

## Importance of Food Elements

The purposes of food are to promote growth, to supply force and heat, and to furnish material to repair the waste which is constantly taking place in the body. Every breath, every thought, every motion, wears out some portion of the delicate and wonderful house in which we live. Various vital processes remove these worn and useless particles; and to keep the body in health, their loss must be made good by constantly renewed supplies of material properly adapted to replenish the worn and impaired tissues. This renovating material must be supplied through the medium of food and drink, and the best food is that by which the desired end may be most readily and perfectly attained. The great diversity in character of the several tissues of the body, makes it necessary that food should contain a variety of elements, in order that each part may be properly nourished and replenished.

The food elements. -----

The various elements found in food are the following: Starch, sugar, fats, albumen, mineral substances, indigestible substances.

The digestible food elements are often grouped, according to their chemical composition, into three classes; viz., carbonaceous, nitrogenous, and inorganic. The carbonaceous class includes starch, sugar, and fats; the nitrogenous, all albuminous elements; and the inorganic comprises the mineral elements.

Starch is only found in vegetable foods; all grains, most vegetables, and some fruits, contain starch in abundance. Several kinds of sugar are made in nature's laboratory; cane, grape, fruit, and milk sugar. The first is obtained from the sugar-cane, the sap of maple trees, and from the beet root. Grape and fruit sugars are found in most fruits and in honey. Milk sugar is one of the constituents of milk. Glucose, an artificial sugar resembling grape sugar, is now largely manufactured by subjecting the starch of corn or potatoes to a chemical process; but it lacks the sweetness of natural sugars, and is by no means a proper substitute for them. Albumen is found in its purest, uncombined state in the white of an egg, which is almost wholly composed of albumen. It exists, combined with other food elements, in many other foods, both animal and vegetable. It is found abundant in oatmeal, and to some extent in the other grains, and in the juices of vegetables. All natural foods contain elements which in many respects resemble albumen, and are so closely allied to it that for convenience they are usually classified under the general name of "albumen." The chief of these is gluten, which is found in wheat, rye, and barley. Casein, found in peas, beans, and milk, and the fibrin of flesh, are elements of this class.

Fats are found in both animal and vegetable foods. Of animal fats, butter and suet are common examples. In vegetable form, fat is abundant in nuts, peas, beans, in various of the grains, and in a few fruits, as the olive. As furnished by nature in nuts, legumes, grains, fruits, and milk, this element is always found in a state of fine subdivision, which condition is the one best adapted to its digestion. As most commonly used, in the form of free fats, as butter, lard, etc., it is not only difficult of digestion itself, but often interferes with the digestion of the other food elements which are mixed with it. It was doubtless never intended that fats should be so modified from their natural condition and separated from other food elements as to be used as a separate article of food. The same may be said of the other carbonaceous elements, sugar and starch, neither of which, when used alone, is capable of sustaining life, although when combined in a proper and natural manner with other food elements, they perform a most important part in the nutrition of the body. Most foods contain a percentage of the mineral elements. Grains and milk furnish these elements in abundance. The cellulose, or woody tissue, of vegetables, and the bran of wheat, are examples of indigestible elements, which although they cannot be converted into blood in tissue, serve an important purpose by giving bulk to the food.

With the exception of gluten, none of the food elements, when used alone, are capable of supporting life. A true food substance contains some of all the food elements, the amount of each varying in different foods.

Uses of the food elements. -----

Concerning the purpose which these different elements serve, it has been demonstrated by the experiments of eminent physiologists that the carbonaceous elements, which in general comprise the greater bulk of the food, serve three purposes in the body;

1. They furnish material for the production of heat;
2. They are a source of force when taken in connection with other food elements;
3. They replenish the fatty tissues of the body. Of the carbonaceous elements, starch, sugar, and fats, fats produce the greatest amount of heat in proportion to quantity; that is, more heat is developed from a pound of fat than from an equal weight of sugar or starch; but this apparent advantage is more than counterbalanced by the fact that fats are much more difficult of digestion than are the other carbonaceous elements, and if relied upon to furnish adequate material for bodily heat, would be productive of much mischief in overtaxing and producing disease of the digestive organs. The fact

that nature has made a much more ample provision of starch and sugars than of fats in man's natural diet, would seem to indicate that they were intended to be the chief source of carbonaceous food; nevertheless, fats, when taken in such proportion as nature supplies them, are necessary and important food elements.

The nitrogenous food elements especially nourish the brain, nerves, muscles, and all the more highly vitalized and active tissues of the body, and also serve as a stimulus to tissue change. Hence it may be said that a food deficient in these elements is a particularly poor food.

The inorganic elements, chief of which are the phosphates, in the carbonates of potash, soda, and lime, aid in furnishing the requisite building material for bones and nerves.

Proper combinations of foods. -----

While it is important that our food should contain some of all the various food elements, experiments upon both animals and human beings show it is necessary that these elements, especially the nitrogenous and carbonaceous, be used in certain definite proportions, as the system is only able to appropriate a certain amount of each; and all excess, especially of nitrogenous elements, is not only useless, but even injurious, since to rid the system of the surplus imposes an additional task upon the digestive and excretory organs. The relative proportion of these elements necessary to constitute a food which perfectly meets the requirements of the system, is six of carbonaceous to one of nitrogenous. Scientists have devoted much careful study and experimentation to the determination of the quantities of each of the food elements required for the daily nourishment of individuals under the varying conditions of life, and it has come to be commonly accepted that of the nitrogenous material which should constitute one sixth of the nutrients taken, about three ounces is all that can be made use of in twenty-four hours, by a healthy adult of average weight, doing a moderate amount of work. Many articles of food are, however, deficient in one or the other of these elements, and need to be supplemented by other articles containing the deficient element in superabundance, since to employ a dietary in which any one of the nutritive elements is lacking, although in bulk it may be all the digestive organs can manage, is really starvation, and will in time occasion serious results.

It is thus apparent that much care should be exercised in the selection and combination of food materials. Such knowledge is of first importance in the education of cooks and housekeepers, since to them falls the selection of the food for the daily needs of the household; and they should not only understand what foods are best suited to supply these needs, but how to combine them in accordance with physiological laws.

### About the Author

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