Notes on Practical Nursing.

THE DIETING OF PATIENTS.

LECTURES TO PROBATIONERS.

By Miss Helen Todd,
Matron, National Sanatorium, Bournemouth.

III.—ARTIFICIAL DIGESTION—EFFECT OF COOKING ON FOOD-STUFFS.

At our last lecture we produced artificially some of the changes brought about in food-stuffs by the natural processes of digestion, changing starch into dextrine and then into glucose. We will now proceed to demonstrate what is meant by the saponification and emulsion of fats.

If we shake up a little oil and water we shall find that it is impossible to make the two mix for more than an exceedingly short period of time. Add a little alkali (liquor potassæ is a good example) and shake up well the mixture; the result is a milky-looking fluid, the alkali having caused the saponification of the oil, which has now made a perfect emulsion or mixture with the water, the oil being divided into minute globules and suspended in the water, from which it will not easily separate. We can also obtain an emulsion of oil and water, without saponification of the former, by using yolk of egg.

Our next demonstration will consist of changing the proteids in a mixture of beef-tea, white of egg, and milk into peptones by the well-known processes of pancreatising and peptonising them. We proceed as in preparing pancreatised or peptonised foods for the sick, but as we wish to peptonise the proteids completely in as short a time as possible, we shall use a very much larger quantity of the soluble ferment than would otherwise be the case, putting ʒij. of liquor pancreaticus and 15 gr. of sod. bicarb. to ¼ pint of our mixture, and letting it stand thirty minutes at a temperature of 104° Fahr. Our second specimen is prepared with glycerine, pepsin, and hydrochloric acid, 2 per cent, instead of liquor pancreaticus.

Peptones are not precipitated by boiling or by nitric acid, nor do they give any precipitate if treated with copper sulphate, as we have shown to be the case with proteids.

To produce liquid peptones from proteids in a solid form takes some time, and it is therefore necessary to prepare this experiment beforehand, but you can easily repeat it for yourselves. Take a little lean meat and hard-boiled white of egg, chop it up small, put it into a jar containing a little water, some dilute hydrochloric acid (2 per cent. strength), and a small piece of an animal's stomach (which any butcher will give you), put the jar in a warm place (104° Fahr.), and give an occasional stir. After a few hours the fibres of the meat will become swollen and transparent, and in twelve hours the solid matters will have almost dissolved and the strained liquid give negative results if tested for proteids.

Diffusibility.

We will next demonstrate what is meant by diffusibility, *i.e.*, the property possessed by certain substances, such as glucose and peptones, of passing through a moist animal membrane.

I have here a small bladder filled with alcohol, and having a glass tube inserted at its neck, which is tied firmly round it in such a manner as to be watertight; the glass tube has its upper end bent at a sharp angle. We immerse the bladder in a vessel containing water; in a short time water will pass through the bladder-wall and drip from the bent end of the tube. The alcohol will not pass into the water.

If a 20 per cent. solution of either salt or sugar and water be used instead of alcohol, diffusion will take place both from without and within, water will pass into the bladder and the saline or saccharine solution will pass out. Starches and proteids will not make their way through the bladder, sugars and peptones can do so.

If a piece of parchment takes the place of the bladder in this experiment, the process of diffusion will be much more rapid.

The Influence of Cooking upon our Food.

The more civilised man becomes, the more elaborate grows his cooking, until very frequently drugs must be employed to counteract the "cook who softens all the hard things and carefully takes away all the indigestible parts which would act as a stimulant to the intestine" (Lauder Brunton). Cooking is, however, useful in many ways; it ensures the destruction of many dangerous bacilli which may be present, though not detected in some food-stuffs; it also, by increasing the palatability of the article to be eaten, assists appetite to a great extent. Thus the action of heat on roasting meat produces certain volatile substances which give rise to its well-known appetising odour, powerful enough to cause the familiar phenomenon known as "making the mouth water," by exciting the nerves of the salivary glands in a hungry man.

Again, much of the digestibility of foods depends upon the manner in which they are cooked and prepared for the table. Taking a potato for example, we observe an immense difference between the same article raw and cooked; starch grains (of which it is chiefly composed) are enclosed in tough cell walls, proof against the solvent agents of the digestive fluids; heat causes the contents of the cell to swell and burst the walls, and so allow the starch granules to be brought into immediate contact with the soluble ferments which affect them. Heat, moreover, begins the process of turning starch into dextrine; and as all the digestive juices require a heat of about 100° Fahr. to work in, the taking of

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