

be replaced by a glazed visiting-card. In examining earthy sulphates by this method, a little borax ought always to be added to the carbonate of soda, in order to promote the solution of the test-matter. If oxide of manganese be present in the ash, the well-known manganate of soda, or "turquoise enamel," will also be obtained by this treatment.

*Estimation of Sulphur*:—The following plan is perhaps the most simple that can be employed for the determination of sulphur in coal samples. It is merely an adaptation to blowpipe practice of the process very generally employed for that purpose:—

As large an amount of coal as practicable, several pounds at least, taken from different parts of the same heap or bed, must be broken into powder and well stirred together. About 150 milligrammes are to be weighed out for the assay. This amount is to be intimately mixed with about 450 milligrammes of nitrate of potash and an equal quantity of carbonate of potash, and the mixture, with a good covering of salt, is to be fused in a small platinum crucible of about a quarter of an ounce capacity. The crucible may be fixed in an ordinary blowpipe-furnace, in the centre of an already used charcoal-block, as the cavity of the latter will require to be larger than usual. The heat at first must be very moderate, as the mixture swells up greatly; but after a couple of minutes, or thereabouts, a tolerably strong blast may be kept up for from two to three minutes in addition, when the operation will be finished. The alkaline sulphate, thus produced, is dissolved out by boiling water, and the solution, acidified by a few drops of chlorhydric acid, is then treated with chloride of barium. The weight of the precipitate divided by 7.28 gives the amount of sulphur. An ordinary blowpipe crucible of clay may be employed for this operation; but it is always strongly attacked by the mixture during fusion, and is otherwise less convenient for the purpose than one of platinum.

When the iron pyrites in the coal is not in a state of semi-decomposition, its amount, and consequently the amount of sulphur, may be arrived at far more nearly than might at first thought be supposed, by the simple process of washing in the agate mortar. Each single part of pyrites corresponds to 0.583 of sulphur. Several large pieces of the assay-coal should be taken, and broken up into powder, and a couple of trials should be made on separate portions of this. About 500 milligrammes may be taken for each trial, and washed in three or four portions. In the hands of one accustomed to the use of the mortar in