Lectures on Elementary Physiology in relation to Medical Nursing.

By Bedford Fenwick, M.D.
Physician to The Hospital for Women, Soho Square.

Lecture I.

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THE method in which the blood is conveyed to every part of the body is termed its "circulation." The simplest proof which can be given of the fact that every drop of blood moves on, instead of remaining stationary in the blood vessels as was believed in olden times, is obtained by placing the web of the foot of a recently killed frog under a microscope, as the tissue is so transparent that both the blood vessels and the blood moving through them can be easily seen. In surgical practice the same important truth is taught by the fact that when an artery is cut the blood comes out in regular spurts or jets, each of which, as we shall shortly see, corresponds to a contraction of the heart which pumps the blood into the arteries. The necessity for the circulation of the blood will be understood from the fact that it is the medium which carries to the tissues in every part of the body the nourishment which they require, and without which, as we have already seen in a previous lecture, they would decay and perish. The cells of the tissues suck up from the blood the material which they each require for the building up and preservation of their own particular substance, and the oxygen which they need for their constant vitalisation. In return, they give back to the blood the waste substances and the carbonic acid which they have formed in consequence of the work which they are doing for the body generally—just as we saw that a piece of coal, in order to give out heat and warmth absorbed oxygen from the air, and in its burning gave off carbonic acid. It is evident, therefore, that in order to obtain the necessary substances for the supply of the tissues the blood must be constantly passing through the organs which receive the nourishment taken by the body. In other words, the circulation of the blood through the walls of the stomach and of the intestines is essential in order that it shall be able to take up the necessary food for the tissues. In like manner it is necessary that the blood should pass through the lungs in order to get rid of its carbonic acid and to take up the oxygen from the air; and in order to purify it from other waste materials it must pass through organs like the kidneys and the liver whose function it is to remove these products from the blood. The circulation of the blood, then, is essential to life, and it is carried on by means of the heart, which is practically a most powerful pump, and of canals or tubes called blood vessels which pass from the heart to every part of the body and back again to the heart.

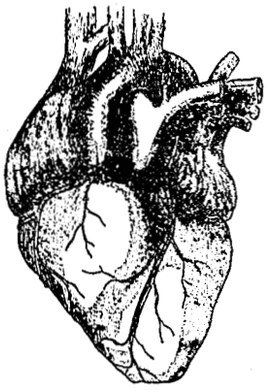

Diagram of Heart, with Great Blood Vessels.

The heart, then, consists of two separate halves and four distinct cavities, each half consisting of an upper and a lower chamber, opening into each other by a narrow rounded door or "orifice," over which curtains are spread, to which the name of "Valves" is given. The upper chambers on each side of the heart are called the "Auricles," and the lower rooms are called the "Ventricles." The auricles and ventricles respectively are distinguished according as to whether they are on the right or left side of the heart, and are therefore known as the *right auricle* and the *right ventricle*, or the *left auricle* and the *left ventricle* respectively. To trace, then, the course of the circulation, let us start from the right auricle, into which the blood, we will imagine, is just pouring from the *veins*. The chamber gradually dilates as the blood flows into it until it is fairly distended; then the muscles, of which its walls are composed, contract, and so the cavity of the chamber is practically closed up, the blood which it contained being forced through the open door which is known as the Tricuspid Orifice into the right ventricle, the cavity of which is then distended by the in-rushing blood just as that of the auricle was. When the ventricle is full the muscles of its walls, in like manner, contract and close its cavity; but, at the same time, the curtains, which are called the Tricuspid Valves because they form three cusps or parts, are pushed together and back against the opening, and thus prevent the blood from returning back into the auricle. The full force, then, of the contraction of the walls of the ventricle is utilised in propelling the blood which it contains into the large tube at the upper part of its cavity, and which is known as the Pulmonary Artery. The blood then rushes into this artery and then the muscles, of which the

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