

in relation to food supply; the number, character and special functions of the elements appropriated; the relations of food supply and nutrition to conditions of health and disease; the relations of food supply to improved qualities of plants for purposes of human food; the special capacity of the plant for digestion, and its relation to the character of food used, are all so intimately connected with the subject as a whole and with each other, that no complete statement can be made without taking some account of all these considerations. Concerning some of them, we are forced to admit that as yet, but little real progress has been made in the direction of their correct elucidation, nor can we look for a final solution until such time as chemistry shall make us more fully acquainted with the composition of plants in various stages of development, and under widely different conditions of growth, and thus provide the key which shall unlock the door to those now mysterious physiological changes peculiar to nutrition.

In the process of nutrition, certain substances enter directly into the composition of various parts of the plant, to the formation of which they are absolutely essential. There can, therefore, be no doubt that they are food substances. Others, however, although taken into the plant, do not enter as an essential ingredient into the construction of parts. Nevertheless, it is found that their elimination from the food supply so disturbs the normal processes of growth, as to leave no doubt in our minds concerning their necessity in what are termed the metabolic processes, or the chemical changes incident to nutrition. It is therefore as proper to regard them as food substances as the former.

In order to determine what elements may be properly regarded as plant food, we first of all resort to chemical analysis, and in the second place to special methods of cultivation. When a plant is burned, or when it suffers the slower oxidation of decay—the final results being the same in each case—we find that by far the greater part of the original structure disappears in the form of aqueous vapor, carbon dioxide gas and volatile acids, while a very small