

Salmon, George | Encyclopedia.com

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(*b.* Cork, Ireland, 25 September 1819; *d.* Dublin, Ireland, 22 January 1904)

mathematics.

Salmon's father, Michael Salmon, was a linen merchant; his mother, Helen, was the daughter of the Reverend Edward Weekes. After early schooling in Cork he entered Trinity College, Dublin, in 1833 to read classics and mathematics. He graduated in 1838 as first mathematical moderator. He was elected a fellow of Trinity College in 1841 and, as required by college statutes, took Holy Orders in the [Church of Ireland](#). In 1844 he married Frances Anne, the daughter of the Reverend J. L. Salvador; they had four sons and two daughters.

The main burden of teaching in Trinity College was then borne by the fellows, and Salmon spent twenty-five years as a lecturer and tutor—mainly in the mathematical school, but also to a lesser extent in the divinity school. During this period he published some forty papers in various mathematical journals and wrote four important textbooks.

Over the years Salmon became frustrated by the heavy load of tutoring and lecturing, much of it of an elementary kind, and was disillusioned because he was not made a professor, a promotion that would have relieved him of most of this load and given him more time for his research. It must have been this which influenced him, in about 1860, to turn away from mathematics toward the theological studies in which he had always been interested—and which appeared to offer better prospects of promotion. In fact, in 1866 he was appointed regius professor of divinity and head of the divinity school, a post that he held for twenty-two years. During this period he published four more books; they earned him a reputation as a theologian that was as great as the one he already had as a mathematician.

In 1888 Salmon was appointed provost of Trinity College. He remained an administrator for the rest of his life. He was a good and much-loved head of his college, although he had become a strong conservative in his old age, so that his provostship was a period of consolidation in the college rather than one of reform.

When Salmon joined the staff of Trinity College in 1841, its mathematical school was already internationally known and his colleagues included the well-known scholars Rowan Hamilton, James MacCullagh, Charles Graves, and Humphrey Lloyd. There was a strong bias toward synthetic geometry in the school, and it was in this field that Salmon began his research work, although he shortly became interested in the algebraic theories that were then being developed by Cayley and Sylvester in England and by Hermite and later Clebsch on the Continent. Salmon soon joined their number, and played an important part in the applications of the theory of invariants and covariants of algebraic forms to the geometry of curves and surfaces. He became a close friend of both Cayley and Sylvester and exchanged a voluminous mathematical correspondence with them for many years. His chief fame as a mathematician, however, rests on the series of textbooks that appeared between 1848 and 1862. These four treatises on conic sections, higher plane curves, modern higher algebra, and the geometry of three dimensions not only gave a comprehensive treatment of their respective fields but also were written with a clarity of expression and an elegance of style that made them models of what a textbook should be. They were translated into every western European language and ran into many editions (each incorporating the latest developments); they remained for many years the standard advanced textbooks in their respective subjects.

Salmon's own most important contributions to mathematics included his discovery (with Cayley) of the twenty-seven straight lines on the cubic surface, his classification of algebraic curves in space, his investigations of the singularities of the ruled surface generated by a line meeting three given directing curves, his solution of the problem of the degree of a surface reciprocal to a given surface, his researches in connection with families of surfaces subjected to restricted conditions, his conditions for repeated roots of an algebraic equation, and his theorem of the equianharmonic ratio of the four tangents to a plane cubic curve from a variable point on it.

When his investigations called for it, Salmon was an indefatigable calculator. The most famous example of this was his calculation of the invariant E of the binary sextic, which he published in the second edition (1866) of his treatise on modern higher algebra and which occupied thirteen pages of text.

BIBLIOGRAPHY

I. Original Works. The [Royal Society Catalogue of Scientific papers](#), V. 381–382; VII, 819, lists fortyone memoirs by Salmon published between 1844 and 1872. His mathematical textbooks are *A Treatise on Conic Sections (Dublin, 1848)*; *A Treatise on the Higher Plane Curves: Intended as a Sequel to a Treatise on Conic Sections* (Dublin, 1852); *Lessons Introductory to the Modern Higher Algebra* (Dublin, 1859); and *A Treatise on the Analytic Geometry of Three Dimensions* (Dublin, 1862).

His most important theological writings are *A Historical Introduction to the Study of the Books of the [New Testament](#)* (London, 1885); *The Infallibility of the Church* (London, 1888); *Some Thoughts on the Textual Criticism of the [New Testament](#)* (London, 1897); and *The Human Element in the Gospels*, N. J. D. White, ed. (London, 1907), posthumously published.

II. Secondary Literature. On Salmon and his work, see the obituary by J. H. Bernard in *Proceedings of the British Academy*, **1** (1903–1904), 331–315; by R. S. Ball in *Proceedings of the London Mathematical Society*, 2nd ser., **1** (1903–1904), xxii–xxviii; the unsigned obituary in *Nature*, **69** (1903–1904), 324–326; and the obituary by C. J. Joly in *Proceedings of the [Royal Society](#)*, **75** (1905), 347–355. See also *The Times* (London) (23 Jan. 1904), 13; and *Dictionary of National Biography*.

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