

convenient and does not permit of cooking by steam as is sometimes desired, so better get the double boiler the first chance you get. When you have learned its usefulness you will never keep house without it. Two egg beaters are suggested, the whip for whites of eggs, which should always be beaten on a plate, the Dover beater for whole eggs and yolks; these are generally beaten in a bowl. The number and size of the saucepans will depend considerably on the size of the family but they should always be of good material, without breaks or chipped places in the enamel, if that ware is used. It is almost impossible to cook without burning in a saucepan from which the enamel had been broken or worn off, besides the glazing is a kind of glass and bits of it entering the stomach or intestines may be injurious.

A Lesson in Food Principles

After equipping our kitchen with the necessary utensils and before we actually begin to cook, it is important to know something about the character and composition of the materials which we are to use. For, no matter how fond we are of cooking and even if we have acquired considerable skill in it, the real reason for our efforts is to furnish nourishment for the body in such form as is most useful to it and also to provide material for body heat and energy. According to its function the nutritive part of food—or the "food principles"—are termed protein (or tissue builders), fats, carbohydrates, water and mineral substances. Proteins contain nitrogen, oxygen, hydrogen, carbon and sometimes sulphur and phosphorus. They make up the greater part of all tissues and organs of the body and are necessary in food to supply the elements for growth and repair. This class of foods is found in considerable quantity in lean meats, fish, the white of eggs, curd of milk and cheese, beans, peas, gluten in flour and nuts. There is a small per cent of protein in all kinds of food except pure fats, sugars and starches.

Fats contain only carbon, hydrogen and oxygen. They are concentrated fuel foods and give to the body $\frac{2}{3}$ times as much heat as will be furnished by the same weight of dry protein, starch or sugar.

Carbohydrates include both sugars and starch foods and are composed of carbon, hydrogen and oxygen. The difference between this class of food and the fats is that the hydrogen and oxygen in carbohydrates are always in proportion to form water and there is much more carbon in the fats.

The carbohydrates, like the fats, are fuel foods and yield warmth and power to the body when oxidized by the air which is brought in by the lungs.

If more food is eaten and digested than the body requires for immediate use it is stored up as fatty tissue to be used for fuel if necessary. At least fats and proteins are stored up as fat but the pro-

teins, if eaten in excess of requirements, are likely to clog the digestive tract and make poisons in the blood.

Water is needed for the fluids of the body, to carry food to the tissues and carry away wastes, also to regulate the temperature of the body.

Mineral substances are necessary in the formation of bone, in the digestive fluids and as a small but necessary part of every living cell in the body. Mineral matter is found in all foods but is most abundant in vegetables, fruits, milk and eggs.

A certain amount of these food principles is needed every day in the diet of every person, the amount depending on the age of the individual, his work, the climate in which he lives and the general condition of his health. There is more likely to be too large, rather than too small, an amount of all the classes of food in the ordinary diet. The woman, who is desirous of making the food which she serves day after day to her family accomplish the most good, will learn to classify all the common foods according to their chief constituents and will try to serve them in as nearly correct proportions as possible. The well balanced diet should contain fuel units from 10 to 15% protein, 15 to 40% fat and from 40 to 60% carbohydrate.

The value of any diet is not so much what foods it contains as the amount of body fuel which it represents, so the dietitian calculates of heat units in a day's rations more than the variety of the bill of fare.

Composition of Some Foods Before Cooking

The following table gives approximately the parts of nutrient in 100 parts of food materials:

Eggs—13 parts albumen, 10 fat and 74 water.

Milk—3½ casein, 4 fat, 5 sugar and 87 water.

Wheat flour—12 water, 12 gluten, 75 starch and 1 fat.

Cornmeal—12 water, 9 protein, 75 starch, 2 fat.

Dry beans and peas—13 water, 24 protein, 60 starch, 2 fat.

White potatoes—78 water, 2 protein, 18 starch, trace of fat.

Beef—(average) 60 water, 18 protein, 20 fat.

Cheese—33 water, 26 protein, 33 fat.

Nuts—3 water, 20 protein, 15 starch, 55 fat.

Butter—12 water, 1 protein, 85 fat.

Lard, olive oil—100 fat.

Carrots, parsnips and turnips—85 water, 1 protein, 9-12 starch and sugar, ½ fat.

All these foods contain from one-half to one per cent of mineral matter, the amount being largest in vegetables and fruits.

Effect of Heat on Different Foods

After studying the classes of food, and learning to distinguish them according to their chief function in the body, it is necessary to know something about the effect of heat on each class and whether cooking increases or decreases its digestibility. The term digestibility usually refers to the length of time a food remains in the stomach rather than the amount of it which is digested.

Protein foods are hardened somewhat by heat, this class of foods is made less digestible by cooking because one form of it is albumen, or a substance similar to white of eggs. This is hardened by heat and if the temperature at which it is cooked is above 160 degrees F., it is toughened. Other proteins, as found in meat milk, gluten and beans and peas are hardened somewhat by heat.

Fat is not greatly changed in cooking unless the temperature is too high, the flavor of fat meat is improved by cooking. Too high a temperature causes fats to break up into glycerine and a fatty acid the temperature at which this change takes place varies with different fats. Butter "splits up" at the lowest temperature which is the reason why it is not a suitable frying medium, olive oil "splits" at the highest temperature though both lard and beef suet can be heated to a high degree before this change takes place, which imparts to the fat a bitter taste.

Starch absorbs water, swells and becomes partially soluble in water. The wall, or covering, which surrounds the grain of starch is ruptured by boiling temperature and the starch within is liberated and becomes gelatinized by



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cooking. Because it is essential, in the proper cooking of all starchy foods, that this covering should be broken, all cereals, potatoes and other starchy vegetables should be cooked in boiling water for a long time.

Sugar is not changed if cooked at a low temperature, unless it is cooked in a food containing an acid, then it slowly changes to another form, less sweet and non-crystallizing. Cooking sugar in rhubarb or other acid fruits is an example of this change; less sugar is required to sweeten it if it is added after the rhubarb is cooked.

In cooking, all foods are subjected either to dry or moist heat and these two general methods are divided into the following different ways of cooking:

In dry heat—Broiling, pan-broiling, roasting and baking, all of which require a high temperature at first and when applied to meats the object is to first sear the outside of the piece of meat, to retain the juices then cook at a lower heat to soften muscle fibres and prevent the albumen toughening.

Boiling is cooking at the temperature of boiling water, 212 degrees F.

Stewing is cooking in a liquid generally water at a temperature ranging from 160 to 180 degrees.

Steaming is cooking in contact with steam, usually over water.

Frying is cooking in sufficient fat to cover the food, about 360 degrees.

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