Elementary Anatomy,

AS APPLIED TO NURSING.

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LECTURE III.—THE BLOOD.

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BEFORE discussing the Heart and the Circulation it will be well that we should understand the chief characteristics of the fluid which is thus propelled to every part of the body, and which is, as you are aware, the Blood. In order to understand its constitution, it is necessary to examine it with a microscope which magnifies at least three or four hundred times. We will imagine then that we have twisted a piece of string tightly round the middle of the last joint of one finger, and made it swell and become darker in consequence of the obstruction caused by the string to the return of blood from the end of the finger. It is now pricked with a sharp clean needle, and a good sized drop of blood which exudes is deposited upon a slip of thick glass and covered with a piece of well cleaned thinner glass, so as to spread out the fluid evenly into a thin layer. To the the naked eye this layer will appear to be of a pale reddish colour and quite clear, but if we look at it first of all through a pocket lens, it will look like a mixture of excessively fine, yellowish-red particles, like sand or dust, with a watery, almost colourless, fluid. Immediately after the blood was drawn the particles would appear to be scattered pretty evenly throughout the fluid, but after a short time they become aggregated into little patches, and the layer of blood becomes more or less spotty; the particles are what is termed the *corpuscles* of the blood, the nearly colourless fluid in which they are suspended is called the *plasma*. Suppose we now take a second drop of blood from the finger and leave it for a few minutes on the slide, we find that it has ceased to be fluid, and has become more or less solidified into a gelatinous-like drop, thus showing what is called the *coagulation* of the blood—it is important to remember this fact, because it is of the greatest importance in the progress of disease. If now we take a third drop of blood from the finger and add to it a few grains of common salt, we should find that, after the same length of time, the blood remained fluid, and apparently unaltered; in other words, coagulation had been prevented.

These simple experiments teach us three very important things concerning human blood. That it is composed of a watery fluid in which coloured corpuscles are contained; that it has a remarkable power of coagulating or clotting; and that this coagulation may be prevented by artificial means, such as the addition of salt.

We now go a step further and place our first slide under a microscope, and then we find that the corpuscles which we observed, by means of our hand lens, are bodies of very definite and different characters of two kinds, called, respectively, the *red corpuscles* and the *white corpuscles*. The former are much more numerous than the latter, and have a yellowish red tinge, while the latter are somewhat larger than the red bodies, and, as their name implies, are pale and devoid of colour. The red corpuscles are flattened circular discs which, on an average, measure $\frac{1}{3200}$th part of an inch in diameter, and are about ¼ of that in thickness. From this it follows that rather more than ten million of them would lie on a space one inch square. The broad faces of the discs are not flat, but somewhat concave, as if they were pushed in towards one another; hence the corpuscle is thinner in the middle than at the edges, and, when viewed under the microscope by reflected light, it looks clear in the middle and dark at the edges, or dark in the middle and clear at the edges according to circumstances. When, on the other hand, the discs roll over and present their edges to the eye, they look like *rouleaux*. These appearances will be more easily understood if you will take an ordinary biscuit and turn it first of all with the broad surface and then with the edge against your eye. The red corpuscles are very soft, flexible, and elastic bodies, so that they can readily squeeze through openings and canals narrower than themselves, immediately afterwards resuming their proper shapes. The outside of each corpuscle is denser than it is inside, which contains a semi-fluid or quite fluid matter of a red colour called *hæmoglobin*.

Each corpuscle then is a small flattened bag with more or less fluid contents. The colouress corpuscles are larger than the red, as we have said before, their average diamater being $\frac{1}{2500}$th part of an inch; and they further differ from the red variety by the extreme irregularity of their form, and by their tendency to attach themselves to the glass slide, while the red corpuscles float about and tumble freely over one another. Another peculiarity is, that the white corpuscles are constantly varying in their shape, whereas, as we have said, the red corpuscle is changed only by outside influences, such as pressure or the like. The colourless corpuscle of the blood therefore possesses, in a high degree, the power of contractility; the white corpuscles like, the red, are composed of little bags containing a clear or granular fluid, together with a little body which is called the *nucleus*. The plasma of the blood contains a substance which is called *fibrin*, and which is the cause of the apparent solidification or coagulation of the blood, and which we shall see hereafter is of great importance in the methods

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