Todhunter, Isaac | Encyclopedia.com

(*b*. Rye, Sussex, England, 23 November 1820; *d*. Cambridge, England, 1 March 1884)

mathematics.

Todhunter was the second son of George Todhunter, a Congregational minister in Rye, and Mary Hume. Upon the death of his father, the family moved to Hastings, where his mother opened a school for girls and where Todhunter was educated in private schools. Although he is said to have been extremely backward as a child, Todhunter later made good progress under J. B. Austin, with whom he subsequently obtained employment as a schoolmaster. While teaching at schools in Peckham and in Wimbledon, he enrolled as an evening student at University College, London. In 1842 he was awarded the B.A. (obtaining a mathematical scholarship), and in 1884 he received the M.A. (with gold medal). In the same year—acting on the advice of Augustus De Morgan, professor of mathematics at University College—he entered St John's College, Cambridge, where he graduated B.A. (senior wrangler) in 1848 and was given the Smith Prize. Shortly after graduating he was awarded the Burney Prize for an essay in the field of moral science. The following year he was elected to a fellowship, and he remained at St John's College, where for fifteen years he tutored, lectured, wrote, and examined. According to the rules of the college, he resigned his fellowship upon his marriage in 1864 to Louisa Anna Maria Davies. In 1862 Todhunter was elected fellow of the Royal Society of London, and he served on the council of the society from 1871 to 1873. He was also a founding member of the London Mathematical Society.

Throughout his lifetime Todhunter gave much public service as an examiner for the University of Cambridge in moral sciences and also in the mathematical tripos; he also examined for the University of London and for the Indian Civil Service Commission. Most of his time he devoted to writing, and the formidable series of mathematical textbooks he produced established him as one of the most influential figures in mathematical education of the nineteenth century. The textbooks were full and thorough, and were written with meticulous care. Consequently they were extremely popular with schoolmasters and some titles in particular the *Algebra* (1858) and the *Euclid* (1862), had fifteen or sixteen editions. Many boys went through school and university studying mathematics entirely from Todhunter's textbooks.

Todhunter had little sympathy for the growing spirit of reform and criticism in mathematical education as evidenced in the formation of the Association for the Improvement of Geometrical Teaching (1871). He resisted all attempts to displace Euclid's *Elements* from its central position in mathematics courses. He also defended vigorously the rigors of the examination system as the only sound basis for obtaining and maintaining high standards in mathematics teaching. In *The Conflict of Studies . . .* (1873) he discussed many matters raised by the new reform movements and defended a point of view that, even at that time, was thought conservative. The attack he made on the teaching of experimental science contains the much-quoted statement, "If he [the boy] does not believe the statements of his tutor—probably a clergyman of mature knowledge, recognized ability and blameless character—his suspicion is irrational and manifests a want of the power of appreciating evidence, a want fatal to his success in that branch of science which he is supposed to be cultivating."

Although Todhunter's textbooks continued in use for many years after his death, his reputation rests on the contribution he made to the history of mathematics. The most important works are *A History of the Progress of the Calculus of Variations During the Nineteenth Century (1861); A History of the Mathematical Theory of Probability From the Time of Pascal to That of Laplace* (1865); and *A History of the Mathematical Theories of Attraction and the Figure of the Earth From the Time of Newton to That of Laplace* (1873). A further work, *A History of the Theory of Elasticity*, was published posthumously (1886–1893). In all of these works, Todhunter gave a close and carefully reasoned account of the difficulties involved and the solutions offered by each investigator. His studies and use of source material were thorough and fully documented.

In 1871 Todhunter won the Adams Prize of the Royal Society, for an essay, *Researches in the Calculus of Variations*. The subject arose out of a controversy that had been carried on in the *Philosophical Magazine* some years before, concerning the nature of discontinuity. Todhunter's thesis illuminated some special cases but was obscured by the lack of any adequate definition of continuity.

Todhunter was not an original mathematician. His textbooks were useful in mathematical education but soon became outdated; the histories are still valuable.

BIBLIOGRAPHY

I. Original Works. None of Todhunter's biographers have found it worthwhile to compile a full list of his elementary textbooks, which ran into a great many editions in his lifetime and, after his death, were revised by others so that they might continue to be useful in schools. The library of St. John's College, Cambridge, contains most of these books and also a collection of journal articles. There is also a small MS collection, which includes the *Arithmetic* on which Todhunter was working immediately prior to his death.

The more important historical works of Todhunter are *A History of the Progress of the Calculus of Variations During the Nineteenth Century* (Cambridge, 1861); *A History of the Mathematical Theory of Probability From the Time of Pascal to That of Laplace* (Cambridge, 1865); *A History of the Mathematical Theories of Attraction and the Figure of the Earth From the Time of Newton to That of Laplace*, 2 vols. (London, 1873); *A History of the Theory of Elasticity and of the Strength of Materials From Galilei to the Present time*, K. Pearson, ed., 2 vols. (Cambridge, 1886–1893). Essays on education are contained in *The Conflict of Studies and Other Essays* (London, 1873). The Adams Prize essay was printed as *Researches in the Calculus of Variations* (London, 1871). Todhunter also edited George Boole, *Treatise on Differential Equations* (London, 1865) and *William Whewell*. *An Account of His Writings, With Selections From His Literary and Scientific Correspondence*, 2 vols. (London, 1876).

II. Secondary Literature. On Todhunter and his work, see J. E. B. Mayor, "In Memoriam," in *Cambridge Review*, **5** (1884), 228, 245, 260; E. J. Routh, in *Proceedings of the Royal Society*, **37** (1884), xxvii–xxxii; and A. Macfarlane, *Lectures on Ten British Mathematicians of the Nineteenth Century* (New York, 1916), 134–146.

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