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Felix Edgar Wormser*

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Kidder, Peabody & Co.  
17 Wall Street  
New York, N.Y.

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Illinois Merchant's Trust Bldg.  
Chicago, Ill.

Gentlemen

In accordance with your request, I have carefully examined the property of the Oregon Copper Co., near Baker, Oregon, spending thirteen days - from February 15 to 27 - on the ground, and herewith submit my report thereon.

Very truly yours,

(Signed) Felix Edgar Wormser

FEW:r

*Engle 1100 x*  
*H. C. Livingston*  
*1927*

Baker, Oregon  
August 18, 1927

Oregon Copper Company,  
Baker, Oregon.

Gentlemen:

Below follows a brief geological report on the structural features of your Balm Creek orebody and an outline of development, which, in the writers opinion, should lead to the discovery of this orebody on the four hundred and thirty two foot level of the Balm Creek shaft. This report is accompanied by a map which was constructed for the purpose of graphically depicting as nearly as possible the ore occurrence as disclosed by the workings.

This map is a prospective view imaginatively taken from a point southwest of the Balm Creek shaft at an angle of approximately forty five degrees and from an infinite distance. The distances projected on this map are not true distances but prospective distances due to foreshortening. They can, however, be used for measurements by simple calculation.

The report is based upon certain information obtained during the early part of June, while with the O. A. C. School of Mines class, supplemented by two weeks additional work in August, when I was assisted by Mr. John Arthur in obtaining the necessary data.

Yours very respectfully,

/s/ D. C. Livingston

DCL/AP

BRIEF STATEMENT OF  
MOTHER LOBE AND OREGON COPPER MINING PROPERTY

By John Arthur

Baker, Oregon, March 1, 1934.

Since this property is well known little will be said about its history. The vital point to consider is can it be made a paying mine. This is a fact of which the writer is confident and therefore presents the following facts for your consideration.

The property is situated 25 miles northeast of Baker, Oregon, on a good highway. The snow fall is light and automobiles can be used the entire year. Ample water and timber is close to the property for all purposes that a mine requires.

A few years ago when metal prices were high the property was booming. During this time any prominent engineers and geologists, who were employed by the company, made glowing statements, and to back their belief in the property personally made heavy stock purchases at high prices. This belief in the merits of the property was not only their's, but many visiting engineers from large operating companies went into the market and invested thousands of dollars in the stock for their own account.

Were all of these men mistaken? I think not. However, the panic and general slump of metal prices made all forget. The reason that large blocks of the stock were bought was that the management found there was a progressive increase of gold mounting to \$1.00 per ton for each 100 feet in depth on the ore. On the 500-foot level, just above the "big fault", the result of a crosscut 75.5 feet across the ore body gave remarkable gold returns.

At the time of driving the above crosscut the mine foreman took daily face samples and these gave an average of \$54.46 per ton for the 75.5 feet. A box sample was taken from each car as the muck was removed from the crosscut, and the average of this sampling was \$24.54 per ton. Mr. P. W. Racey, the manager, then becoming bewildered or suspicious, went in and personally cut samples for a width of 49 feet and sent them to Salt Lake for assay. These samples averaged \$16.97 per ton. All of the above was in gold, except \$6.00 per ton which was in copper.

The above is interesting and goes to show the spotted gold condition of this ore body. After the above sampling, Mr. Sanford, the surveyor, had channel samples taken across this ore body and made an average of gold \$4.30, silver .05 ounce, copper 2.074% per ton. Quite a difference in the results. THERE IS A REASON which I will explain. (See attached map "A" for the above results.)

With no criticism of the management or engineers that were on the ground, I still will emphasize the fact that THEY ALL OVERLOOKED A BET. Surely there is some reason for all those varied values and at least, the writer for one, did take the trouble to find how the high gold values occurred.

The gold was surely there, else where did it come from? This writer found out. The writer can, and did, at any time go into this crosscut and take samples up to a foot wide and many feet long and get ore assaying \$50.00 to \$1500.00 in gold per ton, thus accounting for the spotted condition in sampling. I don't know of any engineer that was on the ground who went to the trouble to find out just what that ore body really would assay in gold, but I can say that the gold values are somewhere between Mr. Sanford's sampling of \$4.30 per ton and the car samples assaying approximately \$18.00 per ton in gold.

#### Reason for the Above Erratic Values

The ore body was first formed with low gold content, this representing the part of the vein that Mr. Sanford sampled. Later movements in the vein fractured or fissured it at right angles to the strike. The fractures, or fissures, filled with more silica-copper and very high gold values. In other words making a multitude of small rich veins within the main big vein, and all of these small veins contain much very fine free gold.

#### The Rich Cross Veins in the Crosscut

One of these cross veins is directly in the reef of the crosscut on the west corner; another goes directly down the center of the crosscut, and a third goes down the extreme east lower corner. The Sanford sampling being in the center of the crosscut sides misses all of these. TO GET AN AVERAGE SHOWING OF ALL OF THIS THE WRITER TOOK SAMPLES UP EACH SIDE VERTICAL AND OVER THE TOP OF THE CROSSCUT ROOF, WHICH CUT ALL OF THE ORE BODY INCLUDING THESE STRAKS? AND THE RESULT WAS FOR THE 30 FEET SAMPLED TO VERIFY BY THEORY OF A GOLD CONTENT OF \$18.00 per ton. Should a sampler formerly get a very high sample it was not considered as it did seem erratic. Another thing, in the Sanford sampling of this ore body--the ore was very hard and the unaltered vein matter was soft, containing little value, and the hid samplers, as shown by the channels, took too much of the soft material in proportion to the hard quartz to get a fair average sample. The above was checked out by myself. I took a correct channel sample across 30 feet in a straight cut and secured \$5.00 per ton more gold than the badly taken samples.

The above condition of right angle fractures filled with high grade ore is characteristic of the entire ore body from the surface down, but is more pronounced in the lower levels. (See letter "B" by Mr. Pierson, as to the difference on the third level between car and face samples). It is evident that the blasting gets a nearer correct average. In the fact samples at times we would get an exceptionally high assay in gold, but being, or seeming, erratic, we would discard it.

#### Gold figures at \$20.00 per ounce

All of the above values of course were figured at \$20.00 per ounce and the mine with the gold in the ore and a 14-cent copper market was considered to be of good paying grade. Now with gold at \$35.00 per ounce it is even better than with the higher copper price.

With the foregoing showings and good reports from the engineers who managed and were otherwise employed by the company, the directors with much enthusiasm and confidence did not hesitate to borrow money to continue development. Like

everyone they could not foresee the panic that was to befall the country and make it impossible to repay these loans. Therefore, like thousands of other enterprises, the Oregon Copper company was sued and the property foreclosed to satisfy the creditors, thus losing the property to the stockholders.

The writer tried very hard on a three month's campaign to rally the stockholders together, hoping that they might contribute in numbers, a few dollars each monthly, to redeem the property, but did not succeed. Recently personal letters have been written to those who were thought to be the best prospects to learn if they would assist in recovering the property. No substantial interest has been shown and now the writer in order to save himself, and to further prove his contention that the mine can be made to pay, will endeavor to either interest the stockholders, or outsiders, to take over the property and get it into production within six months from this date.

Option to Purchase Property

Mr. Hamilton Corbett, the party who obtained title to the Oregon Copper Company property through foreclosure for money loaned the company, was recently in Baker and was interviewed regarding an option to purchase the mine. The following terms and price were agreed upon, and, if satisfactory to his associates, will be signed:

Price of Property	\$300,000.00		
Payments-----	\$ 5,000.00	Dec. 30,	1934
	20,000.00	" 30,	1935
	20,000.00	" 30,	1936
	20,000.00	" 30,	1937
	25,000.00	" 30,	1938

We have the privilege of selling any machinery or equipment, not required in working the mine, money received on such sale to be applied on the final payment of purchase price, or we can sell parts of the mining property and apply money received in the same manner.

There is to be 10% royalty from ores or mill products shipped to smelter to apply on the mine payments as they become due. This 10% means that all railroad freights from Baker to the smelters and all smelting charges are deducted at the smelter and the net returns from the smelter sent to the bank in Baker. The bank will hold out 10% of such checks for Mr. Corbett and turn the 90% remaining to the account of the party having the lease and option. The 10% held out by the bank to be applied on the purchase price of the mine.

Within 60 days after the signing of the option we must assume the watchman expense, if one is kept, but in any case after 90 days 150 shifts work a month must be performed on the property. This can be either in the mine or in mill construction. In any case we must keep a watchman if no other men are working on the mine. We must assume the taxes for 1934 and must carry some insurance. The insurance need not be a great amount until the water system is repaired for fire protection.

Statement Regarding Operation

All the mine maps and statements were sent to Portland at the time the mine was closed, but the writer has the attached maps, and ample data to make the following statements regarding operating methods and mill heads that will be obtained.

The various estimates of what was considered ore in the reports of different engineers range from 200,000 to 265,000 tons in the Balm Creek ore body from the surface to the 500-foot level. These estimates are conservative. In places where the ore was down to 10 feet in width, and not out further on, they terminated their measurement of ore, and in many places where no ore was given the writer drove through good grade gold values. With these facts in mind there is no doubt that 300,000 tons of ore would be available if all were mined, but the writer would only deliver to the mill one-half of that amount by eliminating the lower grade, barren material and leaving it in the mine as filling, thus increasing the mill heads.

The Balm Creek vein, the one that we would mine, has an easterly-westerly strike. The north or footwall is in rhyolite and the south or hanging wall is a diabase. The average dip is about 70 degrees to the south. The vein matter between these walls is a highly feldspar porphyry--at least the occurrence of this porphyry seems to be necessary to make ore. Gold and solutions ascending through the vein replaced the soluble feldspars and deposited the minerals. In some places there is nearly complete replacement and it is in these places that the higher values exist, also in some small openings or fissures solid high grade ore is found. The most complete replacement of porphyry by ore exists on the lower level.

In mining this ore body it would be the writer's intention to mine the entire body, using a horizontal cut and fill method, which permits of sorting in some cases and in others breaking down the lean porphyry as waste filling. This method should be used in the sulphide zone, as throughout this ore body there are highly mineralized streaks, then streaks of unaltered porphyry, or slightly mineralized of low tenor that would be waste, thus increasing the grade of milling ore nearly double. In the oxidized zone near the surface containing copper glance and free gold this would be more difficult, but by taking the more quartz sections a fair selection should be made. In selective mining in the sulphide zone all that is required is to take the sulphide and quartz, as both the latter are very hard, and the unaltered or slightly altered porphyry is rather soft, in some cases gougy.

Ore Available to Start Mill On

Mine dumps at Balm Creek that can be recovered--not being covered up. This ore is car measured and sampled, mostly taken out by the writer. Some better grade was taken out by others, which when milled with the ore I took out should show a much better return, however, I am using my figures.

Ore on Balm Creek dumps, 6740 tons, assaying--		
Gold	0.17 oz. @ \$33.00 per oz., price smelter pays-----	\$ 5.61
Silver	.30 " @ 0.60 " " " " " " "-----	.18
Copper	1.9 % @ .05 " lb. " " " "-----	1.90
	Gross value per ton-----	\$ 7.69
	Less 10% loss in milling-----	.77
	Balance value-----	\$ 6.92
Cost per ton putting in mill-----		\$ 0.50
" " "	milling-----	1.50
" " "	marketing-----	1.08
	Total cost per ton-----	\$ 3.08
	Profit per ton-----	\$ 3.84
Profit from 6740 tons dump ore-----		\$ 25,881.60

There are two tunnels above the collar of the shaft and ore from these can be used while clearing the lower level of water. The surface trenches on the ore body show, one a width of 58 feet of ore assaying, the lowest obtained, \$6.65 per ton in gold, and the other trench across 30 feet of ore assays 1/2 ounces, or \$10.00 per ton in gold.

The ore in the two levels below is from 6 feet to 50 feet wide and assays have been obtained from \$1.00 to \$12.00 per ton in gold for good widths. (These golds figured at \$20.00 per ounce.)

My estimate is that a length of 200 feet and 20 feet wide with a depth of 140 feet will be taken out for milling using a sort of selective mining. This figured at 12 cubic feet per ton will give 46,620 tons to mill from these two surface tunnels. As directly under the surface there is a good deal of chalcocite, which will in this block show very good copper values even with the leached out surface, my estimate of the grade of ore that will go to the mill from this block is:

Gold	0.227 oz.	@ \$33.00 per oz.	-----	\$ 7.49
Silver	0.35 "	@ .60 " "	-----	.21
Copper	2.5 %	@ .05 " "	-----	2.50
Gross value at smelter metal prices-----				\$10.20 per ton
For safety allow 15% in mill loss-----				1.53
Balance value-----				\$ 8.67 per ton
Cost per ton mining, delivering to mill-----				\$ 1.75
" " " milling-----				1.50
" " " marketing-----				1.20
Total cost per ton-----				\$ 4.45
Profit per ton-----				\$ 4.22
Profit on 46,620 tons-----				\$196,736.40

Below the adit tunnel level, which is partially under water--the water a few days ago was about 80 feet below the collar of the shaft and rarely gets above that point--ore has been proven to be 10 to 30 feet wide, and 125 to 225 feet in length, with ore up to 10 feet wide beyond some of these lengths. No doubt more length will be proven when mining is under way. The depth on the ore body would be in this block 400 feet, and below this ore there is fully 10,000 tons of \$8.00 gold ore opened by myself and not taken into consideration by others.

The above figures even taking 30 feet as an average width would show about 185,000 tons of ore, and I think 30 feet will be taken with selective mining, but I will warrant that 100,000 tons will be had for the following grade ore:

Gold	.30 oz.	@ \$33.00-----	\$ 9.90	
Silver	.35 "	@ .60-----	.21	
Copper	3.00 %	@ .05 per lb.-----	3.00	
Gross value per ton-----			\$13.11	
Less 10% loss in milling-----			1.31	
Balance value-----			\$11.80	
Cost per ton mining, hoisting to mill-----				\$ 2.00
" " " milling-----				1.50
" " " marketing-----				1.45
Total cost per ton-----			\$ 4.95	
Profit per ton-----			\$ 6.85	
Profit on 100,000 tons-----			\$685,000.00	

Summary of Above Profits

Dumps-----	\$ 25,881.60
Ore above adit level-----	196,736.40
Ore below adit level-----	685,000.00
Total	<u>\$907,618.00</u>

It will be noted at the 10% royalty mentioned earlier in this statement, according to the above estimate of profit would pay for the mine under the contract with Mr. Corbett.

The foregoing seemingly large profits are occasioned by the high price of gold now obtained. If it is desired, even more selective mining can be obtained, especially in the sulphide zone, where it will be much easier.

The marketing figures used in these estimates were recently obtained by the writer and are higher than we can expect one we are actually in production.

The figures follow:

Trucking from mine to railroad at Baker-----	per ton	\$ 2.50
Sampling, weighing, moisturing, loading on cars at Baker-----	per ton	.50
Railroad freight to smelter-----	per ton	\$ .00
Hauling 6% moisture in concentrates-----	per ton	.54
Smelter charges, deducting already made on ore-----	per ton	3.50
Total per ton of concentrates-----		<u>\$13.04</u>

Milling

Some years ago preliminary flotation tests were made on sulphide ore by both the International Smelter and the Utah Copper Company--as a matter of friendship. These companies gave results showing 94% copper extraction with concentrates carrying 24% copper. The gold extraction was 85.5%, but it was said and thought a finer grinding might increase the gold extraction. Later Milner Roberts, of the Washington University, made tests on the gold and reported 91% recovery of that metal is possible. From late improvements in flotation concentration there is no doubt that the sulphide ores should give extractions of 92% gold, and 95% copper. More tests should be made to take advantage of the latest practice of milling.

While mining the above ore prospecting should be carried on to find the lower extension of that ore body beyond the fault, and while it is unnecessary to go into detail on the fault at this time, I will say that I have strong evidence of where to pick it up, as work done in the direction of the movement began to encounter gold ore similar to that belonging in the Balm Creek ore body.

Quite a lot of equipment has been sold from the property in the past year, still the buildings are in good shape and there remains \$50,000.00 worth of machinery on the property, if one had to purchase it. Some stuff is needed for operation, but about \$7,000.00 would replace sufficient for a 100 ton milling plant.



What is Needed as Mill-Plant, Approximate Cost, Etc.

A flotation plant to treat as least 100 tons daily should be built. Before doing so the ores should be submitted to the proper testing plants to determine the best method to used in the treatment.

The following estimates are what I consider the plant could be put in operation for. It is possible that some standard rebuilt machinery could be purchased in order to come within these estimates. As there is not much snow fall in the vicinity of the mine, building would not be expensive and lumber could be cut on the ground for both building and mining at a cost of less than \$14.00 per thousand feet.

Cost of 100 ton mill, machinery and building-----	\$50,000.00
" " purchasing additional transformers, etc.-----	7,000.00
" " ore runways outside, mine preparation-----	<u>8,000.00</u>

The above costs of course could only be had with careful economical management, and the mill should be operating by June, next.

Further details and proposals to either the stockholders, or any parties putting up the money will be given should they show serious interest.

Yours very truly,

John Arthur.