

	Per Cent.		Per Cent.
"Silica	82.50	Sulphur	1.19
Lead	9.10	Zinc	0.81
Copper	8.22	Silver	0.54
"Samples of pulp going into the pans for the same month showed that it contained—			
	Per Cent.		Per Cent.
"Copper	1.05	Sulphur	0.09
Lead	0.48	Silver	0.05
Zinc	0.25		

"For the year ending the 31st May, 1889, the details of milling were as follows:—

"Dry tons crushed	9,061.96
Average assay of silver per ton	22.67
Gross contents of ore, silver ounces	305,434.75
Estimated per cent. of reduction	80.70
Estimated product, silver ounces	165,785.84
Dry tons of concentrates produced	541.80
Average assay of concentrates in silver per ton	136.17
Silver in concentrates	73,777.55
Silver in bullion	97,660.60
Total production of silver ounces	171,438.15
Actual percentage of silver saved	83.45
Total cost of milling	£ 8,105 s. 4 d.
Average cost per ton	0 17 11

"The average crushing-capacity of each stamp in twenty-four hours was 2.61 tons.

"When the mill was started by the present management an assay of the escaping slime-water was made, showing the value of the slimes carried away with it to be 52oz. of silver per ton, or more than double the silver contents of the original ore. A series of carefully-conducted experiments were at once inaugurated, and from them it was learned that 3 tons of these slimes dry, containing 156oz. of silver, were passing through the waste-gate from the settling-tanks every twenty-four hours. These slimes were too light to permit of their being settled by even the most extensive system of tanks, and to check this heavy loss a china pump was placed in the last of the series of slime-tanks. This pump discharges into a small tank placed above and immediately in front of the mortars. It is only 1ft. deep, being made shallow in order to prevent the gradual settlings of the slimes in it, and consequently the necessity of cleaning it out from time to time. From the side of this tank and near its bottom is the 2in. pipe for supplying the water to the stamps. The only purpose of this tank is to furnish water to the stamps at uniform pressure. By prohibiting the use of any clear water in the battery, the escape of these slimes was very materially reduced; but this of itself was not enough to stop all overflow, as it would be in an ordinary wet-crushing mill, for reasons that will be explained later on.

"The immediate effect of turning back into the battery, say, 2 tons of slime every twenty-four hours, carrying twice as much silver as the original ore—and this proportion of value has always existed—was to heavily 'salt' our battery-sample; and, as the most rigid economy was essential to the commercial success of the property, the question of securing an accurate check on the mill became momentous. After careful consideration, it was decided to adopt the following system: Night and day samples are taken from the battery-launders in the usual manner, and are assayed daily with the other mill-samples, but the results are corrected by the salting for the previous month. To determine this percentage it is simply necessary to obtain the actual battery-assay, and this is secured from the date furnished by the balance of the mill-work, after the monthly averages are made up, in the following manner: The number of tons crushed, *minus* the number of tons of concentrates produced, must equal the number of tons amalgamated. The number of tons amalgamated, multiplied by the average assay pan-sample, must be equal to the total silver contents of the pulp amalgamated. This, added to the total silver contents of the concentrates produced, secured in the same manner, gives the grand total of ounces of silver in the ore. This, divided by the number of tons crushed, gives the actual battery-assay. In this computation all tons are dry tons. The percentage of salting thus determined varies slightly, but the fluctuation is due more to errors in sampling than to any change in the actual amount of the salting. Usually this is about 5 per cent.

"There was still a heavy loss in the escape from the settling-tanks of water carrying rich slimes, owing to the introduction of water at the head of the vanners. To stop this a small jet-pump using steam from the boilers, and supplied with 50ft. of steam-hose for a discharge, was placed at the tanks, and the slime-water used in lieu of clear water for thinning down the pulp in the pans. While this corrected the evil, it had also the effect of increasing the difficulties in the way of concentration, as, in order to stop all overflow from the tanks, only as much water could be used on the heads of the vanners as was pumped into the pans, *plus* the evaporation. After much experimenting it has been found that with the limited quantity of water that can be used on the vanners, a speed of 180 revolutions of the crank-shaft per minute, with a belt-travel of 3ft. 6in. per minute, and an inclination of 3½in. in the length of the machine, gives the most satisfactory results on these ores, although intelligent and constant adjustment is rendered necessary by reason of the changes occurring from time to time in the character of the pulp treated.

"By reference to the details of milling for the year ending the 31st May, 1889, it will be noticed that the mill overran its assays 2.49 per cent., or 5,144.63oz. As the actual battery-assay is determined by the assays of average pan and concentrate-samples, and as the pan-sample is of necessity taken