

VITAMINS.

BY MISS ISABEL MACDONALD, S.R.N.

The vitamins are elusive as will-o'-the-wisps in the study of dietetics and have, for decades, cost specialists, dietitians and scientists hours and years of earnest study in the effort to arrive at some sort of understanding of their actual composition. The problem still evades those scientists although the effort towards its elucidation has resulted in a mine of valuable information in relation to the hygiene of foods. The first milestone in the study of vitamins is generally given as the year 1747, for then it was discovered that a small quantity of lemon juice, in the diet of sailors, would control scurvy, which had, until then, been so prevalent in the navy; but, long before that, some understanding had existed of the value of fresh vegetables in the dietary. One is tempted also to consider how far the success of the herbalists of olden times may have been dependent upon certain constituents of the medicinal plants they used and of the existence of which they were totally unaware. Doubtless the drying of the herbs would, to some extent, minimise their value from a vitamin point of view, but still, in certain cases and where the preparation of the concoctions and infusions did not destroy the vitamin element, there is no doubt that benefit was derived from what was then an unknown constituent of the vegetable kingdom. In 1885 a new finger-post was erected when an outbreak of beri beri in the Japanese navy led to the discovery that this was traceable to the use of polished rice as a staple article of diet. Since 1912 the study of vitamins has gone on intensively, but there is always the handicap that arises on the difficulty in comprehending the precise make-up of these will-o'-the-wisps. The animal kingdom has been called in to contribute its sacrifices to the attainment of knowledge. In cases where rats, guinea pigs, etc., have been fed on "purified" food stuffs such as polished rice, boiled milk, lard, etc. (*i.e.*, on foods in which the vitamin element has been destroyed) growth has ceased to a considerable extent and symptoms of disease have appeared; but the addition of butter, eggs, cod liver oil and other foods containing vitamins have ameliorated or cured these conditions. In cases in the human kingdom, where errors in diet relating to the vitamin content of food have arisen, the effect of the addition of these "will-o'-the-wisps" has been magical and they have proved a veritable elixir of life.

The name vitamin arose first from a belief on the part of scientists that these elements in food belonged to a class of substances called amines and that they were necessary to life. This last is true but, in the light of more recent study, the first conclusion has been reversed and both the pronunciation and spelling of the word has changed; there was introduced a lengthening in the sound of the "i" and *vitamines* became *vitamins*.

In some way the vitamins initiate or at least stimulate chemical action and prevent changes of a morbid character such as end in diseases like beri beri, scurvy and others. Just for this reason the faculty of some particular vitamin is indicated by the word *anti* (*e.g.*,

anti-scorbutic, anti-neuritic, etc.) More often however it is found more convenient to isolate the vitamins into certain classifications, *e.g.* Vitamin A, Vitamin B and so on. Some six different forms of vitamin have been discovered but there may be hundreds more and the study of them is still in its infancy.

The machine age has had its influence on the vitamin properties of food and in some, but not all, artificial foods the vitamin content is destroyed in process of manufacture. Bottling and tinning of foods does not destroy vitamins if the process is carried out on proper scientific lines with a view to retaining these valuable elements, and most good firms do observe the rules required and, indeed, the contents of the tin or bottle can be reheated without destruction of their vitamins. There can, however, be complete loss of vitamins in the cooking of vegetables, fruit, etc. Hay-box cooking is admittedly bad in this connection and to cook foods twice is destructive to vitamins—fried potatoes which have already been cooked are, for instance, deficient in vitamins and the same may be said of fish cooked a second time and other twice-cooked foods.

One extraordinary aspect of the vitamin question lies in the fact that, although the vitamins are absolutely necessary to health, a very minute amount of each is required for the maintenance of health.

VITAMIN A.

Vitamin A is very definitely associated with growth and a deficiency of it inevitably leads to a stunted development in young children while it also produces certain degenerative changes in the system. It apparently has some very direct influences on bone development although less so than Vitamin D. A deficiency of it gives rise to a form of ophthalmic disease, xerophthalmia, sometimes termed "night blindness," for the patient cannot see in a subdued light; the eye becomes dry and the cornea develops a condition known as keratomalacia.

Vitamin A is found in two classes of food, animal and vegetable. It is formed in plants through the action of sunlight and in fact this is the ultimate source of all vitamins. We obtain a large proportion of our vitamins directly from the vegetable constituents in our dietary and they are also obtained in good proportions from fish fats such as turbot liver oil and cod liver oil. To trace such vitamins to their origin is an exceedingly interesting story—it lies in the play of the sunbeam on a silver sea! There they are conjured up, created, these "will-o'-the-wisps" in the study of dietetics, by the action of the sunlight on myriads of minute floating plants known as *algæ* which, just like most other plants, develop under the influence of sunlight. They grow in spring and summer and great masses of them drift about in tides and winds and form veritable floating islands of vegetable life; these masses are known as plankton, they are really great sea restaurants for myriads of protozoa. Very small fish feed on these small unicellular creatures (*i.e.*, the protozoa) and the small fish are in their turn eaten by larger fish which again are devoured by other cannibals of the sea. By getting the effect of the sunlight on the *algæ* you ultimately can arrive at obtaining a concentrated vitamin (the result of the sunbeam on the *algæ*) in fish and especially in fatty fish;

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