As an example of the tremendous importance of the price of a product in mine valuation, I will cite from my report on the Michigan mines. At the time of that report, the price of copper was 12¼c. per pound. A group of copper mines in Michigan were producing, and had been producing 200,000,000 lb. of copper per year at a cost of 10c. per pound, in round figures. I valued the mines on the assumption that the average price of copper would be 14c. per pound as against the current price of 12¼c., and I put a valuation of about $70,000,000 on that basis. Roughly, at 14c. a pound, the earnings would be $8,000,000 a year, and the total value of the group would be nine times that, or $70,000,000. You will find it is a difficult thing in commercial transactions to figure steadfastly on a price that is different from the present price. When I talked about copper averaging 14c. a pound, many said, "That is not the present price, it is 12¼c." Some thought the price might go even lower instead of higher. I think if I had not been prepared by several years' study of that very subject, I would certainly have used a lower figure than 14c. a pound for the average price of copper. At any rate, the value I put on them was nine times their annual income at 14c. If I had used the current price of 12¼c., their annual income would have been only $4,500,000. As a matter of fact, within less than 12 months after the report was made the price of copper had gone up to 17¾c., and the usual proportion of people thought that the price would go still higher, and that this might be the average. If it had been the average, the earnings of these mines would have been nearly $15,500,000 at that price of copper.

Now let us look at what these figures mean in terms of the life of a mine. If I had figured that the mines were worth $70,000,000 at a price of 12¼c. per pound, I would have had to believe that the mines, on the average, were good for 40 years' life, instead of about 13 years. If, on the other hand, I had assumed that the price would be 17¾c., in order to make the mines worth the price I put on them they would have to last only five or six years. Therefore the fluctuations of price in less than a year corresponded to an extension in the life of those mines from five or six years to 35 or 40 years. Here again I am dealing in a mere approximation. I suppose these mines produce about 20 lb. of copper per ton; therefore to get 200,000,000 lb. of copper per year you would have to mine 10,000,000 tons. Therefore, the figures that I actually used meant that I believed there was 130,000,000 tons of copper ore which could be depended on. That is an enormous amount of ore. Figured roughly, that would mean a lode of solid ore five miles long, of the average width of 12 ft., and 5,000 ft. deep; it was actually obtained by projecting the production of the mines and the development of the mines far below their present position. Now if I had to estimate on 12¼c. copper, I would have had to figure on 40 years' life, or I would have had to believe that there were 270,000,000 more tons there than I thought I was justified in believing. On the other hand, if we put the value at 17¾c., I should have had to figure on only 50,000,000 or 60,000,000 tons of ore. Therefore, I say, as affecting the values of mines, the actual fluctuations of price within one year were equal to an uncertainty in the ore production in those mines of more than 300,000,000 tons. An engineer is not likely to make a mistake like that with mines so fully developed as these Michigan properties, many of which are worked to a great depth, are well managed, and have their outlines very well shown. He could, however, easily make just as important a mistake as that in figuring on his average price of copper.

As a matter of fact, I do not think the 14c. price I used was an accurate figure. I have believed that copper would average more than 15c. per pound, taking into view the development of the business, but 14c. was as far as I thought I could go. I do know that mines have been valued within the last five years on prices estimated all the way from 12c. to 20c. Just imagine what a difference that makes in the estimated value of those mines! I know a very important mine in Mexico, the organizers of which believed that copper would not average less than 20c. per pound. I know of mines, on the other hand, that are being valued on an expectation of 12½c. per pound. The same uncertainty applies to all kinds of metals.

I ran against the same difficulty with another group of mines during that same Michigan study. In the iron mines I assumed a price for iron which happened to be almost the same as the price for the year 1911, which was a dull year in the iron business. In this case, however, the price, instead of going up, as the price of copper did, went down about 50c. a ton the next year. Now the margin of profit for those iron mines, during the period that I figured on, was just about $1 a ton, so that if you take off 50c. a ton you cut the profits in two. Of course, during all this last year, I have been exposed to a good deal of criticism by the iron miners, because they say I assumed a wrong price. While it may have been wrong for the year 1912, I notice that prices for the year 1913 have been fixed lately and at a figure very close to my average, in fact, almost identical with it if certain reductions in freight rates be considered.

In both the iron and copper calculations, I have been asked a great many questions as to how I arrived at the prices I assumed. Here there are certain evidences which can be used as guides, and are well worth studying. One general fact about the prices of all mining products is that they vary in cycles or in waves, irregularly of course. If, after a period of high prices, you find that prices are definitely going down and reach a new level, it is pretty safe to believe that the lower level of prices will continue several years. On the other hand, after a period of low prices, when once the metal rises markedly, it is pretty safe to assume that it will stay at a higher level for several years. Those fluctuations are things very well worth studying. It is a matter on which you cannot form opinions right away. You will find in a year from now that you will be justified in holding a different idea from the one you may have at present.

The valuation of a mine, while in the long run it depends on the average, is influenced a good deal by the present price. If you have a copper mine that is going to last ten years, and you expect 18-c. copper for three years out of those ten, it is a matter of considerable consequence to your property whether that 18-c. price comes during the first three years or during the last three years of the life of your mine. If it comes in the first three years you will get your profits and may invest them, perhaps in other directions, and the interest on that money for the following years will be worth a great deal to you. I must confess, in regard to the question of profits, that I was wrong when I wrote my book on the "Cost of Mining" in laying too much stress on average price. I now believe the public is right when it puts a higher value on properties during periods of high prices for metals. That is merely an assertion which I offer you to think about.

(To be continued.)