

For these reasons we are compelled to seek for the nourishment of plants in the contents of the atmosphere: and as Oxygen and Nitrogen cannot add to the weight of organic bodies in their isolated form, these functions must be solely fulfilled by Carbonic Acid, Ammonia and Water. If we abstract from Humus its action on the mechanical texture of soils, its beneficial influence on vegetation is then due to its giving rise to Carbonic Acid, Ammonia and Water, and to no other cause.

It has already been shown that Carbonic Acid, Ammonia and Water, are the products of the decomposition of organic substances; and we have seen that they are also assimilated by plants as nourishment, and their elements, under the dominion of the vital powers, arranged to form new compounds of organic character. The same substances which have served to produce the plant, are thus regenerated after its death by the process of its decay, thus forming an eternal transition from the organic state to the inorganic.

The inorganic, or mineral, constituents of plants, though small in quantity when compared with the organic part, are nevertheless essential, and must be considered just as indispensable for their growth as are Carbonic Acid, Ammonia and Water. For the proof of this, it is only necessary to let experiments speak. The result of observations made by the Prince of Salm-Horsmar in this matter, are especially interesting, and have established the following facts: In a mixture containing all the various substances requisite for the nourishment of plants, except Silicic Acid, Oat plants remained low, pale and dwarfish; without lime, they died after the second leaf; without Potash and Soda, they reached only a height of three inches; without Magnesia, they remained weak and lying down; without Phosphoric or Sulphuric Acid, very weak and without fruit, but upright and of normal formation; without Iron, they remained very pale, weak and badly formed; and without Manganese, they did not reach their full strength and showed but a few flowers. Soda could not represent Potash in relation to the strength of the plants; Magnesia could not represent Lime. When, however, all of the mineral substances which vegetable life requires, were present in their proper proportion, and in sufficient quantity, the oat plant reaches a complete and pretty luxuriant development, even with an entire absence of Humus, or any vegetable substance in the experimental mixture.

THE RELATIONS WHICH EXIST BETWEEN PLANTS AND THE SOIL, AND THE MANNER IN WHICH THESE RELATIONS INFLUENCE THE GREATER OR LESS FERTILITY OF THE SOIL.

In the preceding chapter we gave a knowledge of the soil, as far as it embraces its origin, and its consequent composition: we gave farther, the principles upon which the nutrition of plants is based; all that is now left for our consideration is an inquiry into the re-