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Six Articles on James Mills Peirce

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Introduction

In the heady post-Stonewall days many of us who had just "come out" were looking for gay role models in our own profession. In particular, I hoped to find a gay mathematics professor that I could write about. Jonathan Ned Katz furnished him in 1976 in his *Gay American History* (1976). Katz published the letter from "Prof. X" that had been written to John Addington Symonds, which first appeared in *Sexual Inversion* (1897) by Havelock Ellis and Symonds, and identified its author as James Mills Peirce. But Katz's identification, while extremely likely, lacked final proof. That I set out to find, always with the idea of later publishing a scientific biography of Peirce as I had earlier done for Giuseppe Peano.

Among other places, I spent much time in the Houghton Library of Harvard College – in fact, I spent every day of one Christmas holiday there – searching through the Peirce correspondence. At first I had no luck, but on my last day there I found just the evidence I was looking for in Peirce's correspondence with Thomas Sergeant Perry. With this in hand, I wrote up my argument for Peirce's authorship of the "Prof. X" letter and submitted it to the *Journal of Homosexuality*. It was my first contact with that journal – I was later to be its copyeditor for eight years. Although I found my evidence completely convincing, in an excess of modesty, I referred to it in "The Case for James Mills Peirce" as "circumstantial". That was a mistake, since that word was often the only one remembered – as if my case were not proved. I believe it was. Men have been hanged on much slimmer evidence.

I continued to collect material for a biography of Peirce. To this end, I published in *Historia Mathematica* the brief article "Towards a Biography of James Mills Peirce," in which I asked readers for information. The article itself consisted mostly of an annotated list of Peirce's own publications. There was no response to my request for information, and it soon became clear to me that Peirce's mathematics by itself did not merit the publication of a scientific biography. Thus I gave up that project.

But Peirce had done original work in quaternions and that now-out-of-date theory had a certain historical interest. I thus put what information I had into "James Mills Peirce and the Cult of Quaternions," which was also published in *Historia Mathematica*.

(A few years later I read a similar paper, "James Mills Peirce und die Einführung der Quaternionen in Amerika," at a history of mathematics seminar in Oberwolfach, Germany.)

If Peirce was not a first-class mathematician, there is no doubt that he was a first-class teacher and administrator. I found it of interest that he and Charles W. Eliot, later president of Harvard, had together introduced the first written examinations at that institution – something that we all now take for granted. I published "The First Written Examinations at Harvard College" in *The American Mathematical Monthly*, a journal primarily read by college teachers.

Since I had labeled my evidence in "The Case for James Mills Peirce" as circumstantial, I now determined to marshal it in a more forceful way and bring it home to Harvard. The result was "A Fierce & Quixotic Ally" in *Harvard Magazine*, the publication distributed to all graduates of Harvard, where it was published with a very nice photograph of a young – and not unattractive – James Mills Peirce. Curiously, that article, which appeared near the back of the magazine, was not listed in the Table of Contents, so that many readers were unaware that it was in that issue. Other readers, who did find it, were unhappy that their college magazine had been "sullied" by its publication.

Finally, I pointed out Peirce's membership in "New England's First Mathematical Family" in a slight article in the *New England Mathematics Journal*, a journal primarily for school teachers of mathematics.

The six articles mentioned above are all included in the present publication. It is in the nature of such articles that there is much repetition in them – and for this I apologize here.

* * *

Although I had given up the idea of writing a scientific biography of Peirce, it occurred to me that I might use the material I had collected in a "fictional biography," i.e., make it the basis of a novel. Thus, on retirement from Providence College in 1986, I carried the Peirce material with me to my new home in San Francisco. But there, too, it simply sat in files – until a "first novel" contest by Alyson Publications and A Different

Light, the local gay bookstore, finally prompted me to write the novel and submit it in the contest. Alas, it did not win – the prize was publication – and I never found a commercial publisher for it. I later published *Sex & Math in the Harvard Yard: The Memoirs of James Mills Peirce* myself in 2000 and have also made it available as an ebook on my web site. I believe it gives a good historical view of the development of graduate education in New England in the nineteenth century. Some readers have complained that, since it is a "fictional" biography, it is difficult to tell truth from fiction in it, but the title of the book suggests the dividing line. Namely, the sex is all fictional; the math and related areas of Peirce's life (study, administration, teaching) are based on careful study. Readers of the following articles are urged to follow this up with a reading of the novel, if they have not already done so.

Hubert Kennedy

James Mills Peirce

Journal of Homosexuality, Vol. 4(2) (Winter 1978): 179–184

THE CASE FOR JAMES MILLS PEIRCE

Hubert Kennedy, PhD

ABSTRACT: This paper presents a circumstantial, but convincing, case that James Mills Peirce (1834–1906), professor of mathematics and first dean of the Graduate School of Harvard University, was the author of a strong defense of homosexuality, which was published anonymously in 1897.

Perhaps the strongest defense of homosexuality written by an American in the 19th century was in a letter to John Addington Symonds, published in the first English edition of *Sexual Inversion*, by Havelock Ellis and Symonds (1897). That the author of that letter, called only "Prof. X" there, was James Mills Peirce (1834–1906), at that time Perkins Professor of Astronomy and Mathematics at Harvard University, was first suggested by Jonathan Katz (1976, p. 629). New evidence has since turned up supporting Katz' suggestion.

In *Sexual Inversion* the letter is introduced as follows: "Prof. X., in a letter to Symonds (who described him as 'an American of eminence, who holds a scientific professorship in one of the first universities of the world'), has carried to the furthest extent the theory of the sexual indifference of the genital impulse, and the consequently normal nature of homosexuality" (Ellis & Symonds, 1897, p. 273). Readers may judge for themselves the extent of his views, which, by rejecting the current theories that held homosexuality to be a fault, such as the "masculine body with a feminine soul" theory of Ulrichs and the "colour-blindness of the genital sense" theory of Symonds (1969, p. 754), surpass even those of Symonds himself, who has long been thought to be one of the strongest advocates of homosexuality in the 19th century. The letter follows:

I have considered and enquired into this question for many years; and it has long been my settled conviction that no breach of morality is involved in homosexual love; that, like every other passion, it tends, when duly understood and controlled by spiritual feeling, to the physical and moral health of the individual and the race, and that it is only its brutal perversions which are immoral. I have known many persons more or less the subjects of this passion, and I have found them a particularly high-minded, upright, refined, and (I must add) pure-minded class of men. In view of what everybody knows of the vile influence on society of the intersexual passion, as it actually exists in the world, making men and women sensual, low-minded, false, every way unprincipled and grossly selfish, and this especially in those nations which self-righteously reject homosexual love, it seems a travesty of morality to invest the one with divine attributes and denounce the other as infamous and unnatural.

There is an error in the view that feminine love is that which is directed to a man, and masculine love that which is directed to a woman. That doctrine involves a begging of the whole question. It is a fatal concession to vulgar prejudice, and a contradiction to all you have so firmly adduced from Greek manners, and, indeed, I may say, to all the natural *evolution of our race. Passion is in itself a blind thing. It is a furious pushing out, not with calculation or comprehension of its object, but to anything which strikes the imagination as fitted to its need. It is not characterised or differentiated by the nature of its object, but by its own nature. Its instinct is to a certain form of action or submission. But how that instinct is determined is largely accidental. Sexual passion is drawn by certain qualities which appeal to it. It may see them, or think that it sees them, in a man or a woman. But it is in either case the same person. The controlling influence is a certain spiritual attraction, and that may lie in either. The two directions are equally natural to unperverted man, and the* abnormal *form of love is that which has lost the power of excitability in either the one or the other of these directions. It is unisexual love (a love for one sexuality) which is a perversion. The normal men love both.*

It is true enough that in primitive society all passion must have been wholly or mainly animal, and spiritual progress must have been conditioned on subduing it. But there is no reason why this subjugation should have consisted in extirpating, or trying to extirpate, one of the two main forms of sexual passion, and cultivating the other. The ac-

tual reasons were, I take it, two: (1) to reserve all sexual energy for the increase of the race; (2) to get the utmost merely fleshly pleasure out of the exercise of passion. Whether either of these reasons adds to the spiritual elevation of love may be doubted. Certainly not the second, which is now the moving influence in the matter. It is true enough that all passion needs to be unceasingly watched, because the worst evils for mankind lie hidden in its undisciplined indulgence. But this is quite as true of intersexual as of homosexual love. I clearly believe that the Greek morality on this subject was far higher than ours, and truer to the spiritual nature of man; that our civilisation suffers for want of the pure and noble sentiment which they thought so useful to the state; and that we ought to think and speak of homosexual love, not as "inverted" or "abnormal," as a sort of colour-blindness of the genital sense, as a lamentable mark of inferior development, or as an unhappy fault, a "masculine body with a feminine soul," but as being in itself a natural, pure and sound passion, as worthy of the reverence of all fine natures as the honourable devotion of husband and wife, or the ardour of bride and groom. (Ellis & Symonds, 1897, pp. 273–275; reprinted in Katz, 1976, pp. 375–376)

In addition to the maturity of its author, already indicted by his holding a professorship, we learn from the letter that he was apparently familiar with Symonds' *A Problem in Greek Ethics* (1883) and with the theory of Karl Heinrich Ulrichs, whose views he probably learned from Symonds' *A Problem in Modern Ethics* (1891). If the original of this letter could be found, that would establish authorship, but it is not known to exist, and its existence is highly unlikely. If not destroyed earlier, it was almost certainly destroyed by Edmund Gosse, to whom Symonds' papers had been left by Horatio Brown. Gosse told Symonds' granddaughter, Janet Vaughan: "Hagburgh Wright & I had a bonfire in the garden and burnt them all, my dear Janet, all except his autobiography which we have deposited in the London Library not to be available or published for 50 years" (Symonds, 1968, pp. 381–382).

Among the over 2,000 known letters of J. A. Symonds are letters to three Americans: Walt Whitman and his friend Horace Traubel, and Thomas Sergeant Perry. None of these could have been "Prof. X," since Symonds knew that none of them held a scientific professorship. We may note, however, that T. S. Perry, with whom Symonds was personally

acquainted, quite possibly shared the sentiments of that letter. At Perry's request, Symonds had sent him a copy of *A Problem in Greek Ethics*. He later sent him a copy of *A Problem in Modern Ethics*, and (he had also sent a copy of John Beddoe, MD, FRS) he wrote to Edmund Gosse on February 23, 1891: "Both reply emphatically that they agree with my conclusion & suggestions on the legal point, but that they do not think it possible for the vulgar to accept them" (Symonds, 1969, p. 554). In the same letter, he said of Perry that he was "quite one of the most learned and clearest-headed men in the USA" (p. 554).

In two of his letters Symonds mentioned another American with whom he corresponded on the subject of homosexuality. He wrote to Henry Graham Dakyns on May 20, 1891: "I have received a great abundance of interesting and valuable communications in consequence of sending out a few copies of that 'Problem in Modern Ethics.' People have handed it about. . . . The oddest information has come from 1) America, in the shape of sharply-defined acute partisanship for Urningthum, 2) London, in the shape of about twelve Ms confessions" (Symonds, 1969, p. 579). One month later Symonds wrote to Edmund Gosse, on June 22, 1891: "Here I composed an appendix to my 'Problem,' combining several new considerations brought home to me by the correspondence wh[ich] that sparely circulated essay has educed. I found a fierce & Quixotic ally, who goes far beyond my expectations in hopes of regenerating opinion on these topics, in a Prof. Pierce (?) of Cambridge Mass. He ought to be in Europe now. . . . If he crosses your path in London, look after him, & mention me. I hear he professes Mathematics" (pp. 585–586).

Now, these two letters surely refer to the same American correspondent (the spelling of whose name Symonds is apparently unsure of—the question mark is his), Symonds mentions no other such correspondent, and the descriptions admirably fit the "Prof. X" letter. Thus it is highly probable that "Prof. X'' was "Prof. Pierce(?)."

Before Katz (1976) suggested that Symonds' correspondent was J. M. Peirce, he had already been identified otherwise twice. In his biography of Henry James, Leon Edel (1969) identified Symonds' "fierce and Quixotic ally" as "the American mathematician-philosopher, C. S. Peirce" (p. 125), whereas the editors of Symonds' (1969) *Letters* identified him as "Benjamin Osgood Pierce [sic] (1854–1914), mathematician and physicist

of Harvard University (p. 579). But the first cannot be correct, since C. S. Peirce was not a professor in Cambridge and did not travel to Europe after 1883, and the editors of the *Letters* soon realized that J. M. Peirce was also professor of mathematics at Harvard, thus leaving the identification in doubt. (J. M. Peirce and C. S. Peirce were brothers. B. O. Peirce—the name is so spelled—was a distant cousin.) Katz (1976) notes that "a well-informed source says 'The only possible identification' for the individual in question is James Mills Peirce" (p. 629). The choice of J. M. Peirce was probably based on his friendship with T. S. Perry. This choice has since been confirmed by a letter from J. M. Peirce to T. S. Perry,[1] which shows that he and Symonds were indeed in correspondence. Writing from the Isle of Wight on July 13, 1891, shortly after his arrival in Europe, Peirce says: "I had a pleasant letter from Symonds just before sailing, asking me to go to see him. I mean to accomplish that, if possible. I have just been writing him." The date of this letter nearly coincides with the time Symonds expected his "fierce & Quixotic ally" to be in Europe. In fact, Peirce mentions in the letter to Perry that he had been staying in Southamptom and had gone up to London for a day or 2. Thus, the "fierce & Quixotic ally" is undoubtedly James Mills Peirce. But there is further evidence linking J. M. Peirce with the letter in question.

The author of the "Prof. X" letter was apparently familiar, as mentioned above, with Symonds' two essays: *A Problem in Greek Ethics* and *A Problem in Modern Ethics*. The first was printed in 1883 in only 10 copies; the second, in 1891 in 50 copies. But Symonds sent T. S. Perry a copy of each of these rare works. Thus "Prof. X" most probably saw Perry's copies. J. M. Peirce was a close friend of Perry—a letter from Perry to Peirce[2] on February 14, 1870, was addressed "To my dear Valentine!"—so Perry would surely have shown him the essays.

One more connection may be mentioned. After Symonds' death in April 1893, Havelock Ellis obtained permission from Horatio Brown, Symonds' literary executor, to use

1. Peirce, J. M., to Perry, T. S., July 13, 1891, bMS Am 1865 (3–5), Manuscript Collection, Houghton Library, Harvard University, Cambridge, Massachusetts. (The quotation is by permission of the Houghton Library, Harvard University.)

2. Perry, T. S., to Peirce, J. M., February 14, 1870, Special Collections, Miller Library, Colby College, Colby, Maine.

some of Symonds' material in the book on which they had been collaborating. When it appeared that there would be difficulty finding an English publisher, the book was first published in German (Ellis & Symonds, 1896). This was followed by the publication in English (Ellis & Symonds, 1897)—both of these editions containing the "Prof. X" letter. According to Ellis (1939), "It was never published in English, for at the last moment, when the English edition was already bound and on the eve of publication, the Symonds family seem to have taken alarm and Brown bought up the edition, though numerous copies nevertheless (not, of course, by my connivance nor to my benefit) succeeded in getting into circulation" (p. 351). A second edition was published that same year, but with Symonds' name missing from the title page. Thus the first English edition, with Symonds' name on the title page, was extremely rare—yet, J. M. Peirce possessed a copy of that edition (*Auction Sale*, 1909, Item No. 1390).

This, then, is the information available, linking J. M. Peirce with the "Prof. X" letter. The evidence is circumstantial, to be sure, but very convincing, and most readers will probably agree that the case for James Mills Peirce is adequately proved.

J. M. Peirce, the eldest son of Benjamin Peirce (1809–1880), who was also professor of mathematics at Harvard University and the most famous American mathematician of his day, graduated from Harvard in 1853. He then spent a year in the Law School and later graduated from the School of Divinity, but given a choice of continuing as a Unitarian minister or returning to the Mathematical Department of Harvard, where he had in the meantime been a tutor for 4 years, he accepted an appointment as assistant professor in 1861. He was full professor from 1869 and in 1885 was appointed Perkins Professor of Astronomy and Mathematics, succeeding his father, who died in 1880.

As secretary of the Academic Council from 1872 and dean of the newly organized Graduate School, 1890–1895, Peirce worked closely with his former classmate, President C. W. Eliot, in the development of the graduate program. Until his father's death he kept rooms on campus, where his friends, even among the students, were welcome to visit. His affectionate friendship with the younger T. S. Perry (at the time of the "Valentine" letter Peirce was 36, Perry 25) continued after the latter's marriage; as a new member of the St.

Bodolph Club in 1892, Perry jokingly wrote his friend Leonard Opdycke[3] that his family thought he had deserted them, since he spent so much time at the club with Peirce.

Peirce was fond of music and the theater. He was a member of the Hasty Pudding Club as a student, and later he seldom missed a Boston "first night"; he more than once visited Bayreuth for the Wagner festival, but Shakespeare was his passion, as he once said. As a mathematician, Peirce has been overshadowed by his father, Benjamin Peirce, and his brother, C. S. Peirce, but he had a reputation as an excellent teacher, and he contributed greatly to the development of the mathematical curriculum of Harvard University.

James Mills Peirce published a textbook in analytic geometry, several pamphlets of mathematical tables, and some dozen articles, ranging from a study of the philosophy of Malebranche, through a biographical sketch of a friend who died in the Civil War, to contributions to his mathematical specialty, the theory of quatcrnions. We may now add to this list a forceful statement of his advanced view of homosexuality—a view that would not become current for another three-quarters of a century.

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[PROJECTS department]

TOWARDS A BIOGRAPHY OF JAMES MILLS PEIRCE

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If there is truth in the saying that "the life of a scholar is his works" (as asserted, for example, by F. G. Tricomi [1967, vii]), there still remain two tasks facing the biographer: (1) to identify the subject's works and (2) to place them in historical context. This note is a result of the first of these tasks and is intended as part of a larger project. The list of publications of James Mills Peirce presented here is believed to be nearly complete; the annotations are intended more to identify the content of the publications than to place them historically. The author welcomes any correspondence regarding this project.

James Mills Peirce (1834–1906) was the first of the five children of Sarah Hunt (Mills) Peirce and Benjamin Peirce (1809–1880), Perkins Professor of Astronomy and Mathematics at Harvard University. Their second child was Charles Saunders Peirce (1839–1914), the noted philosopher and logician who is increasingly becoming known as a mathematician (see, for example, [Eisele 1976]). C. S. Peirce was especially trained as a scientist, but it was J. M. Peirce who followed in their father's footsteps, teaching mathematics at Harvard University for almost 50 years.

After graduating from Harvard College in 1853, Peirce attended the Law School for a year. Then in 1854 he and his former classmate (and later President of Harvard University) Charles W. Eliot were appointed Tutors in Mathematics, positions they held until 1858, when Eliot became Assistant Professor of Mathematics and Chemistry. Peirce, who had entered the Divinity School in 1857, resigned as tutor to become a proctor, a position he held until 1861. He graduated from the Divinity School in 1859 and preached in various churches in 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 1915, and Whittemore 1906].)

PUBLICATIONS OF JAMES MILLS PEIRCE

1856

The Character and Philosophy of Malebranche. *Monthly Religious Magazine* 15, 375–399.

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 Cyclopedia*, 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* 5, 561.

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), 275–275 [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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JAMES MILLS PEIRCE AND THE CULT OF QUATERNIONS

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SUMMARIES

Quaternions furnish an example of the rise and fall in popularity of a mathematical theory. Without attempting to trace its mathematical and sociological causes, this note highlights some moments in the history of this phenomenon, as well as some of the scientists involved, especially the neglected mathematician James Mills Peirce.

Die Quaternionen liefern ein Beispiel des Aufstiegs und des Falls der Popularität einer mathematischen Theorie. Ohne die mathematischen und soziologischen Ursachen zu forschen, wird hier die Glanzpunkte der Geschichte dieses Phänomens, sowie einige in Beziehung stehende Wissenschaftler, besonders der vernachlässigte Mathematiker, James Mills Peirce, dargestellt.

When James Mills Peirce died on March 21, 1906, the Boston *Herald* and *Transcript* reported that he was considered "the world's authority on quaternions." Like many newspaper obituaries, this may have been an exaggeration, but it cannot have been far wrong. After the death in 1865 of William Rowan Hamilton, the discoverer of quaternions, the "world's authority" was probably Hamilton's disciple. Peter Guthrie Tait; but by the time of his death in 1901 the quaternion star was on the decline, and quaternions have since been relegated to a small section in textbooks of modern algebra, as an example of a non-commutative division ring. There was a time, however, when mathematicians "believed" in quaternions. The present paper is an attempt to highlight this phenomenon and James Mills Peirce, one of the "true believers" in the cult of quaternions.

Although the value of quaternions was debated from the beginning, the subject also had staunch supporters, and in 1848 both the Royal Irish Academy and the Royal Society

of Edinburgh awarded Hamilton medals for his discovery. That was the year that Hamilton first lectured on quaternions at Dublin University and the year that Benjamin Peirce of Harvard University offered a course which included "Hamilton's researches respectting quaternions" [Cajori 1890, 137]. Despite the fact that Benjamin Peirce "did more than anyone else to develop interest in quaternions in the United States," he "did no creative work directly within the quaternion tradition" [Crowe 1967, 125]. Benjamin's son, J. M. Peirce, however, did original and creative work within this tradition.

James Mills Peirce, Benjamin's eldest son, was born on May 1, 1834. He graduated from Harvard College in 1853, the same year that Hamilton published his *Lectures on Quaternions*. After attending the Law School for a year, he became a Tutor in Mathematics at Harvard College. He left this position in 1858 (he was a student in the Divinity School from 1857 and graduated in 1859), but returned to teaching in 1861 when he was appointed Assistant Professor of Mathematics.

When Peirce' former classmate and fellow Tutor in Mathematics, Charles W. Eliot, was appointed President of Harvard University in 1869, he immediately promoted Peirce to University Professor of Mathematics. Thereafter, Peirce worked closely with Eliot in the development of graduate education at Harvard, a program that resulted in the founding in 1890 of the Graduate School of Arts and Sciences, of which Peirce has been called "almost the father" [Byerly 1906, 575].

There had hardly been any serious graduate study in any subject at Harvard before 1869; but in 1872 a Graduate Department was established, and the following year the first two Harvard Ph.D.'s were awarded, one to Peirce's student and later colleague, William Elwood Byerly (1849–1935). Peirce, as Secretary of the Academic Council, was the real leader of this department. He continued in this position for 18 years, until the organization of the Graduate School in 1890, when he became its first dean. In this new post "he continued with unabated zeal his work of fostering advanced scholarship" [Byerly 1906, 576].

In recalling their years together, Eliot later said: "Together we had shared the inspiration and stimulus which came from his father Benjamin Peirce as a teacher, and together we profited by his father's advice during our early professional career" [Eliot 1923, 9]. For Peirce, one "inspiration and stimulus which came from his father" was his

enthusiasm for quaternions, so that in the 1870s, when Benjamin Peirce's health began to fail, James not only assumed administrative duties in the Mathematics Department [Cajori 1890, 147], but also taught advanced courses previously offered by his father. From 1878 he was regularly teaching a two-year course in quaternions.

Another person inspired by Benjamin Peirce' enthusiasm for quaternions was Thomas Hill (1818–1891), Eliot's predecessor as President of Harvard University. Hill graduated from Harvard College in 1843, having "attained particular distinction in mathematics, and invented an instrument for calculating eclipses and occultations for which he was awarded the Scott Medal of the Franklin Institute" [Land 1933]. In a review of Hamilton's *Lectures on Quaternions* (1853), Hill wrote:

> It is confidently predicted, by those best qualified to judge, that. in the coming centuries Hamilton's Quaternions will stand out as the great discovery of our nineteenth century.... The name of Hamilton will be ... made immortal by its connection with the eternal truth revealed through him. [Hill 1857, 223–226].

The cult of quaternions at Harvard University was continued by J. M. Peirce, with an article on quaternions for *Johnson's New Universal Cyclopedia* [Peirce 1877]. It appeared several years before P. G. Tait's "Quaternions" in the *Encyclopaedia Britannica*, 9th edition, and compares favorably with it. For most of his life Peirce cherished the idea of writing a treatise on the subject, as he wrote his brother Charles on October 9, 1901: "I should be glad to finish before I die something that will be a real contribution to Quaternions and will promote its continued and more advanced study" [Eisele 1976, Vol. 3, p. 1072].

Charles S. Peirce had earlier shown that he did not share his brother's enthusiasm for quaternions [Eisele 1976, Vol. 3, p. xx]. But James' faith in the subject had been quickened in 1895 when Pieter Molenbroek of the Hague and Shunkichi Kimura of Japan (at that time a graduate student at Yale University) announced the formation of an "International Association for Promoting the Study of Quaternions and Allied Systems of Mathematics." Unfortunately, the first election of officers proved a failure. P. G. Tait was elected President, but declined to act on the ground of failing health; Kimura was elected Secretary, but in the meantime had to return to Japan, from where it was impractical to

carry out the duties of the office; and Molenbroek, who was elected Treasurer, lost his health and was unable to transact the duties of organization. Kimura and Molenbroek then asked Arthur Stafford Hathaway, Professor of Mathematics at Rose Polytechnic Institute (Terre Haute, Indiana), "to endeavor to bring the society into more active existence" [Joly 1901, 9].

The next election took place, at Hathaway's suggestion, at the meeting of the British Association in Toronto in 1897. Alexander Macfarlane was elected Secretary to replace Kimura; Molenbroek remained Treasurer, as it was hoped (in vain) that his health would improve; and it was resolved that Sir Robert Stawell Ball be requested to act as the first President. This slow process of organization drained away some of the early enthusiasm, but in the Association's "Bulletin" of March 1900 there are listed 68 members, including "National Secretaries" for 11 countries. For countries with only one member, e.g., Peano in Italy, that member was by rule the National Secretary. (The "Bulletin" was issued from Toronto. Macfarlane was then Lecturer on Mathematical Physics at Lehigh University, South Bethlehem, Pennsylvania, but gave his address as Chatham, Ontario, which was also the address of William Edwin Hamilton, son of W. R. Hamilton and editor of his posthumously published *Elements of Quaternions*.)

The stated object of the Association was "to further in every way possible the study of the calculus of vectors and related quantities." However, quaternions were neglected from the first, for the elections of Ball and Macfarlane brought into control two men who, in one way or other, had sided with the "vectorialists" in the "vectors versus quaternions" controversy in the years 1890–1894, a controversy begun by P. G. Tait's reference to J. W. Gibbs as "one of the retarders of quaternion progress." (For a discussion of this controversy, see Crowe [1967, 182–224].) Although this probably discouraged J. M. Peirce, who was listed in the first treasurer's report (1899) as having made a $5 "donation" to the new organization, he remained a member of the Association until his death in 1906. The Association continued in existence until 1913. In the "Bulletin" for that year. Secretary James B. Shaw reported the death of Macfarlane just before the Bulletin was completed and noted: "As all the terms of office expire with the end of the current year, this leaves the Association almost in a state demanding a reorganization." The reorganization seems not to have occurred and the Association apparently dissolved.

J. M. Peirce was a devoted follower of Hamilton: his brother Charles wrote in 1910 that James "remained to his dying day a superstitious worshipper of two hostile gods, Hamilton and the scalar $\sqrt{(-1)}$" [Archibald 1927, 527]. But he was not unaware of the newer "Vector Analysis." J. W. Gibbs sent Peirce a copy of his pamphlet with this title, which Peirce acknowledged on March 10, 1884, with appreciation, especially of the linear vector function. Indeed, Peirce asked for more copies for use in his class [Wheeler 1962, 222]. Peirce's plans for writing a treatise on quaternions were not realized, but his two publications in this area of mathematics were directly within the quaternion tradition. (For a list of Peirce's publications, see Kennedy [1979].)

In January 1899, Peirce (on leave of absence from Harvard University) visited his brother, Herbert Henry Davis Peirce (1849–1916), at that time First Secretary of the American Embassy, St. Petersburg, Russia. He sent from there a note on "Determinants of quaternions," which Maxime Bôcher, his colleague (and former student) at Harvard University, read for him at the meeting of the American Mathematical Society held on February 25, 1899. Only an abstract of this paper was published [Peirce 1899]; in it Peirce saw as his principal result the connection between linear equations of quaternions and determinants of quaternions. He wrote:

> The condition for quaternions [to satisfy a linear equation] are given in another (somewhat empirical) form by Hamilton. But their relation to the theory of determinants is not indicated and this seems to the writer to give the true key to the subject of linear equations [1899, 337].

Peirce's most original treatment of quaternions was his paper "On certain complete systems of quaternion expressions, and on the removal of metric limitations from the calculus of quaternions" [1904]. Here Peirce introduces 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" [Jahnke 1904, 581]. The article shows a remarkable dedication to the cause of quaternions, but the peak of their popularity had long since passed. No one thought it worthwhile to cultivate the new field thus opened up by him.

Despite the declining interest in quaternions near the turn of the century, any shadow cast on Hamilton's priority was sure to bring cries of outrage from the true believers. An example of this was the reaction to a remark of Felix Klein in a progress report on the publication of Gauss' *Werke*. Klein said there:

> And what may appear even more surprising, already in 1819 he represented the "mutations of space" (as he says); i.e., the rotation of space about the coordinate origin, together with an arbitrary similarity transformation diverging from the latter, by means of the same four parameters, which the later quaternion theory uses; he designates the four parameters taken together as a mutation scale and gives explicit formulas for the composition of two scales (therefore the multiplication of two quaternions), using for this the symbolic expression $(abcd) \cdot (\alpha\beta\gamma\delta) = (ABCD)$, and he expressly remarks that this is a case of a non-commutative process! [Klein 1898, 130–131].

(Klein was referring to the note in Gauss' *Werke*, Vol. 8, pp. 357–362.)

This brought immediate reaction from partisans of quaternions, notably P. G. Tait [1899] and C. C. Knott [1899], who warmly defended Hamilton. Knott's extreme partisanship for quaternions had been shown in the quaternions versus vectors controversy already mentioned, especially in the pages of *Nature*. He wrote there:

> That they can re-cast many quaternion investigations into their own mould does not prove their mould to be superior or even comparable to the original. Yet, in so far as they possess much in common with quaternions, the modified system used by Gibbs, Heaviside, and Macfarlane cannot fail to have many virtues [Knott 1893, 149].

Knott closed with a quotation from the poet John Milton:

> His form had not yet lost
> All her original brightness, nor appeared
> Less than Archangel ruined. [*Paradise Lost*, Bk. 1, lines 591–593].

With the passing of such true believers as Tait, Knott, and Peirce, the cult of quaternions seems to have ended, but articles advocating quaternions have continued to appear.

(See, for example, Edmonds [1974], which also includes a list of such articles.) And as Alfred Bork wrote in 1966:

> We should keep in mind that no conceptual scheme, no concept, no notation is ever completely dead; they have a habit of reappearing at later stages in the history of physics, often in very different contexts. The quaternions furnish an interesting example. Many physicists today are unaware of their existence. Nevertheless, they have had a small but persistent use in physics in the twentieth century, particularly in problems relating to quantum mechanics and quantum-field theory. Perhaps we shall again see a great resurgence of the quaternion. [Bork 1966, 211].

Or, as Milton further described the "Archangel ruined":

> But his face
> Deep scars of thunder had intrenched, and care
> Sat on his faded cheek, but under brows
> Of dauntless courage, and considerate pride
> Waiting revenge. [*Paradise Lost*, Bk. 1, lines 600–604].

NOTE

I am grateful to a referee for calling Edmonds [1974] to my attention, as well as Naiman [1974], which I have not seen. The referee writes: "This dissertation does not treat Peirce, but it does supply useful background information."

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THE FIRST WRITTEN EXAMINATIONS AT HARVARD COLLEGE

HUBERT KENNEDY

It is remarkable that the first written examinations ever demanded at the end of a year's course at Harvard College were in mathematics. It is even more remarkable that the two tutors who introduced them later held the highest offices at Harvard University: one became President and the other was the first Dean of the Graduate School. The two men were Charles W. Eliot (1834–1926) and James Mills Peirce (1834–1906).

Both Eliot and Peirce graduated from Harvard College with distinction in 1853. Eliot held second rank and Peirce ninth in a class of 88. Although both had, under the limited option then available, elected upper-level courses in mathematics, at the time of their graduation neither planned a career in teaching or mathematics. Eliot later wrote of himself:

> When I found myself a Bachelor of Arts I had no idea what profession I should follow; and after a vacation spent chiefly in travel, I returned to my father's house in Boston, and made serious efforts to supplement my college education. I joined a business college to learn bookkeeping, and took lessons in French and German, because neither at school nor at college had I been required to study these languages, or indeed been offered good opportunities to do so. [**1**, p. 97]

In the meantime, Peirce had entered the Law School. But when the opportunity of becoming a tutor (and retaining his rooms in the Harvard Yard) appeared, he did not continue his study of law, and indeed remained undecided about a final choice of career for several years. Eliot, however, had determined on a university career by the time they were appointed Tutors in Mathematics in 1854.

Peirce chose to teach the Freshman Class, the required subject for the first semester being Plane and Analytic Geometry, while Eliot taught the required Algebra to the Soph-

omores. (The following year they exchanged classes.) The two new tutors (who replaced the undoubtedly overworked Mr. Choate, who had just resigned) immediately instituted changes in the way of conducting classes and in the examinations. The change from the earlier recitation method was described by Peirce in his semiannual report to the Board of Overseers of Harvard University for the first term of the academic year 1854–55:

> In addition to the recitations, the class was required, three tines in the term, to bring in written analyses of suitable portions of the text-book, the last being an analysis of the whole book. These exercises were designed to call attention to the connections of different parts of the subject and its method of treating it used in the text-book.
>
> Problems, solvable by means of theorems contained in the text-book, were occasionally proposed to exercise and test the skills and accuracy of those who chose to attempt them. Though these problems were voluntary and received no marks, solutions of them were offered by a very satisfactory number of students. The solutions were almost always correct and complete, and, in several instances, remarkable for neatness and originality. They were returned, after being examined, with the comments of the instructor. [**3**, vol. 1, pp. 200–202]

During the second semester the Freshmen studied Plane and Spherical Trigonometry. Peirce again noted:

> The system of voluntary problems was continued; and to those who desired to attend a course of explanations was given of the methods of constructing maps. [**3**, vol. 1, p. 239]

The first written examinations were introduced by Peirce and Eliot at the end of their first year as tutors (not at the end of their second year, as stated by Henry James [5, vol. 1, p. 68]). Hugh Hawkins summed up their reasons:

> Offended by the dubious expertness and obvious absenteeism of the Overseers, the unequal difficulty of questions posed to different students, and the weight assigned to daily recitation marks, the young tutors obtained permission to substitute written examinations, which they graded themselves. [**4**, p. 15]

Although their permission had been "very reluctant," as Eliot later recalled, the Examining Committee was pleased with the result. Rev. Thomas Hill (later President of Harvard University, 1862–1868) reported for the Committee:

> The Sophomore and Freshman Classes have been exercised, once a fortnight, during the last term in a new mode of recitation; and the same mode was adopted for their examination. The class was brought together in Harvard Hall, and seated at tables in that spacious room, in such a manner as to prevent any assistance of one scholar by another. Here under the eye of tutors and proctors, each man labored for two hours; solving as many as he was able of a printed list of about twenty questions; recording his work and results in a blank book. These books were afterwards examined by the tutors and by the committee and marks were entered on the scale of merit in proportion to the number of examples performed, as well as to the correctness of results. Afterwards twelve of the best scholars in each class were orally examined but the results of this oral examination were not entered upon the scale of merit. Both classes appeared remarkably well under this severe test, and reflected great credit upon the instruction of the tutors Eliot and Peirce. [**3**, vol. 1, pp. 276–277]

As a result of this experience, the Examining Committee recommended the following year that written examinations not only be held in mathematics but be considered for other subjects as well. There was some opposition to this, of course, but as Hawkins noted:

> The new arrangement had a strong appeal to faculty professionalism, and it spread to other departments. By increased reliance on written examinations in determining rank, the faculty freed class time from graded recitations. [**4**, p. 15]

Two years later Peirce again taught the Freshman Class, and this time he attached a copy of his Trigonometry examination to his report. There were eighteen questions, of which two were on the use of logarithms and three on navigation and surveying. Here are two examples:

> No. 3. How many parts of a plane triangle is it necessary to know, in order to solve it? How many parts of a spherical triangle?...

No. 12. *Problem*. To solve a spherical right triangle, when one leg and the adjacent angle are given. [**3**, vol. 2, p. 71]

After four years as Tutor of Mathematics, Eliot advanced in his chosen academic career with an appointment as Assistant Professor of Mathematics and Chemistry. At the same time, Peirce resigned as Tutor to complete his studies in the Divinity School, which he had entered in 1857. His former classmate Edward Pearce was appointed Tutor in his place, and Peirce was given the position of Proctor, formerly held by Pearce, thus allowing him to retain his rooms in the Harvard Yard. (Indeed, this was the one constant in all of Peirce's changes; and he kept rooms in the Harvard Yard until 1880.)

After graduating from the Divinity School in 1859, Peirce preached in various churches in and around Boston, and briefly in Charleston, South Carolina. However, he was never "settled" as a Unitarian minister; and 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 remained in Harvard's Mathematical Department the rest of his life; as tutor and professor, he taught mathematics there for nearly fifty years.

Of perhaps equal importance with his teaching was Peirce's activity as administrator. When Eliot was appointed President of Harvard University in 1869, be immediately promoted Peirce to University Professor of Mathematics, and the two resumed the close collaboration that they had begun as tutors. This resulted in the further development of Harvard as a university. A Graduate Department was founded in 1872, and Peirce, as Secretary of the Academic Council, was its real leader. The first two Harvard Ph.D.'s were awarded the following year, one to Peirce's student, and later colleague, William Elwood Byerly (1849–1935). It was Byerly who later remarked that Peirce was "almost the father" of the Graduate School of Arts and Sciences, and Peirce was named its first Dean when it was founded in 1890. After five years in this position, he became Dean of the Faculty of Arts and Sciences for the next three years.

Eliot later recalled this period of their collaboration:

> He became in the College Faculty a steady advocate of every measure which enlarged the freedom of students and increased advanced instruction in Harvard College. His influence in the College Faculty was strong, partly because he was visibly disinterested, and partly because he was an ardent speaker and formidable antagonist in debate.... He had the vision of the new university, and was a strong member of the group that worked for it. [**2**, p. 9]

The story of Charles W. Eliot's long tenure as President of Harvard University, from 1869 until 1909, has been excellently told by Hawkins [**4**] and James [**5**] and need not be repeated here. Peirce's story is not so well known, since he has been overshadowed by his father, Benjamin Peirce (1809–1880), also professor of mathematics at Harvard and the most famous American mathematician of his day, and by James's brother, Charles S. Peirce (1839–1912), the mathematician-philosopher, who is often considered America's most original thinker. Though without the mathematical genius of his father, J. M. Peirce clearly surpassed him as a teacher; and although James was not as original as his irascible brother Charles, he was by far the more lovable.

While still a tutor, Peirce showed ability as a teacher, and he used his experience to write a textbook in Analytic Geometry [**8**]. This book was first used by him in the fall of 1857; it was successfully used at Harvard for many years. Apart from several small volumes of mathematical tables, this remained his only book.

For many years Peirce cherished the project of writing a treatise on quaternions, but he never accomplished it. His father had been an enthusiastic champion of this subject and, as early as 1848, offered a course that included "Hamilton's researches respecting quaternions." When Benjamin Peirce's health began to fail in the 1870s, James not only assumed administrative duties in the Mathematical Department but also taught advanced courses offered by his father. From 1878 he was regularly teaching a two-year course in quaternions.

Peirce's publications number about twenty, and only half of them deal with mathematics. (For an annotated list, see [**7**].) His most original mathematical contributions were in two articles on quaternions, in 1899 and 1904, but by then the popularity of quaternions had already passed and no one thought it worthwhile to follow up his discoveries.

Mathematics was not his only interest. When he died in 1906, the *Boston Herald and Transcript* noted that he was "considered the world's authority on quaternions" but added that Peirce, "though known as a student of higher mathematics to the world in general, was a patron of the arts, being a great lover of poetry and the theatre. He was an omnivorous reader of the poetry and literature of all races." Even less well known to the "world in general" was his interest in homosexuality. After long consideration, Peirce arrived at views that were very progressive for his time, and by 1891 he was forcefully expressing them in a correspondence with John Addington Symonds (1840–1893), historian of the Renaissance in Italy and a leading English advocate of reform of laws relating to homosexuals. (For Peirce's views on this subject, see [**6**].)

They were born within forty days of one another, but Eliot survived Peirce by twenty years. After leaving the Presidency in 1909, he continued to work for the benefit of higher education. Peirce died shortly before his planned retirement date, when he would have completed fifty years of teaching mathematics. Although not in the public eye as Eliot was, Peirce's collaboration with him contributed much to the development of Harvard University, and this collaboration began in 1854 with their appointment as Tutors in Mathematics. According to Eliot:

> As young teachers of prescribed Mathematics in the Freshmen and Sophomore years we worked together with perfect accord and cooperation. Together we introduced certain improvements in the mode of conducting recitations in Mathematics. Together we obtained very reluctant permission from the College Faculty to conduct the final examinations for each year in writing—the first written examinations ever demanded at the end of a year's course in Harvard College. [**2**, pp. 8–9]

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Reputations reconsidered

". . .fierce Quixotic ally"

As a leading nineteenth-century educator, J. M. Peirce could not publicly state his views on homosexuality. But they were far in advance of their time.

by Hubert Kennedy

When Harvard's Graduate School was founded in 1890, the deanship went to the mathematician James Mills Peirce. The appointment would not have surprised his immediate forebears, who were also distinguished academics. Benjamin Peirce, his father, the best known American mathematician of his day, had been a Harvard professor. Peirce's paternal grandfather, who was likewise named Benjamin, had been librarian of Harvard and had written the first history of the University. But these men of the nineteenth century would probably have been taken aback by their descendant's advanced views on the subject of homosexuality.

These were published anonymously in 1897, in *Sexual Inversion* by Havelock Ellis and John Addington Symonds; Peirce's authorship has only recently come to light. The language of Peirce's article is restrained, the tone academic, the import unmistakable. He wrote:

> I believe that the Greek morality on this subject was far higher than ours, and truer to the spiritual nature of man. . . . We ought to think of homosexual love, not as "inverted" or "abnormal," as a sort of colourblindness of the genital sense, as a lamentable mark of inferior development, or as an unhappy fault, a "masculine body with a feminine soul," but as being in itself a natural, pure and sound passion, as worthy of the reverence of all fine natures as the honourable devotion of husband and wife, or the ardour of bride and groom.

Peirce claimed to have arrived at his views much earlier, though he gave no date, and it appears that he was early aware of his own sexual feelings, though he never explicitly said so. Peirce's personal life was as discreet as his anonymous publication. After his death a colleague recalled in the *Harvard Graduates Magazine* that Peirce "was deeply interested in the young men around him," but gave no hint that this interest might have been sexual. Nowadays that inference would almost surely be drawn about a man who kept rooms in Harvard yard from student days until he was 46, often inviting friends to stay overnight. But such assumptions would not have been made a century ago, when homosexuals were thought to be few, and those few degenerate. (Among the case histories in *Sexual Inversion* is one of an American who, at the time of the Oscar Wilde trials, purchased photographs of Wilde, presumably with the intention of scrutinizing them for telltale signs. Even the neutral term "homosexual" was not coined until 1869, and it did not come into common use until the twentieth century.)

It is possible, of course, that Peirce was not sexually active. Certainly the club life of the period furnished many opportunities for socially acceptable male companionship. The surviving correspondence with his College classmates reveals affectionate friendships, however, and he seems to have had the deepest feelings for Thomas Sergeant Perry, a literary critic and sometime Harvard lecturer, whom Peirce first met in 1863 when Perry was a student in the sophomore mathematics class he taught. Peirce was then 29 years old, Perry eighteen. Hardly more than three letters from Peirce to Perry survive; the earliest of them, dated "Cambridge, 17 May 1873," suggests the depth of his attachment. Perry had just told him of his engagement to Lilla Cabot, Peirce wrote:

Dear Tom,

Of course I knew that tears of joy don't last long. But then they are as bitter as any when they are a shedding, & I was glad to hear that you had dried them & were enjoying the deliciousness of a clear spring sky. I am so glad you are so happy. It makes life seem less cruel to me, even if it has no mercy for me, that you have found its only joy.

I had a charming call the other day. I was received so sincerely & feelingly & in a way that seemed to make me really a sharer in your joy. Our friendship is among the things I value most in life, & I like to think that now its pleasure is to be heightened for all coming time. I am apt to

dread my friends' friends, for you know how few people there are who can like or understand me. But here I feel that I have already a strength which you have given me.

Of course the above is not meant to be answered.

Your affectionate J.

The friendship continued, and Peirce often visited the Perrys, even in Europe when Tom and Lilla, who was a painter, spent summers at the artists' colony in Giverny, France. Later Peirce persuaded Perry to join the St. Botolph Club in Boston; Perry jokingly wrote his friend Leonard Updyke on February 1, 1892:

I have nothing more to do with my own happy home, it is deserted; the fire is never lit in my library; I scarcely know my children by sight. I spend all my time here wildly reveling. . . .

We are a wild set; J. M. Peirce & I especially sit up to midnt. &, as it were, personally lead the danse.

Whatever the conflicts of Peirce's emotions, he seemed outwardly at least to have led an undisturbed and rewarding life. There was some hesitancy in a choice of career—after graduating from Harvard College in 1853, he attended the Law School for a year and then transferred to the Divinity School, from which he graduated in 1859—but after accepting the offer of an assistant professorship in mathematics in 1861 (he had also been a tutor in mathematics from 1854 to 1858), he followed a career of nearly fifty years of service to Harvard.

When Peirce's classmate Charles W. Eliot was appointed president in 1869, he immediately promoted Peirce to University Professor of Mathematics. Thereafter Peirce worked closely with Eliot in the development of graduate education at Harvard, a program which resulted in the founding, in 1890, of the Graduate School of Arts and Sciences—of which, as W. E. Byerly later wrote, Peirce was "almost the father." Indeed, as secretary of the Academic Council, Peirce had been the leader of the graduate department since 1872, and with the formal founding of the Graduate School he was named its first dean. He held this position for five years, and was then dean of the Faculty of Arts and Sciences for three years.

Peirce's interests were not all academic. As an undergraduate, for example, he was a member of the Hasty Pudding Club and during his senior year appeared in several of its productions, playing Bradshaw in *Grimshaw, Bragshaw, and Bradshaw*, Mrs. Box in *Box and Cox, Married and Settled*, Letitia Ogle in *Matrimonial Difficulties*, Benjamin Blowhard in *Slasher and Crasher*, and Tinsel John and Mustache Strappado in *The Widow's Victim*. Peirce also appeared as a supernumerary in Boston operatic productions. Robert Samuel Rantoul, editor of the 1913 report of the Class of '53, recalled that it was at the Boston Theatre that Peirce,

> tramping about the stage as a soldier of the Roman Legion in all the pasteboard bravery of the scene, felt the strap which held his cuishes giving way and his tinsel-trappings tumbling about his feet. But the Roman Eagles never drooped. Peirce was equal to the strain. With one hand he secured his armor and with the other he held aloft, as though empires were at stake, the proud SPQR standard of the Conquerors of the World, and, while getting no aid from prompter or conductor, saved a trying situation and the honor of the class.

Peirce's numerous trips to Europe furnished many opportunities for theater and music, and he more than once attended the Wagner Festival in Bayreuth. He seems especially to have enjoyed his year's leave of absence in 1889–90, telling the Harvard Club of New York on his return:

> It was my delightful privilege to drink anew at solemn Roman fountains; to stand, for the first time in my life, on the glorious acropolis, gazing on the ardent blueness of the Saronic wave; to eat the lotus, resting on the warm and lovely bosom of the Nile, and filling myself with something of Egypt's ancient and immortal life and light.

In 1899 he was in Russia, where he discovered how good fresh caviar was there—and how good-looking the men. He wrote from St. Petersburg:

> The *godavoi*, or policemen, are the nicest looking fellows I know in that capacity in any city, as far as possible from your big powerful London bobby, & still further from the wild Irishmen of the New York street. They are rather small, active-looking young fellows, with faces beaming

good humour, without any symbols of authority or force, standing all day long in the middle of the streets to regulate traffic & help people find the way, which they do most obligingly & even affectionately, with soft-toned manly voices.

(Peirce must have misheard the name of the city policemen at that time. It was not *go-davoi* but *gorodovoi*—from *gorod*, the Russian word for "city.")

Peirce apparently preferred to travel with a companion. He wrote his brother Charles on June 27, 1889, inviting Charles and his wife to meet him in New York on the day of his departure for Europe, adding: "I want you both to dine with me at Delmonico's at seven that day with Mr. Clifford, a young friend (a bright young physicist from the Institute of Technology) who is going out with me for the summer." Peirce's companion was probably Harry Ellsworth Clifford, who graduated from M.I.T. in 1886 and joined the Harvard faculty in 1909.

Two summers later, Clifford again traveled to Europe with Peirce. A few days after their arrival in Southampton, on July 13, 1891, Peirce wrote to Perry in Giverny:

Clifford & I had a charming day walking in the New Forest. We are on this Isle for a day or two. But I don't much care for it. Then we head for Switzerland. We do not go to Bayreuth.

I had a pleasant letter from Symonds just before sailing, asking me to go to see him. I mean to accomplish that, if possible. I have just been writing him.

John Addington Symonds, the well-known historian of the Italian Renaissance, had for some time been living in Davos, Switzerland, and it is possible that Peirce visited him there, but there is no other evidence for this. Indeed, the passage just quoted is the only direct evidence that Peirce was in correspondence with Symonds. (Horatio F. Brown inherited all of Symonds's papers, and Brown left them to Edmund Gosse, who destroyed them in a bonfire. Peirce's correspondence was probably included.) The above letter makes clear, however, a reference in Symonds's letter to Edmund Gosse of June 22, 1891:

I have found a fierce & Quixotic ally, who goes far beyond my expectations in hopes of regenerating opinion on these topics, in a Prof: Pierce (?) of Cambridge, Mass. He ought to be in

Europe now . . . . or 'here' as the Americans so oddly call the whole region bounded by Atlantic, Arctic Ocean, Ural Mountains, Egean Sea, & southern Mediterranean coast-line. If he crosses your path in London, look after him, & mention me. I hear he professes Mathematics.

Symonds's "fierce & Quixotic ally" has been variously identified (as C. S. Peirce by Leon Edel in his biography of Henry James and as B. O. Peirce by the editors of Symonds's *Letters*). He was first established as J. M. Peirce by Jonathan Katz in his *Gay American History* (1976).

The topic on which Symonds found a "fierce & Quixotic ally" was, of course, homosexuality. Peirce had doubtless been introduced to Symonds's views by Perry, with whom Symonds had begun a correspondence on literary matters in 1883. Perry had visited Symonds in England in the summer of 1887, and at Perry's request, Symonds sent him copies of his privately printed essays on homosexuality, *A Problem in Greek Ethics* (1883) and *A Problem in Modern Ethics* (1891). Symonds mentioned this to Edmund Gosse in a letter of February 23, 1891, adding that Perry was "quite one of the most learned & clearest-headed men in the USA."

Perry must have shown Symonds's essays to Peirce, and it was probably this that initiated their correspondence. Symonds was very much interested in progressive opinions on homosexuality, to the extent of traveling to Aquila, Italy, in November 1891 to visit Karl Heinrich Ulrichs, one of the pioneers of "homosexual emancipation." Symonds no doubt welcomed Peirce's views and in an apparent reference to his "fierce & Quixotic ally" he wrote to Graham Dakyns on May 20, 1891: "The oddest information has come from . . . America, in the shape of sharply defined acute partisanship for Urningthum."[1]

Before his unexpected death in 1893, Symonds was collaborating with Havelock Ellis on the book *Sexual Inversion*, which was first published in English in 1897. (The delay was due to difficulty in finding a publisher: a German translation appeared in 1896.) Of interest here is Appendix D, a "Letter from Professor X" to Symonds, who described his correspondent as "an American of eminence, who holds a scientific professorship in one of the first universities of the world." This description and the contents of the letter, which is an "acute partisanship for Urningthum," fit Symonds's "fierce & Quixotic

1. Derived from Urning, a German term for a (male) homosexual coined by Ulrichs in 1862.

ally." As Symonds's only other known American correspondents were T. S. Perry, Walt Whitman, and Whitman's friend Horace Traubel, none of whom were scientific professors, all evidence points to J. M. Peirce as the author of the letter—and this is further substantiated by the auction catalogue of his books after his death, which included a copy of the rare first edition of *Sexual Inversion* with Symonds's name on the title page. (When the book appeared, Symonds's literary executor, Horatio F. Brown, who had previously given permission for its publication, bought up and destroyed all available copies, and persuaded Ellis to omit Symonds's name from the title page of all future editions.)

The ideas expressed in this letter establish Peirce as one of the most progressive advocates of homosexuality in the nineteenth century. That Peirce was unwilling to publicly state these views is entirely understandable. Even in the second half of the twentieth century what Peirce wrote is controversial. But today we can read with openness what Peirce had to think and write in secret:

I have considered & enquired into this question for many years; and it has long been my settled conviction that no breach of morality is involved in homosexual love; that, like every other passion, it tends, when duly understood and controlled by spiritual feeling, to the physical and moral health of the individual & the race. . . .

Passion is in itself a blind thing. It is a furious pushing out, not with calculation or comprehension of its object, but to anything which strikes the imagination as fitted to its needs. . . . Sexual passion is drawn by certain qualities which appeal to it. It may see them, or think it sees them, in a man or a woman. . . . The two directions are equally natural to unperverted man, and the abnormal form of love is that which has lost the power of excitability in either the one or the other of these directions. It is unisexual love (a love for one sexuality) which is a perversion. The normal men love both.

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NEW ENGLAND'S FIRST MATHEMATICAL FAMILY

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In the history of mathematics there have been many families of mathematicians. Perhaps the best known is the Bernoulli family of Basle, Switzerland, in the 17th and 18th centuries, which included several quite important mathematicians, chief among them the brothers Jakob (1654–1705) and Johann (1667–1748). Three members of the Peirce family of Cambridge, Massachusetts, deserve special recognition in this regard. They are Benjamin (1809–1880) and two of his sons: James Mills (1834–1906) and Charles Saunders (1839–1914).

Benjamin Peirce received his education at Harvard College, where his father, also named Benjamin, was librarian. In 1833 he was already "university professor of mathematics and natural philosophy," and nine years later, in 1842, he was promoted to "Perkins Professor of Astronomy and Mathematics," a position that was created for him. Benjamin enjoyed a reputation as a brilliant mathematician, but was a very poor classroom teacher, so that his son James Mills was one of the few students able to follow his lectures completely. His son Charles also appreciated his father's ability, and it was he who, after Benjamin's death, edited his most important work for publication (Peirce, B., 1881). This long article, dealing with a large number of noncommutative algebras, had been circulated in lithograph already in 1871 and must have been a result of his long championship of quaternions, the mathematical theory discovered by William Rowan Hamilton of Dublin University in 1843.

After the geometric representation of complex numbers (of the form $a + bi$, where a and b are real numbers and $i^2 = -1$) as points in a plane became widely accepted in the early 19th century, Hamilton, among others, searched in vain for an extension of this sys-

tem to three dimensions by the inclusion of another unit along with 1 and i. It is now known that the system sought by Hamilton is impossible. Hamilton himself dropped that search when, in 1843, he discovered that the system of quaternions, based on the four units 1, i, j, k, such that $i^2 = j^2 = k^2 = ijk = -1$, could be used to describe physical motion in three-dimensional space. (The price for this generalization of complex numbers is the loss of commutativity of multiplication. Hence Benjamin Peirce's later study of non-commutative algebra.)

In the 20th century the use of quaternions in the study of physics has almost entirely been replaced by vector analysis, but in the second half of the 19th century the system of quaternions enjoyed a wide popularity. One of its most enthusiastic supporters was Benjamin Peirce, who included quaternions in his lectures as early as 1848 and continued to offer courses regularly in the subject. It is of interest that he did not limit his audience to Harvard students: at the suggestion of the astronomer Maria Mitchell, professor at Vassar College, he invited her student Mary Whitney to attend the 1869–70 course in quaternions. About this time, too, Benjamin offered to teach a course in celestial mechanics if he could find three students qualified to take it. He did: Mary Whitney, James Mills Peirce, and William Elwood Byerly. Whitney later returned to Vassar College as professor of mathematics. Byerly, who received one of Harvard's first two Ph.D.s in 1873, became professor of mathematics there and was instrumental in founding Radcliffe College, the women's division of Harvard College.

Benjamin's son Charles Saunders is increasingly becoming recognized as a mathematician (see especially Carolyn Eisele's excellent edition of his mathematical manuscripts: Peirce C. S., 1976), but is perhaps best known as an original philosopher and logician. He is much better known than either his father or his brother—there is even a Charles S. Peirce Society, which is active in promoting his work—so that the concentration here is on James Mills Peirce, who continued in the tradition of their father Benjamin. Indeed, whereas Charles early rejected the usefulness of quaternions, James Mills made this his principal study, so that when, his father began to be ill in the late 1870s, James Mills was able to immediately take over his lectures on quaternions. From 1878 he regularly taught a two-year course in the subject.

James Mills Peirce graduated from Harvard College in 1853, at the age of 19, and one year later he and his classmate Charles W. Eliot were named tutors in mathematics. Together they introduced the first written examinations ever held at the end of a year's course at Harvard. This was the beginning of a collaboration that was to radically transform Harvard from a four-year college with strictly prescribed courses into the leading university we know today. At first wavering in his choice of a career—he studied law for a year and completed the three-year divinity program—Peirce accepted a position as assistant professor of mathematics in 1861. When Eliot was named President of Harvard College in 1869 he immediately promoted Peirce to University Professor of Mathematics and called on his collaboration in the development of the university, especially in the promotion of graduate study. Peirce was chief executive of the Graduate Department from its founding in 1872, and when this was formally made into the Graduate School in 1890, Peirce ("almost the father of the Graduate School," as Byerly later wrote) was named its first dean. Peirce held this position for five years and was then Dean of the Faculty of Arts and Sciences for another three years.

James Mills Peirce long had the intention to write a treatise on quaternions, but was probably discouraged by his brother Charles's rejection of the subject. He must also have been hindered by his teaching and multiple administrative duties (from the death of his father in 1880 he was also acting head of the Mathematics Department), so that he left only a few brief articles, the most original of which was an application of quaternions to projective geometry (Peirce, J. M., 1904). On his death two years later the Boston newspapers described him as "the world's authority on quaternions," but by then the popularity of the subject had passed and no one worked the new field opened up by him.

Peirce also took an interest in secondary education, as may he seen from his talk before the New England Association of Colleges and Preparatory Schools (Peirce, J. M., 1892). His major contribution to education, however, came from his collaboration with Eliot in developing the elective system and graduate study at Harvard College. His mathematical contribution was principally made in his classroom, where he enjoyed a reputation as an excellent teacher. We may thus recognize him and his brother Charles, along with their father Benjamin, as the first mathematical family of New England.

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