capillaries are the tiny streamlets down the mountain sides, which uniting together form little rivulets which joining again with others form the streams which being joined by others form the river which finally flows into the sea. So the minute radicles of the circulation, in the shape of the capillaries, join together to form what we might call veinlets, and these uniting together form the veins which finally are united into the great veins of the body, the Venæ Cavæ, which uniting together discharge their contents into the right auricle of the heart.

Such, then, is the circulation of the blood, and it must be remembered that the two sides of the heart, although separate and distinct, act together; so that practically the auricles are filling up with blood from the veins together, contracting together and forcing the blood into their ventricles; and finally that the ventricles contract together, filling up simultaneously the pulmonary artery and the aorta; so that the lesser and the greater circulation of the blood are simultaneous processes. In order now to consider some of the matters, in which the physiology we have learned is applicable to practical Nursing, it is necessary to take some further notice of the peculiarities of the heart's structure. As we have already said, the heart is a bag divided into four portions with a strong partition completely separating one half from the other and all the walls of which are composed of thick layers of muscle. The valves are of the greatest importance in health and of still greater importance in disease. Each valve is composed of a thin, but strong, membrane which is attached by one edge along the margin of the opening which it guards, and which has free edges which in action fall together against the free edges of its fellow valve or valves. For example, let us consider the manner in which an ordinary pair of window curtains are hung—they are, we will imagine, attached to a pole at the upper part of the window and hang downwards therefrom. Their edges can either be brought together in the centre so as to cover the window, or they can be drawn back loosely and thus leave the window exposed. If we draw the curtains together and open the window so that the wind blows in, of course we see the curtains blown in towards the room, and their edges are blown asunder and widely separated. In similar fashion, precisely, the blood as it flows from cavity to cavity, or from ventricle to artery, separates the curtains and enters easily. Then let us imagine that there are strings attached to the inside of our imaginary curtains, which permit their edges to come together, but which prevent any draught from the inside of the room blowing the curtains out of the open window. That represents the condition of the valves in the heart; their free edges have attached to them tiny tendons or strings, the other ends of which are attached to the walls of the ventricles, and thus the force of the blood from the ventricles is prevented from pushing the valve back into the auricle, while the valves, as we have seen, prevent blood flowing back through the opening which they guard. The edges of the valves in health, then, fall accurately together like the edges of well-arranged window curtains. But, in what is known as *Valvular Disease*, the edges of the valves become thickened and rough, and show tiny excrescences like sago grains along their edges, while the same process of inflammation makes the tiny cords which anchor these edges also hard and thickened. When this condition has taken place you can readily understand that the edges of the valves do not fall together and meet as accurately as they do in health, and when the ventricle therefore contracts and the blood is forced back upon the valves, as the curtains do not efficiently close the opening some of the blood flows back into the cavity from which it has just come. By that accident, which is called *Regurgitation*, the heart is, of course, given unnecessary work to do, because it has to pump some of the blood back, again and again, into its next chamber, instead of spending its force in always propelling a fresh portion of the current. And, after a time, it is found that the heart becomes exhausted by having to accomplish such an unnecessary amount of work; its muscle becomes tired, just as the muscles of one's arm become weakened and painful after carrying a heavy weight for a prolonged time. When this overtiredness of the heart occurs its muscle becomes stretched, and permanently or temporarily relaxed, and in consequence the cavity of the chamber, the walls of which are thus thinned, becomes enlarged, or in medical language "*dilated*." If this dilatation of the heart, and the coincident weakness of its muscular wall continues, it becomes more and more difficult for the walls to contract at all, and therefore, in these cases, we find that every now and then the heart falters and halts in its action, and at that moment the patient suffers from an attack of faintness, or, as it is termed, syncope. If the weakness of the walls still further increases, the heart failure may be more than momentary; it may stop altogether; and the patient suddenly dies. It is well to remember that this gradually increasing heart weakness is the most common cause of sudden death from heart disease. Nowadays this form of death is, except in the imagination of the novelist, much more rare than formerly, because, as soon as the dilatation

previous page next page