

before his time, consisted of shreds and patches of crude observation and false induction. Harvey, "having frequent recourse to vivisections," received the first hint of the circulation of the blood, by watching the palpitating heart of a living creature. Haller, who by his doctrine of "irritability," laid the foundation of the true physiology of the nervous system, wrought through pain and death to animals. Charles Bell and Majendie traced out the distinction between motor and sensory nerves, and Marshall Hall demonstrated by vivisectional methods the occurrence and importance of reflex actions, by which one-half of our life is controlled. Weber demonstrated in the same way the inhibitory action of the pneumogastric nerve upon the heart, and laid down the principles of a rational treatment for the prevention of heart failure in diphtheria and other acute diseases. Du Bois-Raymond, Pflüger, Flourens, Brown-Sequard, Schiff, Vulpian, Goltz, Waller; in fact all physiologists by their work attest that if physiology is not a hopeless puzzle and a baseless fancy it is due to the results of experiments on living animals. The chemistry of living beings was worked out in the same way by Lavoisier and Priestly, who first made out the chemistry of respiration. The chemistry of digestion and nutrition would yet have been a phenomenon and a guess if it were not for the labors of Schmidt and Bidder. Fever and inflammation, old mystic words, were never understood till Claude Bernard and Cohnheim made their researches on the vaso-motor nerves of living animals. It was by vivisection Aselli and Pecquet discovered the system of lymphatic vessels and Malpighi the capillary circulation. Artificial respiration was made a practicable means of resuscitation by Vesalius, Hooke and Lowe, through experiments made upon dogs. The experiments of Rev. Dr. Hales on pressure of the blood in the arteries are also to be noted. In the seventeenth century Sir Christopher Wren and other Fellows of the Royal Society experimented on the transfusion of fluids, and recently it has been made a means of saving life. In 1835, a committee of physicians at Dublin showed how heart sounds are produced and enabled clinicians to diagnose the various forms of heart disease. Duhamel in 1740, Sir Astley Cooper in 1820, Syme in 1831, and more recently Ollier and others have conducted experiments on living animals to show the processes by which wounds are healed and injured parts restored, and especially how fractured bones are united, the practical results of which are inestimable. The surgery of the old days has been robbed of its horrors through the results of vivisection. The "fearful fear of hemorrhagy," that the old surgeons felt, is now groundless, through the experiments made in ligaturing the arteries of animals. By this simple process the in-ligating oil, the vitriol, and caustics, the hot searing irons, and recep-