

impossible to give an account of all the experiments these scientists made in order to make sure that the discrepancy in weight already referred to was not due to impurities. Suffice it to say that all possibility of the nitrogen prepared from chemical compounds being a mixture, was shown by varied and careful experiments to be without any foundation.

METHODS OF PREPARATION

Of the elements that combine directly with nitrogen, magnesium was chosen as the best. When nitrogen is passed over this metal in a hard glass tube heated to redness, absorption takes place with incandescence. The authors state that from 7 to 8 litres of nitrogen can be absorbed in a single tube. The nitride so formed is a porous, dirty orange coloured substance. Red hot magnesium therefore was used to absorb or get rid of the nitrogen, while red hot copper was similarly used to combine with the oxygen of the air experimented upon.

The method of Cavendish, by "sparking" nitrogen with oxygen in the presence of an alkaline liquid, was employed by the authors in their earlier experiments. This finally resulted in obtaining a small quantity of residual gas, proportional to the volume of air operated upon, which could not be further oxidised. Its spectrum proved that it was not nitrogen. It was, in fact, the newly discovered element, argon.

The abstract then gives the details of an experiment in which the oxygen of the air under trial was absorbed by red copper. This left a gas of the density of 1.488. This, as the investigators say, while not conclusive, was encouraging. Then by passing backwards and forwards such "atmospheric nitrogen" over red hot magnesium they obtained after 10 days about 1500 c.c. of this heavier gas. This was treated with a large number of chemical absorbents to purify it, and as a result they had 200 c.c. of a gas of the density of 16.1. Still further absorption yielded a gas with a density of 19.09. This on "sparking" with oxygen eliminated the last traces of nitrogen, the remaining gas having 20.0 as its density. This showed, by spectrum analysis, lines not reconcilable with any known element.

The method of atmolysis was then tried. Atmospheric nitrogen, after separation of oxygen by red hot copper, was diffused through a number of tobacco pipe stems. The nitrogen so obtained was denser