

verted into humus as soon as the vital powers have ceased to exist in it. But there is a series of other organic compounds present in the plant, which, besides the above named elements, contain nitrogen as a constituent part; and as these compounds form the real nutritious matter of the vegetable food by being converted into blood, and subsequently applied to the production of the organs of the animal, they must necessarily accumulate in the animal body and re-appear in a more concentrated form in the carcass or the excrements of animals than they occurred in the body of the plant where they originated. These compounds, whether still existing in the plant or already transformed into constituents of the animal body, when they undergo a process of decomposition, produce humus, and, besides, evolve ammonia in proportion to the quantity of nitrogen they contain. The ammonia becomes partly disengaged and is then diffused in the atmosphere, and is partly retained by, and incorporated with, the humus which is simultaneously formed with it.

The atmosphere, which is thus constantly supplied with ammonia from organic bodies wherever existing in a state of decay, contains this substance in a considerable quantity, and, to judge from the result of analytical examinations of the atmosphere, sufficiently even to meet the wants of all the growing crops on earth. Practical experiments have also proven, in accordance with this fact, that plants can be raised and brought to perfect development without the aid of any other source furnishing ammonia but the atmosphere; and if the experience of practical farmers advise us *not* solely to rely upon this source, but to take care, besides, of keeping the soil itself well supplied with it, by means of artificial applications of such manures as are capable of producing it,—it is for reasons which are founded upon the same principles that have been discussed already in their relation to the supply of carbonic acid.

An experiment on the production of plants under given conditions for the solution of certain questions, is altogether different from the practice of producing crops, and the conditions under which it can be most satisfactorily effected. In the one case, we investigate to what extent plants can be forced to live on a partial supply of the necessary elements, and judge from the more or less perfect development of all their parts, whether we have to decide in favor of the one or the other doctrine; in the other case, we are anxious to offer to the plant an abundance of its elements, by opening the most various resources for its supply, and estimate the result, not from the fact that the produced plant shows a root, a chaff,