

As a summary, one would have wished to get a systematic evaluation of the career patterns and professional profile of the mathematicians presented in this book. One has to be content with the short concluding remarks in the introduction: the common denominator of mathematics in Stuttgart has been its positive and active relation to applications and to technology in particular. In fact, it is the merit of this book to have shown that the anti-mathematical movement had not been right.

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Lewis Carroll in Numberland. His Fantastical Mathematical Logical Life

By Robin Wilson. New York/London (Norton). 2008. ISBN 978-0-393-060270. 208 pp. 100 illustrations. US\$24.95

Lewis Carroll in Numberland: His Fantastical Mathematical Logical Life is the first book about the life of Charles L. Dodgson (Lewis Carroll, 1832–1898) that is centered on him as a mathematician rather than as a literary figure. Written for the general reader, the story that unfolds is rich in biographical detail and illustrated with many images of his work that have not appeared in any previous publications. The panoramic picture that Wilson draws of Oxford University in the second half of the 19th century, where Dodgson lived all of his adult life, captures the mood of one of England's oldest and most famous universities.

Robin Wilson is a gifted university mathematical lecturer and this talent is evident in the way he handles the mathematical topics that Dodgson worked on. The reader who is inclined to skip over mathematical content instead will find herself absorbed by the clear explanations of the examples Wilson has selected. For the first time, we see in one place almost all of the major areas of mathematics that interested Dodgson: number theory, algebra, geometry, voting theory, cryptology, logic; and to these he contributed his own novel ideas. However, except for two of the 13 “pillow problems” that Wilson includes in the final chapter, Dodgson's published work on probability theory is not discussed: eleven more pillow problems were devised between 1876 and 1893, in which he became involved with the controversy between frequentist logicians like John Venn and the more Bayesian probabilist William Whitworth; there is also the extended commentary on a probabilistic problem that had appeared in the mathematics section of *The Educational Times* between 1885 and 1889, to which Dodgson added a related problem.

The structure of the book, “An Agony in Eight Fits”, is modeled after Carroll's great nonsense poem, *The Hunting of the Snark*, from 1876. In the eight fits Wilson entwines Dodgson's whimsical pieces with his mathematical work so that the reader comes away with an understanding of how the literary pieces infuse the mathematical ones and how the mathematical pieces inform the literary ones.

The introductory chapter deals with the mathematical ideas that appeared in the Alice books, in the Snark book, and in the less well-known books, *Sylvie and Bruno* (1889), and *Sylvie and Bruno Concluded* (1893). Wilson returns to these books in his discussions of various mathematical topics in later chapters. Dodgson's early life in Daresbury and Croft is described in the first chapter and we learn that he showed a gift for mathematics as a 12-year-old pupil at Richmond Grammar School. Archibald Tait (later Archbishop of Canterbury), the headmaster of Rugby School where Dodgson was sent at the age of 14, held a high opinion of Dodgson's abilities. In the second chapter, Dodgson's life at Christ Church, one of Oxford University's best known colleges, unfolds. He had entered in 1850 and received his B.A. in 1854, finishing at the top of his class in mathematics which he had elected to study, but achieved only a third class degree in the required part of the examinations on classical languages, literature, and ancient history and philosophy.

In the chock-full third chapter we learn about many different aspects of Dodgson's life beginning in 1855 with his teaching at two schools for boys, where he used mathematical puzzles and tricks to enliven his lessons, and his appointment as the Mathematical Lecturer at Christ Church. Around the same time, he published some of his well-known poems, parodies, and short stories. He also began to develop his serious interest in the newly-invented photography that ultimately led to his modern reputation as one of the finest 19th-century photographers of children. This talent allowed him to make the acquaintance of—and to photograph—famous people in the arts and in politics. In this period too, he developed an interest in cryptography beginning with the two polyalphabetic ciphers that he invented in 1858: the key-vowel cipher, a type of Vigenère cipher, and the matrix cipher, a mathematically based Variant Beaufort cipher. These were unnamed until they were discovered in the early 1990s. Ten years later, he created another Vigenère cipher (calling it the alphabet cipher) and a Beaufort cipher that he called the telegraph cipher. By 1875 Dodgson had lost interest in the secure transmission of messages, so he used his fifth and last cipher, *Memoria Technica*, discussed in chapter six, first as a way to remember the mantissas of logarithms—because he had determined that just 26 of these had to be remembered in order to obtain the logarithm of any number correct to seven decimal places without the use of tables—and then as a method for remembering names and dates.

The fourth chapter deals almost entirely with Dodgson's publications on Euclid's geometry and related issues, including the ongoing debate about the use of Euclid's *Elements* as a text in university courses. Here we meet Dodgson's equivalent and unusual closed form of the Euclidean parallel postulate—one that does not involve lines and their "behavior" at infinity, which he claimed was unknowable—that he published in his book *Curiosa Mathematica, Part I* in 1888.

Two quite disparate topics are discussed in the fifth chapter. The first is Dodgson's publication, *An Elementary Treatise on Determinants* from 1866, whose importance was first recognized in the latter part of the 20th century. Wilson clearly explains how determinants are used to solve linear equations, and he presents one of Dodgson's most influential algorithms, "condensation," which is a method of computing determinants that minimizes the computational difficulty. The second important topic in this chapter concerns his letters to child-friends. Indeed, two parodies about Oxford affairs (one of them in letter form) are good examples of Dodgson's playfulness on serious matters. To set things straight it is worth quoting Wilson's comments about Dodgson's friendships with children.

In common with many of his generation, he regarded young children as the embodiment of purity and he delighted in their innocence. His vows of celibacy [he was an ordained deacon] which he took extremely seriously, would have outlawed any inappropriate behaviour, and there has never been a shred of evidence of anything untoward. Subjecting him to a modern 'analysis', rather than judging him in the context of his time, is bad history and bad psychology, and often tells us more about the writer than about Dodgson (pp. 108–109).

All his life Dodgson kept a letter (and parcel) register that incorporated many ideas currently used in the design of a modern database; its final entry was numbered 98,721.

In the fall of 1868 Dodgson moved into spacious rooms in the northwest corner of Christ Church's Tom Quad, where he would construct a photographic studio on the roof above. A year earlier he had been elected to the Governing Body of Christ Church, and so his involvement in the affairs of the College was no longer a matter of choice. In his chapter six, Wilson describes three pamphlets that Dodgson wrote on voting theory between 1872 and 1876 that were motivated by his experiences on the Governing Body, and which establish him as one of the great 19th-century writers on the theory of social choice. In 1881, Dodgson resigned his mathematical lectureship to give himself more time for writing. One result was an 1883 pamphlet on tennis tournaments, a topic that shares similar ideas with elections and whose principles were 50 years ahead of their time. The other was his illuminating pamphlet on parliamentary representation from 1884, a culmination of work that began in 1881 when he became interested in elections and the political scene beyond Oxford. He used this pamphlet in an attempt to influence the outcome of the redistribution bill of 1884, an attempt that ultimately failed. But in both the 1883 and 1876 pamphlets are ideas that anticipated modern game theory.

Recreational mathematics is the main topic of chapter seven, particularly his 1884 publication, *A Tangled Tale*. Wilson reproduces all ten stories, or Knots as Carroll called them, together with all the answers to the problems contained in them (in the Notes and References section). One of these, the second of three problems in Knot IX, is a variant of one of Zeno's paradoxes that Carroll would later develop as a paradox in logic and publish in the journal

Mind. There are many other intriguing puzzles that the reader can try for herself, before looking up the correct answers in the Notes and References section.

Wilson writes that as early as 6 September 1855 Dodgson noted in his diary that he had written part of a treatise on logic. This is the first reference to a subject that would occupy Dodgson's thoughts for the remainder of his life and influence all his mathematical work. In chapter eight Wilson describes many aspects of Carroll's publications on logic: *The Game of Logic* (1886), *Symbolic Logic, Part I* (1896), and the two articles published in 1894 and 1895 in *Mind*, "A Logical Paradox," and "What the Tortoise said to Achilles." Dodgson used the material in his two books to teach short courses in logic at the Oxford High School for Girls and at two of Oxford's colleges for women, Lady Margaret Hall and St. Hugh's Hall. Wilson contrasts Carroll's diagrammatic method with that of his contemporary, John Venn, discusses Dodgson's versions of the ancient Liar Paradox, and reproduces several of the delightfully funny syllogisms and the more complicated soriteses that Carroll worked with that continue to amuse us. Dodgson died before completing the second part of his symbolic logic book, and it was only when William Warren Bartley published his own edition of Carroll's *Symbolic Logic* in 1977 that included material Dodgson had left in galley form, that the novel methods he invented to handle complex arguments—the most important being a mechanical test of validity that he called the Method of Trees—became known.

The final chapter is devoted to Dodgson's work in the last decade of his life, especially *Curiosa Mathematica, Part II, Pillow Problems* (1893). These clever problems, 72 of them designed for mental calculation, are arithmetic, algebraic, geometric, trigonometric, probabilistic and analytic (i.e. involving calculus) in nature. Wilson reproduces a number of the more interesting problems across the range of topics and provides the answers to them. (The illustration on p. 204 will be corrected in the next edition.) Several more intriguing numerical and geometrical puzzles with answers are also included. Less than a month before his death, in a diary entry of 19 December 1897, Dodgson described a problem he was working on concerning triples of right triangles having the same area with sides of integer length. Almost a century later, in June 1996, the problem was completely solved.

Robin Wilson has written an important and timely book that any serious admirer of Charles L. Dodgson will want to read. His book incorporates discoveries about Dodgson's mathematical work that first appeared in print only in the second half of the 20th century. And from this new perspective we can appreciate Carroll as the only mathematician who was an even greater literary figure.

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Italian Mathematics Between the Two World Wars

By Angelo Guerraggio and Pietro Nastasi. Basel (Birkhäuser). 2006. ISBN 978-3-7643-6555-4. x+299 pp. \$119.00

At the beginning of the 20th century, the mathematical community in Italy enjoyed a comfortable position as number three in the football league of mathematical nations, behind Germany and France, and well ahead of England. The size of the community, its geographical spread, the range of research cultivated, the roles that Italian mathematicians played internationally—all these factors assured it of this position. It was also in a kind of "golden age": we need only mention such major players as Betti, Brioschi, Casorati, Cremona, Dini, Segre, Beltrami, Levi-Civita, Peano and Volterra.

This happy situation transmuted into something less than golden in the interwar years, as this book makes plain, for a multitude of reasons, the rise of fascism being the key factor. The authors do a thorough job of depicting this sad state of affairs, building on their earlier collaboration [Guerraggio and Nastasi, 1993]. The work employs a thorough examination of documentary sources to provide a picture of networks of relationships and of institutional history. In

Just when we thought we knew everything about Lewis Carroll, here comes a highly original biography that will appeal to Alice fans everywhere. Fascinated by the inner life of Charles Lutwidge Dodson, Robin Wilson, a Carroll scholar and a noted mathematics professor, has produced this revelatory book—filled with more than one hundred striking and often playful illustrations—that examines the many inspirations and sources for Carroll's fantastical writings, mathematical and otherwise. 100 illustrations. Purchase Lewis Carroll in Numberland: His Fantastical Mathematical Logical Life from Amazon.com. Dear user! You need to be registered and logged in to fully enjoy Englishtips.org. We recommend registering or logging in. "Lewis Carroll in Numberland: His Fantastical Mathematical Logical Life" by Robin Wilson W. W. Norton & Company | 208 pages | English | 2008 | ISBN: 0393060276 | PDF | 5,8 MB. A penetrating work that explores the amazing imagination and mathematical genius of the man who wrote Alice's Adventures in Wonderland. Fascinated by the inner life of Charles Lutwidge Dodson, Robin Wilson, a Carroll scholar and a noted mathematics professor, has produced this revelatory book—filled with more than one hundred striking and often playful illustrations—that examines the many inspirations and sources for Carroll's fantastical writings, mathematical and otherwise. As Wilson demonstrates, Carroll—who published serious, if occasionally eccentric, works in Lewis Carroll in Numberland His Fantastical Mathematical Logical Life An Agony in Eight Fits ROBIN WILSON Bet W. W. Norton & Company New York « London ist published 2008 by Allen Lane, an imprint of Penguin Books, London Copyright © 2008 by Robin Wilson First American Edition 2008 All rights reserved in the United States of America For information about permission to reproduce selections. from this Permissions, W. W. Norton & Company, Inc., 500 Fifth Av New York, NY 10110 For information about special discounts for bulk purchases, please contact 'W. W. Norton Special Sales at Robin Wilson is the author and editor of more than thirty books, including Four Colors Suffice and Lewis Carroll in Wonderland. He is a professor of pure mathematics at the Open University, and a Fellow of Keble College, Oxford University. He lives in London. Product details. Item Weight : 7.2 ounces. Paperback : 251 pages. ISBN-13 : 978-0393304527. Dimensions : 5.5 x 0.63 x 8.25 inches. Publisher : W. W. Norton & Company; Illustrated edition (June 14, 2010).