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Milk the Ideal Food  
Michigan State University Extension Service  
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# MILK

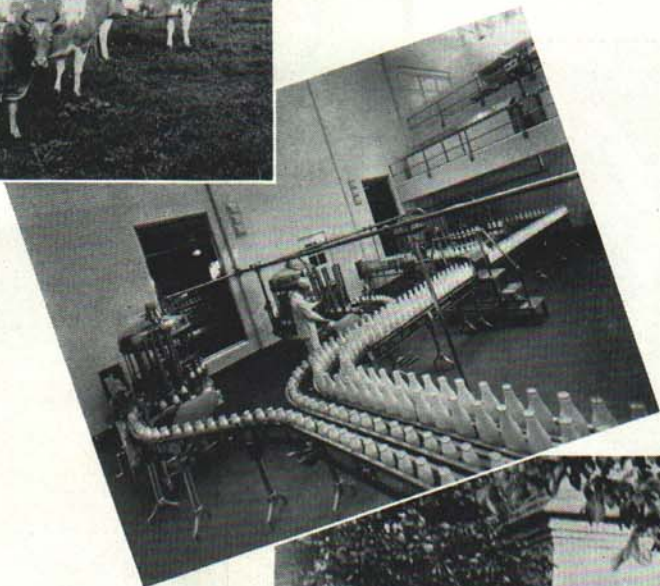
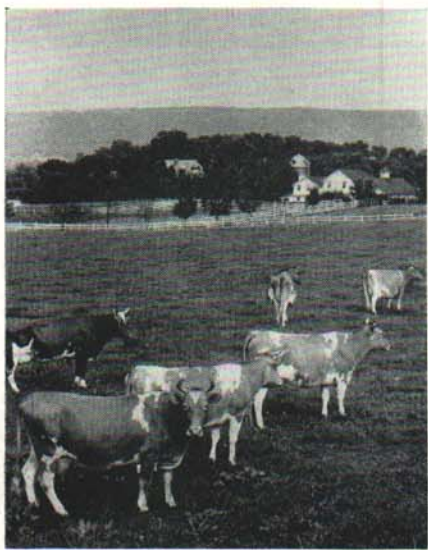
*the ideal food*

By P. S. LUCAS and D. L. MURRAY



(National Dairy Council Photo)

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# MILK—*The Ideal Food*

By P. S. LUCAS and DONALD L. MURRAY

A glass of milk is a remarkable combination of food constituents. Some of the materials found in it are common to no other food. More nearly than any other material, it represents the perfect food for mankind.

In the dim ages, before the time of the written word, the caravans of the earliest white men filed through the passes of the Himalayas, accompanied by their herds of cattle. It is believed that the subsequent progress of the white race from this small beginning has been due to the perfection of diet, made possible through the liberal consumption of milk and dairy products.

Milk contains food elements in proper balance for the body. In addition, its constituents are superior in practically every respect. By this is meant that the proteins of milk are more complete. Its carbohydrates are readily digestible. The minerals of milk are of such composition as to be of maximum use in bone and teeth building. Milk also carries the vitamins essential to growth, health, and life itself.

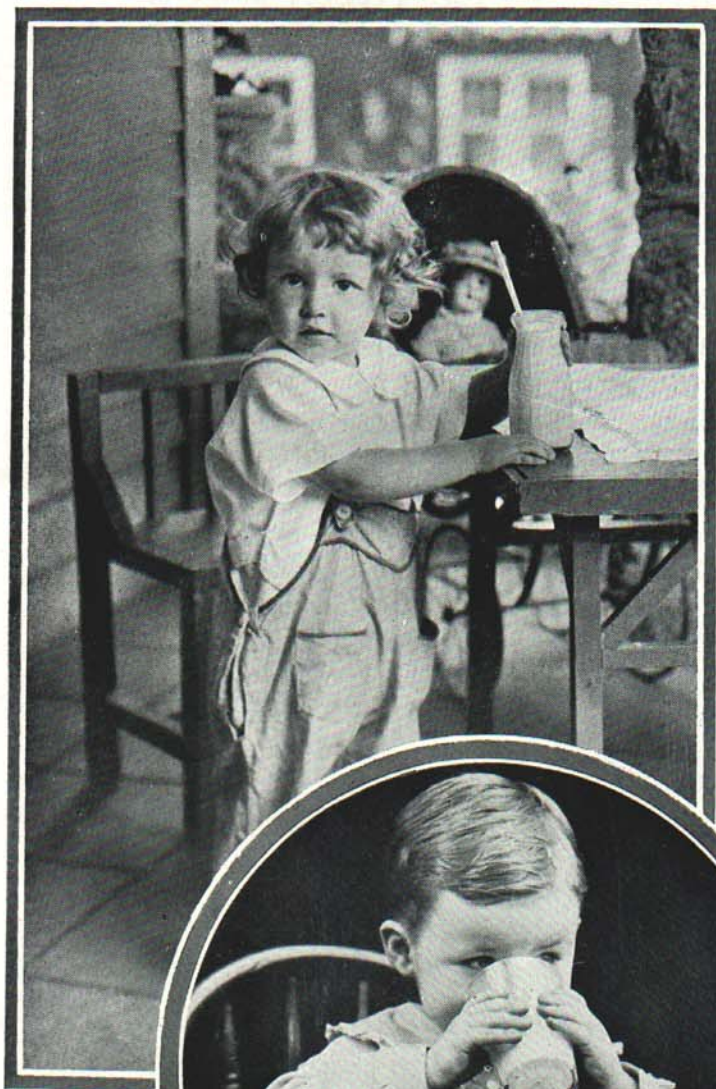
In addition, milk contains no waste such as bone, gristle, shell, skin, or rind. It is ready for consumption, requiring no preparation, cooking, or seasoning.

Milk is nature's most nearly perfect food.

## THE CONSTITUENTS OF MILK

Casein is a white substance found in milk, and familiar to all as being the chief constituent of curd. It is the chief protein found in milk and is present on the average to the extent of 3.02 percent. It is peculiar to milk, being found





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MILK . . . . . *The Ideal Food*

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in no other material in nature. It is present in such fine suspension that the particles cannot be seen with the microscope.

The solids of the brain, the muscles, sinews, and blood of the body are composed chiefly of protein. To restore the waste in these and to produce growth, proteins are necessary. Both whole milk and skimmed milk are rich in casein and are valuable protein foods for growing animals. Where insufficient carbohydrates are taken into the body to supply requisite energy, the proteins are utilized for this purpose as well as for tissue building.

The best nutrition authorities assert that 2.7 ounces of protein per day are necessary for a man. This amount is supplied by 2.2 quarts of milk.

Casein in milk is accompanied by a complementary protein, albumin. Casein differs from albumin in that it contains more phosphorus, and the latter contains more sulphur. The albumin of milk is similar to the albumin of blood.

The sweet taste of milk, which adds so much to its palatability, is due to milk sugar or lactose. About 5 percent of milk by weight is lactose.

While milk sugar resembles cane sugar, it acts quite differently during digestion. When attacked by the digestive enzymes, lactose is broken down into glucose and galactose. Galactose is often referred to as "the sugar of the brain," because of its use in the make-up of the brain and nerve tissue.

Lactose is in solution in milk but may be crystallized into a solid. In such state, it finds wide use in medicines and in infant and invalid foods. It is found in no other product than milk, and its by-products. In order, therefore, to obtain this



important substance, milk or one of its products must be consumed.

### BUTTERFAT SUPPLIES POWER

A pound of butterfat furnishes two and a quarter times as much heat and energy for the body as a pound of carbohydrates. Butterfat is made up chiefly of a mixture of six fats. It has the unique property of melting at body temperatures. Because of this, it does not stick to the mouth and palate when eaten, as would a fat of higher melting point, such as the fats in some butter substitutes. In melting, butter spreads over the tongue, coming into contact with the taste buds of the tongue, and its aroma with the endings of the olfactory nerve. The delightful flavor of butter may be had in no other product.

Butterfat occurs in milk as an emulsion, each globule being so tiny that approximately ten thousand of these globules, placed against each other in a line, would extend only an inch. Perhaps this fineness of division makes for ease of digestion.

Homogenized milk has had its fat globules divided into much finer division than normally occurs by being passed through a homogenizer valve. A cream line does not form on such milk and the fat globules remain uniformly dispersed throughout the product. The casein from such milk forms a softer curd in the stomach during digestion. The milk will not churn and the taste is improved.

When cows have access to green feeds, butter produced from their milk is a deep yellow color. This color is important, since it is the precursor of one of the important food essentials, vitamin A.



### BONE AND TEETH FROM MINERALS IN MILK

If the water is evaporated from milk and the remaining organic constituents are burned, an ash is left, which makes up about 0.7 of one percent of the weight of milk. This is made up of minerals, most important among which are calcium, sodium, potassium, and magnesium. These are combined chiefly with phosphorus and chlorine.

The blood and lymph of the body carry these same minerals in amounts somewhat similar to those found in milk. These minerals are also necessary for the hard portion of the bones and teeth. Lack of these materials in the diet causes malnutrition, malformation of bones, and poor teeth.

Strange as it may seem, a greater amount of calcium is dissolved in a glass of milk than can be dissolved in a glass of water. The teeth of the child may be influenced by the inclusion in the diet of the mother, before the child is born, of an adequate supply of foods rich in minerals. In this connection, a quart of milk daily is almost universally recommended. Milk is rich in all the required minerals, with the exception of iron and copper. Even the inadequate supply of these in milk is present in such form as to be almost completely utilized.

The tremendous importance of minerals in preserving the alkaline reserve of the blood has received much attention in the last few years, and their relation to many obscure diseases has been recognized. In these studies, the important place of milk as a carrier of minerals in almost ideal proportions is emphasized.

### VITAMINS ARE "LIFE NECESSITIES"

The vitamins are necessary for health and even for life itself. Scientists have devoted a vast amount of time, dur-







ing the past three decades, to a study of their chemical nature. The vitamins are usually designated by letters. Those known to be essential to man are A, B-complex, C, and D. Many have been isolated in practically pure state by chemical means.

Vitamin A is soluble in fat and is commonly known as Fat Soluble A. It is regarded as very important in human nutrition. Butterfat is the most palatable food product in which it is found. It is one of the foods in which the vitamin occurs in greatest abundance. Vitamin A is not destroyed by pasteurization. The cow finds her source of Vitamin A in leafy plants, especially the legumes, and transfers it to butterfat.

Vitamin D is also fat soluble, and its lack is associated with rickets, a disease of many symptoms. It is present in cod liver oil, and, in lesser amounts, in butterfat and egg yolk fat. This vitamin in milk is sometimes increased by the addition of vitamin D concentrate, such milk being usually sold as Vitamin D milk.

All other vitamins of milk are soluble in water. Vitamin B, once considered a single product, has been broken down into so many essential substances that it is now referred to as the vitamin B complex. Of these, B<sub>1</sub> or thiamin, is the antineuritic factor. Riboflavin, occasionally referred to as B<sub>2</sub> and G, or the growth factor, is one of the most important constituents of milk. Niacin is the pellagra preventive factor; pantothenic acid, a growth factor; pyridoxine, (B<sub>6</sub>), an antidermatitis factor; folic acid, an aid in the prevention of certain types of anemias; inositol, a growth factor; biotin, needed for the growth of desirable intestinal flora; and cholin, a growth factor.

Vitamin C occurs in milk and is very abundant in tomato and orange juices.

### MILK CONTRIBUTES HEAVILY TO THE DIET

Besides being unusual in that the consumer does not tire of it, milk supplies in each quart the following daily needs of the body:

49% of daily protein need	20% of daily calorie need
60% of daily phosphorus need	33% of daily fat need
145% of daily calcium need	37% of daily Vitamin A need
79% of daily riboflavin need	28% of daily Vitamin B <sub>1</sub> need
30% of daily niacin need	16% of daily Vitamin C need

### WHY DRINK MORE MILK?

The average daily per capita consumption of milk in the United States is 0.55 of a quart. The leading nutritional authorities of the world are in agreement that this should be not less than one quart per day.

Investigation will show that milk is very economical when its protein content and heat and energy producing qualities are considered, not to mention its biological properties. It is one of the cheapest sources of both proteins and carbohydrates.

Milk is used on the training tables of the most famous of athletic coaches and is endorsed by all physicians and health authorities. For the sake of both economy and health, it should be the last article of food to be curtailed. To eliminate or reduce it, is to reduce the material from which the human body and brain are constructed.

Dr. E. V. McCollum, world famous as a research scientist in foods, says: "Milk is an indispensable article of the diet of any people who wish to achieve. I have come to the conclusion, after carefully analyzing the probable effective-

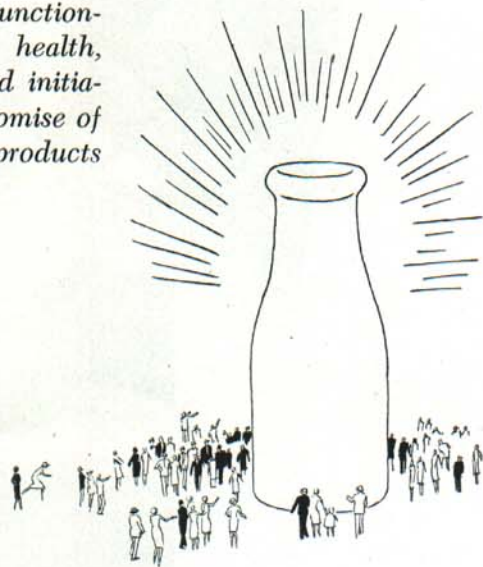


ness of the combinations of foods employed in human nutrition, that the efficiency of a people can be predicted with a fair degree of accuracy from a knowledge of the degree to which they consume dairy products. . . .

“Without the continued use of milk, not only for the feeding of our children, but in liberal amounts in cookery and as an adjuvant to our diet, we cannot maintain the position as a world power to which we have arisen. The keeping of dairy cows was the greatest factor in the history of the development of man from a state of barbarism . . . . Let us appreciate the debt we owe to the milk producer, and reward him according to the service he renders.”

Those quotations are from an unprejudiced scientist and not from dairymen. If this advice could be formulated into a slogan, it might be,

*“For economy, for a well functioning body, for physique, health, happiness, intelligence, and initiative, and for reasonable promise of years, use milk and milk products freely.”*





Photographs on this page  
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