Referring to my special report and estimate on concentrator plant, of November 3rd, 1901, submitted for your approval prior to erection, you will find by comparison with the actual work performed:—

First—That the ratio of concentrating fillings has been 32 tons into 1, which is better than estimated, and that the tonnage of concentrates produced has consequently been increased in the same proportion.

Second—The estimated mill capacity of 125 tons per 24 hours, has been exceeded by 35 tons.

Third—In regard to the value of concentrates. These were based on silver at 57⅝c. per ounce, but during the year this price depreciated to 49c., nevertheless the smelter returns show the average price received from smelter to be $49.11 or equal to the estimated price, which is due to the higher grade of concentrates produced in the mill. In place of averaging 94 8-10 ozs. of silver and 54 per cent. lead to the ton, the average has been 103.8 ozs. of silver, and 60 per cent. in lead, thus making up for the lower metal quotations. The net earnings of concentrator were $35,706.06, plus $3,000.00 for value of zinc on hand, equal to $38,706.06. If prices had remained stable in place of going down, $58.21 or $9.10 more would have been received per ton of concentrates, and the net profits increased by $11,365.00 equal to a net total earning of $50,000.00.

Fourth—In regard to the zinc blende by-product, it will be observed that 1,391 tons have been produced in the mill during the year, representing $11,329.87. This amount compensates in a measure for the lower prices of metals.

Fifth—Regarding the tonnage and class of material put through the concentrator, approximately one-third was taken from the dumps, and two-thirds from old and new stopes. The net tonnage of silver-lead concentrates produced was 1,247. The gross tonnage put through the mill was 40,028 tons.

The estimated tonnage in reserve is approximately 87,000 tons, thus the concentrator will have a supply on hand for not less than eighteen months and more probably two years.

One difficulty experienced in operating was shortage of water during two months of the dry season, which held the capacity and efficiency of the mill back to some extent, and for a short time the mill could only be run on one shift. This feature will be overcome before the dry season sets in this year. Fifty miner's inches of water have recently been granted us, made up partly from an adjacent stream, and partly from mine water running out of tunnel No. 8. The intention is, at an expense of about $2,000.00 to flume the water from the north side of the mountain to the south side, thereby making it available for power and wash water purposes. With this increase of water I do not anticipate any difficulties in keeping the mill up to its full capacity all year round, especially as the past year proved one of the driest on record in the Slocan.

The plant was put in during "hard times" when the prices of metals went lower than ever, and if it could prove a success under such adverse conditions there seems hardly any doubt that previous records can be surpassed, providing prices come up again, as the tendency appears now.

Magnetic Zinc Separating Plant (Now Under Construction)—Until recently all zinc ores in the Slocan, whether associated with galena or found otherwise, had been entirely disregarded and neglected as a mineral of any value.

In the upper ore zones only a small quantity of zinc blende is generally associated with the galena, on which the smelters in the earlier days, placed no penalties. Different conditions existed in a number of the mines located at lower altitudes, where the galena was highly disseminated with a zinc blende that carried good silver values, but nevertheless could not be sold to advantage and was therefore avoided.

An attempt was made a few years ago to ship 1,500 tons of zinc to Swansea, England, but stranded on account of the sudden death of the promoter. After this unsuccessful effort the zinc ores were left on the dumps, or went through the tailraces as so much waste.

In the meantime the percentage of zinc kept increasing in the galena in nearly all the mines, and necessitated the smelters placing a 10 per cent. limit on zinc, with a penalty of 50c. per unit above same. In a number of instances the penalty was severely felt, as only a few mines were in a position to keep within the limit, and a number of properties with 25 and 30 per cent. zinc in the galena could not, for this reason, be operated to advantage.

During 1902 the zinc limit was changed from 10 per cent. to 8 per cent. and it became evident, more so than ever, that something had to be done to overcome the continually increasing penalties. Encouragement was therefore offered by myself and some of my *confreres*, which soon resulted in making satisfactory progress towards solving the zinc question, at least as far as your properties are concerned.

While constructing your concentrator in the fall of 1901, provisions were made to save zinc values, and an accumulation of several hundred tons of 43 to 45 per cent. zinc concentrates were made between June, 1902 and January, 1903, with the hopes of securing a market. This lot has now been disposed of in Kansas, and netted over $8,300.00 You will readily appreciate that this first attempt in the zinc business was fairly good for a starter, when remembered that the zinc was produced as a mere by-product.

In the meantime I found by careful experiments and tests that a far higher grade of zinc blende can be made by giving the ores a slight roast, whereby the (spathic) iron is partly converted into an oxide of iron, in which form it becomes an artificial magnetite, and can be eliminated from the blende in magnetic separating machines with fields of intensified magnetic force.

As soon as this important feature has been fully demonstrated, my proposition to erect a plant for treating 40 tons of zinc ores per 24 hours in this manner was presented to you, and upon receipt of your prompt decision, ground was broken on the 1st of February, and the necessary machinery ordered at once.

The above plant is expected to be completed in June, providing all of the machinery can be obtained within the stipulated time. The machinery comprising roasting furnace, magnetic separators, screens, elevators, fine rolls, etc., will be placed in a building 40 feet wide by 60 feet long. This building is a west end extension of the present concentrator.

The finished product which will run approximately 60 per cent. in zinc, and 16 to 20 ozs. in silver, will contain only a small percentage of iron, and less than 2 per cent. in lead.

With the prospects of being able to produce 6,000 tons or more of zinc from present ore reserves in the mine, during the next eighteen or twenty-four months, I am able to predict a bright future for zinc, and it will be readily seen that the revenues from this by-product from now on will be an important factor to contend with.

Review of Past Year.—In regard to the future of the Payne mine I shall forbear from making promises that necessarily will have to depend on future developments, as well as fair prices for silver, lead and spelter. At the same time I beg to call your attention to certain features that compare favourably with conditions three years ago. At that time tunnel No. 5 had little or no ore exposed in the floor, while to-day the main vein with pay ore has been proved to a depth of 360 feet below No. 5, and 900 feet below the apex.

I have stated in my last year's report and I desire to repeat that the true fissure nature of the Payne's vein with its banded arrangement of minerals, is both characteristic and favourable for deeper prospecting. Lean strata such as found in all mines, and of which No. 5 tunnel is an example, must be expected, also a hard formation, which will have to be counteracted by the exclusive use of power drills. Subterranean water, will no doubt, make its appearance further down, but can be overcome.

Zinc blende is now disseminated with the galena to a far greater extent than heretofore, and one of the most important features of the past year has, therefore, been the happy solution of concentration and separation of zinc blende from the galena, whereby a valuable by-product is added. I have mentioned elsewhere that the constantly increasing percentage of zinc seriously threatened to increase penalties imposed by the smelters, but with the present system of milling it will readily be seen that this feature has been entirely overcome. All ores of a complex nature can now be concentrated into a silver-lead product of an even higher grade than the former clean shipping ore, while the zinc blende is yielding a by-pro-