

of these very substances in the body of the soil itself, and which also exercises an attractive power for these nutriments, and retains and reserves them if they have once become appropriated by the soil.

Among them, *water* is the most common and abundant, for the supply of which nature provides in a liberal manner. But in spite of its being met with almost every where in nature, we are well aware of the fact that it is not seldom wanted, and then usually at a time when the plants need it most urgently for their final development. The injurious effect of dry seasons on *present* crops is well known. On the other hand we meet soils entirely destitute of productiveness, and find, upon examination, that their sterility is the consequence of their wet condition, they being saturated with moisture, and even permit the water to rest upon them and to remain there for a considerable length of time. If by some means the water is removed from this kind of soils, they are at once rendered fertile and fit to reach the highest state of culture.

This state of things shows clearly that the water, though a nutriment to plants that cannot be dispensed with, is nevertheless, to the highest extent injurious to vegetation, if permitted to accumulate in the soil; and as the condition of the soil, as a body at large, is due to its mechanical texture, or to the proportion in which the fundamental constituents are present in it, it follows that a regular supply of this nutriment, neither more nor less than wanted, can only be secured by a proper mechanical texture of the soil. In this case the soil will, at one time, reserve to the utmost, the needed quantity of water, whilst at another, it will freely dispense with all superabundance.

The quantity of water required by plants during their growth is very considerable. It is the medium by which all other nutriments are conveyed to the plants, and with which they dispense again as soon as this function has been fulfilled. Boussingault states that annually by a good crop from one acre, about six millions pounds of water evaporated from the leaves of the plants that was previously taken up by their roots. Besides, plants contain about 12 per cent. of their weight of water in the dry state, which forms a constituent part of their body.

*Carbonic acid*, the second of this class of nutriments, is the substance from which plants derive all their carbon, or about 43 per cent. of their whole weight. A regular supply of carbonic acid is likewise dependent on the mechanical texture of the soil; for carbonic acid is the product of the decomposition of humus, a substance which forms a fundamental con-