The Nutritive Value of Mayonnaise

Address Before the Fourth Annual Convention of the Mayonnaise Products Manufacturers Association

By E. M. NELSON*

IN ORDER to give a clear picture of the part that mayonnaise plays in human nutrition, it will be necessary to discuss briefly the essentials of a satisfactory diet. There was a time when it was generally accepted that if a man consumed sufficient amounts of mineral elements, proteins, and energy-yielding materials, such as carbohydrates and fats, his nutritive requirements would be satisfied. During the past 20 years our conceptions of a complete diet have undergone many changes because we have found from time to time that some essential had been overlooked. What are the components of a satisfactory diet in the light of what is known today?

Every movement of the body, every physical or mental exertion requires the expenditure of some energy. Also, the human organism must be maintained at a certain temperature or it ceases to function. Let us compare the body to a gasoline engine. The engine will burn gasoline or benzene, or a mixture of the two, to carbon dioxide and water in the presence of air and produce power and heat. But the engine will not run if it is too hot or too cold. Carbohydrates include the sugars and starches. Chemically speaking, the term "fat" includes vegetable and animal oils as well as vegetable and animal fat, but excludes mineral oil. Carbohydrates and fats are normally burned in the animal body to carbon dioxide and water, and the body obtains thereby its energy and heat. In the absence of sufficient amounts of these energy-yielding materials the body burns other substances, notably protein.

The protein of the body may be compared to the stone in a building in which the architect's plans call for many kinds of stone. The building cannot be completed unless there is enough of each of the kinds of stone specified. The protein which we eat must be torn down and reconstructed in the body. In the process of digestion protein foods are broken down into compounds called amino acids, which are then resynthesized into the different types of proteins required by the body. Lean muscle tissue, such as beefsteak, is mostly of protein.

The ash which remains after burning plant or animal matter consists of mineral elements. The bones and teeth are composed largely of minerals, principally lime and phosphorus. The mineral elements also control important body functions. A striking example of the importance of a single element of which we need only minute amounts is that of iodine. An iodine containing compound produced by a small gland located close to the upper part of the windpipe regulates the rate at which foods are burned in much the same manner as a governor on a gasoline engine regulates the amount of gasoline which is burned. If there is not sufficient indigestible material, or roughage, in the food we consume the waste products of metabolism may not be properly eliminated. This is particularly true of people whose physical exertion is limited and whose diet consists largely of food products which may be considered concentrated. The necessity of water is obvious.

Vitamins

WE CAN examine a food chemically and obtain reliable information as to its value with respect to protein, energy-yielding and indigestible materials, and minerals, but a chemical analysis will provide little or no information about vitamins. How, then, do we know such substances exist? Under suitable conditions, if a diet is satisfactory with respect to all known factors except one of the vitamins, a typical abnormal condition or disease will develop. In most cases such deficiency diseases are accompanied by other abnormal conditions. In research work in nutrition, however, animals, such as rats or guinea pigs, are fed a diet which is complete except for one of the vitamins and the material to be tested is then fed in measured amounts to determine how much is necessary to provide the missing factor.

Five vitamins, A, B, C, D, and G, are known to be necessary for a complete human diet.

(*Turn to p. 23*)

*Bureau of Chemistry and Soils, U. S. Dept. of Agric.

Nutrition and Mayonnaise

(*From p.* 13)

A deficiency of vitamin A manifests itself by a disease of the eye called ophthalmia, and changes in the mucous membranes of the respiratory and urinary tracts. Infections of the respiratory tract and ear are common when vitamin A is lacking. Beri beri, a disease characterized largely by a degeneration of the nervous system, results from a lack of vitamin B. In scurvy, which is caused by insufficient vitamin C, the bones become brittle, the joints and gums sore and swollen, the teeth loose, and there is evidence of the rupture of small blood vessels usually localized in certain areas. In the absence of vitamin D calcium and phosphorus are not properly utilized and in the young child rickets will develop. Deficiency of vitamin G leads to pellagra, a disease which is prevalent in the Southern States.

Let us now consider what mayonnaise contributes toward furnishing the essentials of a diet which have been mentioned. Analyses show that commercial mayonnaise contains approximately 77 to 83 per cent of vegetable oil, 7 to 11 per cent of commercial egg yolk, from 0.3 to 0.5 per cent of acetic or other organic acid, a small amount of condiments, and water. The vegetable oil can be utilized almost completely as a source of energy. Experiments have shown that approximately 98 per cent of vegetable oils of the type used in mayonnaise are digestible. The egg yolk is a satisfactory source of four of the vitamins, A, B, D, and G. In fact, the egg stands out as an important source of vitamin D among the foods which are extensively eaten. The protein of egg yolk contains all the amino acids known to be necessary for body protein formation. Egg yolk is a good source of mineral elements, being particularly rich in the elements iron and phosphorus, which may be low in the average diet. The relative distribution of the other mineral elements in egg yolk is not much different from their distribution in milk. Fat and fatlike materials which yield energy are important constituents of egg yolk. The acetic acid or other organic acid in mayonnaise will yield some energy, but the amount is negligible. The condiments are used to increase palatability.

There has been a growing tendency of recent years to emphasize far beyond justification the nutritive value of this or that food or food product because it contains one or more of the essential components of a complete diet. It is quite probable that any one of these products could be removed from our reach entirely without noticeably affecting the health of the nation. The American people who consume mayonnaise are eating about as satisfactory a diet as they can be induced to consume. That the American will not make his diet an ideal one is well exemplified by the extensive use of many substances of little or no nutritive value. It can truthfully be said that mayonnaise is in part responsible for making the diet of a great many people approach the ideal. Although we may maintain health with little or no milk, green, leafy vegetables or fruit, the probabilities are that our diets will be much more adequate if these foods are included, and there is no denying that a salad dressing, such as mayonnaise, increases the quantity of green, leafy vegetables and fruits consumed. The enhanced palatability and attractiveness of a lettuce or tomato salad with a "dab" of mayonnaise leads to a greater consumption of such raw foods. Green, leafy foods have been classed with the so-called protective foods in that they supply some dietary essentials which are frequently lacking in our food. Calcium is one of the mineral elements which is frequently low in the diet, particularly if milk and dairy products are used only in limited amounts. The green, leafy foods help to make up the deficiency. The indigestible residue or roughage in leafy vegetables is particularly desirable when a large part of the diet consists of concentrated foods. Raw foods can also be depended upon to furnish vitamin C in greater amounts than foods subjected to cooking. The selection of a salad at a cafeteria or the desire to eat one at home is largely dependent on its appearance which is made more attractive by a suitable dressing.

Food Appeal

THERE is another aspect in the use of mayonnaise which is not so readily defined or described, and that is with reference to appetite and digestion. A healthy man whose occupation calls for tremendous physical exertion can consume a very large meal amid surroundings that would be repulsive to many of us, and yet he enjoys his food to the utmost. He is accustomed to such surroundings, and his appetite is so great that it is not dependent on the appearance of food. On the other hand the sedentary worker, whose exertions are largely confined to that part of the body above the shoulders, does not have a desire or need for large quantities of food Many of these people have become accustomed to associate palatable meals with pleasant surroundings and the attractive appearance of

(*Turn to p.* 33)