

The following quotation from Harvey: "On the Motion of the Heart and Blood in Animals" is given by Professor Rutherford in one of his lectures, and is at once decisive and significant. He says, "It is plain that what has heretofore been said," referring to the theories of Galen, and those who had preceded him "concerning the motion and function of the heart and arteries must appear obscure, or inconsistent or even impossible, to him who carefully considers the entire subject; it will be proper to look more narrowly into the matter; to contemplate the motion of the heart and arteries, not only in man, but in all animals that have hearts; and, further, by frequent appeals to vivisection, to investigate and endeavour to find the truth." These experiments were made upon dogs, toads, frogs, serpents, fish, crabs, and also upon a variety of other animals; by means of these experiments he was enabled to upset completely the erroneous views of Galen, to prove clearly and with certainty the true action of the pulse, to show the absurdity of the old theory of air passing from the lungs into the blood to be distributed over the body, and above all to demonstrate beyond a doubt the true course of the circulation of the blood.

The following simple experiment convinced him that the blood flows in an unceasing circle, and at once threw light upon the whole subject:—By opening one of the small arteries, he was able to drain away all the blood, to use his own words, "of the veins as well as that of the arteries, in the course of half an hour or so."

The experiments of the Reverend Stephen Hales, of Faringdon, who followed closely in the footsteps of Harvey, established the pressure of the blood in the veins and arteries; he made use of different animals, among others, the horse; long glass tubes were inserted into the vessel of which the blood pressure was to be determined, and from the height of the column of mercury supported, the pressure was obtained. The

experiment may be repeated with facility by means of any of the simpler manometers commonly used for that purpose, or by the more delicate spring manometer of Fick.

Look for one moment at the discovery of the lymphatics and lacteals. Gaspard Aselli, while performing an experiment upon a dog, the mesentery having been exposed, noticed "a number of very fine white cords scattered over the whole mesentery, and spreading over the intestines by means of an infinite number of delicate rootlets;" piercing one of these a milk-white fluid escaped, revealing to him what had never before been discovered; the views on this subject being at that time incorrect and in a state of mystical confusion. On seeing the result of the puncture made on one of these rootlets, which he at first imagined to be nerves, he says, in his description of the experiment: "At this sight I could not restrain my joy, and, with Archimedes crying *Ευρηκα!* invited those present to enjoy the spectacle, which was so wonderful and unique that it struck them all with astonishment."

This branch of physiology received another important addition from the experiments of Jean Pecquet, who, while conducting an experiment having for its object some point in connection with the action of the heart, discovered that by "pressing on the lacteals of the mesentery of an animal whose blood was still pretty warm, and whose lacteals were not yet exhausted," he caused the lacteal fluid to pass up the thoracic duct, and thence into the subclavian vein, dropping from the descending vena cava, which had been severed. This experiment was followed up by many others, by which the true nature, cause, and functions of these absorbent vessels were established.

All these facts, which have never been shaken, in spite of the hysterical outcries of the anti-vivisection party, point most unmistakably to Vivisection as the true fountain-head of the most important departments of physiology.