

Lectures on Elementary Physiology in relation to Medical Nursing.

BY BEDFORD FENWICK, M.D.

Physician to The Hospital for Women, Soho Square.

(Continued from page 24.)

THE BLOOD.

IN considering the component parts of the body, it will be well, perhaps, to commence with the most important of all, the Blood, which was tersely described thousands of years ago as "the life"; and this modern physiological knowledge has proved to be a description of absolute accuracy. Because, as you understand what the blood is, and what it has to do in the animal economy, you will come to realise that upon the proper circulation of the blood through the body depends, above all other conditions, the actual life of the animal; that upon the healthiness of the composition of the blood depends the health of the individual, and that, as the constitution of the blood is the first to suffer in illness, so any deterioration of its essential constituents implies, and brings about, a failure in the health of the tissues to which it conveys nourishment and strength. The blood, then, may be described as a fluid which contains a large number of minute bodies floating in it. When a drop of blood is placed under the microscope it is found that these bodies, which are called *corpuscles*—or little bodies—are of two kinds, red and colourless. It has been estimated, in order to show the extremely minute size of these bodies, that there are no less than five millions of red corpuscles in one cubic millimetre of blood, and about ten thousand colourless corpuscles in the same area; the proportion usually found in health being about one white corpuscle to about five hundred red ones. The colour of the blood is due to the red corpuscles, and, therefore, as a practical fact, if the quality of these red corpuscles becomes greatly reduced, the colour of the blood must become correspondingly less vivid. When, therefore, the patient shows the colourless condition of the lips or mucous membranes to which the term *anæmia* is given, it does not mean precisely what that term conveys, but that there is a diminution in the colouring matter of the red corpuscles of that patient's blood. Anæmia literally means bloodless, but an anæmic patient may possess as much fluid circulating in his or her body as any other healthy person of the same size and weight. It is, therefore, in the quality of the red blood cells that the difference exists between the blood of an anæmic patient and that of a healthy person.

The colouring matter of the red corpuscles is called *oxyhæmoglobin*, and when this is examined it is found to contain a definite amount of iron and of oxygen. When, therefore, a patient suffers from anæmia, the first essentials which his or her blood require are the oxygen and iron for which the red blood corpuscles are craving. From this you will understand the rapid effect and the improvement of the health produced in such patients by the administration of iron—due, of course, to the metal being absorbed and utilised by the millions of blood corpuscles. For the same reason the "bloodless" factory girl, when sent to the sea side, loses her anæmia because she has absorbed quantities of oxygen into her lungs and so into her blood. The liquid in which the red and white corpuscles float is called the *Plasma*, and consists chiefly of water containing various salts in solution, so that it is a little thicker than water—as the Scotch proverb reminds us. When some common salt is added to fluid blood in a glass vessel, and the mixture is kept cold by being surrounded by ice, the corpuscles gradually settle to the bottom of the vessel and leave the clear *Plasma* at the top. It is then seen that this fluid is almost colourless, and is, in fact, of a very pale yellowish tint. If it is drawn off from the deposited sediment of corpuscles and slightly warmed, it becomes nearly solidified into a jelly, and in a short time is converted into a little *serum* and a firm colourless *clot*. The clot consists of what is called *fibrin*, and this experiment shows you that the "clotting of blood," concerning which I must say more hereafter, can take place even if the corpuscles are not present; in fact, that it is the plasma of the blood which forms the fibrin which, as we shall see hereafter, plays so important a part in health and disease. The *serum* contains two substances which are known as *albumen* and *globulin*. Albumen is almost identical in its composition with the white of an egg. You will remember that when an egg is boiled, the white fluid surrounding the yolk becomes solidified; and so any other fluid which contains any albumen also becomes white and opaque when it is heated; or if there be much albumen present it becomes quite solid. This, by the way, is the reason why urine is boiled in order to ascertain whether it contains albumen or not; any opaque particles which are formed in this process in *acid urine* are due to the presence of this constituent. *Globulin* is a substance which also coagulates when it is heated, and it chiefly differs from albumen in the fact that it is only soluble in water containing certain salts, whereas ordinary albumen is soluble even in distilled water. The plasma of the blood, then, contains besides albumen and globulin, the peculiar substance,

[previous page](#)

[next page](#)