

lations which exist between plants and their soil, and in what manner these relations influence the productiveness of a soil for plants which may be cultivated upon it. These considerations may lead to the sure foundation of a useful, and thoroughly practical classification of soils, a knowledge, from which we are yet distant, which, however, it may be confidently hoped, will one day be reached by the united co-operation of practical farmers and chemists.

The soil consists substantially of two parts, of which the one constitutes almost its entire bulk, and through which we find the other, in small quantities, uniformly divided and diffused. The soil can be defined as the medium of the processes of vegetable life, and both of its parts, unequal as they are in their quantity, take nevertheless an equally important share in this functional process.

We have before observed that the bulk of plants consists of substances of organic form, composed of Carbon, Hydrogen, Nitrogen, and Oxygen, whilst only a small part of their constituents belongs to the mineral kingdom. This fact, compared with the composition of soils, will enable us to throw a light on the profound and wise manner in which nature has transferred the mediation of the processes of vegetable life to the soil.

We find that the constituents of the bulk of the soil do not directly participate in the nutrition of plants; that none of them is carried away by a crop, and their quantity therefore not diminished; but that the small quantity of substances which form the other part of fertile soils, and which are diffused through the bulk of the former, serve as nourishment for plants, and consequently diminish in soils by being cropped and carried away from them.

The functions which this latter part exercise on the mediation of the processes of life, consist, therefore, in supplying the plants with their necessary mineral constituents, and are perfectly and plainly understood.

The functions of the main part of soils therefore remain only to be considered, and we may judge a priori, that this part, if we abstract from it, its utility as a mass easily penetrated by the roots of plants, and thus capable of rendering them the necessary mechanical support, is that which we have especially to assign as the medium of communication between the atmosphere and plants, and which therefore supplies them with Water, Carbonic Acid and Ammonia; for though the plants are in direct contact with the atmosphere, and, to a large extent, directly nourished from it by means of their leaves; they nevertheless depend, to the same extent, on the constituents of the atmosphere which, through their roots, enter the system. In the first period of their growth, e.g. they are solely referred to this latter manner of nutrition. These nourishments are therefore supplied to the roots, either by the air, (in its gaseous form as contained in the soil, or dissolved in rain-water, which falls on the earth and penetrates the soil,) or supplied by Humus in a manner as already explained.