Harold Ensign Bennet Pardee

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Harold Ensign Bennet Pardee (1886–1973) (Fig. 1) was born in New York City on December 11, 1886, the son of Dr. Ensign Bennet Pardee and Clare Burton Pardee.1, 2 He received his A.B. degree from Columbia College in 1906, at the age of 18, and his M.D. from the College of Physicians and Surgeons in 1909. During three years of postgraduate training at The New York Hospital, he became interested in diseases of the heart under the guidance of Lewis A. Conner and of Horatio Burt Williams, who introduced one of the earliest string galvanometers (the electrocardiograph) into American practice. Pardee began working in the Medical Clinic of The New York Hospital in 1912. He served in the Army Medical Corps during the First World War and spent time at Colchester in the United Kingdom at the heart hospital established by Thomas Lewis to deal with the prevalent problem of “soldier’s heart.”

Pardee is best known for his pioneering research on the electrocardiographic (ECG) recognition and characterization of myocardial infarction and ischemia. “An electrocardiographic sign of coronary artery obstruction” was published in the Archives of Internal Medicine in 1920, 3 at a time when there was increasing interest in the role of the ECG in the evaluation of coronary occlusion. In 1918, Fred Smith in Chicago had reported ECG repolarization changes that accompanied ligation of the coronary arteries in dogs.4 The following year, James B. Herrick, also from Chicago, published a paper in which T-wave inversion in a 42-year-old physician, studied 6 weeks and also 6 months after clinical coronary occlusion, was noted to be similar to the experimental findings of Smith.5

Pardee’s 1920 paper is historically important because it contained the first clear description of the typical evolution of ECG findings in myocardial infarction in humans. He made several significant observations in this paper. Perhaps most notable is Pardee’s clear description of transient ST-segment elevation during the acute phase of infarction, which he described as a takeoff of the T wave from the descending ST-segment elevation above the ECG baseline. Paul Dudley White later called this finding “Pardee’s sign.”

The main emphasis of Pardee’s paper, however, was on the evolution of more persistent symmetric T-wave inversion with a shortened ST segment during the later phases of infarction, as previously observed by Smith and by Herrick.4, 5 Pardee believed the finding was characteristic of old thrombosis, and he called this ECG abnormality the “coronary T wave.” Today, this T-wave inversion would be interpreted as chronic localized ischemia. His paper also included a careful review of a series of about 1,000 ECGs, presumably assembled from hospital and patient records. Within this group he identified four additional cases of the “coronary T wave,” and in each case the patient had a history consistent with coronary artery disease. Pardee was working only with the three standard limb leads. In this paper, he erroneously attributed the axis shift associated with localized necrosis (as a result of what would now be considered pathologic Q waves) to ventricular hypertrophy secondary to infarction.

During the subsequent two decades, Pardee made periodic contributions to the literature on ECG recognition of the varied manifestations of coronary artery disease. He dedicated the first edition of his text, Clinical Aspects of the Electrocardiogram, published in 1924, to Horatio Williams.6 This book was well received, and new editions appeared in 1928, 1933, and 1941. Summarizing progress in the ECG recognition of coronary occlusion in the third edition, Pardee observed that “if records are taken soon enough and are taken frequently, a special series of changes will be found in about 90 per cent of patients suffering from this condition.” He noted that soon after occlusion, the part of the curve that is most strikingly affected

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Received: March 28, 2005
Accepted: June 13, 2005
is the ST segment, with the typical feature being its initiation at some point above (or below) the baseline.

In his book, Pardee credits British cardiologists John Parkinson and Evan Bedford with recognizing reciprocal acute ST-segment changes in leads I and III during acute coronary occlusion, a finding they described in a 1928 paper published in Heart. He credits Barnes and Whitten with establishing the ability of the ECG to localize myocardial infarction and to predict the culprit artery. These Mayo Clinic investigators compared ECGs with autopsies and found ST-segment elevation and T inversion in lead III to be associated with posterior left ventricular infarct location and obstruction the right coronary artery; ST elevation and T-wave inversion in lead I was associated with anterior and apical left ventricular infarct location and obstruction of the left coronary artery, usually of its anterior descending branch.

Pardee explained in the 1933 edition of the ECG text that “the typical S-T deviation may appear within an hour or two of the time when the infarction occurs or may be delayed until the third day or even later,” but it then evolves to the “coronary T wave.” This characteristic T-wave abnormality, according to Pardee, could develop as early as one day following infarction, but he observed that it usually appeared five to ten days after onset of infarction. “The characteristic feature is an upward convexity of the S-T interval which carries the record at first slightly above its point of origin and then downward to form an inverted T wave.” The fourth and final edition of his ECG text, published in 1941, included a section on the value of recording the ECG from the precordium, a technique introduced in the 1930s.

Harold Pardee was active in the organizational and public health aspects of cardiology in New York City and played a national role as well. One of his mentors at The New York Hospital and at Cornell, Lewis A. Conner, was a founder and first president of the Association for the Prevention and Relief of Heart Disease, created in 1915 in New York City. Conner was a founder and first president of the American Heart Association (AHA), a national organization created in 1924. During the 1910s, cardiac clinics were established in New York, Boston, Chicago, Philadelphia, and a few other cities. Pardee was active in this movement and was a founding member of the Association of Cardiac Clinics in New York. He later served as president of the New York Heart Association.

In 1925, Pardee was appointed to the AHA’s Committee on Research, which was charged with developing a nomenclature for standardization of diagnosis and promotion of clinical investigation in cardiac disease. Two years later he was selected as the first chairman of the AHA Committee on Coordination of Investigation. Pardee edited the first four editions of The Nomenclature and Criteria for the Diagnosis of Diseases of the Heart and Blood Vessels, first published in 1928.

Committed to informing the public about cardiac health, Pardee published a 120-page book titled What You Should Know About Heart Disease in 1928. His goal was to inform the general public and cardiac patients about the nature of heart disease. In the preface, Pardee noted that the public’s growing interest in heart disorders was due, in part, to the recent creation of heart associations across the United States. He informed readers that atherosclerosis and rheumatic fever were the two major causes of chronic heart disease. Pardee also discussed the cardiac effects of syphilis, thyroid disease, alcohol, tobacco, diabetes, and hypertension. He maintained an active practice throughout the 1930s and 1940s, with continued commitment to the improvement of cardiac health through organizational work.

Pardee, then President of the New York Heart Association, wrote a long letter to The New York Times in 1955, in which he commented on various issues relating to research in cardiac disease. Among other observations, he noted that “the mortality and complications of attacks of coronary thrombosis and other diseases in which clotting and embolism occur have been greatly reduced by the use of anticoagulant drugs.” He profiled advances in diagnosis, surgery, and angiography. And, ever the proponent of public health research, Pardee ended by stating

I believe that I speak for my fellow officers and directors of the New York Heart Association as well as our colleagues in other cities when I say that a gift to the Heart Fund will help to prolong someone’s life—and it well might be yours or that of someone in your family.

On April 15, 1918, then Medical Corps Captain Harold Pardee married Dorothy Dwight Porter, a member of the Junior League who served as a war nurse, in Hewlett, Long Island. They had two daughters and a son and were active in New York social circles for many decades. Pardee was a sailor of Long Island waters, a regular golfer, a bridge player, a photographer, and a world traveler. His younger brother Irving Pardee was a prominent New York neurologist who married a daughter of John D. Rockefeller, Jr.
Harold Pardee remained associated with Cornell University Medical College and The New York Hospital until his retirement from private practice in 1958. Harold Stewart, a younger Cornell cardiologist, recalled Pardee as

...an impeccable dresser who was a joy to watch as he read the old type film strip electrocardiogram. A complex arrhythmia would bring out a solid gold calipers held at the end of his watch chain and these turned over and over on the strip as he tugged at one or the other side of his always neatly trimmed moustache.2

Pardee died on February 28, 1973, aged 86, at his Park Avenue home.

References
