

required for a particular crop, but contains an abundance of other elements required by other crops. If these latter are now planted, the soil, in course of time, suffers special exhaustion with reference to their requirements, while it regains its ability to produce the crop of the first kind. Thus, by a judicious system of rotation, land may be kept in a constant state of productiveness. It is only when food elements are so completely withdrawn that no one class of plants can be brought to perfection, that the soil is said to be generally exhausted. Therefore, when we speak of the fertility of a soil, or the exhausted condition of a soil, it must always be with direct reference to the particular requirements of the plants we wish to cultivate. And I cannot let this part of my subject pass without pointing out that a large part of the difficulty in successfully combating some of the most destructive diseases of the orchard and garden, arises from a failure to properly appreciate and apply the principles stated.

It is impossible to give more detailed consideration to these aspects of our subject in the brief space allotted to us, important though they are. There are, nevertheless, two features of this question to which I would particularly draw your attention, and from their very important bearing upon the economic side of horticulture, I feel that their somewhat detailed statement will not be out of place. I refer, in the first place, to the relation of nutrition to conditions of health and disease; and in the second place, to the relation of nutrition to improved qualities of fruits.

For many years, the Germans have been among the foremost investigators in efforts to determine the special functional value of the various food elements of plants. The method usually selected has been that of water culture already described, through the medium of which the effect of eliminating any given element, or of varying its proportion and particular chemical combination in the food supply, could be accurately ascertained. From a series of such experiments made as long ago as 1871, in which buckwheat was the particular plant employed, it was observed that in