

MINERAL COMPOSITION, FRESH INTRUSIVE ROCK  
 CARIBOO BELL

PROPERTY FILE  
 92A008

VOLUME PERCENT

	PLAGIOCLASE	K FELDSPAR	AUGITE	BIOTITE	MAGNETITE	OTHER	TOTAL PHENOCRYSTS	AVERAGE OF
Crowded Porphyry ①	60.1	14.2	17.5	/	4.8	3.4	55	4
Porphyry ②	44.4	25.6	16.2	5.8	6.8	1.2	65	5
Porphyry ③	12	2	14	05	7	69.5	305	2
Syeno Diocrite	46.2	18.7	19.4	8.0	6.4	1.3	/	8
Lamp Rocks	28	30	35	/	7	/	/	1

MATRIX

013838

BOOTJACK LAKE IS 6 MILES SW OF THE VILLAGE OF LIKELY.

CARIBOO BELL (BJ)

(52° 12' NW) THIS PROPERTY CONSISTS OF 130 RECORDED CLAIMS, WHICH THE BJ GROUPS EXTEND ON EITHER SIDE OF BOOTJACK LAKE TO POLLEY LAKE

ON THE EAST & TRIO LAKE ON THE WEST. THE CLAIMS WERE LOCATED AND EXPLORED BY MASTODON-HIGHLAND BELL MINES LIMITED 1200 WEST PENDER STREET, VANCOUVER 1, (K.J. SPRINGER, PRESIDENT) IN JANUARY 1966 A NEW COMPANY, CARIBOO BELL COPPER MINES LIMITED WAS FORMED TO CONTINUE EXPLORATION & DEVELOPMENT. IN OCT. 1966 AN AGREEMENT REGARDING FURTHER DEVELOPMENT WAS SIGNED WITH THREE JAPANESE COMPANIES, MITSUI MINING & SMELTING CO. LTD., SUMITOMO METAL MINING CO. OF CANADA LTD. & NIPPON MINING CO. LTD. IN THE AGREEMENT DEVELOPMENT WAS TO PROGRESS IN TWO STAGES WITH PREPARATION FOR PRODUCTION A THIRD STAGE.

MANAGER OF THE PROPERTY IS GERRY NEWCOMB, CAMP SUPERINTENDENT ROY LAMBERT & GEOLOGIST DR. TORU KINUCHI

DURING 1965 A LARGE AMOUNT OF GEOCHEMISTRY

GEOPHYSICS & BULLDOZER STRIPPING WAS DONE ON THE PROPERTY THIS WAS FOLLOWED IN 1966 BY A LARGE AMOUNT OF DRILLING & WITH 2 BX

WIRE LINE DRILLS & ONE CORCO DRILL & IN ADDITION MORE DETAILED DRILLING STARTED IN FEB? GEOCHEMISTRY & GROUND MAGNETOMETER SURVEYS. MOST DIAMOND PERCUSSION HOLES & MOST HOLES WERE DRILLED DRILL HOLES WERE DRILLED TO 400 FEET. THE CORCO DRILL

WERE DRILLED W/ AN EQUIVALENT DEPTH. TOTAL FOOTAGE THIS FIRST DEVELOPMENT STAGE IN MARCH 1967 WAS: DIAMOND DRILLING 548301 FEET, 123 HOLES; PERCUSSION 6585 FEET, 32 HOLES. TO THE END OF THE YEAR WAS: DD. PERCUSSION

AT THE TIME OF THE WRITERS VISIT IN JUNE ONLY SOME 13000' HAD BEEN DRILLED. THE FOLLOWING ACCOUNT DEPENDS LARGELY ON

INFORMATION GATHERED BY THE WRITER AT THAT TIME BUT IS AUGMENTED BY MUCH COMPANY INFORMATION OF MORE RECENT DATE.

### GEOLOGY

THE PROPERTY IS IN A BELT STRIP BETWEEN HORSEFLY & THE QUOSNEL RIVER AT MOOREHEAD CREEK IN WHICH OUTFERRO, ALTHOUGH SCARCE, IS ALMOST ENTIRELY LOWER JURASSIC PURPLE & GREEN ANDESITE TUFFS, BRECCIAS & FLOWS. IN THE VICINITY OF THE PROPERTY, AT MOUNT POLLEY & BOOTJACK MOUNTAIN THESE VOLCANIC ROCKS ARE INTERRUPTED BY A RELATED SEQUENCE OF ~~PER SATURATED~~ PORPHYRIES. QUARTZ-FREE PORPHYRIES AND FINE GRANITOID ROCKS RANGING FROM SYENODIORITE TO SYENITE & LAMPROPHIRE.

Except Outcrop is fairly common on hill tops & steeper slopes but is rare elsewhere - hence the <sup>overall</sup> outline of the intrusions ~~foot~~ plugs is not well known. Two centres <sup>that are not entirely separate</sup> are apparent, one at Bootjack & one on Poley Mtns. The remaining following description is concerned only with the Mt. Poley stock & principally in the central area of this stock. Here natural outcrop & extensive trenches ~~express~~ reveal evidence of a ~~complex~~ sequence of intrusion brecciation, metasomatic alteration, & mineralization so, <sup>involved</sup> complex that only a most <sup>thorough</sup> detailed study could unravel the details. This report is preliminary.

The Mount Poley Stock is formed of a suite of barely saturated rocks that have so many characteristics in common that a family relationship can be assumed. In particular <sup>rock types</sup> all contain similar augite as the main mafic mineral, ~~non~~ <sup>quartz</sup> or feldspathoids, all contain about 5% magnetite, <sup>specimens some</sup> most have stubby apatite phenocrysts & <sup>abnormally</sup> abundant amounts of sphene.

In composition they range from syenodiorite through at least three types of monzonite porphyries to syenite & pyroxene lamprophyre. ~~The syenite is judged to be largely of metasomatic origin.~~ Brecciation, intense alteration & mineralization form part of the plutonic sequence. ~~Unaltered rocks are either fine grained or have a fine matrix.~~ <sup>abundant</sup> ~~druses~~ <sup>cavities</sup> are ~~very common~~ in the breccias & <sup>porphyr</sup> miarolitic cavities occur in some specimens of porphyry; ~~therefore~~ the intrusions occurred at shallow depth. Inclusions & screens of many types of meta volcanic rocks, skarns & early phases are abundant.

FIG — SHOWS AN INTERPRETATION OF THE GEOLOGY OF THE CENTRAL AREA. (NOT ALL THE UNITS SHOW AT THIS SCALE & PRECISE BOUNDARIES ARE NOT) THE OLDEST ROCKS ARE <sup>DARK</sup> GREEN SLIGHTLY PORPHYRITIC ANDESITES WHICH OCCUR IN GREATEST <sup>THESE</sup> AMOUNT IN TR. 19 IN SEAST, BUT AT <sup>HOWEVER</sup> MOST VOLCANICS & SKARNS ARE COMMON AS INCLUSIONS & SCREENS PARTICULARLY WITHIN THE BRECCIA AREAS. IN SUCH SETTINGS THEY ARE COMMONLY <sup>IRREGULARLY</sup> BANDOED OR <sup>MOTTLED</sup> ~~HOMOGENEOUS~~ ROCKS COMPOSED OF VARYING AMOUNTS OF GARNET, PYROXENE, ~~IRON~~ MAGNETITE, POTASH FELDSPAR WITH CLINOZOISITE, CALCITE, <sup>CHALCOPYRITE,</sup> MUSCOVITE, PLAGIOCLASE, APATITE & RARELY SOME ZEOLITES. SOME VOLCANIC ROCKS ARE SO METASOMATIZED IN THE BRECCIA AREAS THAT THEY HAVE ~~BECOME~~ <sup>ARE</sup> INDISTINGUISHABLE FROM INTRUSIVE PORPHYRIES. IN THE SAME SETTING ONLY BY THE ROCKS THAT THEY GRADUATE INTO.

THE SEQUENCE OF INTRUSIVE EVENTS IS STILL PARTLY IN DOUBT BUT BEYOND DOUBT IS THE CLOSE RELATIONSHIP OF ALL ~~THESE~~ INTRUSIVE PHASES, IN TIME AS WELL AS PETROLOGY FOR THEY OVERLAP THE MINERALIZATION. IN THIS SEQUENCE ONE GRANITIC TEXTURED PHASE, A SYENODIORITE & THREE <sup>MONZONITIC</sup> PORPHYRIES AND ONE LAMPROPHYRE DYKE PHASE. THE MAIN DOUBT EXISTS THE RELATIVE AGE OF THE SYENODIORITE TO THE PORPHYRY PHASES IS IN DOUBT.

THE RELATIVE AGE OF THE VARIOUS INTRUSIVE PHASES & THE BRECCIATION & ALTERATION ARE NOT FULLY KNOWN. THE INTRUSIVE PHASES INCLUDED A GRANITIC TEXTURED SYENODIORITE, 3 MONZONITIC PORPHYRIES & A LAMPROPHYRE DYKE PHASE. THE MAIN ELEMENT OF DOUBT IS WHERE THE SYENODIORITE FITS IN THE SEQUENCE.

THE PORPHYRY PHASES WILL BE DESCRIBED FIRST FROM OLDEST TO YOUNGEST. THEY ARE ALL SIMILAR AND WILL BE CALLED MONZONITIC PORPHYRIES ALTHOUGH THIS NAME IS NOT ENTIRELY SUITABLE FOR THE FIRST PHASE (1). THIS IS ~~A~~ TYPICALLY A CROWDED PORPHYRY THAT IN HAND SPECIMEN LOOKS LIKE A FOLIATED, GRANITIC TEXTURED ROCK. FOR IT NORMALLY HAS 50 OR MORE PHENOCRYSTS UP TO 5 MM. LONG. <sup>APHANITIC</sup> IT MAY HAVE A GREY BROWN OR PINK MATRIX. WHERE RELATIVELY FRESH. THE AVERAGE <sup>MINERAL COMPOSITION</sup> OF ~~4 FRESH SPECIMENS~~ IS AS FOLLOWS: PLAGIOCLASE 60.1 PERCENT

TABLE - SHOWS THE MINERAL COMPOSITION OF ALL <sup>FRESH</sup> INTRUSIVE ROCKS  
 THE PORPHYRY PHASES WILL BE DESCRIBED FIRST FROM OLDEST TO YOUNGEST  
 THESE ARE ALL SIMILAR & WILL BE CALLED MONZONITE  
 PORPHYRIES ALTHOUGH THIS NAME IS NOT ENTIRELY SUITABLE FOR  
 THE FIRST PHASE ①. THIS IS <sup>FOLIATED</sup> TYPICALLY A CROWDED PORPHYRY  
 WITH PROMINENT PLAGIOCLASE LATHS IN AN APHANITIC MATRIX  
 OF GRAY, BROWN OR PINK. EXCEPT ON CLOSE INSPECTION IT LOOKS  
~~GRANITIC~~ ON CASUAL INSPECTION IT <sup>MAY</sup> LOOKS AS IF IT IS GRANITIC TEXTURED.  
 NORMALLY THE AUGITE IS FRESH BUT MAY BE PARTLY ALTERED TO CHLORITE  
 OR HORNBLENDS. THE PLAGIOCLASE OCCURS IN LATHS <sup>UPTO 5MM LONG</sup> & STUBBY  
 COMPOUND GRAINS WITH COMPLEX TWINNING. IT IS NEARLY COMPLETELY  
 SERICITIZED. IT APPEARS TO HAVE BEEN ZONED OVER THE INTERVAL  
 AN<sub>50-30</sub>. MAGNETITE IS PARTLY IN LARGE GRAINS. BIOTITE IS ABSENT  
 POTASH FELDSPAR OCCURS AS PAIR PHENOCRYSTS & FORMS HALF  
 THE FINE GRAINED MATRIX <sup>TOGETHER</sup> WITH PLAGIOCLASE & ACCESSORIES INCLUDES  
 STUBBY PHENOCRYSTS OF APATITE, & SPHENE. COMMON MINOR  
 ALTERATION MINERALS IN SMALL AMOUNTS INCLUDES CLINOBIOTE  
 & PREHNITE.

THE SECOND PHASE ② IS ALSO A CROWDED PORPHYRY  
 WITH AN EVEN SMALLER PERCENTAGE OF MATRIX & EVEN LESS  
 OBVIOUSLY A PORPHYRY. IT IS NORMALLY GRAY WITH A FINE  
 INTERSTIAL TEXTURE. OCCASIONAL LARGE WHITE (3x2MM) PLAGIOCLASE  
 PHENOCRYSTS ARE CHARACTERISTIC. ~~THE~~ AUGITE MAY BE FRESH OR <sup>PARTLY</sup> ALTERED  
 TO BIOTITE OR MORE RARELY PREHNITE <sup>CHLORITE</sup> & EPIDOTE. BIOTITE IS PRESENT  
 ALSO AS A PRIMARY MINERAL AS RAGGED MIDDLE SIZED GRAINS. THE  
 PLAGIOCLASE WAS ZONED AND ZONING BUT IS ALMOST COMPLETELY SERICITIZED  
 EXCEPT FOR A THIN RIM. POTASH FELDSPAR OCCURS CHIEFLY IN  
 THE MATRIX. ACCESSORY SPHENE AND APATITE ARE NORMAL. IN ADDITION  
 TO THE <sup>ALTERATION</sup> MINERALS MENTIONED ZEOLITES OCCUR.

THE THIRD PHASE ③ AS FAR AS IS KNOWN IS A MINOR  
 DYKE PHASE. IT IS SIMILAR TO ① BUT CONTAINS MUCH MANY  
 FEWER PHENOCRYSTS IN A <sup>FINELY APHANITIC</sup> CHOCOLATE COLOURED MATRIX.  
 IT IS GENERAL QUITE FRESH BUT PLAGIOCLASE MAY BE PARTLY  
 ALTERED TO MUSCOVITE OR PREHNITE. IT APPEARS TO BE A  
 POST MINERAL PHASE.

(0.5-2 mm)

Q THE SYENODIORITE IS A FINE TO FINE MEDIUM GRAINED GRANITIC TEXTURED ROCK THAT IS NORMALLY DARK GRAY BUT WITHOUT BEING GREATLY ALTERED MAY BE PINKISH. OCCASIONAL LARGE MAFIC PHENOCRYSTS ARE COMMON. AT MANY LOCALITIES IT IS HAS A FAIR FOLIATION, AT OTHER A LATHY INTERSTITIAL TEXTURE. PLAGIOCLASE WAS ZONED FROM AN<sub>70-80</sub> BUT IS NOW HIGHLY SERICITIZED. POTASH FELDSPAR GENERALLY IS INTERSTITIAL. MAFIC MINERALS OTHER THAN THE MAGNETITE ARE ASSOCIATED IN A CHARACTERISTIC MANNER. FRESH PYROXENS MAY BE MANTLED BY HORNBLENDS OR BIOTITE & EITHER ONE MAY EXTEND AWAY FROM THE MANTLE AS A LARGE POIKILITIC GRAIN WITH INCLUSIONS OF SMALL PLAGIOCLASE LATHS. BIOTITE IS MORE COMMON THAN HORNBLOND. ALL THREE MAY OCCUR IN ONE SPECIMEN. THE BIOTITE MAY BE PARTLY ALTERED TO CITRORITE. SPHENE & APATITE ARE COMMON ACCESSORIES. PREHNITE IS A RARE ALTERATION AFTER PLAGIOCLASE.

ZONED THIS LAMPROPHYRE IS AN UNUSUAL ROCK OF PROMINENT AUGITE IN A FINE TO MODERATELY HIGHLY ZONED, SERICITIZED MATRIX OF PLAGIOCLASE. (AN 75-80) WITH INTERSTITIAL POTASH FELDSPAR. THE ROCKS WEATHERS DARK SAND & SOME DYKES CAN BE IDENTIFIED IN THE TRENCHES BY THIS MEANS.

BRECCIATION  
THE STRUCTURE, ALTERATION & MINERALIZATION ARE ALL INTIMATELY RELATED.

THE REFERENCE TO THE GEOLOGICAL MAP WILL SHOW:

AN ADDITIONAL UNIT IS SHOWN ON THE GEOLOGICAL MAP - BRECCIA<sup>FRAGMENTATION</sup>. THESE ARE COMPLEX AREAS COMPOSED OF ROCKS THAT RANGE FROM ONES

ON THE GEOLOGICAL MAP AN ADDITIONAL UNIT IS SHOWN CALLED BRECCIAS. THIS IS A SIMPLE<sup>ST</sup> TERM FOR COMPLEX OF BRECCIAS & ALTERED ROCKS THAT ARE OF MAJOR IMPORTANCE IN REGARD TO THE ECONOMIC MINERALIZATION. THESE ARE WIDELY VARIABLE IN <sup>SIZE</sup> TEXTURE AND ROCKS INCLUDE SIGNIFICANT AREAS OF METAVOLCANIC SKARNS, & BRECCIAS OF THE SAME IN AN INTRUSIVE MATRIX, BRECCIAS IGNEOUS BRECCIAS, SHATTER BRECCIAS SLIGHTLY EXPANDED.

THE RANGE OF TYPES PRESENT IS LARGE & THE COMMONEST FEATURE<sup>IS</sup> THE SALMON COLOUR<sup>OF MOST ROCKS</sup> RESULTING FROM EXTENSIVE POTASH METASOMATISM. MANY OF THE ROCKS CANNOT BE DEFINITELY IDENTIFIED BUT AMONGST THE TYPES ARE THE FOLLOWING:

- ① METAVOLCANIC SKARNS & BRECCIAS OF THESE IN PLUTONIC MATRIX.
- ② BRECCIAS OF PORPHYRY IN AN IGNEOUS MATRIX.
- ③ BRECCIAS OF PORPHYRY ONLY SLIGHTLY EXPANDED WITH DUSY MATRIX FILLED WITH POTASH FELDSPAR, BIOTITE, AMPHIBOLE MAGNETITE, CHALCOPYRITE, & ZENITHES CHIEFLY STIBITE
- ④ HIGHLY ALTERED<sup>HIGHLY</sup> PORPHYRY WITH OR WITHOUT MANY INCLUSIONS, & WITH OR WITHOUT LARGE POIKILITIC PORPHYROBLASTS OF K FELDSPAR.

WHERE ALTERATION IS LEAST THE ROCK TYPE THAT IS GENERALLY RECOGNIZABLE AS THE MAIN TYPE THAT OCCURS AS BRECCIA FRAGMENTS AND OR ORIGINAL HOST IS

THE CROWDED PORPHYRY ①. IN SOME CASES THIS IS ENTIRELY CONVERTED INTO A SYENITE OR EVEN AN ORTHOCLASE ROCK WITH JUST <sup>PALIMPSEST</sup> ~~FRAGMENTARY~~ PLAGIOCLASE, AUGITE OR MAGNETITE.

THIS <sup>ALTERED SALMON</sup> PORPHYRY IS ~~NOT~~ MAY BE CONTAINED IN A GREY OR MATRIX COMPOSED CHIEFLY OF LARGE <sup>IRREGULAR</sup> ORTHOCLASE OR RARELY MICROCLINE CRYSTALS <sup>GRANOS</sup> WITH BIOTITE. THE PORPHYRY ② IS PRESENT IN LESSER AMOUNTS & CONTAINS DEFINITE FRAGMENTS OF

4 PORPHYRY ①. → IN ADDITION TO THE NORMAL MINERALOGY & ALTERATION DESCRIBED WITH THE FRESH ROCKS, MUCH PLAGIOCLASE IN THE MATRIX IS REPLACED BY K-FELDSPAR & PHENOCRYSTS MAY BE ~~UNDEVELOPED~~ EITHER JUST SERICITIZED, MANTLED WITH ORTHOCLASE OR ENTIRELY REPLACED. AUGITE MAY BE FRESH OR REPLACED BY CLINOZOISITE, TALC, SERPENTINE, BIOTITE, SPHENE, CARBONATE OR SOME COMBINATION. TREHNITE IS RELATIVELY COMMON. & APATITE & SPHENE MORE COMMON THAN IN ORIGINAL PORPHYRIES. MANY OF THE BRECCIAS & ALTERED ROCKS ARE ALSO FAIRLY POROUS & MOST ~~ARE~~ CONTAIN SOME CHALCOPYRITE ~~PREFERENTIALLY~~ IN THE BRECCIA MATRIX BUT ALSO IN SMALL SPOTS AND DISSEMINATED. ~~Several~~ LATE ZONULE VEINLETS ARE COMMON.

THE MAP FIGURE —, IS ONLY AN INTERPRETATION OF THE GEOLOGY! THE GEOLOGY IN THE BRECCIA AREAS IS QUITE COMPLEX. ~~THE~~ <sup>PLUTONIC</sup> SEQUENCE THAT SEEMS MOST LIKELY IS AS FOLLOWS: ① INTRUSION OF PORPHYRY ①

- ② INTRUSION OF PORPHYRY ② ~~& BRECCIATION~~
- FOLLOWED OR OVERLAPPED OR FOLLOWED BY BRECCIATION & MAIN ALTERATION & MINERALIZATION. CLOSELY FOLLOWED BY
- ③ INTRUSION OF SYENODIORITE CLOSELY
- ④ DYKES OF PORPHYRY 3.
- ⑤ " OR LAMPORPHYRY.

THE CAUSE OF BRECCIATION IS MOST LIKELY TECTONIC IN THAT THE BELTS OR BRECCIA ARE FAIRLY LINEAR <sup>TRENDSING GENERALLY NORTHWARD &</sup> SEEMING TO DIVERGE ABOUT A CORE OF SYENODIORITE. BRECCIATION MAY HAVE BEEN IN ADVANCE OR INTRUSION OR ONE OF THE LATER PHASES, PORPHYRY 2 OR THE SYENODIORITE. ONE OF THE COMPLEXITIES IS THAT FOLIATION IN THE SYENODIORITE APPEAR DISCONFORMABLE WITH THE CONTACTS, <sup>WHICH COULD BE</sup> ~~SUCCESSIVE~~ <sup>OR</sup> TAKEN TO INDICATE IT WAS AN EARLY PHASE, LATER TRUNCATED. DYKES OF THE PORPHYRIES HOWEVER HAVE NOT BEEN IDENTIFIED



IN THE MAIN SYENODIORITE MASSES, ~~THE~~ ALTERATION OF THE SYENODIORITE IS SLIGHT ~~SUBSO~~ BOTH OF WHICH SUGGEST IT WAS A LATE PHASE.

~~THE~~ THE LATE PROPHYRE DYKES FOLLOW LATE SMALL NORTHERLY TRENDING <sup>STEEP</sup> FAULTS. ONE FAIRLY IMPORTANT SHEAR ZONE FOLLOWS THE ALTERED ROCKS IN THIS SAME ORIENTATION.

### MINERALIZATION.

THE ~~CORE OF THE~~ MT. POLLY STOCK IS EXTENSIVELY MINERALIZED <sup>WITH CHALCOPYRITE</sup> PARTICULARLY <sup>IN</sup> THE BRECCIA ZONES. PYRITE OCCURS AS IN A PARTLY PERIPHERAL DISTRIBUTION. CHALCOPYRITE IS CHIEFLY DISTRIBUTED ~~AS~~ IN MATRIX OF BRECCIA & IN DRUSY CAVITIES. <sup>ALSO</sup> EXTENSIVE REPLACEMENT HAS OCCURRED <sup>ALSO</sup> OF SOME METAVOLCANIC INCLUSIONS IN BRECCIA ZONES. <sup>BOEMITE IS PRESENT IN VERY MINOR AMOUNTS</sup> PYRITE EITHER IN THE ORE ZONE OR PERIPHERAL TENDS TO BE MORE TRULY DISSEMINATED.

BUT ALSO AT FRACTURE COATINGS

MANY SECONDARY COPPER MINERALS OCCUR IN THE OUTCROP, & TRENCHES & UPPER PART OF DRILL HOLES, NOTABLY, MALACHITE, AZURITE, ~~AND~~ WITH TRACES OF CUPRITE & CRYSOCOLA.

THE DRILLING HAS OUTLINED APPROXIMATELY 37,000,000 TONS OR ORG. OF AN AVERAGE GRADE OF  $\sqrt{0.50\% \text{ Cu}}$ , & AW: 0.015 OZ/TON THIS RESERVE IS IN THREE BLOCKS THAT WILL BE MINED SEPARATELY ~~BY~~ AS SEPARATE OPEN PITS.

### QUOTE FROM ANN. RPT.

[ RPT. ANNUAL RPT 1965. PP 140-141 ]