Geological Summary

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The Mosquito Creek Gold Mining Co. Ltd.

Location

The Mosquito Creek Gold Mining Co. Ltd. is a one hundred ton per day gold mine located at Wells B.C. Wells is approximately fifty-five miles east of Quesnel. Quesnel is on Highway 97, approximately seventy-five miles south of Prince George (Figure A). The Mosquito Creek Property adjoins, on the northwest, claims held by the former producer, Cariboo Gold Quartz Mines Ltd.

History

Placer gold was first discovered in the area in the 1860's, and is still being exploited today. Prior to the opening of the Cariboo Gold Quartz Mine in 1933, at least two attempts had been made to mine lode gold. These failed due to poor recoveries. The cyanide extraction method used by the Cariboo Gold Quartz and Island Mountain Mines apparently gave a 90% recovery rate. The Island Mountain Mine, started in 1934, became known as the Aurum Mine after it's purchase by the Cariboo Gold Quartz in 1954. Some of the Island Mountain workings extend into the Mosquito Creek ground, and are reported to contain 40,000 tons, at 0.7 ounces per ton. (Refer to Table 1 for a chart indicating production from both these mines.)

Regional Geology

The rocks in the mine area had been classified as sedimentary formations of the Cariboo Group dating from Early Cambrian and later age by early geological workers. They believed that the shallow-water sandstones, shales and limestones were uplifted, metamorphosed, folded and eroded during a Devonian to Mississippian Cariboo Orogeny.

However, recent work (Struik, 1981) suggests that these rocks may be Late Proterozoic to Cambrian sediments deposited on a shallow to moderately deep ocean shelf with the folding, metamorphism and faulting not occurring until the Early Jurassic to Late Cretaceous Columbian Orogeny. If this hypothesis is accepted, the ore bodies could be Tertiary, since they are controlled by the folding and by the faulting.

The Cariboo Group have been folded into northwest striking and plunging folds which have been overturned to the southwest (Figures B to D). These structures plunge at 20 to 25 degrees; and, going from southwest to northeast, have been called the Island Mountain Anticline, the Snowshoe Syncline and the Cunningham Anticline. The ore bodies are restricted to the northeast flank of the Island Mountain Anticline in the Rainbow and Baker Members which have been shown (Sutherland-Brown, 1957) to be parts of the Snowshoe Formation. The degree of schistosity and cleavage in all rocks of the Cariboo Group is directly related to the intensity of the folding.

Struik interprets the faulting sequence in the mine areas as being (Figure C):-

(1) thrust faulting in the plane of the folds
(2) high angle, reverse and normal faulting in the fold plane
(3) high angle, southeast dipping, normal faults at right angles to the fold plane
(4) high angle, east dipping, north striking faults with right lateral movement

Economic Geology

Gold ore in the Wells area occurs in two forms: firstly, as auriferous pyrite in quartz veins in the Rainbow Member; and secondly, as bedded auriferous pyrite replacement bodies in the Baker Member.

Quartz Veins

The quartz-pyrite veins in the black argillite and argillitic quartzite metasediments of the Rainbow have three fracture directions:-

(1) Transverse Veins - strike N 30 - 50° E and dip 70 - 90° SE

(2) Diagonal Veins - strike N 70 - 90° E and dip 70 - 90° S

(3) Strike Veins - strike N 40 - 60° W and dip steeply NE

Transverse Veins reportedly provided 60 - 75 percent of the ore at the Cariboo Gold Quartz Mine; whereas the Diagonal Veins were the source for most of the vein ore at the Island Mountain Mine. The Strike Veins, although the largest, were also the fewest and least productive.

Ore grade quartz veins would generally contain 15 to 25 percent pyrite and could assay 1 to 2 oz. Au./ton. Weaker pyritization was occasionally accompanied by cosalite (lead-bismuth sulphide), bismuthinite and free gold. The paragenesis determined by Skerl (1948) is: ankerite, quartz, pyrite, sphalerite, chalcopyrite, galena, argentite, cosalite, gold and quartz. Quartz ore was the source for most of the production from the Cariboo Gold Quartz Mine and resulted in an average grade of 0.39 oz. Au./ton.

Replacement Ore

The replacement pyrite ore bodies occur exclusively in the light grey-green calcareous sericitic phyllites, quartzites and limestones of the Baker Member. Generally, replacement ore is adjacent to, or in, the Baker Limestone (Figures B, D and E) which is from 5 to 50 feet thick and up to 50 stratigraphic feet from the Rainbow. This demonstrates the long recognized necessity of being in the proximity of the Rainbow-Baker Contact for success in the search for ore of both types (Figure F). The contact trends northwest and dips at 40 - 50° to the northeast.

Another recognized control for replacement ore is the noses, and occasionally the troughs, of drag folds in the Rainbow-Baker Contact (Figure E). Pencil shaped stopes occur when the replacement is restricted to the nose of the fold; but, occasionally, tabular stopes occur when the replacement follows the flattened limb of the fold.

Also, some stopes appear to have the replacement 'dammed' up against a flat fault (Figure E). The finer grained pyrite in replacement ore carries more gold. The fringes of an ore body are being reached, when increased ankerite, minor amounts of galena and sphalerite, and coarser grained pyrite appear. Trace amounts of scheelite and arsenopyrite are found in both ore types.

Silver values are approximately 10 percent of gold values, so are not as economically interesting.

Ore Genesis

Three theories have been advanced for the existence of the ore:-

(1) remobilized from the country rock by the folding and metamorphism
(2) hydrothermal fluids from a deeply buried source coming up the quartz veins
(3) hydrothermal fluids from a deeply buried source rising up the north striking faults

Theory (1) is doubtful, because pyrite taken from country rock gives low gold assays; while pyrite from quartz veins and replacement ore gives high assays. Evidence exists to prove both of the remaining theories. However, Mr. Marcel Guiguet* (personal communication, 1982), A.C. Skerl, and apparently, A. Sutherland-Brown feel the fault theory is the most important ore control. Local mine history has indicated that most of the ore (both types) is found in close proximity to these faults.

*Geologist and former Manager of Cariboo Gold Quartz Mines Ltd., and currently Consultant to Mosquito Creek Gold Mining Co. Ltd.

Alteration and Trace Element Studies

Little has been done with regard to alteration and trace element studies. A remapping of the workings is in progress: preliminary observations indicate an increase in sericite near ore bodies, particularly in the footwall. Mariposite (Fuchsite) is always closely associated with replacement, usually in fractures in the ore.

Acknowledgements

The writer wishes to thank Dan Alldrick, B.C. Ministry of Mines, and, Vic Tanaka and Jim Kelly, Asamera Inc., for their helpful suggestions and discussions during their visits to the property.

Respectfully submitted,

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TABLE 1

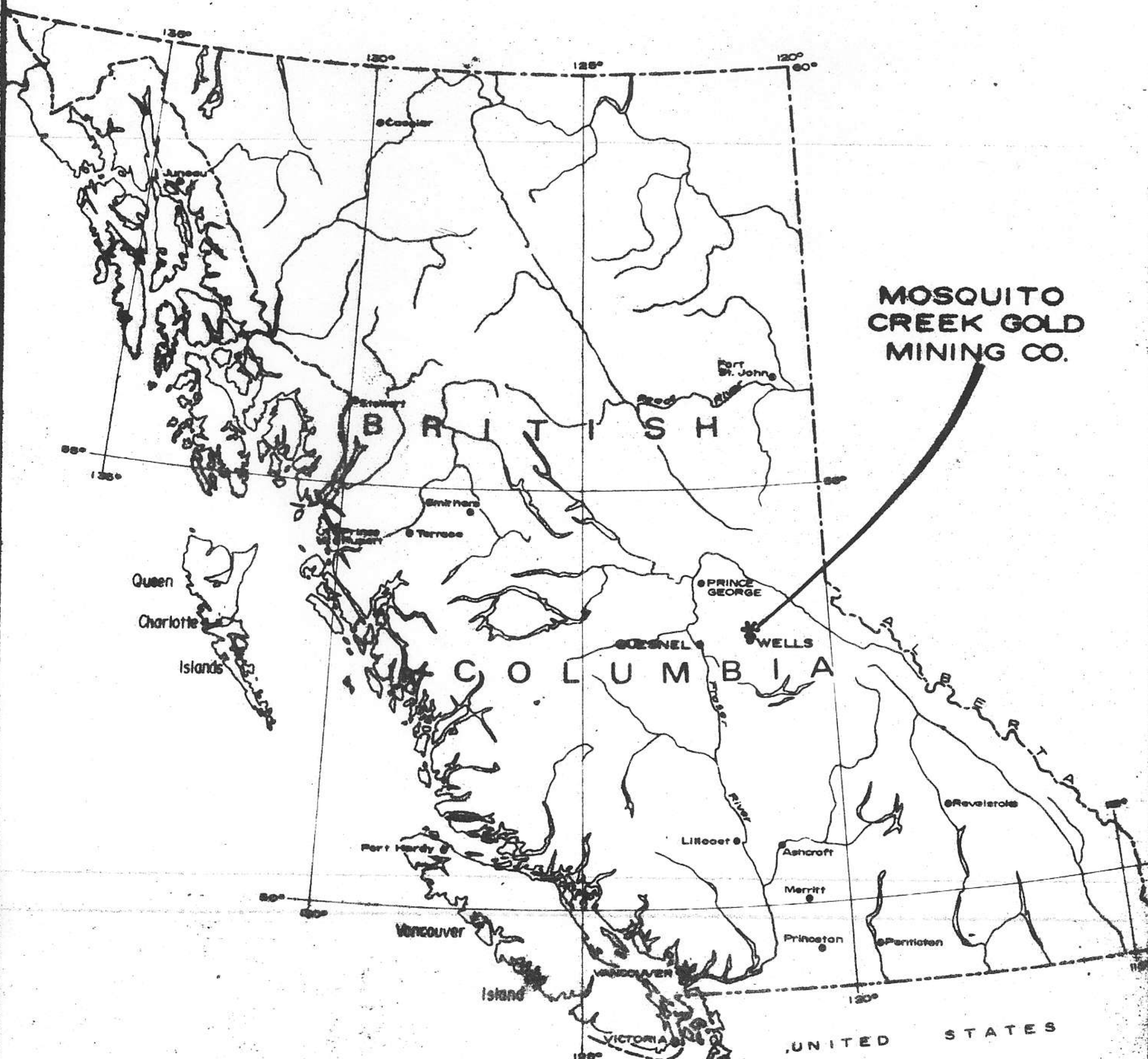
PRODUCTION CHART

CARIBOO GOLD QUARTZ MINE

ISLAND MOUNTAIN MINE

Mine	Tons Milled	Grade	Produced Oz. Au.	Recovered Oz. Au.	Recovered Oz. Ag.
Cariboo Gold Quartz (1933 - 1959)	1,681,950	.3925	660,088	626,755	56,092
Island Mountain Mine (1934 - 1954)	771,109	.4517	348,330	332,465	47,225
Aurum Mine (1954 - 1967)	474,186	.5172	245,265	237,063	34,433
Total Both Mines	2,927,245	.4283	1,253,683	1,196,283	137,750

FIGURE A



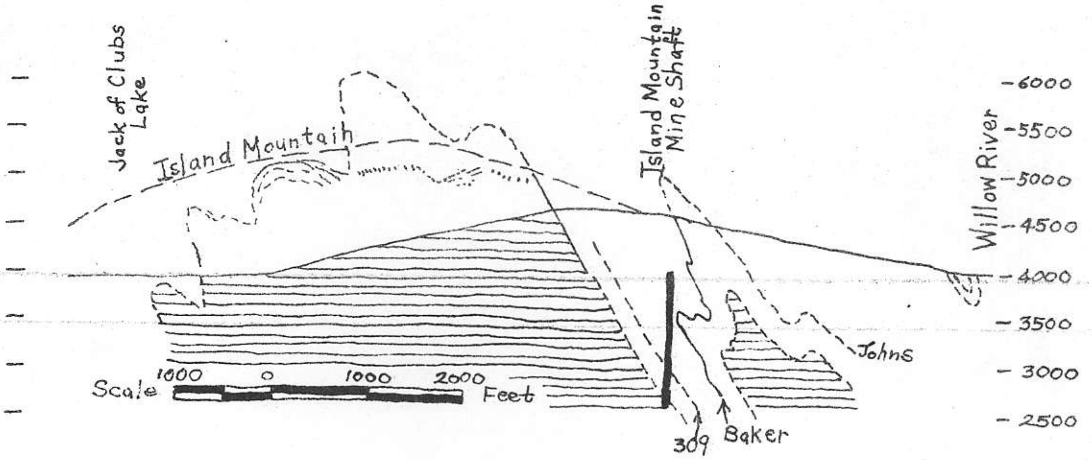
THE MOSQUITO CREEK GOLD MINING CO.

WELLS, B.C.

Scale: 1" = 136 Miles

Fold Structure *

FIGURE B



Baker, 309, and Johns limestone beds } Snowshoe fm.

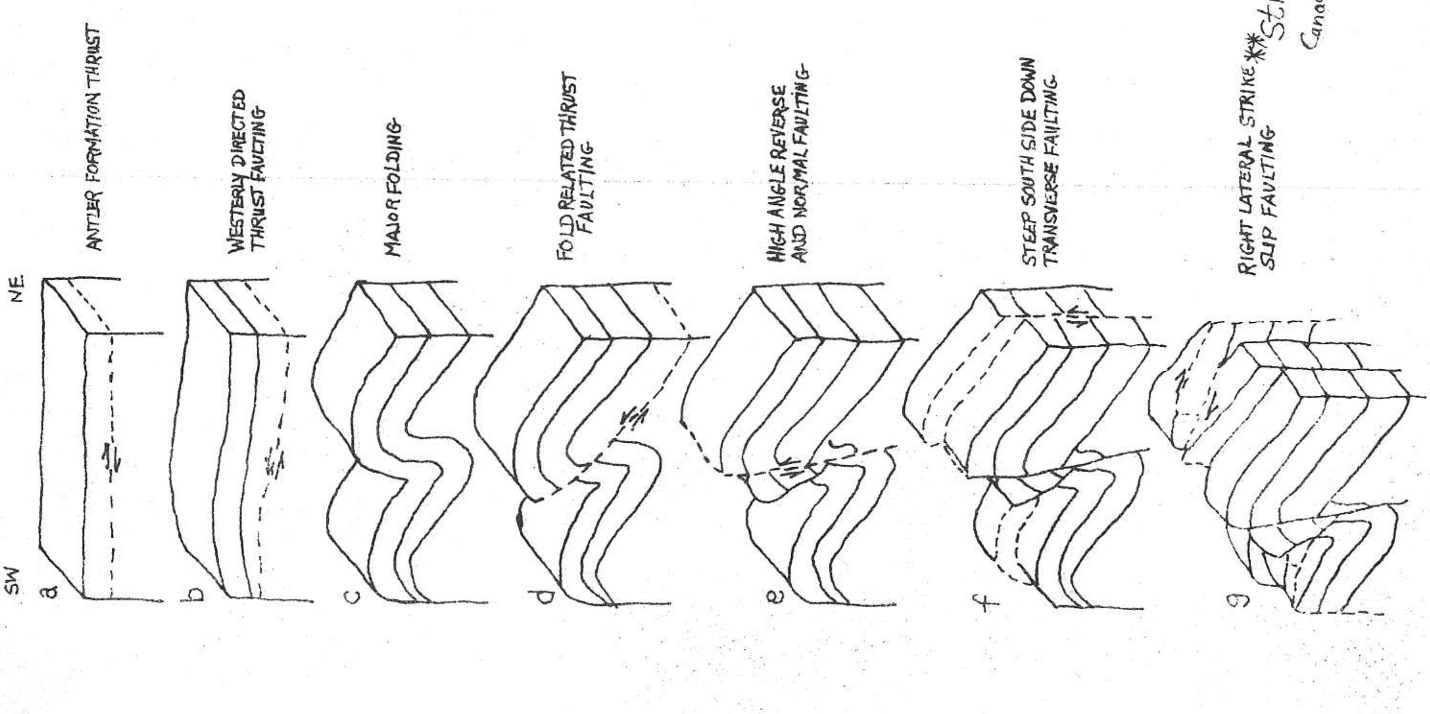
Midas fm.

Profile of Island Mountain, 2500 feet northwest of Section line

* Cross-Section A-A', Figure 8, Page 47 Island Mountain, Sutherland-Brown (1957)

Suggested Mid-Mesozoic Deformation **

FIGURE C



** Struik (1981), Page 1772 Canadian Journal of Earth Science

FIGURE D

P.C. Benedict

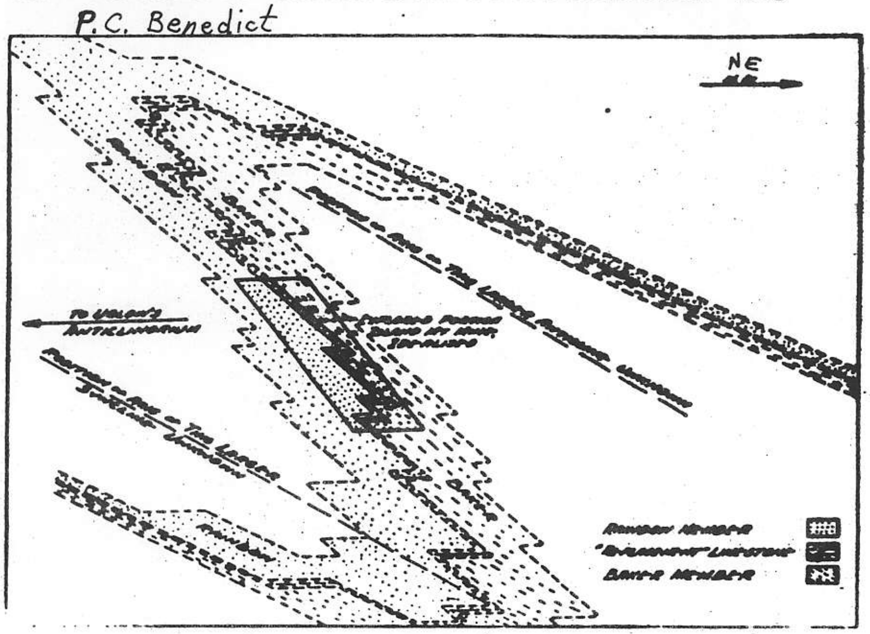


Figure 6.—Idealized vertical cross-section, showing type of folding in Island Mountain mine and simplest interpretation of regional structure hypothetically extrapolated.

FIGURE E

P.C. Benedict

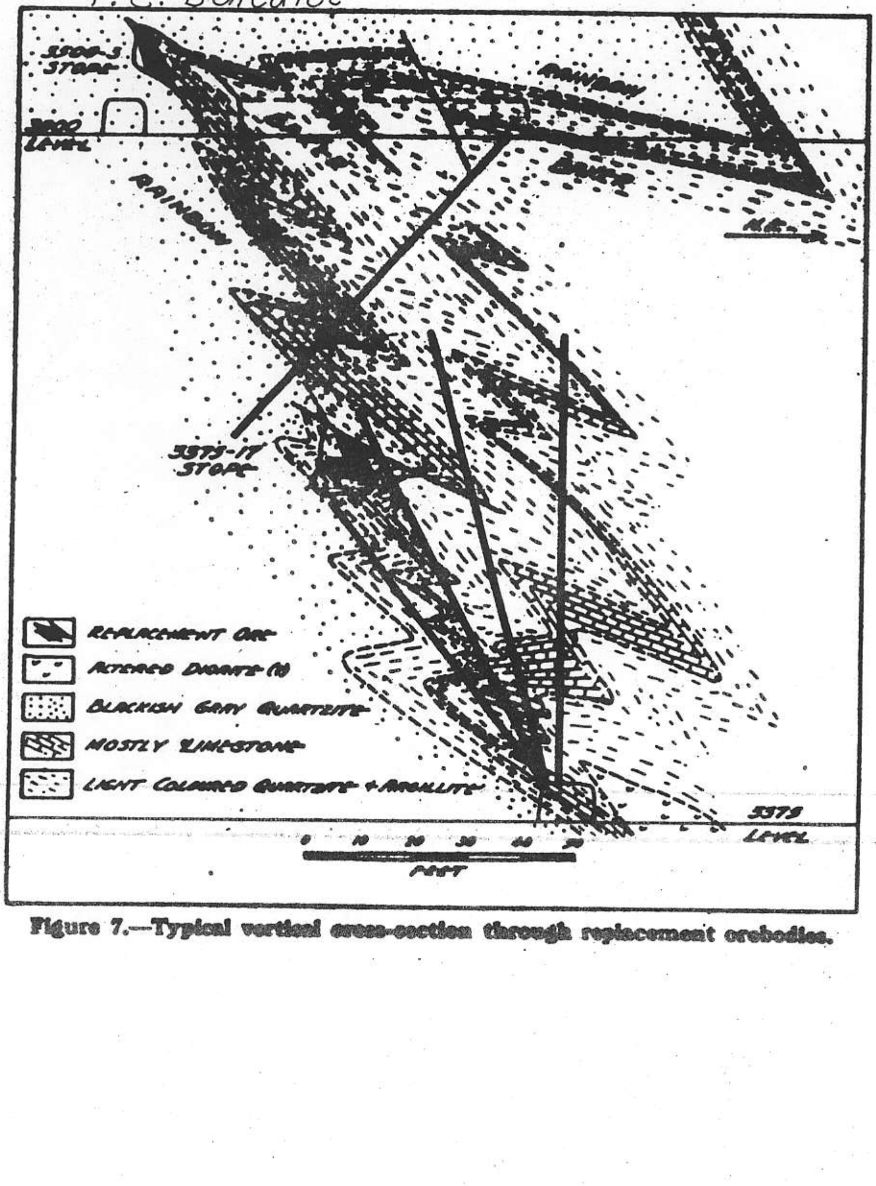


Figure 7.—Typical vertical cross-section through replacement orebodies.

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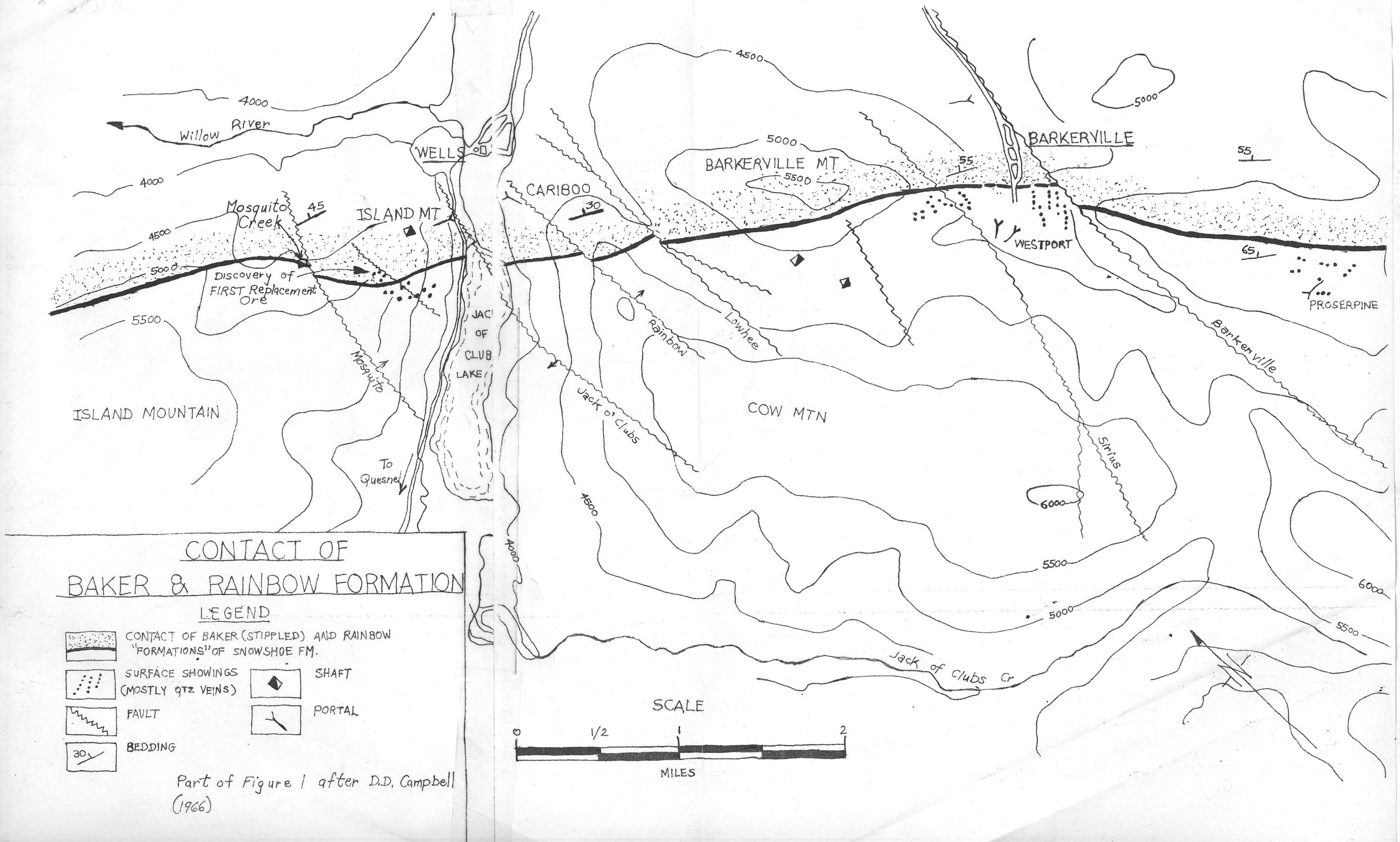
FIGURE E


CONTACT OF
BAKER & RAINBOW FORMATION
LEGEND
CONTACT OF BAKER (STIPPLED) AND RAINBOW "FORMATIONS" OF SNOWSHOE FM.
SURFACE SHOWINGS (MOSTLY QTZ VEINS)
SHAFT
FAULT
PORTAL
BEDDING
30
Part of Figure 1 after D.D. Campbell (1966)
SCALE
0
1/2
1
2
MILES
Willow River
4000
4500
5000
5500
6000
WELLS
ISLAND MT
Mosquito Creek
Discovery of FIRST Replacement Ore
45
ISLAND MOUNTAIN
Mosquito
To Quesnel
JACK OF CLUB LAKE
CARIBOO
30
Jack o' Clubs
Rainbow
Lowhee
BARKERVILLE MT
BARKERVILLE
55
WESTPORT
65
PROSERPINE
Barkerville
COW MTN
Sirius
Jack of Clubs Cr