

LIX.—*The Vapour-density of Hydrofluoric Acid.*

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(Preliminary Notice.)

GORE, in his researches upon anhydrous hydrofluoric acid, showed that by heating a known volume of hydrogen with a slight excess of silver fluoride, the volume of hydrofluoric acid gas formed was approximately twice that of the hydrogen taken, if it were measured at about 100° C., but at lower temperatures it was considerably less than was demanded by the formula HF (*Phil. Trans.*, 1869, 173).

Mallet determined the density of hydrofluoric acid at $30\cdot5^{\circ}$ C., by weighing the vapour in a large glass flask coated internally with paraffin, and obtained a value corresponding to the molecular weight 39·32 at that temperature (*Amer. Chem. J.*, 1881, **3**, 189).

Although this result shows that hydrofluoric acid does not give a vapour-density corresponding to the formula HF at temperatures near its boiling point, it cannot be considered as conclusive proof of the existence of the molecule H_2F_2 . The alteration in vapour-density may in fact resemble the well-known case of acetic acid, in which there is a gradual and progressive breaking down of a complex molecular grouping. We have, therefore, investigated the subject

with the object of ascertaining whether the gas possesses a constitution corresponding to the formula H_2F_2 through any appreciable range of temperature.

By means of a large platinum apparatus provided with stopcocks of the same metal, we have determined the vapour-density at temperatures varying from 26.4° to 88.3° . Pure anhydrous hydrofluoric acid was prepared as required for each experiment from the acid potassium fluoride and was then redistilled through the platinum apparatus placed in a bath of glycerol and heated to the desired temperature. In all, 14 experiments were made at short intervals of temperature between the points given, and the values obtained correspond to molecular weights ranging from 51.19 at 26.4° to 20.58 at 88.3° , the process of breaking up of the molecular grouping being analogous to that observed in the case of acetic acid.

We hope to be able to lay a detailed account of our experiments before the Society at an early date.
