north 75 degrees east, and dips 60 degrees north at its east end and 80 degrees south at its west end; where it stands vertically it is most heavily mineralized. The zone is exposed for a length of 350 feet on the surface, and has been followed for 875 feet underground; it is faulted at its east end by No. 3 shear. The zone was explored by 8,800 feet of diamond drilling.

No. 2 zone. lies some 600 feet east of No. 1, and has not been explored underground. It strikes north 85 degrees east, dips 70 degrees south, and is exposed for 1,340 feet. The zone is composed of quartz-carbonate stringers that lie in a  $2\frac{1}{2}$ -foot shear. Minerals include hematite, chalcopyrite, and native silver. The zone has been explored by fourteen diamond drill-holes, the cores from some of which contained a little silver.

No. 3 zone is a 4-foot shear that lies immediately east of No. 1; it strikes north 70 degrees east and dips southerly at 85 degrees. The zone is exposed for 2,000 feet, and contains quartz-carbonate

stringers with hematite, chalcopyrite, and pyrite. It has been explored by more than 1,500 feet of diamond drilling.

No. 4 zone lies largely in drift, and is a 2-foot shear that outcrops intermittently for a length of 3,700 feet; it lies  $\frac{1}{4}$  mile northeast of No. 1 zone, strikes north 70 degrees east, and dips southerly at 55 to 70 degrees. It contains quartz stringers with pyrite, chalcopyrite, and bornite, and has been explored by more than 1,400 feet of diamond drilling. Only traces of silver and gold were shown by assays.

Several other fracture zones outcrop on the property, and most of them have been explored by diamond drilling. These include Nos. 5, 11, 23, and E-30. The best assay returns were from samples of core from zones 23 and E-30; these ran 1.56 ounces and 0.7 ounce of silver a ton respectively.

#### OTHER DEPOSITS

So far as known, the only other deposits of economic significance are on a group of claims (Walter 1-4) staked by Eldorado Mines on the north shore of Camsell River west of the outlet of Balachey Lake. There, a system of diabase dykes cuts brecciated granite, and the granite has been injected by quartz-carbonate stringers that contain pyrite, chalcopyrite, and hematite.