

had been furnished with various samples of ores from their mines. Slimes from the Wellington and Copper Bay mines were first operated on by calcining them with proto-chloride of iron in a muffle furnace at a dull red heat. Fumes of volatilized chlorides were abundantly developed, especially on stirring the mixture. The results obtained were very variable. With Wellington Mine slimes of 2.9 per cent., one experiment gave 0.5 per cent. copper soluble in water, 0.7 per cent. insoluble and 1.7 per cent. volatilized. In a second trial with the same slimes and a larger quantity of chloride, 1.5 per cent. were dissolved, 0.8 per cent. left insoluble, and 0.6 per cent. volatilized. In a third experiment with Copper Bay slimes of 2.1 per cent., the whole of the copper was rendered soluble. But such a result as the last mentioned was only attainable occasionally, and it became very evident that high temperature and unlimited access of air often combined to make the result unfavorable and at least uncertain. The temperature at which the sulphurets contained in the slimes oxidized, seemed to be so high as to cause a sublimation both of the chlorides of iron and copper. I therefore, in the subsequent experiments, calcined the one previous to treating it with chloride of iron.

The ore next operated on was an average sample of the crush-work at the Wellington Mine, as it comes from the crusher to the jiggers in the ore dressing works. On shaking it on a sieve having fifteen holes to the lineal inch, it was separated into a coarser and finer part, the former assaying 2.6 per cent. and the latter 5.2 per cent. copper. On calcining and further pulverising the finer part, and sifting it on a finer sieve, it separated into one part, coarser in grain, and containing 4.41 per cent. and three parts finer containing 5.58 per cent. copper. The latter sort was heated over a spirit lamp, with one-fourth of its weight of proto-chloride of iron, in a retort through which a current of air had passage. In one experiment 3.9 per cent., and in another 4.3 per cent. of the copper contents were rendered soluble in water. In the first experiment water dissolved out proto-oxide of iron along with the copper, but in the second, which had been heated longer, all iron in the solution was present as peroxide.

Having observed in one of these experiments, that the air contained in the retort seemed sufficient for converting the proto-chloride of iron into perchloride and peroxide, ($6 \text{ Fe Cl} + \text{O}_3 = \text{Fe}_2 \text{ O}_3 + 2 \text{ Fe}_2 \text{ Cl}_3$), it occurred to me that the current of air