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History

Augustus Desiré Waller (1856–1922)—The First to Record the Electrical Activity of the Human Heart

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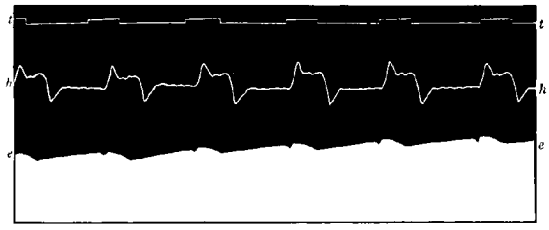
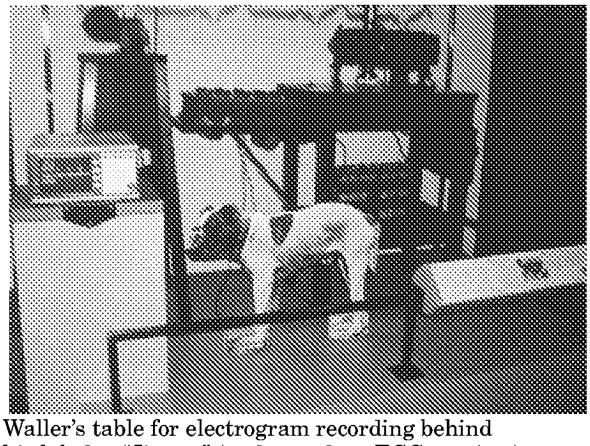
A.D. Waller in his laboratory with lab dog "Jimmy".

Augustus Desiré Waller was born in Paris on July 12, 1856, the son of the celebrated physiologist Augustus Volney Waller. After studying medicine at the universities in Aberdeen, Edinburgh and Leipzig, Waller was made a professor in Aberdeen in 1881. He worked first in the physiology laboratory in London under Burdon-Sanderson and gave lectures on physiology at the London School of Medicine for Women. Waller held the same position for 16 years at the Medical School of St. Mary's Hospital. He was named director of the physiology laboratory of the University of London in 1902. A.D. Waller died in London on March 11, 1922.

Waller primarily studied the electrical phenomena of the heart. As early as 1887, he was able to obtain an electrocardiogram (ECG) from the body surface of a human being with the aid of a Lippmann capillary electrometer. Although the clinical significance of this ECG was not recognized at the time, Waller's work nevertheless laid the foundation for modern electrocardiography.



The first human ECG, recorded by A.D. Waller in 1897.



Waller's table for electrogram recording behind his lab dog "Jimmy" (and a modern ECG moniter). The Bakken. A Library and Museum of Electricity in Life, Minneapolis MN, U.S.A.

Waller found that electrical currents generated by the heart could be recorded with a mercury capillary electrometer when the electrodes were placed on the chest or the limbs. The capillary electrometer was devised in 1873 by Gabriel Lippmann (1845–1921): it consists of a glass tube containing mercury with one end drawn out into a fine capillary (20 to 30 mμ) and immersed vertically in dilute sulfuric acid. Measurement is based on displacement of the mercury meniscus because mercury contracts and expands according to the potential difference between the mercury and acid which are connected to electrodes on 2 points on the body.

Waller's classic demonstration of the human ECG (called the electrogram at the time already) from the intact human heart took place at St. Mary's Hospital, London, in May 1887 with surface electrodes strapped to the front and back of the chest. There were only two distorted deflections: ventricular depolarization and repolarization. The P wave was not discernible with the 1887 apparatus. This historic event in 1887 was also witnessed by Einthoven. The following year, Waller recorded the ECG by using saline jars in which the extremities were immersed. Einthoven, himself, credited Waller with the first human ECG.