by his writings but by his teaching and influence; and two of his pupils, Burdon Sanderson and Michael Foster, have revived experimental physiology in this country, and have diffused an extensive and exact knowledge of it amongst medical men. But more than to any one else since the time of Harvey is our knowledge of the circulation due to Carl Ludwig, who has recorded automatically the pressure of blood in the arteries, and invented a plan of artificial circulation by which changes in organs and blood-vessels could be observed apart from the heart, lungs, and nervous system. Harvey's work showed that he was well acquainted with the effect of emotion upon the heart and vessels. He says, "For every affection of the mind which is attended with pain or pleasure, hope or fear, is the cause of an agitation whose influence extends to the heart."

It is only of recent years that the *modus operandi* of the changes in the heart and vessels known to Harvey has been investigated. The amount of blood in the body is now known to be insufficient to fill the whole of the vessels at once, and, like the supply of water to London, it must be turned off from one set of vessels when it is turned on to another. Thus, when a man begins to think, the blood runs from his feet to his head, as has been shown by Mosso, who puts a man on a large and delicate balance so that his head is on one side of the pivot and his feet on the other. When the man begins to think the blood leaves the legs and runs to the head so that the head goes down and the heels go up. The turncocks who effect this change are the vaso motor nerves, which act under the direction of a nervous centre in the medulla oblongata, where the regulating arrangement for the beats of the heart is also situated. The vessels of the skin and the intestines are more under the control of the central nervous system than those of the muscles, and, when they contract, the blood, being unable to run through the cutaneous and intestinal vessels, runs through the muscles more rapidly than before. It is in the muscles that oxidation and consequent development of heat chiefly take place, and, therefore, when the vessels of the skin become contracted, as on a cold day, the circulation blood is driven out of them into the muscles, where circulation and oxidation become increased, and the temperature of the body is thus maintained. When the muscles contract, as they do during exercise, the circulation through them is first stopped by mechanical compression of the vessels which run through them and supply them with blood, but afterwards it is increased by these vessels dilating and the blood flowing more quickly through them. In consequence of this, sudden exertion tends at first to raise the tension in the arteries and obstruct the circulation. In a man with a weakened heart it may thus lead to cardiac pain, varying from slight discomfort to severe angina pectoris; but if he is able to continue walking the vessels in the muscles dilate, the circulation becomes easier, and the pain may pass away. Over-exertion in even healthy persons tends to cause dilation of the heart, and in young growing boys may lead to permanent mischief. The movements of young animals naturally resemble those of the butterfly and not of the bee. Intermittent exertion, such as is seen in the fitful movements of young animals, the gambols of the lamb, and the frisking of the colt, is well adapted to increase the strength of the body. But steady, long-continued exertion is injurious, preventing development and shortening life.

The rules which have been arrived at by breeders of horses should be carefully considered by masters of schools, and such long-continued and constant exertion as enforced races or paper chases extending over several miles ought not to be allowed, although intermittent exertion in such games as cricket may be very beneficial. Ludwig's discovery of the variations which occur in the circulation of blood through the muscles enables us to understand not only the pathology of angina pectoris, but the *rationale* of the various methods of treating cardiac disease. In most cases the object is a two-fold one—viz., to increase the power of the heart, and also to lessen the resistance which it has to overcome. The resistance may be lessened by increasing the circulation through the muscles, and the methods of doing it may be roughly divided into three, according as the patient lies, stands, or walks. The first method consists in absolute rest in bed with massage; the second, in graduated movements of the muscles of the body and limbs while the patient stands still, as employed by Dr. Schott at Nauheim; and the third in graduated exercises in walking and climbing, as used by Oertel. These methods are all good of their kind, but each is adapted to very different degrees of cardiac disease. The use of massage is as old as Harvey, who records in his works the case of a man who was relieved by a very rough form of massage. It causes a great increase in the rapidity of the circulation of blood through the muscles, and thus may lessen the resistance that the heart has to overcome and greatly assist its action when weak. Harvey also called attention to the advantage obtained by the mixture of blood from various parts of the body, and this function of the circulation has of recent years become of increased importance. It is by no means improbable that the secretions of various glands which are poured out on the surface of the body, or into the intestinal tract, are of less importance than the alterations which are effected by these glands in the blood returning to the general circulation. One gland, the pancreas, pours into the intestine a secretion