
Stephen Hawking's A brief history of time was published 10 years ago. The book, which became a best seller, made him the best known scientist of the age. It followed a 1983 Horizon television documentary about Hawking's struggle to overcome his disabilities, which had brought him to the attention of the general public. People were fascinated by the idea that a man who was completely paralysed might be able to unlock the secrets of the universe. It was inevitable that a biography of Hawking would also become a major seller.

From White and Gribbin's biography we learn that Hawking wrote A brief history of time with the express purpose of making money. He had been diagnosed with motor neurone disease in 1963, at the age of 21, and had not been expected to live for long. In fact there were discussions about whether he might be allowed to finish his PhD in less than the 3 year minimum, because it was feared that he might not otherwise complete the degree. His health did not deteriorate as rapidly as expected however, and by the eighties he was married with children in school and university. The cost of their education would mean that Hawking and his wife Jane would have little to put aside for his future care. A brief history of time was Hawking's solution. At first he talked to the publisher of his previous books, Cambridge University Press, who offered him an unprecedented advance (for them) of £10,000. Eventually he agreed to write the book for a more commercial publisher, Bantam, who offered in excess of $100,000, but even they cannot have anticipated the success of the book, which stayed in the best-seller list for over three years.

The story of Hawking's life has become quite well known. Readers of the Gazette will doubtless be familiar with the contents of A brief history of time. What this biography also provides is the background of Hawking's ideas, explaining which parts of the theory were developed by Hawking and which parts by other cosmologists. Of the two authors, White is an accomplished biographer and Gribbin is well known as a writer of popular science books. Their collaboration has resulted in an entertaining book. Like their subject, who was advised that every equation would halve his book's sales, White and Gribbin have eschewed mathematics in their description of Hawking's work.

The second edition includes two new chapters: A brief history of time travel and Stephen Hawking: Superstar. The former describes the contribution of Hawking and others to studies of the theoretical possibility of time travel, while the latter updates readers on Hawking's life since the first edition. Hawking has tried to balance celebrity with serious work. He has associated himself with a number of causes, appeared in a BT advertisement and an episode of Star Trek: The Next Generation, and gained himself still more celebrity. The downside has been that detractors have become more numerous. What is undisputed is that Hawking has become the best known Lucasian Professor of Mathematics of all time. Even his most famous predecessor, Sir Isaac Newton, is not known to so many lay people.

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The Berlin Mathematische Gesellschaft produced this book to inform delegates to the 1998 International Congress of Mathematicians, which was held in Berlin, about the city's history as a centre of mathematics. It consists of a series of short
essays covering the period from 1700 to the present day.

The organisation of mathematics in Berlin began in 1700 with the founding of the Berlin-Brandenburg Society of Sciences (now the Academy), under the presidency of Gottfried Liebniz. Several prominent mathematicians were attracted to work at the Berlin Academy in the eighteenth century, including Euler, Johann III Bernoulli and Lagrange.

Berlin University was founded in 1810 and developed a strong mathematical reputation by appointing such luminaries as Dirichlet, Eisenstein, Jacobi and Steiner. Another key figure was Augustus Crelle, who founded the celebrated *Journal für die reine und angewandte Mathematik*. Though Crelle was a civil engineer and despite the inclusion of applied mathematics in its title, *Crelles Journal* (as it was generally referred to) became one of the leading journals for pure mathematics during the nineteenth century.

In the middle of the century the early deaths of Jacobi and Eisenstein and the departure of Dirichlet to Göttingen (where he replaced Gauss) were a setback for the development of mathematics in Berlin. However, Dirichlet's pupil Kronecker remained and the new faces included Kummer and Weierstrass. These three established a golden age for Berlin attracting young talent from all over Europe such as Cantor, Schwarz, Mittag-Leffler and Sonia Kovalevskaya.

Towards the end on the century Göttingen, under Klein, re-established its pre-eminence in German mathematics. Frobenius, who succeeded Kronecker at Berlin, tried to attract Hilbert but lost him to Göttingen when the latter created an additional chair for Hilbert's friend Minkowski. Though Frobenius and his fellow algebraist Schur built a solid algebraic tradition at Berlin, the period up to the end of the Great War was one of relative decline.

In the immediate post-war period there was a scramble among German universities to fill a number of vacant chairs. After appointing Schmidt, Berlin was turned down by Brouwer, Weyl, Herglotz and Hecke and eventually settled on Bieberbach and von Mises. Along with Schur, these three began once more to attract major talent to Berlin. Among their students were Szegö, Heinz Hopf, von Neumann, Eberhard Hopf and Brauer.

The Nazi regime had a devastating effect on German mathematics. Many Jewish scholars were dismissed and others emigrated in the face of harassment. In Berlin Bergman, Brauer and Remak lost their right to teach while von Mises and Schur emigrated. Remak was arrested, sent to Sachsenhausen concentration camp, freed to live in Amsterdam and finally taken to Auschwitz, where he was killed. In Göttingen, Landau was subjected to the humiliation of having his lectures delivered for him by his assistant Weber, a Nazi. When Landau tried to lecture himself, opposition was organised by Teichmuller, who claimed that Landau and his students were racially incompatible, and that the students would suffer intellectual degeneration. In Berlin, Bieberbach went even further, teaching a course with the title 'Great German mathematicians – a race-theoretic approach'. Berlin attracted a number of Nazi mathematicians, including Teichmuller and Weber who joined Bieberbach and Hamel (from the Technische Universität) in setting political considerations above mathematical ones.

Political considerations of a different sort dominated the post-war years. In East Berlin, the renamed Humboldt-Universität zu Berlin came under Soviet influence. Following a student initiative in West Berlin the Freie Universität was founded with financial support from the United States. The Free University had many students from East Germany, at least until the Berlin Wall went up in 1961, but no contact
with other universities in Eastern Europe. The Free University's decision to offer a chair to Levi, who had been badly treated by the Nazis, can be portrayed in two ways: as a recompense for past injustice, or as a desperate measure necessitated by the dearth of suitable candidates. Since Bieberbach was also considered for the post, it is difficult to avoid the latter point of view.

German reunification in the early nineties naturally caused a major upheaval. Although the mathematical education of students in the two halves had been broadly similar, the organisation of the universities had been rather different. The Free University continues but has lost the 'special' status it formerly enjoyed as a symbol of democratic and capitalist values in the West Berlin enclave. The two universities in East Berlin and the East German mathematical institutes have been fundamentally reorganised. The intention is doubtless to restore Berlin's mathematical reputation.

The papers that make up this book are a mixture of surveys of the mathematical activity of a generation, biographies of individual mathematicians and accounts of the various institutions. I recommend the book to anyone interested in the history of ideas and personalities. It is a relatively inexpensive paperback that should find its way onto the shelves of many libraries and individuals.

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Jacques Hadamard (1865 – 1963) is perhaps best known to the majority of Gazette readers as one of the two men who proved the Prime Number Theorem. His paper appeared in 1896, the same year as Charles Joseph de la Vallée Poussin's proof. However, applied mathematicians would argue that he was one of the great mathematical physicists. Some might point to other aspects of his work, for he ranged over a breadth of topics which is unknown in the modern era of specialisation. For example, his published books cover elementary geometry (two textbooks), complex functions, fluid dynamics, calculus of variations, partial differential equations, analysis (another textbook) and the nature of mathematics.

Hadamard's status as one of the most prolific mathematical writers is only partially explained by his longevity. He continued to work well into his eighties (his last mathematical paper being published in 1957) and, in his prime, he published up to a dozen papers a year. Despite the volume of his mathematical work, he also found time to get involved in public affairs, especially after the Dreyfus affair (see [1] for an account of the Prime Number Theorem and the Dreyfus affair).

Jacques Hadamard, a universal mathematician combines a well researched biography with an expository account of some of Hadamard's fundamental work. The first 8 chapters, which describe Hadamard's life and the broad sweep of his ever-changing interests, include many quotations from other mathematicians such as Einstein, Julia, Mittag-Leffler, Steklov and Weil, and excerpts from letters written by or to Hadamard. The text is lightened by the generous use of photographs and illustrations as well as a number of insights into Hadamard's character from his youngest daughter Jacqueline.

In the remainder of the book Hadamard's mathematics is described in more depth: Analytic Function Theory; Number Theory; Analytical Mechanics and Geometry; Calculus of Variations and Functionals; Elasticity and Hydrodynamics; and Partial Differential Equations each have a chapter devoted to them.