

The carbonic acid gas of the air, though present only to the extent of 4 parts in 10,000, furnishes all the carbon required for the organic compounds of plants, of which starch, sugar and albumen are the chief. These compounds constitute fully 80 per cent. of their water-free substance, and are those which give to all vegetable tissues their chief value as food for man and beast. Some idea of the extent to which plants appropriate their nourishment from this source may be gained from the statement that an acre of wheat, by virtue of the green colouring matter of its foliage in the presence of the sunlight, will remove during its season of growth nearly one ton of carbon, or as much as would be contained in a column of air over that area three miles in height. Though this is a very large amount, the practical agriculturist needs not to concern himself with this class of food; for nature always furnishes an abundant, a practically unlimited, supply.

Water is invariably found in all the tissues of plants, from 75 to 95 per cent., as in green stem and foliage, to 8 or 10 per cent., as in the seed. From one point of view, water is to be regarded as the most important of all forms of plant food, since without it all other nourishment is unavailable. Though not of the soil, looked at geologically, it is only water present in the soil which is of use to plants. Their whole supply is drawn by the rootlets from this source. Apart from irrigation, we can only indirectly control this supply. Indirect methods for the conservation of soil moisture, chief of which are under-drainage and surface cultivation (which by the formation of a dry earth mulch arrests or checks surface evaporation), are now considered matters of the greatest importance and worthy of equal consideration with problems for supplying plant food. For indeed water not only forms a large proportion of all plant tissues, but it is the vehicle whereby all soil food is appropriated and assimilated. That nourishment which plants take from the air is certainly in the form of a gas, but that which they absorb from the soil must be in the form of a dilute solution. Solids, as such, cannot be utilized; they must first be dissolved. If they cannot be attacked either by the soil water or the slightly acid fluid that exudes from the rootlets, then no matter how rich such solid materials may be in food constituents, they are of no value to crops. The knowledge of this