inferences may be drawn regarding the character of the excitation occurring in the irritable structure. Physiologists a half a century ago demonstrated that "action currents" of the type mentioned arise in the heart muscle. Exposing the heart of animals, they were able to demonstrate the occurrence of such currents in the heart muscle during each cardiac revolution.

A happy idea originated with the English physiologist, A. D. Waller. He saw the desirability of being able to investigate the electrical currents arising in the hearts of human beings and of uninjured animals. It occurred to him that, since the heart is surrounded on all sides by conducting media, in all probability the changes in potential occurring in the heart would also lead to changes in potential in the neighboring tissues of the body, and that by applying an electrode to a portion of the body on the right and another electrode to a portion of the body on the left the action currents due to differences of potential between the base of the heart and the apex of the heart could be led off and measured by introducing a galvanometer into the circuit between the two electrodes. At the time of Waller's experiments the most accurate galvanometer was the mercury-electrometer (the best form of which is Lippmann's), and Waller obtained curves called electrocardiograms from the human heart by the use of this instrument. Owing to the inertia of the mercury, however, the most delicate changes in the electrical potential could not be recorded, and even those changes recorded had to undergo correction by mathematical calculation in order that a true form of curve could be obtained.

An enormous advance in electrocardiography was made in 1903, when the Dutch physiologist, Einthoven, devised his so-called string galvanometer. This is a truly remarkable instrument, and one of the most delicate instruments of precision yet introduced into physiological or clinical work. It is based upon the principle that an electric current passing through a magnetic field undergoes deflection in one or the other direction, according to the direction in which the current flows. Einthoven stretches a most delicate thread (fastened at two ends like the string of a musical instrument) midway between the poles of a powerful magnet and connects the ends of the thread by wires with the electrodes, which lead off the action current from the surface of the body. As the electrical changes take place in the heart