

## Practical Notes on Invalid Feeding.

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### IV.—STARCHY FOODS.

It was shown in the first paper that milk, the most important of invalids' foods, contains too much proteid, when compared with its heat-giving substances, to be perfectly adapted to the needs of an adult. This defect can be easily remedied by adding to milk certain vegetable substances which are very rich in starch, a heat-producing substance.

Starch is insoluble in cold water, but it becomes soluble when the addition of boiling water ruptures the starch grains and forms a jelly-like mass. The cooked starch is acted upon in the mouth by a ferment, ptyalin, contained in the saliva, and the parts which escape its action pass practically unchanged through the stomach to the small intestine, where it is acted upon by the amylolytic ferment of the pancreatic juice, transformed into sugar, and finally absorbed in the blood. In young infants no provision is made for the digestion of starch, and all starchy foods pass unchanged through the digestive tract. Starch is therefore unsuited to infants, but, on account of the ease with which adults digest it when given in moderation, it is a valuable invalids' food to all but diabetics.

A food which contains starch in abundance is rice, a cereal which is more largely grown and consumed as food than any other. It forms the staple food of the natives of tropical countries where it is grown, and is exported in large quantities. Its defect as a staple food is its poor supply of proteids and mineral matters, and this defect is often increased by improper cooking. It may be bought ground, or whole, without the outer husks in the form of pearled grains. Many varieties are sold, but Patna and Carolina rice are considered the best.

As a food it should be eaten with meat, eggs, or milk, and the cooking must be very complete. It contains no astringent principle, but its action is astringent rather than relaxing, so that it is useful in checking diarrhoea.

In boiling rice a large proportion of its small percentage of proteids and minerals escape into the water, and are often thrown away. To boil rice so that there shall be no such waste take one ounce of rice to half a pint of cold water and set it on the fire. Stir it to prevent the grains caking, and bring it rapidly to the boil, removing the scum as it arises. Set the saucepan by the side of the fire so that it shall boil without risk of burning, and when all the water is absorbed the rice will be cooked and the grains will be separate. Boiled rice is much more nourishing when milk is used instead of water, but greater care is necessary in order to prevent burning.

Rice puddings should be made without eggs, for

the reason given in a previous paper. They require to be cooked for a long time in a moderate heat. If cooked too quickly the milk is not properly absorbed. The proper proportion is one ounce of rice, half an ounce of sugar, and a quarter of an ounce of butter to each half-pint of milk. A pleasant change can be made by stirring in a teaspoonful of Plasmon cocoa, and thus making a chocolate rice-pudding.

Ground rice is usually served in the form of blanchmange. Boil a pint of milk with an ounce of sugar and a strip of lemon-peel and pour it on two ounces of ground rice which has been moistened with a little cold milk. Return it to the saucepan and stir it gently during the ten minutes which it should be allowed to boil. Pour it into a wetted earthenware mould and serve it when set; or flavour it with nutmeg or cinnamon and serve it hot as ground-rice caudle.

Rice gruel is made by boiling a quarter of a pound of rice in three pints of water for three or four hours, and then straining it. The liquid part is allowed to get cold, and is useful in diarrhoea.

Sago and tapioca resemble each other very closely in composition and flavour, so much so that tapioca is often sold as pearl sago. The former consists of starch which is washed from the crushed pith of sago palms and then dried on wicker frames. The shape is due to the soft mass being passed through colanders and then rolled before being completely dried. When cooked, sago forms a mucilaginous mass, which is rather indigestible. Its bland character makes it a useful food in the sick-room, and it can often be made the vehicle for the conveyance of stimulants. For this purpose sago gruel is used, and it is prepared by soaking a tablespoonful of sago in a pint of water for two hours, and then boiling it for twenty minutes, stirring it frequently.

Sago milk is made by boiling slowly for half an hour one ounce of sago in half a pint of milk.

Tapioca is rather more easy of digestion than sago, but it is found to remain so long in the stomach that it should not be given in cases where it is necessary to lighten the labours of the stomach. It can be cooked in the same way as sago, but rather less time is needed. Both are useful additions to soup.

Maize is on the borderland between starchy cereals and those which are rich in proteids; but it can be considered here, because in England the whole of the grain is rarely used. When crushed it is known as maize meal and polenta, and is much used in the form of porridge and cakes in America and in Italy. A fine form of crushed maize is known as hominy, and is becoming every year better known and more used. The most popular form of maize in England is a very fine flour, which goes by the name of cornflour, oswego, or maizena. The proteid and fatty portions of the

[previous page](#)

[next page](#)