

Lewis Carroll | Encyclopedia.com

Complete Dictionary of Scientific Biography COPYRIGHT 2008 Charles Scribner's Sons
88-112 minutes

Dodgson, Charles Lutwidge

(b. Daresbury, Cheshire, England, 27 January 1832;

d. Guildford, Surrey, England, 14 January 1898), *mathematics*, *logic*, [political science](#). For the original article on Dodgson see *DSB*, vol. 3.

Thanks to the increasing publication and reprinting of original material and criticism since the 1950s, Dodgson's scientific work has become better known and more widely appreciated. In addition to his contributions as a teacher, popularizer, and puzzle-maker, these publications shed a new light on his social life and his original inventions in mathematics, [political science](#), and logic.

Scientific Acquaintances . Since the 1950s, the progressive publication of new original material (diaries, letters, various manuscripts), the reprint of many of Dodgson's mathematical writings, and the creation of active Carrollian societies have cast a new light on both the personality of Dodgson and his scientific achievements. This new evidence refutes the legend that he was a reclusive man who lived cloistered at Christ Church. He liked meeting the celebrities of the time (actors, scientists, royalty, poets, and painters) and took numerous photographs of them. He had many adult friends (both male and female), and more surprisingly a good deal of his so-called "child-friends" were in fact adult women. Dodgson also participated in many public debates that took place in both university and society settings, and wrote letters to journals and published pamphlets on matters as various as vaccination, teaching science at the university, child actors, and vivisection.

A look at both his published work and private writings shows that Dodgson was acquainted with the scientific players of his time and their achievements. He visited [Charles Babbage](#), met [Arthur Cayley](#), and corresponded with Henry J. S. Smith, Isaac Todhunter, John Venn, Charles Darwin, William Spottiswoode, Francis H. Bradley, and many others. The catalog of his private library shows that he owned the major works of his time in a wide range of scientific interests. Contrary to what Norman T. Gridgeman wrote in the original *DSB* entry, two purely nineteenth-century subjects ([non-Euclidean geometry](#) and [symbolic logic](#)) may illustrate Dodgson's keeping abreast of the mathematical advances of the time in Britain, but like the majority of his contemporary British mathematicians, he ignored many advances made on the continent. For instance, Francine F. Abeles shows clearly that Dodgson knew the existence of the new non-Euclidean geometries, although he did not accept them (Abeles, 1994, p. 16). Dodgson owned copies of the main works on [symbolic logic](#), which was a purely British subject at the time. In his *Symbolic Logic*, he referred to [George Boole](#), Augustus de Morgan, William S. Jevons, John N. Keynes, Venn, and the members of [Johns Hopkins University](#) (the school of [Charles Sanders Peirce](#)). In his diaries, he mentioned Boole's work on logic as early as 25 May 1876. But like his contemporary British colleagues he ignored the work of the German logician [Gottlob Frege](#).

Scientific Achievements . Dodgson's work is fully recognized in at least two areas of the mathematical sciences: the theory of determinants and the theory of voting. On the former, he invented a new rule for the evaluation of determinants by condensation in a paper that was first delivered to the [Royal Society](#) on 17 May 1866. On the latter, he published several pamphlets dealing with the issues of proportional representation, choice theory and elections, betting and rationality in tennis tournaments. Mathematicians and historians of mathematics evoke with respect Dodgson's work in logic and geometry, but in the early 2000s there was an ongoing dispute about its importance.

As a geometer, Dodgson is essentially remembered for his defense of Euclid against the new teaching methods, which flourished at the time. Euclid's rivals aimed to replace his *Elements* as a textbook for teaching geometry with other modern manuals. In *Euclid and His Modern Rivals* (first published in 1879 and then enlarged in 1885), Dodgson collected the main rival manuals, discussed them, and then claimed the superiority of Euclid's

textbook. On this matter he shared the view of some of Britain's leading mathematicians, including Cayley and de Morgan. Dodgson was, however, not completely against change: he introduced some minor modifications to Euclid in his numerous textbooks on geometry. More interesting is his *New Theory of Parallels* (1888), where he presented a new Euclidean parallel axiom.

Although he is generally considered a traditionalist logician merely concerned with recreational issues, Dodgson's writings on logic contain many original inventions that reveal a high understanding of the logical advances of his time. Dodgson signed with his pseudonym ([Lewis Carroll](#)) his two books on the subject: *The Game of Logic* (1886) and *Symbolic Logic, Part I*

(1896). These works present his new diagrammatic scheme for the representation of logical classes and propositions, which despite its numerous advantages in comparison to Venn diagrams, has been seldom used since. In 1977, William W. Bartley III published large fragments from the lost second part of Dodgson's *Symbolic Logic*, which notably included an original method for solving elimination problems with the use of logical trees. More influential are Dodgson's two contributions to the philosophical journal *Mind*: "A Logical Paradox" (1894) and particularly "What the Tortoise Said to Achilles" (1895). These two problems, dealing with hypotheticals, have been widely reprinted; they were commented on and discussed by leading logicians of the nineteenth and twentieth centuries, including Venn, Hugh McColl, Bertrand Russell, [Gilbert Ryle](#), and Willard V. Quine.

There are some other mathematical areas where Dodgson made contributions worth noting: his *Pillow Problems* (1893) included twelve interesting probability problems together with a thirteenth, controversial joke-problem in "transcendental probabilities." He also invented five cipher systems, and published numerous arithmetic methods and problems in the *Educational Times* and the journal *Nature*. Better known are Dodgson's contributions to recreational mathematics. His popular books and pamphlets; his numerous contributions to newspapers and journals; his private diaries, letters, and manuscripts; and even his literary works contain a rich collection of games, mathematical puzzles, and word plays. In the 1890s Dodgson planned to publish a book of original games and puzzles, but he never finished it. However, many posthumous compilations appeared and give a good idea of the richness of his work. Dodgson's fictional works have also been widely quoted, and their main characters (Alice, the Cheshire cat, the Red Queen, the Snark, Humpty Dumpty, Tweedledee and Tweedledum) became recurrent symbols in scientific literature.

SUPPLEMENTARY BIBLIOGRAPHY

WORKS BY DODGSON

Abeles, Francine F., ed. *The Mathematical Pamphlets of Charles Lutwidge Dodgson and Related Pieces*. New York: [Lewis Carroll Society of North America](#), 1994.

— — —. *The Political Pamphlets and Letters of Charles Lutwidge Dodgson and Related Pieces: A Mathematical Approach*. New York: [Lewis Carroll Society of North America](#), 2001.

Bartley, William Warren, III, ed. *Lewis Carroll's Symbolic Logic*. New York: Potter, 1986. A commented edition of the first and (presumed lost) second parts of Dodgson's *Symbolic Logic*.

Cohen, Morton N., and Roger Lancelyn Green, eds. *The Letters of Lewis Carroll*. 2 vols. New York: [Oxford University Press](#), 1979. A voluminous collection that however contains little in the way of letters of scientific content.

Dodgson, Charles L., ed. *Euclid. Books I, II*. London: Macmillan, 1882.

— — —. *Euclid and His Modern Rivals*. 2nd ed. London: Macmillan, 1885. Reprinted by Dover in 1973 and 2004.

— — —. *Curiosa Mathematica. Part I: A New Theory of Parallels*. 3rd ed. London: Macmillan, 1890.

Gardner, Martin, ed. *The Annotated Alice: The Definitive Edition*. New York: Norton, 2000. A good annotated edition of Dodgson's Alice tales, including "The Wasp in a Wig," a suppressed episode discovered in 1974.

Lovett, Charles C. *Lewis Carroll and the Press*. New Castle, DE: Oak Knoll Press, 1999. A descriptive bibliography of Dodgson's contributions to periodicals.

— — —. *Lewis Carroll among His Books: A Descriptive Catalogue of the Private Library of Charles L. Dodgson*. Jefferson, NC: McFarland, 2005.

Wakeling, Edward, ed. *Lewis Carroll's Diaries: The Private Journals of Charles Lutwidge Dodgson*. 9 vols. Luton, U.K.: The Lewis Carroll Society, 1993–2005. The complete version of Dodgson's surviving diaries. Richly annotated.

— — —, ed. *The Oxford Pamphlets, Leaflets, and Circulars of Charles Lutwidge Dodgson*. Charlottesville, VA: Lewis Carroll Society of North America, 1993.

Williams, Sidney Herbert, Falconer Madan, Roger Lancelyn Green, et al. *The Lewis Carroll Handbook*. Folkestone, Kent, U.K.: Dawson, 1979. The standard (but incomplete) bibliography of Dodgson's works. To be used with caution.

OTHER SOURCES

Abeles, Francine F. "Determinants and Linear Systems: Charles L. Dodgson's View." *The British Journal for the History of Science* 19 (November 1986): 331–335.

— — —. "Lewis Carroll's Formal Logic." *History and Philosophy of Logic* 26 (February 2005): 33–46.

— — —. "Lewis Carroll's Ciphers: The Literary Connections." *Advances in Applied Mathematics* 34 (May 2005): 697–708. See the *Erratum* in *Advances in Applied Mathematics* 37 (July 2006): 1. The best overview to date of Dodgson's work in cryptology.

— — —. "Lewis Carroll's Visual Logic." *History and Philosophy of Logic* 28 (February 2007): 1–17.

Bartley, William Warren, III. "Lewis Carroll's Lost Book on Logic." *Scientific American* 227 (July 1972): 39–46.

Cohen, Morton N. *Lewis Carroll: A Biography*. New York: Knopf, 1995. The best biography to date.

Englebresten, George. "Two Important Logical Insights by Lewis Carroll." In *Reflections on Lewis Carroll*, edited by Fernando J. Soto and Dayna McCausland. The Lewis Carroll Society of Canada, 2000.

Gardner, Martin. *The Universe in a Handkerchief: Lewis Carroll's Mathematical Recreations, Games, Puzzles, and Word Plays*. New York: Copernicus, 1996. A good overview of Dodgson's recreational work.

Jabberwocky. The journal of the Lewis Carroll Society since 1969. It became *The Carrollian* in 1998. Available from <http://www.lewiscarrollsociety.org.uk>.

Knight Letter. The magazine of the Lewis Carroll Society of North America since 1974. Available from <http://www.lewiscarroll.org>.

Leach, Karoline. *In the Shadow of the Dreamchild: A New Understanding of Lewis Carroll*. London: Peter Owen, 1999. A very controversial book with a brilliant discussion of the Carroll myth and a much disputed new assessment of his personal and social life.

McLean, Iain, Alistair McMillan, and Burt L Monroe, eds. *A Mathematical Approach to Proportional Representation: Duncan Black on Lewis Carroll*. Boston: Kluwer, 1996.

Moktefi, Amirouche. "How Did Lewis Carroll Become a Logician?" *Proceedings of the Canadian Society for the History and Philosophy of Mathematics* 18 (2005): 136–144.

Seneta, Eugene. "Lewis Carroll as a Probabilist and Mathematician." *The Mathematical Scientist* 9 (1984): 79–94.

Wilson, Robin. "Alice in Numberland: An Informal Dramatic Presentation in 8 Fits." *The College Mathematics Journal* 33 (November 2002): 354–377. A good overview for the general reader.

Amirouche Moktefi