GOLD–SILVER–COPPER MINERALIZATION IN THE BOUNDARY DISTRICT

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INTRODUCTION

A porphyry copper prospect has been found recently in the Franklin Mining Camp north of Grand Forks, near the Boundary District. It is predicted here, on the basis of this study, that a similar porphyry copper deposit will be found in or near the Wallace Creek batholith.

OBSERVATIONS

Three mining camps of the Boundary District of British Columbia seem to be related to a common ore genesis. These are: the Deadwood Camp, the Phoenix Camp, and the Summit Camp (Fig. 5). All the major deposits in these camps are skarn deposits. Figure 6 indicates that the production from the above camps plot on regression lines with a high correlation coefficient, indicating a common, single stage mineralization.

SOURCES OF ERROR

(1) Those who work with production figures know how inaccurate some of them can be.

(2) Studies of metal ratios do show variations with grade of ore. There is the very real question as to if this present study is indicating a common source or a common geochemical phenomenon only.

(3) The production figures are based on recovery and this will vary from mill to mill as well as change in time due to technology. In this study it is assumed that these variations are insignificant compared to the final product.

(4) In the statistical calculations many figures have been rounded off. This normally gives a higher correlation coefficient. However, in this case, this type of error is also considered insignificant.

(5) The 'B.C. Mine' silver production figure has been used in the silver-copper regression line, but the gold production has not been used as it would shift the whole curve and greatly lower the correlation coefficient. This is a bias.

HYPOTHESIS

While the individual orebodies have a north-south orientation, the spatial distribution is around the south edge of the Wallace Creek batholith. Indeed, both the Motherlode and Emma-Oro Denoro mines are in contact with rocks believed to be associated with, or part of, the batholith.

Assuming that the mineralization originated from the Wallace Ceeek batholith, it is postulated that there are areas within the batholith which have gold-silver-copper mineralization.

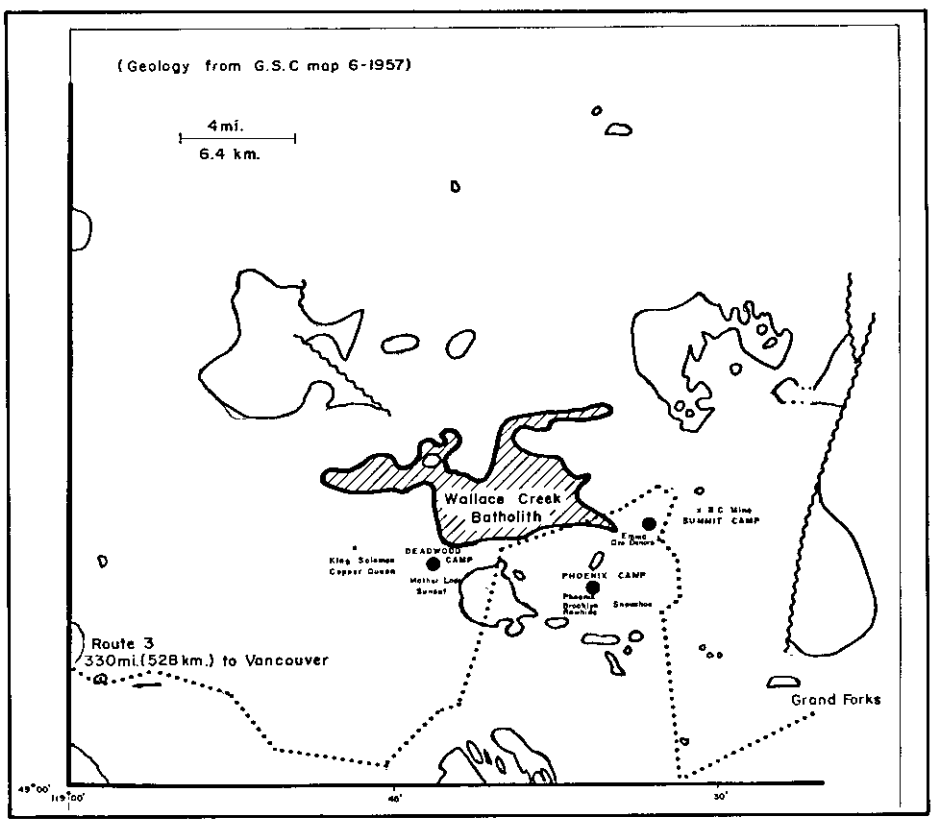

Figure 5. Location of major mining camps in the Boundary District in relation to the Wallace Creek batholith and other Nelson Intrusions.

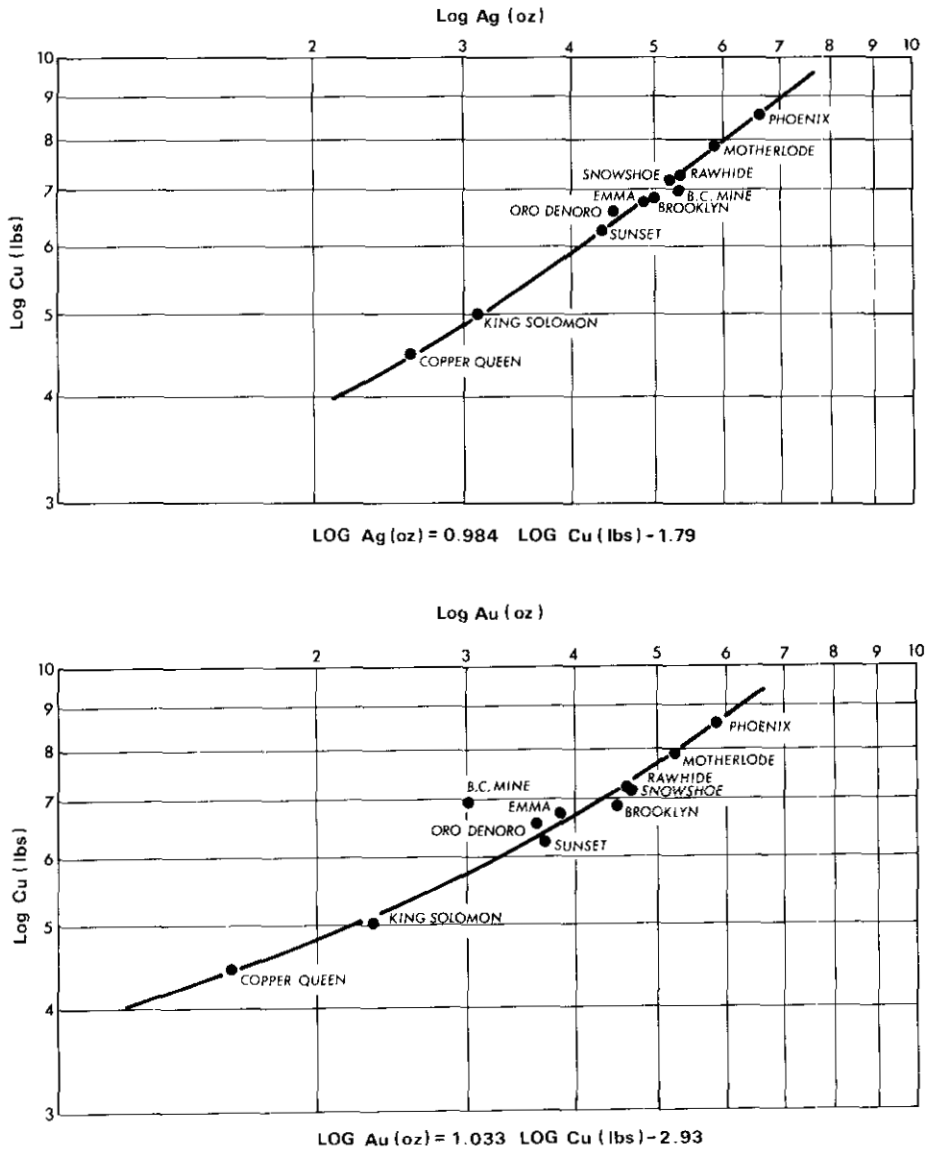

Figure 6. Boundary District, gold-copper and silver-copper ratios.

TABLE 1. PRODUCTION FIGURES

Mine	Years	Copper lb.	Log Copper	Gold oz.	Log Gold	Silver oz.	Log Silver
Phoenix*	1900–69	389,084,296	8.59	764,074	5.88	4,596,861	6.66
Motherlode*	1900–62	76,975,516	7.89	173,322	5.24	688,214	5.84
Brooklyn*	1900–49	7,819,517	6.89	27,404	4.44	110,028	5.04
Rawhide*	1904–16	18,610,304	7.27	33,941	4.53	222,149	5.35
Snowshoe*	1910–11	13,937,892	7.14	41,282	4.62	159,147	5.20
Sunset*	1900–18	1,910,265	6.28	4,649	3.67	24,015	4.38
Emma*	1901–21	5,132,118	6.71	6,804	3.83	78,065	4.89
Oro Denoro*	1903–17	3,727,194	6.57	3,744	3.57	30,652	4.49
King Solomon†	1901–17	101,801	5.01	214	2.33	1,299	3.11
B.C. Mine†	1900–19	9,025,707	6.96	1,002	3.0	214,275	5.33
Copper Queen**	1954–55	28,627	4.46	39	1.59	402	2.60

*Production figures used for Figure 6 from the *Western Miner,* December, 1970, page 45, in a paper titled 'The Greenwood Area' by Frederick H. Reid, P. Eng.

†Production figures from Index No. 3, *British Columbia Department of Mines and Petroleum Resources.*

**Production figures from Index 4, *British Columbia Department of Mines and Petroleum Resources.*

TABLE 2. BOUNDARY DISTRICT
GOLD–COPPER REGRESSION LINE CALCULATIONS

	x Copper	y Gold	xy	x^2	y^2
Phoenix	8.59	5.88	50.51	73.79	34.57
Motherlode	7.89	5.24	41.34	62.25	27.46
Brooklyn	6.89	4.44	30.59	47.47	19.71
Rawhide	7.27	4.53	32.93	52.85	20.52
Snowshoe	7.14	4.62	32.99	50.98	21.34
Sunset	6.28	3.67	23.05	39.44	13.47
Emma	6.71	3.83	25.70	45.02	14.67
Oro Denoro	6.57	3.57	23.45	43.16	12.74
King Solomon	5.01	2.33	11.63	25.10	5.43
Copper Queen	4.46	1.59	7.09	19.89	2.53
	$\Sigma x = 66.81$	$\Sigma y = 39.70$	$\Sigma xy = 279.28$	$\Sigma x^2 = 459.95$	$\Sigma y^2 = 172.44$

$$b = \frac{\Sigma xy - \frac{(\Sigma x)(\Sigma y)}{n}}{\Sigma x^2 - \frac{(\Sigma x)^2}{n}} = \frac{279.28 - \frac{(66.81)(39.7)}{11}}{459.95 - \frac{(66.81)^2}{10}} = \frac{279.29 - 265.24}{459.95 - 446.36} = \frac{14.04}{13.59} = 1.033$$

$$a = \frac{1}{n}[\Sigma y - b(\Sigma x)] = \frac{1}{10}[39.7 - (1.033)(66.81)] = \frac{1}{10}(39.7 - 69.01) = -2.93$$

Log gold (oz.) = 1.033 log copper (lb.) – (2.93)

TABLE 3. BOUNDARY DISTRICT
SILVER–COPPER REGRESSION LINE CALCULATIONS

	x Log Copper	y Log Silver	xy	x^2	y^2
Phoenix	8.59	6.66	57.21	73.79	44.36
Motherlode	7.89	5.84	46.08	62.25	34.11
Brooklyn	6.89	5.04	34.73	47.47	25.40
Rawhide	7.27	5.35	38.89	52.85	28.62
Snowshoe	7.14	5.20	37.13	50.98	27.04
Sunset	6.28	4.38	27.51	39.44	19.18
Emma	6.71	4.85	32.81	45.02	23.91
Oro Denoro	6.57	4.49	29.50	43.16	20.16
King Solomon	5.01	3.11	15.58	25.10	9.62
B.C. Mine	6.96	5.33	37.10	48.44	28.41
Copper Queen	4.46	2.60	11.60	19.89	6.76
	$\Sigma x = 73.77$	$\Sigma y = 52.89$	$\Sigma xy = 368.14$	$\Sigma x^2 = 508.39$	$\Sigma y^2 = 267.57$

$$b = \frac{\Sigma xy - \frac{(\Sigma x)(\Sigma y)}{n}}{\Sigma x^2 - \frac{(\Sigma x)^2}{n}} = \frac{368.14 - \frac{(73.77)(52.89)}{11}}{508.39 - \frac{(73.77)^2}{11}} = \frac{368.14 - 354.70}{508.39 - 494.73} = \frac{13.44}{13.66} = 0.984$$

$$a = \frac{1}{n}[\Sigma y - b(\Sigma x)] = \frac{1}{11}[52.89 - (0.984)(73.77)] = \frac{1}{11} = (52.89 - 72.58) = -1.79$$

Log silver (oz.) = 0.984 copper (lb.) – (1.79)