

as it comes from the cow, is a liquid of pretty uniform composition, which the owner of that accommodating animal obtains from her in much the same way as we obtain water from a pump, with the somewhat important difference that purchasing and maintaining the cow is considerably greater than that of making and keeping a pump. But in both cases the fundamental idea would probably be that milk percolates through the cow as water does through the pump, by some mysterious process of nature, and without any special intervention on the part of the proprietor of the animal, except where, as is sometimes the case, he confuses, no doubt in a fit of temporary abstraction, the produce of the cow with the iron tail with that of the more costly quadruped, and thereby produces a result of which, unfortunately for him the law is apt to take disagreeable cognizance. The hundredth person to whom the above query was put might probably reply in some such manner as this:—"Milk is an oleo albuminous liquid of organic origin and variable composition, which is valuable for nutritive purposes in consequence of its containing all the elements of a perfect diet in an easily digestible form, and in proportion to the amount of these elements which it contains; it is manufactured by farmers and others with the aid of machines, which are called cows, out of grass, oil cake, roots, and other forms of vegetable raw material, and the consumer generally receives what the trader manufactures for him in the same happy ignorance as to whether he is getting value for his money that the farmer himself often exhibits in regard to the cost at which he produces the milk." Such at any rate would be the sort of definition of milk which would be given by anyone who appreciated the precise nature and origin of this most ancient of dietetic necessities, and the very close analogy which it bears, in regard to its production, to bread, cheese, cotton, cloth, and other articles of daily use, the quality and value of which is known to vary largely according to the way in which they are manufactured.

Let us commence, then, with the consumer. Let us refresh our memories with a brief survey of the composition and character of milk, so that we may see what are our requirements in regard to these points, and how we may assure ourselves that we are obtaining what we want.

In the first place it is well to note that, taking milk of average quality, 870 parts out of a 1000 (i.e. nearly 90 per cent.) are water; or, to put it in another way, a pint of milk will contain only about 2 oz. of water-free nutritive material, or 1 lb. avoirdupois of such material per gallon; which, at the ordinary prices paid by the consumer—viz., 4d. per quart, gives 10d. per lb. as the cost of the water-free constituents of milk, and enables us to compare it in this respect with meat. Now assuming 10d. per lb. as the price of an ordinary joint, such as a leg of mutton, and all wing 20 per cent. for bone, skin, and other constituents which are practically worthless for nutritive purposes, and then taking into account the fact that even where the whole of the nutritive matter is retained in the process of cooking, nearly 75 per cent. of what is left to us is mere water, we shall find that the cost of such meat, when it comes to be applied as suitable material for the purpose of alimentation in our bodies is something over 2s. per lb. of

water-dry constituents. Regarded from this point of view, milk comes out very favorably in comparison with meat, but, of course, the value of this estimate requires to be checked by an examination of what these water-free constituents in each case are. Of the 23 parts of water-dry materials which are contained in every 100 by weight of ordinary cows' milk, a little more than four consist of fat (butter), about the same quantity of albuminoid substances (chiefly casein), nearly five parts are sugar, and but half a part is composed of various salts; or, to put it in an easily-remembered form, the saccharine, albuminoid, and fatty constituents are present in about equal proportions, the sugar being a little in excess of the cheesy element, and the latter a little in excess of the butter. So that, putting the salts—whose actual cost, if purchased in another form, would be very trifling—out of the question, if we were to mix dry cheese, white sugar, and fat (such as beef dripping or lard) together in equal proportions, we should have a compound whose nutritive value would pretty nearly equal that of the water-dry constituents of milk at 16d. per lb. Now cheese contains a little more than one-third its weight of water, so that we may take it when deprived of this element to be worth 1s. per lb.; and assuming 4d. as the price per pound for sugar, and 8d. for that of beef dripping or lard, we find that the total cost of our milk substitute would be 2s. per pound. Hence it is clear that we have in milk a much cheaper food compound of that composition than we can obtain in any other way. But in discussing the nutritive value of milk, and especially in comparing it with meat, it is necessary to bear in mind that however well suited it may be, from the large relative proportion of fat and sugar which it contains, for the nutriment of young animals in which these elements are required to supply the demands of growth, it is not so well adapted for that of adults, especially where the conditions of the struggle for existence involve the necessity for constant repair of the waste which takes place in the albuminoid or muscular elements of the body. To supply 23 oz. of water-free food, which is, according to Parker, one day's allowance for an adult, about 11 pints of milk would have to be consumed, which would represent not only an excessive amount of water to swallow, but far more fat than could be usefully employed by the system.

When we turn to our pound of water-dry meat-stuff, we find that instead of its containing 33 per cent. of fat, there is only about 20 per cent., though this will, of course, vary with the amount of fat that may be accidentally combined with the meat, and that nearly the whole of the residue is albuminoid matter, the amount of saline material being a little in excess of that of milk. It follows, therefore, that taking these points into consideration, milk, looked at as an exclusive food stuff for an adult animal, is very little, if any cheaper, than meat at 10d. per lb. But when we recollect that by supplementing the deficiency of albuminoid material in milk by corresponding material derived from the vegetable world, as we do, for instance, by combining bread with it, we can easily see how, at a comparatively small additional cost, we can so modify milk as to make it the basis of a diet which is far cheaper than animal food and equally nutritious.—*Agricultural Gazette.*

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