

passed those of Rothamsted, the work was being continued in the friendliest manner, and utterly free from envy and dispute.

From these memoranda regarding this great meeting of agricultural scientists at Halle, it will be seen that the fixation of atmospheric nitrogen by plants of the sub-order papilionaceæ, is now established beyond all possibility of doubt. and that that farmer will be the truest artist and become the richest man who makes the best use of these well established results of scientific investigation in agriculture.

But although it is a fact that these humble leguminous plants are so highly gifted by nature, it is equally certain that the cereals and other plants of a higher order cannot appropriate nitrogen in this direct way. They and their rootlets must search for it in the soil in the form of nitric acid, which may have been brought from the atmosphere into the soil or have originally existed as nitrogen in its organic matter or humus, or may have been produced by the oxidation of ammonia. Decayed vegetable matter, peat and black muck contain quantities of nitrogen varying from $\frac{1}{4}$ to 2 per cent. in the air dried condition. When this is composted or mixed with other soil and stable yard manure the nitrogen is gradually made available for plant food ; in fact it undergoes a process of oxidation, being first changed into ammonia and then if bases are present into nitric acid. This lecture would certainly be incomplete without some notice of these important compounds. We shall now make some reference to ammonia ; later on to nitric acid.

(Here experiments were introduced illustrative of the great solubility and alkaline character of ammoniacal gas ; the formation of ammonium chloride and the oxidation of ammonia in the ignition of the bichromate.)

But it is our business this evening to go further and ask what use the plant makes of the nitrogen which it appropriates. It is immaterial whether we suppose that the nitrogen is assimilated as such or as ammonia or as nitric acid, in any case the use which is made of it by plants, and the wonderful products into which it is transformed by the vital activities at work in these, are simply miraculous. A very high authority, Mr. Warington, a colleague of Sir Henry Gilbert and Sir