

Practical Notes on Invalid Feeding.

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I.—MILK.

Every nurse knows that in the acute stages of disease, or when the body vitality is very low, a patient has to be kept upon a liquid diet. The two liquids which are commonly given under such circumstances are milk and some liquid form of meat, such as beef-tea or meat extract. The two resemble each other in nothing but their liquid state, and, unless the principal characteristics of both are understood by the nurse, the patient will be at a disadvantage.

The two cannot be indiscriminately interchanged, for only one can be regarded as a true food, and that is milk.

Milk is Nature's provision for the nourishment of the young of the higher animals, and a chemical analysis of any kind of milk shows that its constituents are combined so as to meet exactly the need of the animal for which it was produced. To build new tissue, and to replace that which is worn away by work, and by the processes of living, milk contains proteid or flesh-forming substances in the form of casein and lactalbumen. To supply heat and energy, there is milk-fat or cream, and milk-sugar or lactose. In addition to these substances there is a proportion of mineral matters, such as phosphate of potash and phosphate of lime, which help to build up the tissues of muscle and bone. The whole is diluted by a large percentage of water, so that the nourishment is not in a highly-concentrated form.

Church gives the percentage composition of cow's milk as follows:—

Water	...	...	86.3
Casein and other albuminoids	...	...	4.1
Milk-fat	...	...	3.7
Lactose, or milk-sugar	...	...	5.1
Mineral matters	...	...	0.8

When compared with human milk it is found that the proteids and the fats are in too large a proportion for the needs of an infant. Accordingly, in practice, water is added to adjust the proportions. This makes the lactose present in too small a quantity, so that sugar (preferably milk-sugar) is added so that the diluted cow's milk may resemble human milk in composition.

An adult can take a more concentrated form of nourishment than an infant, so that in invalid feeding dilution must never be resorted to unless it is found that, owing to the nature of the curd, the milk is difficult of digestion.

To give a person in health sufficient milk to supply the daily requirements of heat-giving sub-

stances would mean an excess of proteids and a great excess of water. In invalid feeding this disadvantage of milk is not noticeable, for a person lying in bed does not require so much energy-producing food as a person who is engaged in active work, and he is able to obtain some of his source of energy from the proteids, and, by taking less milk than is necessary in health, the proportion of water is not inconveniently great. It is found that four pints of milk per day will provide sufficient food-stuff for an invalid, and particularly in illnesses of short duration, when the body has a reserve of material upon which it can draw. If less than three pints are taken it should have its proportion of nourishment increased by the addition of well-beaten egg, or by the addition of the tasteless proteid powders such as plasmon or nutrose. The quantity of fat can also be increased by additional cream, but such an addition must be made gradually and with caution.

The question of boiling milk or serving it raw has been much discussed, but the balance of evidence seems to weigh in favour of boiling the milk. Dr. Hutchison looks forward to the day when the drinking of raw milk will be considered as barbarous a custom as the eating of raw meat is at present. The one advantage in favour of raw milk seems to be that its slightly anti-scorbutic properties are destroyed by heat. This is but a slight disadvantage, for the addition of a teaspoonful of finely-mashed mealy potato to the pint of milk overcomes the scorbutic tendency of boiled milk. In infant feeding the milk could be diluted with some of the water in which old potatoes have been boiled, provided that it does not contain too much salt; and both infants and invalids can be kept free from scurvy by an occasional spoonful of orange juice or raw meat juice. It is urged sometimes that boiling renders the milk less nourishing. In a way this is true, for the skin which forms on boiled milk consists of coagulated albumen, and, as the skin is removed, part of the proteid substance is lost. But water is also lost through evaporation, so that the loss of nourishment is not so great as appears at first sight.

The great advantage of boiling milk is that germs are destroyed by the heat. When the milk leaves the udder of the cow it is practically sterile, but it soon becomes contaminated and forms a "host" or resting-place for the germs which give rise to fermentation. In small numbers such germs may be comparatively harmless, but they have been proved to give rise to diarrhoea when present in large numbers. Milk also has the power of absorbing disease-producing germs, and in many cases unboiled milk has proved the vehicle of communication of infectious diseases.

Experiments show that exposure to a temperature of 158° Fahr. for about twenty minutes is sufficient

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