

THE ELMORE PROCESS IN BRITISH COLUMBIA.

(By H. Hayman Claudet, A.I.M.M.)

THE MINING RECORD of August of last year contained a very interesting article on the concentration of ores by means of oil, written by Mr. H. E. T. Haultain, in which he gave an historical and descriptive account of the Elmore Process. As interest on this subject is being keenly revived just now in this country through the Canadian Ore Concentration, Limited, who hold the patent rights for the process in Canada, having started a small testing works in Rossland, and as everyone concerned in low grade properties is expecting great things from this process, probably a short account of the experimental plant, together with a few details as to costs of working on the commercial scale may be of use to your readers.

In the experimental plant exactly the same operations take place as on the commercial scale, only without some of the appliances which make the latter automatic, but the method is identical, and if an ore will give good results on the small scale it is practically bound to do so on the large.

For convenience the process may be described in three stages:

1. The mixing of the pulp with oil during which operation the oil comes in contact with the mineral values and holds them in suspension.

2. The separation of the oil from the mineral in a centrifugal machine with a specially constructed solid basket.

3. The drying of the product from (2) in a second centrifugal machine with a perforated basket.

In the hand plant (1) the mixing is performed in a three-foot drum, shown in the photograph, about one foot deep which revolves vertically and has an opening in the front through which the sample in the form of pulp is poured in. The oil is then added in about the proportion of one-quarter to three-quarters the amount of sample taken, depending on the quantity of mineral therein. There are small baffle plates inside the drum which cause the mixture to get thoroughly agitated simply by turning the drum slowly a few times by hand. When the oil has picked up enough mineral it is skimmed off the water and the tailings are run out through a plugged hole in the circumference of the drum. The tailings are allowed to settle and then are dried, weighed and assayed.

2. The separation of the oil which has been collected takes place in a small type of centrifugal machine

which has a speed of 2,000 revolutions per minute and is driven by an electric motor. (See photo.)

3. The drying is accomplished with the same machine by interchanging the solid basket for the perforated one, which has a cloth bag fitting inside and in which the concentrates are dried.

These are weighed and assayed, and both the actual recovery of values is obtained and also that by difference between the original sample and the tailings.

Having proved in the testing plant that any particular ore is thoroughly suitable to the treatment it must next be considered, before going further, if the local conditions allow of the concern to be a commercial success, and it may be well to look into these conditions as they would affect the oil process.

It must be expected that the field for the Elmore Process will be greatly on low grade properties, which will necessarily mean that everything must be designed and worked on the most economical lines, and while it is possible to treat at a profit certain ores which could not be worked by any other method the margin must not be cut too fine and it should be proved beforehand that there will be sufficient profit to allow for the fluctuations in the metal market and any other contingencies which are likely to crop up.

There should be sufficiency of water, a good site for the mill, allowing the pulp to flow from the battery to the oil plant by gravity, also suitable space for depositing tailings and a fairly accessible position for the transportation of stores and oil, and for shipment of the concentrates to smelter.

If water power is not available electricity should be used, if there is an installation anywhere near, as the power required is very small and a plant capable of handling 100 tons of ore per day could be most economically worked by arranging a few small motors to drive the different machines, and in this way a lot of shafting and frame work for same could be dispensed with.

Let us now view the cost of buying and erecting an oil plant of 100 tons daily capacity, not going into the milling machinery or power:

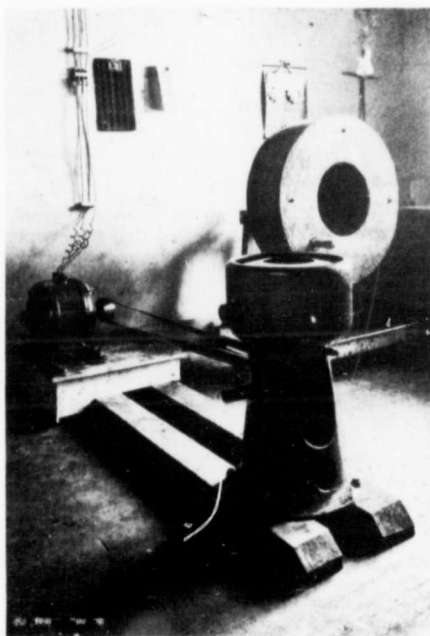
1. Price of 100 tons plant, which is approximately \$10,000.

2. Cost of freight of machinery to mine.

3. Cost of erection, including excavation for foundations, concrete, timbers for buildings, etc.

4. Cost of running and up-keep.

The first item to go into in detail is the cost of freight of machinery. At present this is made in England and the weight of a 100 ton plant is approximately 48



The Canadian Ore Concentration Company's Experimental Plant at Rossland.