

From this it appeared that in the residue there were present of copper—

In an insoluble state.... 11.82 grs. = 25.15 per cent.
In a soluble state..... 10.51 " = 22.36 "

22.33 grs.

Amount of copper lost.. 24.67 " = 52.49 "

47.00 grs.

The only way in which this extraordinary loss of 52.49 per cent. can be accounted for, is by supposing it to have been volatilized; and other circumstances confirm this view. The calcined substances contained 66.35 grains of sulphate of soda. Consequently 53.11 grains of common salt must have been decomposed, and 32.08 grains of chlorine liberated from it. Of this, 11.82 grains are found in combination with the copper in a soluble state. The remaining 20.26 grains were more than sufficient to form sub-chloride with the 24.67 grains of copper volatilized. The whole of the 32.08 grains of chlorine were not however sufficient to convert the forty-seven grains of copper contained in the ore into soluble protochloride.

From this experiment it became evident, 1st, that even with the use of a large quantity of peroxide of iron, it is difficult to treat copper pyrites so as to produce enough of sulphuric acid to render all the copper soluble; and 2nd, the calcination must be performed at as low a temperature as possible, in order to prevent the volatilization of the copper. The experiment was therefore performed a second time, care being taken to keep the temperature low. The same materials, in the same proportions, were used, and the product this time from the 800 grains weighed 792 grains, and contained—

Iron oxide and other insoluble matter.. 66.00
Sulphate of soda. 17.60
Chloride of copper..... 9.64 = 4.55 copper.
Chloride of sodium (by difference).... 6.76

100.00

Thirty-six grains of copper out of the original forty-seven were this time removed in a soluble form; equalling seventy-six per cent, instead of the twenty-two per cent, of the former experiment. Further, it appears that 139 grains of sulphate of soda were formed; and consequently 111 of chloride of sodium decomposed, and sixty