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Hogan, Edward R.

Of the human heart.

A biography of Benjamin Peirce.

Lehigh University Press, Bethlehem, PA, 2008. 429 pp. \$80.00. ISBN 978-0-934223-93-5

This is a delightful book dealing with the life and the accomplishments of one of the most illustrious American mathematicians of the nineteenth century, Benjamin Peirce (1809-1890), who was called by Arthur Cayley "the Father of American Mathematics". It is written by the retired mathematician Edward R. Hogan, who has been working "over a period of many years" to prepare this volume. It is the work of a life, written with love— as the very title of the book already suggests— and it is dedicated to the author's wife "with my whole heart".

It is a pleasure to read this book and it is possible to learn a lot from it, not only about Benjamin Peirce but also about the launching of American science over the course of the nineteenth century. Peirce served between 1867 and 1874 as the third Superintendent of the United States Coast Survey, which was then the main scientific agency of the government. This biography is particularly welcome since until now there was no truly comprehensive study of this outstanding figure of American mathematics. The booklet of Raymond Clare Archibald [*Benjamin Peirce 1809-1880. Bibliographical sketch and bibliography*, Open Court, Chicago, 1925; JFM 51.0024.03], and the entry (updated in 2008) by Ivor Grattan-Guinness and Alison Walsh ["Benjamin Peirce", in *The Stanford Encyclopedia of Philosophy* (Fall 2008 Edition), <http://plato.stanford.edu/archives/fall2008/entries/peirce-benjamin/>] are very far from providing the rich knowledge found in this book. The author recalls in the preface that when Benjamin Peirce feared in 1864 that he was terminally ill, he wrote to his friend Alexander Dallas Bache, "if I should be taken, dearest Chief, exert all your influence to save me from eulogistic biographers". Hogan adds, "until now Peirce has fared fairly well. For 125 years he has escaped a full length biography" (p. 9). An essential ingredient of this biography is that the author relies heavily upon Benjamin Peirce's letters (with his terribly bad handwriting), the letters of his sister Charlotte Elizabeth and his correspondents. For this reason, the author humbly calls his book "a documentary biography", but for the reader it is more exactly a fully documented biography.

The career of Benjamin Peirce is carefully described, beginning with his birth into a wealthy Salem family on April 4, 1809 until his death after a painful illness in Cambridge on October 6, 1880. Throughout fifteen chapters all the steps from his early instruction at Harvard until his retirement are patiently reported, paying particular attention to Peirce's work as an astronomer, as a mathematician, and as a government employee. "Peirce was a scientific patriot. He saw the glory of America (...) in terms of the nation's becoming a world leader in science and education. By the 1840s, many Americans, especially American scientists, were determined to make American science respected. No one worked harder to raise the level of American science during this period than Benjamin Peirce" (pp. 25-26).

Despite his intense work in astronomy and geodesy, "Peirce was a mathematician at heart". Although Peirce's favorite study was pure mathematics, he had broad interests and viewed astronomy as the science "best fitted for the application and advancement" of mathematics (p. 288). At the end of his life, partially under the influence of his son Charles, "Peirce returned to his first love", with his last major mathematical work, his "Linear associative algebra" [*Amer. J. Math.* **4** (1881), no. 1-4, 97-229; [MR1505290](#); JFM 13.0082.03]: "This was not only his best work, but the first important mathematical research done by an American" (p. 289). "Humbly though it be [Peirce writes to George Bancroft], it is upon which my future reputation must chiefly rest". Peirce's definition of mathematics in the first page of his book is nowadays well known: "Mathematics is the science that draws necessary conclusions. This definition of mathematics is wider than that which is ordinarily given, and by which its range is limited to quantitative research". The last chapter, under the title "My best love", is dedicated to Peirce's family life, his wife Sarah and his children, and it is full of valuable information about the accomplishments of the members of this distinguished family. The book includes two appendices with a list of the Presidents of Harvard during Peirce's lifetime and a chronology, together with 90 pages of notes, a bibliography and an index.

[Reviewer's remarks: In a work of this type the accumulation of some minor misprints is unavoidable. For the reviewer it is really a pity that the middle name of Charles S. Peirce, son of Benjamin, is consistently misspelled as "Saunders" instead of "Sanders"; also the surname of the family "Peirce" is sometimes misspelled "Pierce".]

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