

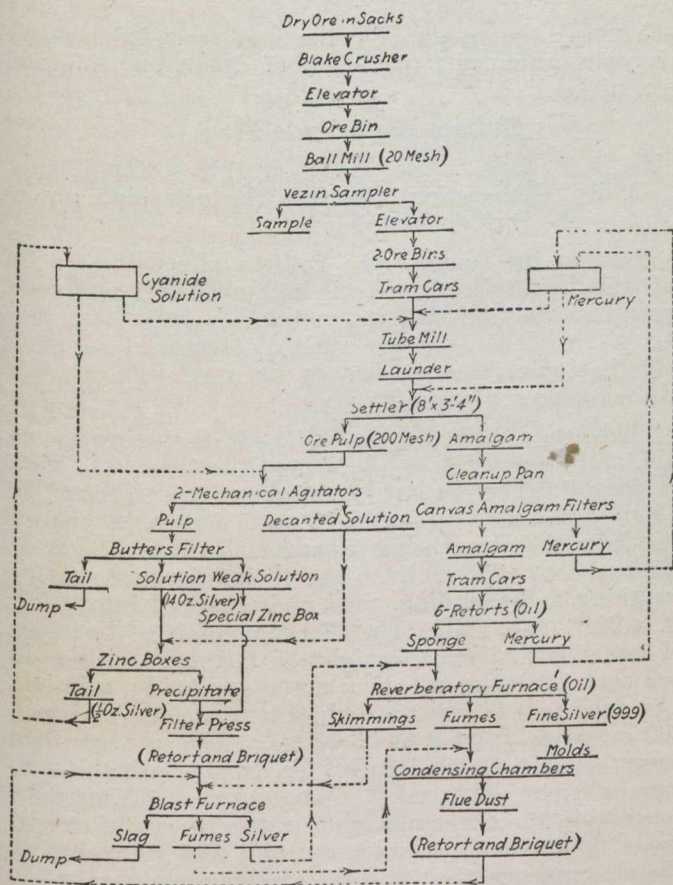
content in metal of such purity as to be ready for the mint. The entire process is so expeditious that the silver is delivered at New York within a week of the day when the ore is received at the mill and a cheque for the yield is received concurrently with the shipment. No less than 20 tons of mercury is in use at a given time. The cyanide has a cleansing effect upon it; indeed, the use of mercury would be impracticable without the cyanide, for the mercury would become 'sick' or fouled so as to hinder amalgamation with the silver in the finely ground arsenical ore. The yoking of amalgamation and cyanidation constitutes another remarkable feature. To the practical man, however, the most memorable note is the fact that a consignment of ore is turned into negotiable paper within seven days."

mesh material is being ground in a tube mill. The mill used is a Krupp mill 3 feet 11 inches in diameter and 19 feet 8 inches long, fitted with silex liners and run at 37 r.p.m. The weight of ore per charge depends somewhat on the silver content, but with 2,500-oz. ore the ordinary tube-mill charge is 6,500 lb. of ore; 8,500 lb. of mercury; 3,800 lb. of cyanide solution, and six tons of pebbles.

"The materials are charged through a manhole on the top of the mill, and after the cover has been replaced the mill is revolved for 9½ hr., when 99 per cent. of the pulp will pass a 200-mesh screen. This fine grinding is necessary to liberate the fine particles of silver and permit of complete amalgamation. A screen analysis of the final tailing shows that the coarser particles are much richer than the slime; this is also shown by the accompanying screen tests on ore crushed through a 10-mesh screen.

"It was found advantageous to have a certain quantity of silver go into solution in the cyanide, and to this end more air had to be supplied to the charge.

"Each gudgeon of the mill is fitted with a stuffing box through which passes a heavy cast-iron pipe, four inches outside diameter, with a 1½-inch hole through the centre. The casting is held stationary by bolts to the concrete foundation, and the mill revolves about



Flow sheet, Nipissing high-grade plant.

Grading Analysis of Nipissing Ore Crushed Through 10-Mesh.

Mesh.	Percentage by weight.	Silver oz. per ton.
+ 20	12.7	6837
+ 40	26.2	3375
+ 60	11.6	2330
+ 80	6.3	1954
+ 100	6.3	1654
+ 120	2.7	1348
+ 150	1.3	1182
+ 200	3.8	1202
- 200	29.1	706

the pipe. Compressed air under 25 lb. pressure is introduced through one of the hollow castings. At the outlet end there is a right-angle turn in the hollow casting just inside the mill and the upper end reaches to within ½ inch of the lining. The heavy cast-iron elbow, therefore, remains stationary, the inside leg stands vertical, and the upper end remains above the level of the charge at all times, allowing the compressed air to escape while the mill is in motion. The casting is heavy enough to withstand the battering of the pebbles falling against it. This arrangement allows the mill to be filled well above the centre with a consequent decrease in the power used, but it is found that the best results are obtained by filling the mill to a point two inches above the centre.

"At the end of the grinding period the three manhole covers are replaced by coarse screens and the mill is turned over; the charge falls into a sheet-iron hopper which delivers it into an all-iron settler, eight feet in diameter, fitted with wooden shoes. The tube mill is then washed out twice by revolving it with a ton of solution and 1,500 lb. of mercury. These washes are added to the charge and the settler filled with solution; the charge is kept in agitation by the muller while the amalgam is drawn off into an iron cleanup pan, and from there into canvas amalgam filters, of which there are 24, each holding 400 lb. of amalgam. The pulp is gradually run out of the settler by drawing the top plug, the balance of the charge being washed twice with solution.

A more recent article by Mr. R. B. Watson, general manager, Nipissing Mining Co., in December, 1912, issue of the Engineering and Mining Journal, gives further information. Mr. Watson says:

"The high-grade ore from the picking tables is delivered to the sampling plant at the top of the mill where it is put through a 9 x 15-inch Blake crusher and elevated to steel receiving bin. From this it is fed automatically into a No. 3 6-foot Krupp ball mill carrying 1,000 pounds of steel balls and fitted with 20-mesh screens. The metallics or silver nuggets which will not pass the screen are removed periodically by taking off a screen, and are melted down in the refinery. From the ball mill the pulp is delivered by a spiral feed to a Vezin sampler and elevated to two 60-ton steel storage tanks, from which it is drawn as needed for treatment in the mill.

"The main operation consists of amalgamating the silver in a 5 per cent. cyanide solution while the 20-