

We may consider all reserve material as occurring in two forms, the liquid and the solid. Of the former we have examples in the oils, sugars, inulin and allied compounds, although the two latter may also be obtained in a solid form under certain special conditions of treatment. Of the latter we have familiar examples in the various kinds of starch which, however, is most probably also a liquid at certain times, as when in process of transfer from one organ to another. We should also enumerate, among the solid forms of reserve material, those peculiar forms which protoplasm assumes when passing into the resting state, such as are to be found in the crystalloids, aleurone, etc., or in other words, in the so-called protein compounds of seeds.

It is not the purpose of this paper to discuss all, or even a large portion of these compounds, since the subject is altogether too large to permit of proper treatment within such brief limits, and I shall therefore confine my remarks to that one form of most frequent and conspicuous occurrence, starch, since what is true of this in its distribution and relation to pathological conditions, is also true in a very large measure of the other forms of reserve material; and, moreover, it is in the distribution of this in health and disease with which our investigations have been chiefly concerned.

The leaves are the special organs of digestion for the plant, and to them we may consider this function wholly confined; except in cases where there is a green bark, as in all herbaceous plants and the young shoots of woody plants, or where true leaves are absent, and their function is assumed by other parts of the plant, as in the cacti. The products of digestion are in general the same in either case, as, also, must be their final distribution and use, so that what is true of the leaves in their relation to the digestive function must also be true of other green parts. The essential features of the digestive process, as we observe it in leaves, are the decomposition of  $\text{CO}_2$  and  $\text{H}_2\text{O}$  with recombination of their constituent elements, giving rise to starch as a solid product to be utilized in nutrition, while free O is liberated into the surrounding air whence the  $\text{CO}_2$  was derived. This action may be regarded as continuing during the entire vegetative period, so long as chlorophyll is present and sunlight has free access to the leaves, and, therefore, under otherwise uniform conditions, sub-