LXX.—*On Phosphoryl Trifluoride.*

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The existence of oxyfluoride of phosphorus was first definitely established by Moissan, who obtained it by the action of the electric spark upon a mixture of phosphorus trifluoride and oxygen. On passing the induction spark into a mixture of 2 vols. of the trifluoride and 1 vol. of oxygen standing over mercury, a violent explosion occurs, and the new gas is produced. (*Compt. rend.*, **102**, 1245.)

In a paper on the Oxidation of Haloid Salts in the *Journal für praktische Chemie*, 1880, **21**, 438, Schulze has described the behaviour of various oxides upon haloid salts in absence of oxygen, and states that on heating fluorides with molybdic oxide and phosphoric oxide, oxyfluoride of molybdenum and oxyfluoride of phosphorus were obtained. No description of the properties of these compounds is given, nor do any analytical observations appear to have been made.

We find that phosphorus oxyfluoride can be easily obtained by heating an intimate mixture of cryolite and phosphorus pentoxide. The materials, in the proportion of 2 parts of the finely-powdered cryolite and 3 parts of phosphoric oxide, are placed in a brass tube and gently heated. The gas is readily disengaged, and as soon as that which is evolved is wholly absorbed by caustic soda solution, the rest may be collected at the mercurial trough. That the gas so obtained is practically pure is shown by the following numbers :—

	Observed.	Calculated.
Vapour density	52·3	52·0
Determination of phosphorus—		
Preparation I	30·36 p. c.	29·81
Preparation II	30·06 „	—

This method of obtaining phosphorus oxyfluoride is analogous to that by which Kolbe and Lautemann prepared the oxychloride (*Annalen*, **113**, 240), namely, by heating phosphoric anhydride with common salt :

$$2P_2O_5 + 3NaCl = POCl_3 + 3NaPO_3.$$

We had intended to have completed our study of this gas before offering any communication on the subject, but, as we are no longer in a position to work in concert, we have ventured to lay this short preliminary note before the Society. One of us, however, trusts, in a short time, to be able to present the results of a fuller investigation.