

of salt yielded, on calcination, a product from which water dissolved 18.6 grains of copper. The ore contained 20.4 grains; hence 91.1 per cent of the copper were dissolved.

200 grains of Escott copper pyrites of 23.6 per cent, 100 grains of iron pyrites, 800 grains of iron oxide, and 200 grains of salt were calcined together. The product weighed 1349 grains, from which water dissolved 46.6 grains of copper. Consequently ninety-eight per cent of the copper contents of the ore were rendered soluble.

In order to prove that the iron oxide is essential to producing this favorable result, the last experiment was repeated, the iron oxide being excluded from the mixture. On calcining and lixiviating, only 33.4 grains of copper were dissolved; that is, seventy per cent only instead of ninety-eight per cent.

The foregoing experiments were performed on plates of fire-clay in the muffle of a cupelling furnace. The iron oxide used was prepared by calcining iron pyrites with salt, and then lixiviating and drying. The following trials were made in a manner approximating more to the method that would necessarily be adopted in carrying out the process on a large scale. The mixtures were merely stirred on an iron plate lying upon two ignited billets of wood in a common stove. And further it will be seen that the oxide of iron necessary in the process was obtained from the ore experimented on. This ore was from the Capel Mine near Lennoxville, and had the following chemical composition:

Copper ..	8.60
Iron	30.31
Sulphur (by difference).....	34.34
Silica and argillaceous matter.....	26.75
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	100.00

These figures correspond to the following mineralogical composition:

Copper pyrites	24.72
Iron pyrites.....	40.79
Quartz, &c.....	26.75
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	101.26

It may be said that in round numbers this ore consisted of one half iron pyrites, one fourth copper pyrites, and one fourth rock. The first calcinations made with it were principally for the purpose of obtaining the necessary iron oxide. Nevertheless, the quantity of copper extracted was at the same time determined.