

ELDER MINE  
JOSEPHINE

REPORT  
on  
THE ELDER MINING COMPANY.

The Elder Mining Co. is an American corporation, organized in 1906 under the laws of the State of Arizona. Its principal place of business is in Phoenix, the capital of this State, and its administration office is in San Francisco, Union Trust Building.

The corporation has for its object the exploitation of a bed of copper and gold ores, already known to exist for several years in the neighborhood of the village of Waldo in Josephine County, State of Oregon.

The nominal capital of the Elder Mining Co. is \$500,000. (Fracs. 2500000.-), divided into 25000 shares of \$20. (100 francs) each, issued to stockholders or Bearer at their option.

Of these 25000 shares, 10000 still remain in the Treasury, and the 15,000 shares alone participate in the results.

These 15,000 shares are considered sufficient to erect a smelter and to develop the mine. The company ultimately proposes to issue the 10,000 shares, which are still in the Treasury, as funds may be required and in particular with the view to erect an electric converter, for the refining of copper ore and the extraction of precious metals.

The American Company had already started development work, when the catastrophe in San Francisco, shortly followed by the financial stringency in the United States, prevented further operations by the owners.

Reports received on the quality of the mine and the reputation

to the mine, to determine its value, and to map out an economical plan for working the same. Further on, the report in detail, of this engineer will be found, showing the possibilities of this enterprise, and the results, which can be expected.

According to this report a net profit of about \$15. per ton for every ton of ore mined, may be counted upon. It is proposed to mine 50 tons per day, meaning a profit of \$750. or 3750 francs, or an annual profit of \$225,000. or 1,125,000 francs.

Reserving one-half of the above amount for a sinking fund, there will still remain \$112,500. equal to 562,500 francs, available for dividends; in other words \$7.50 or 37.50 francs for every share of the 15,000 shares issued of the value of \$20. or 100 francs each.

#### ADMINISTRATIVE COUNCIL

Jas. O'B. Gunn, President of Mechanics Savings Bank, San Francisco.  
T. Wain Morgan Draper, former scholar of the College of Freiberg,  
former Colonel of the American Militia, Engineer of Mines.  
M. S. Wilson, of the firm of Wilson & Wilson, Attorneys, S. F.

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REPORT

on

THE ELDER MINING COMPANY

(Copper & Gold Mine)  
Oregon,  
U.S.A.

Charged with the examination of the properties of the Elder Mining Co., in the State of Oregon, (U.S.A.) we visited the premises during the month of February, 1909, and the report of our visit follows herewith:

1. LOCATION.

In the U.S.A., near the Coast of the Pacific Ocean, a great deal of gold has for a long time been found, and it is but recently, that attention has been drawn to numerous deposits of copper ore, which extend from north to south in the States of Oregon and California.

Since the discovery of gold mines, half a century ago, copper ore has been found in this section, and wherever auriferous alluvions have been found, the presence of pyrites of iron more or less rich in copper values have been observed.

One may say, that the copper mineral, constitutes more or less or to a great extent, the mother of the gold ore, which has been discovered in an abundance hardly ever equalled.

The mineralized section of this territory may be divided into two zones, forming two parallel belts, running north and south, and corresponding with the mountain range, near the coast of the Pacific Ocean.

The zone most remote from the coast, has at its base, the railroad, with Portland as its northern and Los Angeles as its

The second zone is nearer the coast, but as the means of communication are almost nil, its mineral deposits are much less exploited. However, at the present time, attention is very strongly drawn to this side, because it is acknowledged, that the mineral deposits found here are very rich. That is to say, that while the ores of the first mentioned zone show an average of between 3 and 6% of copper, those of the second zone show at least 10% and above. The quantity of gold contained per ton, is generally 3 grammes and runs as high as 12.5 grammes.

These favorable conditions have led to searches for ore. To tell the truth, up to the present time attempts have not been very numerous, because the mineral will pay only under certain conditions; to make it pay, the cost of transportation must be reduced; as the cost of installing new improvements involves a considerable outlay, a period of inactivity naturally results.

## 2. COMMUNICATIONS.

The mine which we went to examine, and which is called the Elder Mine, is located in the second zone. It is in such a condition that one can readily see, that its operation will prove extremely remunerative, as the ore can be reduced to 40% as I shall show later on.

The property, Elder Mine, is located near the village of Waldo, celebrated in the annals of auriferous alluvions. Close by is the Queen of Bronze Mine, operated for more than three years. At the foot of the ore-bed, there is a good road, passable all the year around. This road from one side, puts Waldo into communication with Grants Pass, distance 41 miles, and on the railroad line between Portland and San Francisco, and from the other side with

One may therefore easily connect with the station at Grants Pass, which has connection with the great copper smelters of California.

### 3. COUNTRY.

The country is entirely timbered, scarcely here and there one may see some patches of agriculture on entirely virgin and very fertile soil.

The forest, which covers the country, consists almost entirely of pines, such as pitch pines, sugar pines and others. One sometimes meets giant trees, the wonder of the world, the Sequoia Gigantia.

South of Waldo, the Government has reserved the forest to prevent its destruction, and this measure has had some influence to keep out exploitation.

The climate is very moderate, the winters are very mild, characterized principally by rains. Snow, not very abundant, remains on the ground but a short time, except on the mountains exceeding 1000 metres in height. The summers are dry, particularly in the month of September. The climate is very healthy, there are no mosquitoes and therefore no fever. The population is thinly scattered. Here and there one finds some houses, some occupied by farmers, some by gravel miners and some by prospectors.

Postal and telephone service as well as schools are everywhere established, and it is remarkable with what facility one can replenish supplies and find the help of mechanics.

### 4. GEOLOGY.

The Waldo District is particularly rich in mineral showings. Everywhere, in passing through the country, one finds indications of mineralization, consisting of spongy oxide of iron, in almost all of the ravines made by rivers. In ascending the mountains, one almost invariably again finds the oxide of iron, which forms the iron cap, immediately under which the copper ore is found.

Geological study of the country shows, that the subsoil is constituted of a great mass of eruptive rock. It is a diorite, almost always transformed, near the surface, into serpentine, and it is near the contact of the serpentine with the diorite that one finds mineral showings. To speak correctly, one does not find oneself in the presence of a true vein, for no one can say that there have not been breaks, which have been filled by metalliferous debris.

One finds oneself rather in the presence of a rock (diorite) covered by another rock (serpentine) and on the surface of these two rocks, there has been some melting process or condensation of the sulphurets contained in one (diorite). These sulphurets are also lodged between the two rocks, forming a true continuous sheet.

The mineral does not only show itself on the side of the mountains, but also in the valleys and deep ravines, in such a manner, that one may safely say, that it will surely extend to the hydrostatical level. Some work has already demonstrated that it exists in depth, in fact below the bottom of the valley.

The copper bed of Waldo has already been known for a long time, It is more than half of a century since a Frenchman established himself in the country, and having commenced work with the most rudimentary methods, contented himself with mining the oxidized ore from the surface, and shipping same to Crescent City. This individual thus dug a number of holes which have since permitted to follow up the vein or bed.

After him followed a number of men, who did superficial work but as they had neither money nor ability, these tentative workings resulted in nothing.

Finally, and some time ago, a Mr. Tutt, from Colorado, came to examine these beds, and brought considerable property. He immediately started to open up the Queen of Bronze Mine in a business-like manner. Used to mining he at once understood that

was impracticable to ship the crude ore and he built a furnace, capable of treating from 100 to 125 tons of ore per day. Success crowned his enterprise, and even during the economical crisis, he did not stop operations.

#### 5. NATURE OF ORE AND ANALYSIS

The development work done by Mr. Tutt shows in a very exact manner the nature of the ore, its value as well as the manner of treatment necessary to make the ore merchantable.

The ore shows itself in pyrites of iron very rich in copper; it is compact without impurity, other than a little calcite in small veins, and it contains from 10 to 18% of copper.

The neighboring mother-rock is also mineralized, and may perhaps be considered as ore; its extent is variable and diminishes gradually as one leaves the vein.

At Mr. Tutt's the average value of the ore thus treated has been DRM. This well known fact, resulting from three year's work, is of great importance to the Elder Mine, which is a continuation of the Queen of Bronze Mine, and exactly presents the same ore under the same conditions. The quantity of gold contained in the ore mined by Mr. Tutt varied from 4 to 12.5 grammes per ton.

We have compared the industrial results with analyses made of the ore from the Waldo Mine. Samples of the ore have been taken by us with the greatest of care and in a manner to avoid possible errors and to give an average result to conform to that given by the practical work.

The four samples thus chosen have been analyzed by Messrs. Morris Bros, and give the following results:

The difference in the contents of copper in samples 1 and 2 comes from the fact that the rock was knocked down by dynamite, and that we took the samples in the dark without picking the ore, just as it came to hand. In practice, only the ore would be taken

leaving the sterile rock behind. However, it may be, one may state that the ore on the average contains 14.23% of copper and 4.75 in gold per ton: this is magnificent.

The composition of the ore in itself is remarkable, in as much as it contains no antimony, no arsenic, and that the amount of silica contained, is almost sufficient to make the ore "self-fluxing."

The ore of the Queen of Bronze Mine contains on an average 10% of copper, less than we show. The difference arises from the fact that the work in the Queen of Bronze Mine leaves much to be desired.

In our calculation, for caution's sake, we only consider that the ore contains from 10 to 12% of copper.

#### 6. TREATMENT OF ORE.

The ore being in a compact state, without gangue and impurities, cannot be worked mechanically. Thus Mr. Tutt had a furnace built, which transformed the ore into matte of 40% copper. It would be possible to concentrate the ore still more and thus save in transportation costs, but the refineries for special technical reasons, prefer matte of 40% copper. The furnace installed by Mr. Tutt is called a water jacket, with a capacity of from 100 to 125 tons of ore per day. The fuel used is coke, hauled in wagons from Grants Pass to the mine, the cost of this fuel delivered at the mine is 150 francs (\$30). In spite of this high price, Mr. Tutt has made considerable money.

There being considerable wood in the country, and which can be had from outside of the National Reservations, it would be advantageous to use it for fuel, the same as is done in Montana.

The manufacture of matte in this latter state is principally done in reverbatory furnaces, which gives a better result, than water jacket furnace.



This method should therefore be followed. It may be stated, that the Company owns sufficient wood on its own property, to allow of the operation of a furnace for a long time to come.

7. ELDER MINING COMPANY.

This Company possesses concessions on both sides of the Queen of Bronze Mine, extending from North to South, that is to say in the direction and over the mineralized zone. The portion to the South of the Queen of Bronze Mine is called Waldo, and the one to the North "Railroad Sections." In addition to this mineralized territory, the Company also possesses a certain number of claims, on which copper has been found, chromite and auriferous alluvions. The surface, which the Company possesses is as follows:

|                            |              |       |
|----------------------------|--------------|-------|
| Waldo Mine . . . . .       | 160          | acres |
| Railroad Sections. . . . . | 320          | "     |
| Monarch . . . . .          | 7.5          | "     |
| New Discovery. . . . .     | 20           | "     |
| Accident . . . . .         | 20           | "     |
| Hortense . . . . .         | 20           | "     |
| Ida . . . . .              | 20           | "     |
| Copper Belle . . . . .     | 20           | "     |
|                            | <u>578.5</u> | "     |

It is on the Waldo property that all the work has been done; on the Railroad Sections, and the other claims, only assessment work has been done and such work as the mining laws demand.

As we did, one may follow the mineralized zone from the extreme North of the Railroad Sections to the Southern limits of Waldo; everywhere one sees outcroppings of hematite, which forms the iron cap of the vein. Here and there, one finds excavations, probably half a century old, probably made for the purpose of looking for gold, and which are a valuable guide today.

The presence of the iron cap continues to show itself for several miles to the North of Waldo, where Mr. Tutt and others have acquired the mining rights. One may say, that the territory owned by the Elder Mining Company and Mr. Tutt, is intermixed.

It is in about the center of the Waldo property, that the work has been done. It at first consisted in sinking, which proved that the ore existed under the iron cap. But it was necessary to prove that the ore really extended in depth, which all the geological observations indicated. A tunnel driven about 40 metres below, where the first gallery cut the vein, has again encountered the mineralized zone, exactly at the point indicated by the incline of the vein. One finds, that the mother rock gradually becomes richer and it all at once becomes a mass of pure mineral. I had eight charges of dynamite set off in the side of this tunnel and I could measure 12 feet of compact ore, without other gangue, than very small veins of calcite. From the only passage of this gallery across the mineralized zone, about 65 tons of ore have been taken. From there a chimney, by which one can reach the surface workings, has been run, thus assuring ventilation. The ore, gained by this work, together with the above mentioned, amounts to about 250 tons, of which about 50 tons have been sent to the smelter for assay purposes, and the balance of about 200 tons today remains at the entrance to the gallery.

In the face of this fine showing we advised the immediate resumption of work, which since done, we find on our return fully justifies the good opinion we had of the ore-bed.

#### 8. RICHNESS OF MINE. TONNAGE.

In this Mine there is ore mined, ore in sight, ore in reserve and probable ore.

a. The ore mined consists of about 200 tons, placed on the mine platform at the mouth of the gallery.

b. The ore in sight, is that which has been opened up by the tunnel and by the two galleries running to the right and to the left of the wall of the deposit, from the beginning of the mineralized part.

The ore is in sight for a distance of 9 metres with a height of 40 metres; it experimentally shows a thickness averaging 3m.30 of compact ore. This ore weighs at least 4.000 kilogrammes per cubic metre, the tonnage will then be:

$$9 \times 40 \times 3.30 \times 4 = 4.752 \text{ tons}$$

from which must be deducted the ore already taken out, say from 250 to 300 tons. There then remains actual ore in sight, exposed by work, from 4000 to 4500 tons in round numbers.

c. The ore in reserve is that which exists in the whole mineralized zone of the Waldo Section, from the top of the iron cap to the level of the actual gallery.

The length of the zone is 800 metres, the average known height is 40 metres. As to thickness, instead of taking this at 3 m.30, the thickness in the present workings, we shall figure it at but 3m.

Under these conditions, the calculation is as follows:

$$800 \times 40 \times 3 \times 4 = 384,000 \text{ tons,}$$

but to be conservative, we shall take but half of this amount, and say that the tonnage in reserve amounts to about 192,000 tons of ore.

d. The probable ore, is that which is likely to exist below the actual or present level, and the ore which may be found on the other side of the Queen of Bronze Mine, on the Railroad Sections.

One may figure that the entire Waldo ore-bed, from below the present level, could be worked to a height of 130 metres.

Accepting the same characteristics, the result in tonnage would then be:

$$800 \times 130 \times 3 \times 4 = 1,248,000 \text{ tons,}$$

of this we should take out but 1/3. say 416,000 tons

As to the Railroad Sections, we shall not take them into account, as they never have been explored to any depth; but by

virtue of their close proximity to the Queen of Bronze Mine, we must not forget that very likely there will be as much ore found there as at Waldo . In fact, the superintendent of the Queen of Bronze Mine, after having asked the permission of the Elder Mining Co., for his own satisfaction, made some investigations on the Railroad Sections near the Queen of Bronze Mine, and in his opinion, there are good copper ores in the neighborhood.

To sum up, there are:

|                |          |
|----------------|----------|
| Ore on dump    | 200 tons |
| Ore in sight   | 4400 "   |
| Ore probable   | 192000 " |
| Ore in reserve | 419000 " |
|                | <hr/>    |
|                | 612000 " |

The conclusion from these very moderate estimates is, that there is a great quantity of ore in the Elder Mining Co's properties, sufficient to insure extensive work for a long term of years.

#### 9. WORK.

The mining of the ore is very simple. The tunnel on the side of the hill cuts the vein on either side of which a gallery has been run in such a manner that four ore shoots (?) can be installed.

The work of mining presents absolutely no difficulties. Timbering is not necessary, as the rock is very solid. Virtually during the month of April, the output should be 25 tons per day, and that simply in the work of preparing the ore-shoots. End of May everything will be ready for a daily output of 50 tons. The output could be forced still more by running a gallery above the present working level, but this is not necessary at present. The mined ore must be lowered below the mouth of the tunnel, to a place, where it is proposed to build the furnace. A road is now being built.

The site of the furnace has been selected, with the view to ultimately allow of the development of the entire mine, by driving a tunnel which will open up a level with the furnace, this tunnel it will not be necessary to build just yet, because there certainly is sufficient ore above the present level to insure work for long months to come.

The furnace will be a reverberatory one, heated with wood, with a daily capacity of 50 tons, and a rock crusher.

Definite plans are now under consideration, and construction work can begin immediately.

#### 10. NET COST.

Considering that it will be necessary to produce a copper matte for the market of about 40%, we shall give the details of the net cost of this material. This price includes the cost of mining of the ore, its treatment for matte and the cost of transportation of the matte to the refinery.

a. MINING. The ton of ore delivered at the furnace, together with carting and supervision, will cost \$2.00 for a daily output of 50 tons.

b. The matte produced in a reverberatory furnace, output 50 tons per day, from the time of the entrance of the raw material until it is taken out as ingots, will cost for labor, fuel, motive power, analyses and supervision, \$2.44 per gross ton treated.

c. Transportation of the matte. The transportation of a ton of matte from the mine to the Station at Grants Pass by wagon will cost \$5.25; the transportation by rail from Grants Pass to the refinery, will average \$3.25; the total cost of transportation of a ton of matte will be \$8.50.

Fifty tons of ore treated daily for conversion into matte of 40% will in proportion to the richness of the ore, yield a larger quantity of material, that is to say:

50 tons of ore at 10% will yield 12.5 tons of matte at 40%.  
 50 " " " " 12% " " 15 " " " " "

The transportation of these 50 tons of ore, converted into matte, will be in proportion to the amount of copper contained.

The result is that a ton of gross ore converted into matte will cost for transportation as follows:

|                             |        |
|-----------------------------|--------|
| Per ton of gross ore at 10% | \$2.13 |
| " " " " " 12%               | \$2.55 |

d. REFINING. The cost of refining will most likely be \$3.00 per ton of matte at 40%. To make sure, we shall figure that the cost of treatment of a ton of matte at 40% will be the same as the cost of refining a ton of ore, say \$6.00.

In reducing to units the ton of ore mined we find the cost of refining a ton of ore at 10% \$1.50  
 " " " " " 12% \$1.80

To sum up, the following table will show the net cost of a ton of ore, sold and delivered at the refinery:

|                         | Ore at 10% | Ore at 12% |
|-------------------------|------------|------------|
| Mining                  | \$2.00     | \$2.00     |
| Manufacture of Matte    | 2.44       | 2.44       |
| Transportation of Matte | 2.13       | 2.55       |
| Refining of Matte       | 1.50       | 1.80       |
|                         | <hr/>      | <hr/>      |
|                         | \$8.07     | \$8.79     |

e. GENERAL EXPENSES. As the work will be in full activity, we believe that the general expenses may be placed at \$4,250. per month. In these expenses are included the cost of management and accounting, the preparatory work, the axes, journeys, administrative expenses, etc.

For a monthly output of 1500 tons, this would mean \$2.82 per ton. From this follows, that the total cost of ore will be:

|            |         |
|------------|---------|
| Ore at 10% | \$10.89 |
| " " 12%    | 11.61   |

II. SALE.

A ton of matte sells by the units contained. Usually the buyer deducts a unit and one-half, but to provide for small expenses we shall deduct two units, and figure that the matte of 40% contains but 38%, for which we receive payment.

The price of copper in the U.S. is not fixed, as in Europe, by the ton but by the pound. The American ton contains 2000 pounds, from which follows, that a ton of matte contains 760 pounds of merchantable copper.

Taking the price of copper at lowest it has yet reached during the late crisis, say 12 cents per lb., corresponding to 54 lbs sterling per ton, the ton of matte, delivered at the refinery, will have a value of

760 \$0.12 \$91.20

In applying the price to the ton of ore, we find that the ore is worth:

|                |         |
|----------------|---------|
| Per ton at 10% | \$22.80 |
| " " " 12%      | 27.36   |

As the ore contains gold, say \$2.50 per ton, the total value of the ore will be:

|        | Ore at 10%     | Ore at 12%     |
|--------|----------------|----------------|
| Copper | \$22.80        | \$27.36        |
| Gold   | 2.50           | 2.50           |
|        | <u>\$25.30</u> | <u>\$29.86</u> |

This is the merchantable value of a ton of ore.

12. EXPENSES OF DEVELOPMENT AND ROLLING FUND.

What is to follow is subject to the mine being put into full operation, that is to say:

- 1st. The mining of 50 tons of ore per day.
- 2nd. The treatment of ore for matte.

1st. Mining of 50 tons of ore per day. This production should be attained very soon and before the furnace is finished. It is also necessary, during this work, that the production be restricted and that ore only should be taken from the two galleries in the direction

For this work, as well as for putting the buildings, etc. in order, \$17,500. should be provided for, to be distributed during the months of March, April, May, June, July and August.

2. INSTALLATION OF FURNACE. The Furnace, with all the appurtenances and a road to the entrance of the gallery will cost at most \$35,000. This amount cannot be divided into monthly payments, at least one-third must be at once available for the ordering of material and mechanical parts.

To these amounts, representing the expenses, there must be added a rolling fund, necessary to keep the work going for about a month and a half, and to allow of the payment for merchandise, the payment of which is customary, one month after delivery. Returning to above figures, it will be seen that \$30,000. must be provided for, but this sum may be materially reduced by taking advantage of possible business opportunities and discounts.

To sum up, it is necessary to place at the disposal of the mine.

|      |  |                |
|------|--|----------------|
| 1st. | For the monthly expenses of March<br>April, May, June, July & August | \$17,500.      |
| 2nd. | For expenses to construct furnace<br>and accessories                 | <u>35,000.</u> |
|      | Total expenses   | \$52,500.      |

and hereto must be added a maximum rolling fund of \$30,000.

Under these conditions it is indisputable that the mine show the results which we have indicated.

It is certain that this mine will show results as good, if not better, than the California mines, - Mammoth, Balaklala, Afterthought, Penn Chemical Co., etc.

### 13. BENEFITS OR PROFITS.

The profit from a ton of ore is shown by the preceding calculations by taking the difference between the merchantable value and the net cost.



|                    | Copper at 10%  | Copper at 12%  |
|--------------------|----------------|----------------|
| Merchantable value | \$25.30        | \$29.86        |
| Net cost           | 10.89          | 11.61          |
| Difference         | <u>\$14.41</u> | <u>\$18.25</u> |

From the above figures, we deduct 5% to provide for loss in the treatment of ore, for loss in transportation of ore and matte and for general expenses not foreseen. Thus finally the net profit of a ton of ore refined will be:

|            |         |
|------------|---------|
| Ore at 10% | \$13.69 |
| " " 12%    | 17.34   |

This profit, in our opinion, is certainly obtainable, for all the costs and expenses have been figured excessively high. The profit to be expected may therefore be placed at from \$13.00 to \$17.00 per ton of ore.

The price of copper, at the mine, with ore at 10% would be probably no longer pay a profit, is 6-1/4 cents per lb., or 30 pounds sterling per ton.

#### CONCLUSIONS.

We conclude by saying:

- 1st. The properties of the Elder Mining Co., throughout their entire length show a rich and strong ore-body, the ore being of a compact mixture of pyrite of iron and chalcopryrite, from three to four metres in thickness.
- 2nd. The average contents in copper are 14% and there are 4.75 grammes of gold per ton.
- 3rd. The work done on the territory of the Elder Mining Co. as well as that done on adjoining property, has proven that there is a large quantity of ore, sufficient to insure a daily output of 50 tons, for more than 30 years to come.
- 4th. Mining is of the easiest, because it is done on the side of a hill under most excellent conditions, without timbering nor waste rock.

5th. The sale of the ore is subject to its reduction to matte of 40% as it is done in the adjoining mine.

6th. It is necessary to expend about \$52,500. to assure the mining and treatment of about 50 tons of ore per day, and this will leave a net profit of from \$13.00 to \$18.00 per ton, the price of copper being 54 pounds sterling per ton.

7th. In six months the improvements can be completed, and the product be ready for market.

8th. The mine, in every respect, is in most excellent condition, and a brilliant future may be predicted, like that of similar enterprises, started not long since, in the Northern part of California.

Waldo, February, 1909.

Paris, April, 25, 1909.

(Signed) A. FONVILLE,  
Engineer, E.C.P.