

CARBOHYDRATES.

Meat contains but a small amount of carbohydrate, only a fraction of one per cent.

ASH.

Of mineral matters, meats contain more or less which have value as food, the most important being phosphates of potash, lime, and magnesia. These are used chiefly in the formation of bone.

STRUCTURE OF MEATS.

Meat consists of the muscular tissue or lean, and the varying quantities of fat which is deposited between and within membranes and tendons. The muscular tissue of which lean meat is composed is formed of bundles of reddish fibres enclosed in a delicate web of connective tissue to be distinguished from the sheath which encloses the whole muscle. The bundles are of different sizes in different muscles, and for the most part run parallel to one another, though they have a tendency to converge towards the points at which they are attached. Each of these bundles is made up of similar smaller bundles, which can be again subdivided into smaller and smaller bundles until the individual muscle fibres are reached. These are so small that they are invisible to the unaided eye. They vary in diameter from $\frac{1}{16}$ to $\frac{1}{32}$ of an inch.

The muscle fibres and muscle bundles are held together by means of connective tissue. Each of the bundles of muscle fibres seen when a piece of meat is cut "across the grain," as in a round steak, is made up of hundreds of fibres.

Between and inside the bundles of fibres the fatty tissue of meat is found. Its distribution is not uniform, however, but in structure it consists of a fine network of connective tissue in which are enclosed clusters of fat cells.

TOUGHNESS OF MEATS.

Whether meat is tough or tender depends on two things:—(1). The character of the walls of the muscle fibres, and (2). The character of the connective tissues which bind the fibres and muscles together. In young and well nourished animals the walls of the fibres are thin and delicate and the amount of connective tissue is small. As the animals grow older, or are made to work, or are poorly nourished, the walls of the muscle fibres and the connective tissues become thick and hard. In mastication an effort is made to separate the fibres from one another so that they may be readily subjected to the action of the digestive juices. It is highly important that it should be understood that it is the fibre of the meat that has the nutritive value, and that much of its value is lost when it is not rendered easily accessible to the digestive secretions by thorough mastication.

After an animal has been slaughtered the meat undergoes several changes in texture. In the first stage, when the meat is just slaughtered, the flesh is soft, juicy, and quite

tender. In the next stage the flesh stiffens and the meat becomes hard and tough. This condition is known as *rigor mortis* and continues until the third stage, when the first changes of decomposition set in. In hot climates the meat is commonly eaten in either the first or second stage, and in cold climates seldom before the second stage, and often, in order to lessen its toughness, it is allowed to enter the third stage. The softening is due in part to the formation of lactic acid which dissolves the connective tissue, and may be imitated by macerating the meat with weak vinegar. Meat is also sometimes made tender by cutting the flesh in thin slices and pounding it across the cut ends until the fibres are broken. In all cases the aim is, as in mastication, to secure the separation of the individual nutritive fibres.

THE FLAVOR OF MEAT.

This depends upon the kinds and amounts of "nitrogenous extractives" which the muscle fibres contain, and as a rule these depend largely upon the age of the animal and upon the character of its food. Meat which is allowed to hang and ripen, develops added flavors.

THE DIGESTIBILITY OF MEATS.

The value of meat depends not alone upon the amount of nutrients which it contains, but also upon the proportion of these nutrients which the body can digest and use for its support. As a matter of fact, which has been determined by experiment, flesh of all kinds, either raw or cooked, can be readily digested by a healthy man. It is true also, however, that roasted meat is rather more *completely* digested than either raw or boiled meat, and that raw meat is more *easily* digested than cooked meat.

The following table gives an approximate estimate of the ease of digestibility of animal foods, commencing with the most digestible and ending with the least digestible:—

1. Oysters.
2. Soft cooked eggs.
3. Sweetbread.
4. White fish (boiled or broiled), such as blue fish, shad, smelt.
5. Chicken (boiled or broiled).
6. Lean roast beef or beefsteak.
7. Eggs, scrambled, omelette.
8. Mutton, roasted or boiled.
9. Squab, partridge.
10. Bacon, crisp.
11. Roast fowl, chicken, capon, turkey.
12. Tripe, brains, liver.
13. Roast lamb.
14. Chops, mutton or lamb.
15. Corned beef.
16. Veal.
17. Ham.
18. Duck, snipe, venison, rabbit and other game.
19. Salmon, mackerel, herring.
20. Roast goose.
21. Lobsters and crabs.