

The Food Value of Flour and Breakfast Foods

Compared With Other Foods Flour Products, Particularly Bread, Most Valuable as Heat Producers and Body Builders.

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In the March number of the Journal we dealt with the composition and food value of bread from different grades of flour. We now want to give some data regarding the relative cost of food materials in flour and bread and in some of the common foods on the market. At such a time as this when economy and efficiency are so absolutely necessary, it is almost imperative that we look more closely into the actual cost of nutrients in the common foods we purchase. It is true that in feeding human beings, palatability is a very important factor and because of this the material supplying the cheapest important factor and because of this the material supplying the cheapest nutrients may not be the best for all people; but it may not be out of place to compare the actual amount of food nutrients that can be purchased for any given amount of money in the form of some of our more common foods. A food that is quite palatable to one person may not be to another, but the comparison of their actual value will hold good in general.

The Nutritive Value of Foods.

Generally speaking, foods are valuable for nutritive purposes in proportion as they contain protein, fat, carbohydrates and ash. Some materials such as fruits and green vegetables are more valuable for condimental and medicinal purposes than for the actual amount of nutrients they contain, and are very essential for these purposes. But such substances as meats, flour, bread, breakfast foods, milk, roots, tubers, etc., are valuable as foods in that they contain digestible protein, fat and carbohydrates. The protein such as lean meat, white of egg, gluten of flour, etc., is the only constituent in our foods capable of building up muscle, or lean meat; connective tissue, etc., in the body, and are commonly spoken of as the flesh formers. The fats and carbohydrates are used in the production of heat and of the energy to do work, internal and external. When eaten in larger quantities than is necessary for these purposes, they are stored on the body in the form of fat to be drawn upon as required. If protein is eaten in excess of requirements, it may also be converted into fat; but, as it is the expensive part of a food, it is not economical to use protein foods for this purpose. A properly arranged diet will not provide more protein than is required for doing the work which it alone of all the food constituents is capable of performing. The ash, or mineral part of the food, is required for building bone. A child must have abundance of the flesh-forming and mineral materials to build up muscle and bone. An adult is not adding to the body weight in this manner; its food is used more for the production of heat and energy; consequently, the cheaper carbohydrates may form a larger part of the diet. When we wish to make a close comparison of the value of foods it is evident that we must take into consideration the age of the person using it; the young and growing child requires more protein than the adult. However, for the present we will compare the foods only on a general basis.

The Comparative Caloric Values of Foods.

The best generally accepted basis for making such a comparison is on the ability of the food to furnish heat in the body. This will form a true guide to the nutritive value of the food whenever the diet of which it forms a part supplied a sufficient amount of digestible protein, and this will be the case whenever a person is living on a general mixed diet. Each pound of digestible protein and carbohydrates will produce 1,860 calories of heat in the body, and the same weight of fat will produce 4,220 calories of heat. If then, we calculate the number of heat units that the various breakfast foods, flour, etc., are capable of producing, we find that among these cereal products there is naturally very little difference, and a pound of one is about as valuable as a pound of another. If, however, we wish to include in our comparison the weight of each nutrient and the number of calories of heat that the amount of food we can purchase for any given sum of money will furnish, we get wide differences. To illustrate this, we have prepared a table giving the weight of protein, fat and carbohydrates that one dollar's worth of each of the foods

will provide, and in the last column the calculated number of calories of heat the same amount of food will furnish. This last column will, then, give the relative value of the foods when the diet of which it may form a part furnishes a sufficient amount of protein. Milk, milk products and meats have been added to the list of cereal foods for purposes of comparison.

Table giving number of pounds of Protein, Fat, and Carbohydrates and calories of heat furnished by One Dollar's Worth of Each Food.

	Price.	Protein.	Fat.	Carbo- hydrates.	Fuel Value.
Milk	8 cts per qt.	1.04	1.27	1.66	10.402
Skim-milk	10 " " gal.	3.4	.30	5.1	17.076
Buttermilk	10 " " gal.	3.0	.50	4.8	17.362
Butter	30 " " lb.	.3	2.83	....	12.000
Cheese	20 " " lb.	1.39	1.84	....	10.360
Beef, flank	12½ " " lb.	1.34	1.51	....	8.924
Beef, sirloin	24 " " lb.	.69	.68	....	4.132
Veal, cutlets	22 " " lb.	.91	.34	....	3.145
Mutton chops	20 " " lb.	.67	1.44	....	7.326
Ham, cooked	40 " " lb.	.50	.56	....	3.304
Eggs	25 " " doz.	.79	.56	....	3.853
White bread	4 " " lb.	2.10	.50	12.2	28.710
Flour	\$3 per cwt.	3.25	.03	25.3	54.057
Rolled oats	7 lbs. per 25c.	3.5	1.9	20.0	51.730
Farinas	6 " " 25c.	2.3	.24	18.7	40.070
Corn meal	25 cts " 80 ozs.	1.31	.25	16.36	33.921
Roman meal	25 " " 42	1.71	.29	6.76	22.753
Shredded Wheat	25 " " 30	.86	.06	5.75	12.547
Corn Flakes	10 " " 11	.37	.10	5.55	11.432
Grape Nuts	15 " " 15	.71	.56	4.92	11.309
Puffed Rice	15 " " 9	.28	.05	3.00	6.311
Potatoes	90 " " bag	2.18	.10	15.6	33.492
Beans	5 " " lb.	3.90	.54	12.0	31.000

The price of the foods given in the first column will naturally vary in different places. Some of them, particularly potatoes, may be very much lower than the present market prices; but they serve very well for making a comparison.

Milk contains some carbohydrates as well as the protein and fat, and thus, like the cereal foods, supplies all the constituents required to make a complete food. Cheese is valuable for its fat and protein, while butter contains only fat that has any food value. The meats contain no carbohydrates, which means that they do not supply any of the cheap heat and energy producing materials; consequently, they furnish a small number of calories of heat. It is noticeable also that one dollar spent on meats will not furnish as much protein as if used in purchasing milk, flour bread or rolled oats.

The Digestible Constituents of Foods.

No attempt has been made to calculate the amount of digestible constituents, but it is probable that over 95 per cent of the protein of the milk and meats and about 80 per cent of that of the cereals will be digestible. The fat of cereals will be less digestible than that of the milk and meats, and the sugar of the milk will be almost entirely absorbed, while a considerable proportion of the carbohydrates of the bread and breakfast foods would resist the action of the digestive juices. It is also quite probable that more energy will be required to digest the vegetable foods. However, after allowing for this, it is evident that the cereal foods are a cheap source of protein and carbohydrates and that it is because of the presence of the latter cheap heat-producing materials that this class of food has such a high fuel value.

Their Money Value and Palatability.

Taking the figures as they stand, it is evident that milk furnishes protein and fat more cheaply than the various cuts of the meats. Skim milk and buttermilk, when they can be purchased, are particularly cheap sources of protein, and are probably the cheapest source of this constituent among all our foods. Butter is valuable almost entirely for the fat it contains, and as an energy producer is as cheap as any of the meats, while cheese as a source of protein and fat is very much cheaper than the meats. Thus, one dollar expended on cheese at 20 cents per pound will furnish about twice as much protein, nearly three times as much fat, and about two and one-half times as much energy as the same

amount of money spent on sirloin steak at 24 cents per pound. From the above it is evident that one dollar spent on milk, or any of its products excepting butter, will furnish more protein, or muscle-forming material, and more energy, as indicated in the fuel value column, than fresh meats. Furthermore, there is no reason why the cheaper milk products should not at least partly replace the more expensive meats. There is, however, the whole problem of palatability to contend with and it is very doubtful if there are many people who will give up meats for milk products, unless these are put up in a form that is equally palatable.

Flour Products, Particularly Bread, Stand High.

Flour has been figured at a cost of \$3.00 per hundred pounds and contains about as much protein and more calories of heat than any other food on

the list. The cost of manufacturing it into bread reduces the amount of food constituents purchasable for one dollar, yet the bread stands high. Rolled oats, at seven pounds for twenty-five cents, are almost as cheap a source of food materials as flour while the various wheat farinas, such as Cream of Wheat, come next. All these foods have to be cooked. It may be more trouble and expensive to make bread in the home from the flour than to cook the oat meal and farinas, yet flour and its various products compare very favorably with rolled oats and the farinas.

When we turn to the other breakfast foods, it is at once evident we pay a great deal for the manner in which they are put on the market. Investigations show that they are no more fully digested than the bread and rolled oats. Some of them are ready to serve, and, consequently, there is no trouble or expense incurred in cooking them, but it is evident that we pay dearly for this convenience. Some of them are also sold in packages, but even this does not add to their food value and it is doubtful if any cleaner or better material is obtained in this way than when purchased in bulk.

Flour and bread are often spoken of as being the "staff of life"—and apparently with good reason. Perhaps no food is used in such a variety of ways and is as cheap and satisfying as flour and its products. Oatmeal, or the farinas and milk make a very nutritious and at the same time cheap food; but, considering the variety of ways flour is used, and that milk will fill out and balance the diet, these foods have certainly no advantage over bread and milk.

THE BETTER WAY.

Chas. M. Schwab, congratulated in Pittsburg on a large war order contract which he had just received from one of the warring nations, said:

"Some people call it luck, but they are mistaken. Whatever success I have is due to hard work and not to luck.

"I remember a New York business man who crossed the ocean with me one winter when the whole country was suffering from hard times.

"And you, Mr. Schwab," the New York said, "are like the rest of us, I suppose, hoping for better things?"

"No, my friend," I replied. "No, I am not hoping for better things. I've got my sleeves rolled up and I'm working for them."—Philadelphia Bulletin.