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## What do We Eat to be Healthy

By DR. F. F. TISDALL

DR. TISDALL:—MR. Chairman, honored guests and gentlemen: I appreciate very much the words of introduction spoken by your chairman, and I am very glad to be here today to have the opportunity of telling you some of the work going on at the Hospital for Sick Children, and to discuss this problem of nutrition which I hope will prove of interest to you. In December I had a letter from Washington which stressed the economic value of proper nutrition, and the necessity for industry to foster the principles of adequate feeding, from the point of view of increasing efficiency as well as from the humanitarian standpoint.

During the last few years I have been associated with Toronto business men, and I have found that in them the humanitarian motive is strongly developed. But I have also found that if our conversation got round to methods of increasing efficiency and production you could see at once that you were talking in their language. Now I wish you would consider this question of nutrition from purely selfish standpoints—not only as it applies to the health and efficiency of yourselves and your families but as to the way in which the application of these principles to Canada in general would effect the economic welfare of the country and industry, particularly the food industry. It would take care of a large part of the food surplus and improve the health and efficiency of a vast number of people. That in its turn would have an effect on industry generally and the improvement would be reflected in your economic welfare. Thus from the purely selfish motive of dollars and cents it is worth while to be interested in the application of the principles of nutrition to Canada as a whole, and to see that the people are properly nourished.

The third point of view is that of the ability of the nation to defend itself. Sir Edward Mellanby, Secretary General of the Medical Research Council of Great Britain, said that of 58,000 recruits examined for the army no less than 38 per cent. were rejected on account of physical defects resulting from improper nutrition. With this in mind I would ask you to consider the problem, not only from the standpoint of economic welfare, but from that of national safety, and our ability to defend ourselves.

As you see I am leaving the most important motive to the last. That is the humanitarian motive, and I am sure there is no one among you who does not get some pleasure out of the feeling that he is doing something to improve the health and welfare of his fellow men.

During the last twenty-five years there has been no branch of science that has made more rapid progress than that of nutrition, and today scientists the world over are agreed on the fundamental principals of nutrition—unanimously agreed as to what constitutes those principles. There are still variances in detail such as the amounts that should be eaten, and what should be eaten with what, but on fundamentals scientists are unanimous.

Dr. Tisdall showed a series of lantern slides. The first was a picture of a frail looking little girl holding in her arms a large and well nourished fowl. Its interest he said lay in the fact that it showed that whereas the farmer had realized the necessity of feeding the cock properly he did not seem to think it necessary that the same principles should be applied to his own children.

There are, Dr. Tisdall continued, no fewer than thirty-two food elements that are essential to normal healthy living, and it is very important that we should know what these are, how much of each we need and where we can get them. Malnutrition is not an obvious condition as a rule, and a man may be able to carry on his ordinary everyday activities without any apparent trouble. At the same time if his diet is not properly regulated he will be deprived of energy and vigor, and his resistance to disease will be lowered. He will be slightly anaemic, and when colds are going round he will get one every time where the man who

eats properly will avoid one. Not only that, he will have a great deal more trouble getting rid of them.

Now I expect you are going to say that you are business men and haven't the time to spend chasing thirty-two food elements and seeing that you get them. You don't have to. Fortunately there are only a few of these elements that we have to watch carefully. The average diet contains most of them, and only a little care is needed to see that we get the ones that are lacking.

Essential food elements fall into five groups: 1, Vitamins; 2, minerals; 3, proteins; 4, fats; 5, carbo-hydrates—and to obtain them all regularly it is not necessary for the diet to be monotonous. In fact proper nutrition depends on variety in diet, and the reason for that is that some of these elements are needed in quite large quantities while others are required in only minute amounts. Certain foods, such as milk and eggs contain several of these food elements. There are other foods however that we must avoid taking in excess. These are such things as cake, pastry, and candies. In themselves they are not harmful, but if they are taken in excess they tend to crowd out other foods that are really essential.

Having given you this general outline I should like to go into more detail. First let us take the first element, vitamins. There are seven of these that are well known, and of them five are important from the standpoint of diet. The first is vitamin A, lack of which causes eye trouble and a tendency to infections. Happily vitamin A is very abundant and widely distributed. It is to be found in milk, cream, butter, carrots, tomatoes, leaf lettuce, spinach, eggs, liver and kidney. Thus you will see it is easy to get our full requirements. If our daily diet contains half to a pint of milk, butter, two vegetables in addition to potatoes and an egg we shall get all we need. But we must certainly see to it that we do get it, for the lack of this essential vitamin produces profound changes throughout the entire body. Infections are liable to occur in the nose, throat, sinuses and lungs, such as colds, bronchitis and pneumonia. In the young growth is retarded and weight becomes stationary. Lack of this vitamin may lead to bad teeth because the enamel forming cells cannot function properly without it.

Secondly we have the vitamin B group. This is subdivided into several sections, but our concern lies chiefly with B1 and B2. Deficiency of these results in neuritis and constipation. This vitamin is widely, though, unfortunately, not abundantly distributed. That being the case it is essential that we watch carefully to see that we get enough of it. The principal sources of supply are fruits and most vegetables, particularly peas and beans; whole grain cereals, egg yolk, milk, liver and kidney. Wheat germ, the embryo discarded by the millers in making white flour is rich in the vitamin. The chief difficulty we encounter is in the fact that B1 is soluble in water, and when vegetables are boiled as much as 90 per cent. of the vitamin may go down the sink as a waste product. I would like to impress on you that whole wheat bread should always be given to children. It is an excellent source of the vitamin, without which the appetite fails and smaller amounts of the other essential foods are eaten as a consequence. The results in children are slower growth and a less than normal gain in weight. In both children and adults the stomach and intestines lose their tone and are no longer able to function efficiently. Constipation and a general lowering of health follow.

Lack of the third vitamin, vitamin C, causes scurvy, hemorrhages round the teeth and throughout various other parts of the body. Fortunately this disease, in its marked form, has been almost wiped out as the result of almost general realization of the dietary importance to everyone, including babies, of fresh fruit or fresh fruit juice. It is essential that we take some fresh fruit or raw vegetable every day if we are to get our supply of vitamin C for it is readily destroyed by heat in the presence of air. Oranges, lemons, grapefruit and tomatoes provide the richest source of supply. Factory canned tomatoes are excellent if fresh are not available, for though they are canned by the use of heat they are not exposed to the air during the process, and the vitamin remains unaffected. Though, as I said, scurvy has practically been wiped out, even a moderate deficiency of this vitamin will affect the health of the gums and teeth, and interfere with the normal functioning of the body.

The last of the vitamins with which we are particularly concerned is Vitamin D. It is particularly essential to children. Without it they develop rickets, soft bones and defective teeth. In older children and adults the results of a shortage of the vitamin are a greatly increased amount of tooth decay. As this vitamin is not available in ordinary foods in adequate amounts it is essential for every infant and child, and advisable for every adult to make sure of a supply of vitamin D during the winter months—from October to April. One teaspoonful of cod-liver-oil a day will give us a sufficient amount of vitamin D during these months, and there are also available in Canada specially prepared milks and breads that contain it. Egg yolk, and sunshine in the summer are also sources of supply. Direct exposure to the sun produces the same result with relation to Vitamin D as does the taking of cod-liver-oil, but in our modern civilization we do not get as much sunshine as we should. When we do get out of doors, unless we are bathing, we are ordinarily clothed in such a way that very few of the valuable rays of the sun actually strike our bodies. Furthermore, in large cities, smoke and dust will cut off as much as fifty per cent. of these beneficial rays.

(Dr. Tisdall showed slides which depicted the effects of experiments in feeding—withholding and adding vitamins to the diet of rats and guinea pigs—to illustrate the conclusions he had related in the foregoing.)

Now we come to minerals. Of these there are thirteen that are essential to an adequate diet. Here again we are fortunate that we need really concern ourselves with three of them, because if our diet is at all reasonable it will contain adequate amounts of the other ten. The three for which we must watch are Calcium, lack of which causes defective bones and teeth; iron, lack of which causes anaemia; and iodine, lack of which causes goitre.

These minerals are supplied chiefly by Milk, cheese, eggs, liver, kidney, leafy vegetables such as celery, lettuce and cabbage, fruits and iodized salt. There is a constant storage and use of calcium in the bones. A person may appear in the best of health, yet the bones may not contain as much calcium as they should, and the result will be trouble. For example, a pregnant woman is liable to suffer

from tooth decay because she has to divide her supply of calcium with her child. If she does not get an adequate amount in her diet nature takes it out of her bones and teeth. Our greatest sources of calcium are milk and milk products. One gram of calcium is obtainable from 1½ pints of milk, four ounces of cheese, five pounds of cabbage, three pounds of celery, three pounds of dried dates, eight pounds of bread or seventeen pounds of beef. To get an adequate supply an adult should consume each day from half to one pint of *Pasteurized* milk and a growing child who is forming bones should get a pint and a half, including the milk used in cooking. Iron is obtained largely from vegetables and fats. Other sources are eggs, liver and kidney. Again, however, care must be taken in the cooking of vegetables, for iron is fairly soluble in water, and if an excess of water is used in cooking half the essential mineral will go down the drains. Iodine is largely obtained in sea foods, and people who live inland have to depend on iodized salt for their supply. Careful attention should be paid to obtaining an adequate supply of these three minerals, for in addition to other troubles caused by their lack, the intestinal tract becomes sluggish and the consequent delay in excretion can seriously impair the health.

Proteins come next in the list of food essentials. They are supplied by meat, fish, poultry, milk, cheese, eggs, peas, beans and other vegetables, flour and grains. Proteins supply no less than ten of the thirty-two food elements that should form part of our everyday diet. Of the three kinds of proteins—animal, vegetable and grain—animal proteins, including milk, cheese and eggs are the most effective tissue builders because of their similarity to human protein. There should be a liberal supply of animal proteins in the diet, because they cannot be easily replaced by vegetable or grain proteins, and they are necessary to the growth and repair of the body throughout life. Lack of sufficient proteins results in stunted growth and general loss of health.

A proper supply of fats is also necessary to good health. They are the main source of heat and energy but they contain certain other elements that are essential to health. All we need will be furnished by two or three ounces a day, and the best form is butter. Other foods, however, can

supply the necessary amounts of fat and they are cream, milk, bacon and other fat meats, lard, vegetable oil shortening and egg yolks.

Carbohydrates form our chief source of energy, and if we did not have them in the form of flours and sugars with their wonderful keeping qualities our modern civilization—consuming as it does, huge quantities of food—could not exist. As I said before, however, care must be taken in the use of cakes, pastries, jams, candies and so forth. They are so accessible and so palatable that there is a tendency to take them in excess and so crowd out the other elements that are essential to health.

What I have said may sound very complicated, but a basic diet for good health is a very simple matter. We can be assured of all the requisite food elements if we build our daily diet around the following: 1, One half to a pint of Pasteurized milk (for children  $1\frac{1}{2}$  pints); 2, one egg; 3, some meat; 4, two vegetables cooked with a minimum amount of water; 5, some raw fruit or vegetables. In addition, during the winter months we should take a daily teaspoonful of cod liver oil, or some other source of vitamin D in capsule form. By habitually building our meals around the foods I have mentioned we can obtain more vigor, maintain a stronger resistance to disease and live longer. If however one's diet suffers from a continued lack of any one or more of the necessary elements, the body may undergo definite impairment. The defect may not be obvious at once. When one of the vitamins or minerals is completely absent from the diet it may be some weeks before the condition of ill health will result, but result it certainly will. When, as is most frequently the case, the essential element is not entirely absent, but present only in a quantity below the actual need, the diseased condition may show itself only after months or years.

To show you how easy it is to get a diet which is faulty I would like you to consider our lunch today. It was as good a meal as anyone could ask—at first sight. But let me analyze it for you in relation to the essentials I have outlined. The total daily requirements of the average business man who lives a more or less sedentary life are 2,400 calories. The luncheon provided 1,649, enough to keep you

going at the hardest manual labor you could undertake. (For ease of comparison the rest of the analysis is set out in the table below.)

Total daily requirements.	Amount supplied by luncheon.
Fat, 80 grams	91 grams
Protein, 72 grams	69 grams
Calcium, 600 mgms.	147 mgms.
Iron, 10 mgms.	13 mgms.
Vitamin A +++	++
Vitamin B +++	+
Vitamin C +++	+++
Vitamin D +++	Nil

As I said before it was a nice satisfying luncheon, but if you kept it up as a steady diet you would eventually run into trouble.

A little time ago there was conducted in Toronto a survey to try to arrive at what proportion of the essential food products the average person obtained. This survey covered a hundred families and 602 individuals. We were able to measure exactly the amount of food essentials that were consumed. The table on the screen shows the percentage of the essential amounts that were consumed.

Element	By Men	By Women	By Children
Calories . . . . .	77	70	75
Proteins . . . . .	86	73	75
Iron . . . . .	115	53	53
Calcium . . . . .	106	82	53

If the people of Toronto had the amount of milk required for an adequate diet the supply would have to be increased thirty per cent., and if the people of Canada as a whole had all that is necessary to proper nutrition the food industry would be thriving, and the improvement in the economic condition of the country would be reflected in you and me. Dollars and cents will be needed if we are to see that our people are properly nourished, but the cost will be amply repaid in an increased longevity, health and efficiency that will tend to raise the economic standards of the whole country, an end which I think you will agree with me is earnestly to be desired.