

***MOST HONOURABLE REMEMBRANCE.
THE LIFE AND WORK OF THOMAS BAYES***

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668 pages with 29 illustrations

The author of this book is professor of the Department of Mathematical Statistics at the University of Natal in South Africa. Andrew I. Dale is a world known expert in History of Mathematics, and he is also the author of the book “A History of Inverse Probability: From Thomas Bayes to Karl Pearson” (Springer-Verlag, 2nd. Ed., 1999).

The book is very erudite and reflects the wide experience and knowledge of the author not only concerning the history of science but the social history of Europe during XVIII century. The book is appropriate for statisticians and mathematicians, and also for students with interest in the history of science. Chapters 4 to 8 contain the texts of the main works of Thomas Bayes. Each of these chapters has an introduction, the corresponding tract and commentaries. The main works of Thomas Bayes are the following:

Chapter 4: **Divine Benevolence**, *or an attempt to prove that the principal end of the Divine Providence and Government is the happiness of his creatures. Being an answer to a pamphlet, entitled, “Divine Rectitude; or, An Inquiry concerning the Moral Perfections of the Deity”. With a refutation of the notions therein advanced concerning Beauty and Order, the reason of punishment, and the necessity of a state of trial antecedent to perfect Happiness.*

This is a work of a theological kind published in 1731. The approaches developed in it are not far away from the rationalist thinking. This is not surprising because Thomas Bayes was a Presbyterian minister in Tunbridge Wells, son of the Rev. Joshua Bayes, a Nonconformist minister. As A.I. Dale comments, “...dissenters (or Nonconformists) grew disenchanted with the Established Church of England. The rise of Natural Philosophy led to an increased interest in Natural (as well as Revealed) Religion, and it was believed that the character of God could (and would) be revealed by a scientific study of His works”.

Chapter 5: **An Introduction to the Doctrine of Fluxions, and defence of the mathematicians against the objections of the author of the “Analyst”, so far as they are designed to affect their general methods of reasoning.**

Published in 1736, in this work Thomas Bayes defended the logical foundation of Newton’s calculus against the opinion of George Berkeley, the author of *The Analyst*. Dale suggests that Bayes was elected as a Fellow of the Royal Society in 1742 on the strength of this work.

Chapter 6: **A Letter from the late Reverend Mr. Thomas Bayes, F.R.S. to John Canton.** It was published in 1763 in *Philosophical Transactions of the Royal Society of London*. The fact that Bayes died in 1761 suggests that it was communicated to Canton, only after Bayes’s death. This letter is about the behaviour of the Stirling-de Moivre asymptotic series for $\log(z!)$.

Chapter 7: **An Essay towards solving a Problem in the Doctrine of Chances.**

It was published posthumously by his friend Richard Price in the *Philosophical Transactions of the Royal Society of London* in 1763. Quoting Dale, “In the introduction to the first volume of their *Breakthroughs in Statistics* Kotz and Johnson listed eleven works, up to and including Galton’s *Natural Inheritance*, that have had lasting and fundamental effects on the direction of statistical thought and practice. One of these is Thomas Bayes’s *Essay towards solving...*”. In this Essay he was the first person to formally define a method of calculating the probability of an event occurring based upon the frequency with which that event has occurred in the past.

Chapter 8: **A Demonstration of the Second Rule in the Essay towards the Solution of a Problem in the Doctrine of Chances, published in the Philosophical Transactions, Vol. LIII.** In 1764 Richard Price sent to publish this mathematical appendix or supplement to Bayes’s *Essay towards the Solution of a Problem in the Doctrine of Chances*. The first part is apparently due to Bayes himself, but the rest of the results are due to Richard Price.

Chapter 10 comprises several manuscripts of Thomas Bayes of the Library of the Royal Society: 1- a letter to John Canton on infinite series, 2- a letter to John Canton commenting on some remarks by Thomas Simpson on errors in observations and 3- some notes on electricity. It also contains a description of the main papers of Thomas Bayes in the Stanhope collection.

The contents of Chapter 11 are very interesting. They are about an anonymous notebook found in the monument room of the Equitable Life Assurance Society in London. On its first page, dated in 1747 and signed by M.E. Ogborn, it bears the following words: “This book appears to be a mathematical notebook by Rev. Thomas Bayes, F.R.S. The handwriting agrees very well with papers by him in the Canton papers of the Royal

Society, Vol. 2 p. 32.” The notebook was written in both longhand and shorthand, and in English, French and Latin. The topics discussed in the notebook are divided by Dale into several groups: 1- mathematics, 2- natural philosophy, 3- celestial mechanics and 4- miscellaneous matters. For instance, one of these “miscellaneous matters” is about the pyramid of Cheops measured by Greaves.

Chapters 2 and 3 are dedicated to the genealogy and life of Thomas Bayes. In a preceding biography, Pearson (1978) commented, “. . . it is impossible to understand a man’s work unless you understand something of his character and unless you understand something of his environment. And his environment means the state of affairs social and political of his own age.” Following these premises, Dale has done an excellent job along this book. Thomas Bayes was probably born in 1701 so that in the year 2001 the 300th anniversary of his birth was celebrated. In 1731 he became the Presbyterian Minister at the Meeting House, Mount Sion, Tunbridge Wells in Kent. Many details about his life can be also found in the paper of Bellhouse (2001), “The Reverend Thomas Bayes, FRS: A Biography to Celebrate the Tercentenary of His Birth”, *Statistical Science* 2004, Vol. 19, No. 1, 3–43. Little is known about Bayes and he is considered an enigmatic figure of the science. This book is a great contribution to the understanding of this important figure.

Chapter 12, the last, is dedicated to the burial and last wills of Thomas Bayes, and also to describe his tomb that is placed in Bunhill Fields in London, near the Royal Statistical Society head office. Dale gives a description of the inscriptions on the vault of the tomb:

Rev. Thomas Bayes Son of the said Joshua and Ann Bayes (59)
7 April 1761
In recognition of Thomas Bayes's important work in probability
this vault was restored in 1969 with contributions received
from statisticians throughout the world

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