USE OF AMMONIA.

It is time for the farmers to look for assistance to the collateral sciences, which have hitherto been studied, perhaps, for mere pleasure, and there to see if anything can be found as a remedy for a great existing evil—scarcity of food of their own production. When a blue, red, or purple precipitate fell on mixing together two nearly colourless solutions, it was inferred that wool, silk, cotton, or paste, might receive the same colour under the same circumstances, and never has any inference come to a better result. The Egyptian agriculturists were for centuries robbed of their ammonia for commercial purposes, in other parts of the world, until chemistry found that it was a mere compound of hydrogen and nitrogen, and that we had plenty at home, and now it may be made from anything containing its elements. Sulphate of magnesia used to be made only by evaporation of the water, containing it naturally in solution, until chemistry found that the same substance could be produced by adding sulphuric acid to magnesian earth. It is by an examination of the elementary constituents of substances that we are to expect to find out a principle for the more speedy and convenient modes of producing them. We could not produce ammonia unless the substances used contained its elements. We could not produce sulphate of magnesia by adding sulphuric acid to lime, nor are we to expect to produce the very compound substance, "grain," by adding as manure common salt, nitrate of soda, or gypsum, or any one article only. Elementary bodies cannot be produced out of nothing, and no compound body can be produced unless it has by some means or other free access to *all* the elementary bodies required for its constitution. In the process of making ammonia, if there is more nitrogen than the existing quantity of hydrogen requires, the excess is lost; if more sulphuric acid is added than the magnesian earth requires for the production of sulphate of magnesia, the excess runs to waste: then why should we add from 10 to 20 bushels of bones, when the crop to which they are applied, will only require one bushel or less? Why should we add so many bushels of salt, when the crop only requires a few pounds? I leave these to be answered by those persons who do such things. According to the same mode of inference, we have no need to add any constituent to which the article to be produced can have free access without being added; and if, in the production of grain, the crop can obtain some of its elementary constituents from the atmosphere, we shall have no need to add them as a manure; and provided there shall be a sufficient supply, we could not expect any benefit from the addition of them as manure. In my last letter, I endeavoured to show that oxygen, hydrogen, and carbon, in the form of water and carbonic acid, were supplied abundantly by nature, and that the plants could be supplied from that source, and it remains for us now to consider whether or not plants can supply themselves with the other organic constituent, nitrogen, which exists so abundantly in the atmospheric air. It seems strange if a plant cannot help itself to an elementary constituent which it requires when that constituent exists in the greatest abundance all around it; and if vegetable matter in the process of decay liberates free nitrogen, it is only reasonable to infer that they must appropriate free nitrogen during their growth, otherwise there would be a constant diminution of the combined nitrogen, and that vegetation must be constantly wasting, while the opposite is found to be the case since the population, and with it nitrogen in combination, increases. Also when we consider that plants can obtain combined nitrogen from no other source than ammonia, it is difficult for us to explain the quantities in some crops; for instance, one acre of peas which, here, are sown after corn crops, and without manure remove from the land, of nitrogen, 125 lbs. and beans which are planted on exhausted land on purpose to renovate it, remove 150 lbs. of nitrogen, while an acre of turnips, highly manured, remove but 85 lbs. of nitrogen, and an acre of potatoes, also highly manured, remove but 82 lbs. of nitrogen. Are we to come to the conclusion that turnips cannot obtain 85 lbs. of nitrogen from the same source as beans can obtain 150 lbs. of nitrogen? or are we to infer that one plant can and another cannot remove nitrogen from the air; the conclusion come to by Dumas and Boussingault, which I think should not be acted upon without further proof. In the ordinary mode of farming, the manure, and with it the ammonia is applied to those crops which require the least of it, turnips and potatoes, while we have every reason to believe that all the ammonia will be evaporated by the time that the clover and grain crops come, which require the most of it, the clover removing per acre 132 lbs.

Ten tons (the quantity for an acre) of fold-yard manure, contain 110 lbs. of nitrogen, and the nitrogen contained in an acre's produce of turnips, barley, clover and wheat, would be 337 lbs.; and supposing the land in pasture to receive as much nitrogen as it affords, and that all the wild vegetation requires as much for its reproduction as it has afforded during its decay, then we must suppose that two-thirds of the nitrogen removed by the four crops above mentioned, is afforded by the decomposition of the refuse of the towns and cities. If plants can obtain two-thirds of their nitrogen from the air, it is not difficult to suppose that they may obtain the whole quantity from the same source, as the wheat and clover probably do, and this must have been the case in Egypt when the whole of their manure was burnt, and the ammonia removed from it. The same must have happened upon land which never had any manure, as in Hungary, where wheat and tobacco have been cultivated alternately for centuries without the introduction of nitrogen. The Egyptians apply ashes only as a manure, and they always have exported, and still do, in the form of wheat and beans, export much nitrogen. We are told that every pound of ammonia saved in the farm-yard, will be equal to a bushel of wheat in the field; why then is not the price of farm produce governed by the quantity of nitrogen they contain? Because the proposition is not true, and those who try the experiment, will find that for every pound of nitrogen added to manure as wheat growing on land in a good state of cultivation, they will have a bushel, and perhaps several bushels less; therefore, I ask, what good would all the cows urine in England do, said to be worth £48,000,000. A farmer of much experience said to me last night, the wool waste was no benefit to turnips, and this view is supported by the analysis of turnips, and we may on the same ground question our mania for guano. The farmers round London apply woolen rags or shoody to their wheat crops at the rate of half a ton per acre, and in doing so, they apply 136lbs of nitrogen as manure to a crop which only removes from the land 67lbs. of nitrogen; now, if every atom of nitrogen were saved that the land produces, it could only receive the same as it produces. Therefore, it becomes a question, where we shall get the nitrogenous compounds to till with; and if we get so much more than we produce, somebody else must be losing