VI.—*Note on the Quantitative Determination of Sulphur.*

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MY object in communicating the following brief note to the Society is to direct attention to a source of error which has hitherto escaped notice in the estimation of sulphur, where fusion of the substance with nitre is the process employed.

The method by fusion is generally conducted in a gold crucible or platinum dish over the gas-flame. Now, I have found that unless great care be taken to prevent the fused mass passing over to the outside of the vessel, and so coming in contact with the flame or products of combustion, an appreciable and, in some cases, serious error will arise, owing to the sulphuric acid produced from the sulphurous acid in the flame—a product of the oxidation of the bisulphide of carbon contained in the gas—combining with the potassa of the fused salt.

I have made several experiments to ascertain the amount of error that may be occasioned from the above cause, but it will not be necessary for me to describe more than one :—

In this instance, the flame issuing from a Bunsen's burner was made to strike against a little fused nitre on the under-side of a small platinum dish, when, in three-quarters of an hour, as much sulphuric acid was obtained as is equivalent to 12 milligrammes of sulphur—a quantity larger than is contained in 5 grammes of grey pig-iron.

In fusing pig-iron with nitre, a process recommended by some for the estimation of the sulphur it contains, the mass, especially if the iron be rich in manganese, invariably creeps over to the outer walls of the crucible, and it is therefore impossible to obtain correct results when the operation is conducted over the gas flame.

As a check on the experiments, nitre was fused by the flame of the spirit-lamp, when, as was to be anticipated, not a trace of sulphuric acid could be detected upon the addition of a barium-salt to the aqueous solution of this fused mass, rendered acid by hydrochloric acid.