

present in lymph and chyle. Liquid or soluble albumen, as shown in the white of egg, coagulates by heat and various chemical agents.

2. Albumen, as found in the juice of carrots, turnips, and cabbages, and obtained by boiling their juices. It is the same body as albumen from eggs.

3. Fibrin made by stirring blood with a rod. It is the basis of muscle of flesh. Flesh-fibrin probably bears the same relation to blood-fibrin as coagulated albumen does to soluble albumen.

4. Fibrin made from Wheat-flour. It is identical with the fibrin found in flesh, but not exactly the same as that found in blood, and is known as *Gluten*.

5. Casein prepared from milk, in which it is soluble, owing probably to a little alkali: when an acid is added, the Casein curdles or coagulates, and then is known as Cheese. In 100 parts of cows' milk there are  $3\frac{1}{2}$  parts of Casein.

6. Casein or Legumin, as found in peas, beans, lentils, coffee, &c. The Casein of Vegetables is now supposed by most chemists to be identical with the Casein or Cheese of Milk, but a few chemists still deny this. 100 parts of peas contain above 20 parts of Casein.

The flesh formers are most abundant in those plants which yield the substantive food of man. These plants belong principally to the group of Cereal grasses and Leguminous plants. Of these the most important is Wheat.

#### WHEAT, (Species? of the genus *Triticum*)

The plants yielding Wheat belong to the natural order of Grasses (*Graminaceae*). They have never been found in a perfectly wild state, and on that account have been supposed to originate in some other form of Grass at present wild. Although surmises have been made that the wheats originate in a wild plant called *Aegilops ovata*, the fact of the conversion of one into the other has not yet been proved. The Wheat plant is grown all over the world, but flourishes mostly between the parallels of 25 and 60 degrees of latitude. It is more abundant in the northern than in the southern hemisphere.

The varieties of Wheat cultivated in Europe may be divided into those whose flowers produce awns, and those without these appendages, or *bearded* and *beardless* Wheats. The fruits or seeds of these varieties are red or white, hence a further sub-division takes place into *red* or *white*, bearded or beardless, Wheats. Amongst the red bearded varieties is the fingered Egyptian or Mummy Wheat, which presents the peculiarity of several branches bearing fruits proceeding from its central stalk. Wheat is also called hard and soft according to its consistence, and winter and spring as it is sown at those seasons of the year. The red varieties yield the largest amount of grain, but the white the whitest flour.

Wheat is preferred to the other Cereal grasses as an article of food on account of its containing a larger quantity of flesh-forming matters. The flour also may be rendered very white by separating it from the husks, or bran, and the fruit is much more easily separated from the chaff than is the case with the other Cereals. The proportion of flesh-forming matters to those which give heat are more nearly adjusted to the requirements of the system in Wheat than in any other food. Hence, probably, its very general use as an article of food amongst the populations of the hardest working nations in the world.

The quantity of Wheat-corn grown annually in

the United Kingdom has been calculated at 14,000, 000 of quarters. In 1858, 3,000,000 of quarters of Wheat were imported into this country, exclusive of flour, meal, sago, rice and other grain.

Good Wheat should give three-fourths of its weight of fine flour; but the chemical composition of this depends upon the greater or less quantity which it contains of the outer husks. The finest flour is not so rich in flesh forming matter as the coarser kinds. The average composition in 100 parts may be taken as:—

Water .....	14.0	} or {	Water.....	14.0
Gluten .....	12.8		Flesh-formers.....	14.0
Albumen .....	1.8		Heat-givers .....	69.8
Starch .....	65.7		Mineral Matter.....	1.6
Sugar.....	5.9			
Gum .....	1.7			
Fat.....	1.2			
Fibre .....	1.7			
Ashes.....	1.6			

1. Wheat, of which the chemical composition varies according to the varieties, 21 oz. required to make 1 lb. of flour.

2. Bran, or outer and inner skins of the wheat— $5\frac{1}{2}$  oz.

3. Flour, or the inner part of wheat separated from the outer parts of bran—16 oz.

4. Water from 1 lb. of Flour— $2\frac{1}{2}$  oz.

5. Gluten from 1 lb. of flour—2 oz.

6. Albumen from 1 lb. of flour— $\frac{1}{2}$  oz.

7. Starch from 1 lb. of flour— $9\frac{1}{2}$  oz.

8. Sugar from 1 lb. of flour—1 oz.

9. Gum from 1 lb. of flour— $\frac{1}{2}$  oz.

10. Fat from 1 lb. of flour— $\frac{1}{8}$  oz.

11. Fibre from 1 lb. of flour— $\frac{1}{2}$  oz.

12. Ashes from 1 lb. of flour— $\frac{1}{4}$  oz.

13. Carbon from 1 lb. of flour—7 oz.

#### BREAD.

All food is called bread which is made from the flour of grains or seeds made into dough and baked. Bread is either *vesiculated* or *unvesiculated*. The latter is called unleavened bread, and consists of such preparations of flour as are known by the name of biscuits and cakes.

Vesiculated bread is prepared in two ways, either by *fermentation* or *aëration*. In all cases fermented bread is made from the flour of wheat, or a mixture of this with the meal or flour of other grain. Oats, barley, maize, rye, will not alone make fermented bread. The meal of these grains is added to wheaten flour when they are made into bread.

In the making of fermented bread yeast is added to the flour, and the gluten of the flour is put into a state of change, but not decomposed. A small portion of the starch is formed into glucose, which is decomposed, and alcohol formed, and carbonic acid produced. The carbonic acid gas escaping from the mass vesiculates the bread. This process is called the *rising* of the bread. It is in this stage that the starch enters into a state of change which assists its subsequent solution in the stomach.

Bread is vesiculated, without being fermented, by two processes. 1, by the addition of substances which during their decomposition give out carbonic acid, as carbonate of soda and hydrochloric acid. 2, by making the bread with water charged with carbonic acid gas. The first is the process recommended by Dr. Whiting, and sold in London under the name of Dodson's Unfermented Bread. The second process consists in mixing water, containing carbonic acid gas under pressure, with flour, so that