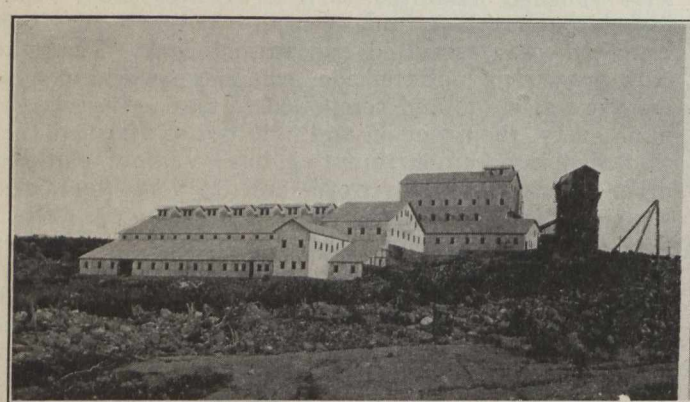
bed. The story told is that the father of the children, realizing their imminent danger, seized the dynamite, but before he could throw it out of the house it exploded in his hand, shattering one of his arms and so injuring the lower part of his body that recovery is regarded as most unlikely. Other cases of brutality on the part of the strikers are alleged, but as yet investigation of them has not been made.

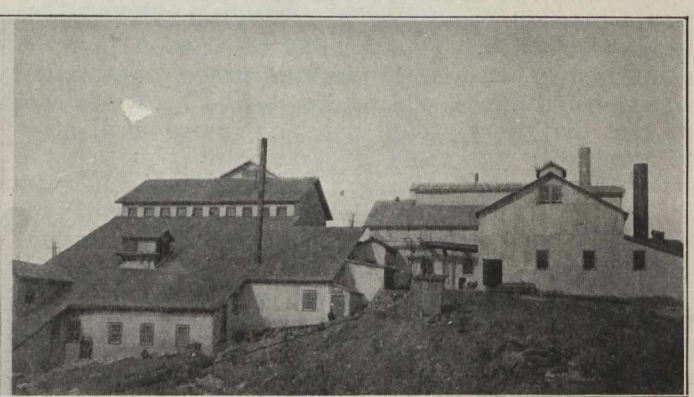
AMALGAMATION AND CYANIDATION OF COBALT SILVER ORES

By Reginald E. Hore.

Both high grade and low grade ores are now being treated by amalgamation in some plants at Cobalt, and low grade ore is being cyanided. At the Nipissing the process for treating the high grade has proven quite successful, and a similar plant has been built at the Buffalo. Amalgamation of concentrates from low grade ore is used at the Nova Scotia mill. Cyaniding is extensively used at the O'Brien and Nova Scotia plants. At the Buffalo, slimes are cyanided, and at the Nipissing high grade mill, tails from amalgamation treatment are cyanided and the Nipissing has recently put into operation a large cyanide plant for the treatment of low grade ore.



Nipissing low-grade plant.



Nipissing high-grade plant.

High Grade Plants.

To treat high grade ore on the property without smelting it, the Nipissing management has a very satisfactory process which was worked out by Charles Butters and his assistant, G. H. Clevenger. The crushed ore is ground with mercury in a tube mill. The amalgam sponge is melted in a reverberatory furnace and refined. The tails from the tube mill are cyanided. The precipitates are melted in a tilting furnace and refined in the reverberatory.

The Nipissing high grade mill has been described by Mr. T. A. Rickard in the June, 1912, number of the Mining Magazine, and I quote here his description and comments:

"The ore after being crushed to 70 mesh at the sampler is delivered to the plant with an average content of 2.600 oz. silver per ton. It is fed to a Krupp tube-mill 20 feet long by 4 feet diameter. The charge consists of 3½ tons of ore, 4½ tons of mercury, and a 5% cyanide solution. The tube-mill is closed at both ends. Air, to accelerate chemical action, is introduced through a pipe. There is also an ingenious device whereby the excess of air is subsequently expelled. After nine hours in the tube-mill, 98% of the silver has been extracted from the ore, which in the form of pulp, then passes to a settler, where the amalgam is separated by gravity. Thence it goes to a clean-up pan and drainers. These last are canvas bags for removing any excess of mercury. Meanwhile the pulp and solution, deprived of amalgam, passes to a vat and is fed to a Butters filter, the clarified solution going to boxes in which the dissolved silver is precipitated by zinc shaving. This shaving is in the form of a coarse wire, necessary on account of the strength of the cyanide solution. The residue, left on the filter, is stored, being valuable for its arsenic, nickel and cobalt. As yet no method has been devised for eliminating the arsenic in this residue with a view to marketing the nickel and cobalt.

"Meanwhile the amalgam, containing 80% mercury and 20% silver, is placed in retorts, each of which holds 450 lbs. After the mercury has been distilled, the silver, still containing 1% mercury, is taken to a reverberatory furnace. Here it is melted in a charge of 25,000 ounces. After 15 hours' exposure to a hot oxidizing atmosphere, without addition of any flux, the molten metal is cast in ingots, each weighing 1,100 oz. silver, which is 999 fine. Two oil-burners furnish the necessary heat. The flue from the furnace is provided with a water-jet condenser, whereby 1,000 to 2,000 lbs. mercury is arrested monthly. The gases escape at 100 degrees F. While I was collecting these data a melt was about to be finished, and I was able to see the bath of molten metal before it was tapped into the rows of ingots. During February 550,000 ounces of silver were melted in this small plant.

"The richness of the mine product under treatment and the completeness of the metallurgical operations left a vivid impression. Within a small building it was possible to watch the successive stages by which a complex ore of a refractory type yielded its precious