air and forms the dioxide (BaO_2). But, when the temperature is raised, this change is reversed, the dioxide breaking up into the monoxide and oxygen. Advantage has been taken of this reversal in Brin's method of manufacturing oxygen from the air. Equations representing such reversible actions are, like algebraic equations, true when read either way, as:—

$$BaO + O = BaO_2$$
$$BaO_2 = BaO + O$$

Dissociation by heat into gaseous products which recombine when the temperature is lowered comes under the head of reversible changes. The decomposition of barium dioxide may be regarded as dissociation, since the oxygen recombines when the temperature is lowered. But a typical example of dissociation is seen in the case of *ammonium chloride*, the gas density of which was found to be only half that calculated from the formula NH_4Cl; that is, a given weight occupied twice the calculated volume. This suggested the idea that the double volume is due to the decomposition of the ammonium chloride into two gases. This can be proved to be the case by a simple experiment. Heat a little ammonium chloride in a covered platinum crucible until it is volatilised. Remove the cover and insert quickly a strip of moistened blue litmus paper. It is turned red. The ammonium chloride was dissociated into ammonia and hydrochloric acid. The former, being the lighter gas, diffused out more rapidly, so that the remainder was acid in reaction. By a more complicated apparatus the separation by diffusion can be effected in such a way as to show the presence of each of the gases. *Phosphorus pentachloride*, PCl_5, is an example of a volatile substance which dissociates