

and around Boston--and briefly in Charleston, South Carolina--but in 1861, when Eliot gave up the mathematical half of his assistant professorship to take charge of the chemical laboratories of the Lawrence Scientific School, Peirce accepted an appointment as Assistant Professor of Mathematics. He was promoted to University Professor of Mathematics in 1869, and to Perkins Professor of Astronomy and Mathematics in 1885.

After C. W. Eliot was appointed President of Harvard University in 1869, following 4 years as Professor of Chemistry at the newly founded Massachusetts Institute of Technology, he soon involved Peirce in administrative duties. Peirce was executive head of the Graduate Department from its organization in 1872, through its reorganization as the Graduate School in 1890 (when Peirce was named Dean), until 1895, when he resigned to become Dean of the Faculty of Arts and Sciences, a post he held until 1898.

As a creative mathematician, J. M. Peirce has been overshadowed by his father Benjamin Peirce and his brother C. S. Peirce, but he enjoyed a reputation as an able administrator and an excellent teacher. He traveled widely and had many interests; he was respected by all and loved by a few intimates. The following brief but varied list of his publications can only give a glimpse into the life of the man who was described by a former classmate as "a very interesting character." (The best available biographical sketches of J. M. Peirce are [Byerly 1906, Rantoul 1913, and Whittemore 1906].)

#### PUBLICATIONS OF JAMES MILLS PEIRCE

1856

The Character and Philosophy of Malebranche *Monthly Religious Magazine* 15, 373-399

This was written in 1854, when it won the Bowdoin Prize for a Resident Graduate. J. M. Peirce was at that time a student in the Harvard Law School.

This article is an excellent analysis of the philosophy of Malebranche, seen as a development of that of Descartes.

1857

*A Text-Book of Analytic Geometry; on the Basis of Professor Peirce's Treatise*, Cambridge, Mass. (John Bartlett) vii, 228 pp. + 6 plates

Peirce's textbook, the result of his 4 years spent as a tutor in mathematics at Harvard College from 1854 to 1858, was based on his father's text, although the treatment is much more detailed.

Peirce noted that he departed from the ordinary mathematical textbooks not only in the introduction of illustrations drawn from physics, but also "in sometimes following out to a considerable length merely speculative views, such as the relation between the forms of the conic sections. I cannot but think it a mistake to confine the general student to the methods of Mathematics--to drill him in processes without calling his attention to its purely intellectual value, or its importance as an instrument in Physical Science" (p. iv).

1866

Charles Russell Lowell *Harvard Memorial Biographies*, 2 vols. Cambridge, Mass. (Sever & Francis) 1, 296-327

The Harvard Memorial Biographies were of Harvard alumni who died in the Civil War. J. M. Peirce was a friend of the Lowell family, whose son, Charles Russell Lowell, Jr., was less than a year younger than Peirce.

1869

*Introduction to Analytic Geometry* (Cambridge, Mass. (Harvard Press)) 8 pp.

I have not seen this. This was apparently an outline of the course taught to Sophomores at Harvard College.

1871

*Three and Four Place Tables of Logarithmic and Trigonometric Functions* Boston 16 pp.

1873

*The Elements of Logarithms, with an Explanation of the Three and Four Place Tables of Logarithmic and Trigonometric Functions* Boston vi, 83 pp.

This publication adds instructions to the tables above, with examples showing how to use them.

1877

Quaternions *Johnson's New Universal Cyclopaedia* New York (A. J. Johnson & Son) 3, 1491-1493

[?]

General Outline of a First Course in Quaternions (Mathematics 6)  
11 pp.

1878

References in Analytic Geometry *Harvard College Library  
Bulletin* 1, 157-158; 246-250; 289-290

This is a brief summary of the work of François Viète, followed by a masterly analysis of Descartes' *Géométrie*. Priority questions are also discussed and Peirce is careful to point out the motivations Descartes found in the work of Viète and others. Peirce here shows himself to be a very able historian of mathematics.

1879

*Mathematical Tables, Chiefly to Four Figures. First series*  
Boston (Ginn & Heath) 42 pp. + fold out

This useful set of tables was reprinted at least 10 times during Peirce's lifetime.

1881

Rule Relating to the Calendar *The Harvard Register* 3, 361

Peirce accurately describes his calendar in the opening sentence: "The following rule for ascertaining the day of the week on which any date of the Christian era falls is easily carried in the memory, and may often be found useful." The calculations required are not difficult and the method is indeed memorable.

[J. M. Peirce, ed.] *Ideality in the Physical Sciences*, by Benjamin Peirce Boston (Little, Brown & Co.) vi, 211 pp.

Plans for publication of six lectures delivered by Benjamin Peirce in 1879 at the Lowell Institute in Boston were interrupted by his death on October 6, 1880. J. M. Peirce's contributions to this volume were a preface describing the origin of the lectures, footnotes citing sources he believed his father had used, and an appendix (pp. 197-211) in which he gives the views of his father on some matters not completely worked out in the lectures, principally concerning a rather dubious conjecture about the discovery of the planet Neptune.

1888

*An Outline of the Elements of Plane Analytic Geometry for the Use of Students in Mathematics C, 1887-88* Cambridge, Mass 68 pp.

Despite the modest title, this is a thorough summary of plane analytic geometry through the theory of curves of the second degree.

1891

*Remarks at the Dinner of the Harvard Club of New York, 20 February 1891* Cambridge, Mass. 11 pp.

Peirce here shows himself to be an accomplished after-dinner speaker, in an able defense of graduate study; he was in fact primarily responsible for the recent reorganization of the graduate program at Harvard University.

1892

Theoretical knowledge and practical facility in algebra: To what extent is each important in preparation for college? *School and College* 1, 535-540

Remarks before the New England Association of Colleges and Preparatory Schools, October 15, 1892.

1895

The Graduate School *Annual Reports, 1894-95* Cambridge, Mass. (Harvard University), 101-133

Peirce was executive officer of the Graduate Department of Harvard University since its establishment in January 1872, and Dean of the Graduate School from its reorganization in 1890 until 1895. This was his last report in that capacity. Besides the usual statistical information, this report is of interest for Peirce's rationale behind the newly established John Harvard Fellowships and his valedictory comments on his office.

1896

[Excerpt of a letter to John Addington Symonds] *Das konträre Geschlechtsgefühl*, by Havelock Ellis and J. A. Symonds, Hans Kurella, trans. Leipzig (Georg H. Wigand's Verlag), 277-279

This is a translation of the following publication, but appeared earlier because of the difficulty in finding a publisher in England.

1897

[Excerpt of a letter to John Addington Symonds] *Sexual Inversion*, by Havelock Ellis and J. A. Symonds London (Wilson & Macmillan), 273-275 [Reprint ed. New York (Arno Press) 1975]

This letter was published anonymously, but is undoubtedly by J. M. Peirce (see [Kennedy 1978]); it is an extraordinarily strong defense of homosexuality.

1899

Determinants of Quaternions *Bull. Amer. Math. Soc.* (2) 5, 335-337

In a review of this note, Emil Lampe [1899] called attention to some results of Peirce's extension of the theory of determinants to include quaternions, but he seems to have missed what Peirce himself saw as his principal result, namely, the connection between linear equations of quaternions and determinants of quaternions.

1903

Benjamin Peirce *Lamb's Biographical Dictionary of the United States* John Howard Brown, ed. Boston 6, 196-198

This biographical sketch of Peirce's father was published anonymously, but is known to have been written by him.

1904

On Certain Complete Systems of Quaternion Expressions, and on the Removal of Metric Limitations from the Calculus of Quaternions *Trans. Amer. Math. Soc.* 5, 411-420

This article by James Mills Peirce is original, creative, and is directly within the quaternion tradition. In fact, E. Jahnke [1904] wrote in his review: "The author attempts to awaken to new life the calculus of quaternions, in the form given it by Hamilton, through the introduction of the duality principle and the principle of homogeneous coordinates, in order to make possible an application of quaternions to the field of projective geometry, which has hitherto been closed to quaternions." (This is the entire review.)

Peirce had for many years planned to write a treatise on quaternions; this article probably represents the most original of the material planned for the treatise.

When Peirce died in 1906, two Boston newspapers reported that he was "considered the world's authority on quaternions." This may not have been literally true, but cannot have been very far wrong.

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## DISSERTATION COMPLETED: FROM ENIAC TO UNIVAC

Dr. Nancy Stern has completed her Ph.D. dissertation in the history of computing at the State University of New York at Stony Brook. The thesis is entitled "From ENIAC to UNIVAC: A Case Study in the History of Technology." For some indication of the results contained in the dissertation, interested readers should consult her forthcoming article "The BINAC," *Annals of the History of Computing*, Volume 1 Number 1, July 1979. For additional information concerning Dr. Stern's dissertation, she may be contacted at Hofstra University, Department of Administrative Computer Systems, Hempstead, New York 11550.

## DISSERTATION IN PROGRESS: RICHARD DEDEKIND

Ulrich Caesar is preparing a dissertation on Richard Dedekind's contributions to number theory and algebra. The research is being carried out at the University of Mainz under the supervision of Prof. N. N. Stuloff.