Charles Lutwidge Dodgson

(Lewis Carroll)

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Biography Paper

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Introduction

A simple search on the Internet of "Charles Lutwidge Dodgson" will yield few interesting results, mostly to do with logic and mathematics. If, however, one were to search for "Lewis Carroll," a wealth of fascinating web pages would come up, filled with photographs, poetry, and nonsense. Ironically, these two seemingly irreconcilably different characters are in fact one and the same. Lewis Carroll, best known as the author of the classics *Alice's Adventures in Wonderland* and *Through the Looking Glass*, was the nom-de-plume of the mathematician and logician Reverend Charles Lutwidge Dodgson.

Early Life

Charles Lutwidge Dodgson was born on January 27, 1832, in Daresbury, Cheshire, the third child and the eldest son in a brood of eleven children. His father, the Reverend Charles Dodgson, had studied "mathematics and classics" at Oxford University and later was appointed a mathematics lecturer at Oxford where he also held a Fellowship.[1] After giving up his Fellowship at Oxford to marry his cousin Frances Jane Lutwidge in 1827, he became a curate at All Saints' Church in Daresbury. Charles Lutwidge was baptized in his father's church on July 11, 1832.[1]

In 1843, the family moved to Croft-on-Tees in Yorkshire, where his father took a position as the local vicar (and thereby substantially increasing the family income).[1] The family was able to live in a large three-storied Georgian rectory with a full garden, a luxury compared to the small accommodation they had had in Daresbury.([1];[3],8) It was in Croft that young Charles started writing poems and stories with the "Rectory Magazines," his own "publication" to which all family members where expected to

contribute.[2] Those that still survive are almost all written by Charles; those eventually published include "*Useful and Instructive Poetry* (1845; published 1954), ... *The Rectory Umbrella* (1850-1853, published in 1932), and *Mischmasch* (1853-62; published with *The Rectory Umbrella* in 1932)."[2]

Education

Throughout his childhood, Dodgson, like all his siblings, was given the rudiments of basic education by his parents.   His reading material, being the son of a minister, was understandably primarily religious in nature, and by the age of seven he had read *Pilgrim's Progress,* a remarkable feat for one so young.[1]   His love of mathematics was instilled in him by his father, and indeed Charles "looked up to his father and wished to be like him. … Not only did Dodgson model himself on his father, but his father also wanted his son to follow in his footsteps by studying mathematics at Oxford, then obtaining a Fellowship, marrying and becoming a vicar."[1]

In August 1844, Dodgson was enrolled in Richmond School, just ten miles away from home. He was a boarder student, living in the house of the headmaster, James Tate, along with his wife and six children and several other students.[3,14] Stuart Dodgson Collingwood remarked in *The Life and Letters of Lewis Carroll* that Dodgson "loved his 'kind old schoolmaster,' as he affectionately called him." The headmaster returned the compliment and reported to his parents that Dodgson possessed "a very uncommon share of genius[,] … capable of acquirements and knowledge far beyond his years, while his reason is so clear and so jealous of error, that he will not rest satisfied without the most exact solution of whatever appears to him obscure. He has passed an excellent

examination just now in mathematics, exhibiting at times an illustration of that love of precise argument, which seems to him natural."[4],24-25) Dodgson's love of mathematics was certainly fostered in the environment at Richmond, where he felt he led his peers and won many prizes. He left Richmond in November 1845.[12]

On his fourteenth birthday, Dodgson entered Rugby School, a public school of some esteem. Here Charles struggled to survive the daily rigors of the traditional bullying – or "fagging" as it was called at the time.[3],19) Although constantly miserable, he managed to keep his studies up and won a "steady stream of prizes. Again mathematics was his favorite subject, but he also excelled at divinity."[1] In the spring of 1848 he caught a case of whooping cough, which gave him a susceptibility to bronchial coughs that plagued him off and on for the rest of his life. Later that year he caught the mumps, which left him permanently deaf in his right ear.[1]

Dodgson graduated from Rugby in December 1849, and in May matriculated at (that is, enrolled in) Christ Church College Oxford, his father's alma mater. According to St. Andrew's University's MacTutor biography, due to a "shortage of accommodation … he had to return to his parent's home in Croft"[1] and wait for almost a year before starting at Oxford. On January 24, 1851, Dodgson arranged to live with the Rev. Jacob Ley, a friend of his father, but had to return home almost immediately due to the sudden death of his mother on January 26.[1] "When he returned to Oxford [after the funeral] he was filled with determination to work hard so that he might win scholarships and become financially independent. … [I]n November 1851 he was awarded a Boulter Scholarship worth £20 a year."[1] In December 1852, he received a Second Class in classics and a First Class (B.A.) in mathematics and was awarded a Fellowship. This came with £25 a year

for life and the right to live in Christ Church College. The Fellowship also required him to take Holy Orders and to remain unmarried.[1] Following his ordination, he could have gone on to become a vicar, as his father had done, and so could have married and been appointed to a parish by the college. "But," as the Encyclopedia Britannica Online states, "he felt himself unsuited for parish work and, though he considered the possibility of marriage, decided that he was perfectly content to remain a bachelor."[2]

After receiving his Fellowship, Dodgson' next goal was to obtain an appointment as a mathematics lecturer in Oxford (with its stipend of £200 a year), again following in his father's footsteps. He started taking pupils in an unofficial tutoring capacity, which took up to fifteen hours a week, "which does not leave me much time for scholarship," he wrote in his diary.[3,51] He sat the scholarship examinations for the lectureship on March 22, 1855. He finished only five questions in the morning exam, and four in the afternoon. The following morning he succeeded in only two questions, and did not bother to show up for the final paper that afternoon.[3,51] When the scholarship went to someone else he wrote in his diary:

> "It is tantalizing to think how easily … I might have got it, if I had only worked properly during this term, which I fear I must consider as wasted. However, I have now got a year before me, and with this past term as a lesson … I mean to have read by next time, Integral Calculus, Optics (and theory of light), Astronomy, and higher Dynamics. I record this resolution to shame myself with, in case March 1856 finds me still unprepared, knowing how many similar failures there have been in my life already."[1]

He took on up to fourteen pupils for the Mathematical Examiner G. W. Kitchin after this, hoping that it would be "decidedly favourable to my getting the lectureship hereafter, though it by no means secures it."[3,52] He was also appointed the sub-librarian at Christ Church (a position that also brought in £35 a year), which added to his already

hectic schedule.[3],50 It is also interesting to note that about this time, Dodgson wrote the first stanza of his most famous poem, 'Jabberwocky', that later appeared in full form in *Through the Looking Glass* in 1872*:*

> *'Twas bryllyg, and the slythy toves*
> *Did gyre and gimble in the wabe;*
> *All mimsy were the borogoves,*
> *And the mome raths outgrabe.*[5],76

Also during this time, he "began arranging a scheme for teaching systematically the first part of Algebraic Geometry: a thing which hitherto no one seems to have attempted. I find it exceedingly difficult to do it in anything like a satisfactory way." In May he received the Bostock Scholarship, worth £20 a year, and wrote out "in an improved form the *Fifth Book of Euclid Proved Algebraically* and … made considerable progress in my treatise in Algebraic Geometry."[3],52 When he returned to Oxford in October 1855 after a lecturing trip, he was made a Mathematics Lecturer. Exactly when this occurred is not known; that particular volume of diaries is missing.[3],55 At the end of the year, he wrote:

> "I am sitting alone in my bedroom this last night of the old year, waiting for midnight. It has been the most eventful year of my life: I began it a poor bachelor student, with no definite plans or expectations; I end it a master and tutor in Christ Church, with an income of more than £300 a year, and the course of mathematical tuition marked out by God's providence for at least some years to come. Great mercies, great failings, time lost, talents misapplied – such has been the past year."[4],61

Charles Dodgson remained a lecturer at Christ Church in Oxford until 1881, a total of 25 years. He noted wryly after his final lecture that his first lecture had been attended by nine students; his last was attended by only two.[6] During his tenure, in addition to his literary work and mathematical and logical output he wrote countless treatises and guides for students on a variety of topics.[6]

Mathematician & Logician

The old theory on Dodgson's attitude toward scholarly research was that he worked in a bubble, neither keeping up with current events in academia nor bothering to read books on the topics he was working on. Volume 4 of the Complete Scientific Dictionary of Scientific Biography (DSB) states that he "made no attempt to keep abreast of contemporary advances in mathematics or logic or to discuss his ideas with other academics."[6] This misconception, refuted by the discovery of previously unpublished letters, diaries, and manuscripts, was rescinded by Volume 20 of the DSB, which states that he in fact enjoyed a lively correspondence with a number of the notable mathematicians and logicians of his day. It was also common for a British scholar in the Victorian era to be disdainful of and to ignore academic advances made on the Continent.[7]

Geometry

Dodgson's love of geometry – of the traditional Euclidean genre – dominated much of his published work. In 1872, he "wrote out 'the Definitions, etc., of Euclid Book I by plan of improving by modern lights but keeping much of the original idea as possible.'"[3],383) Dodgson loved the tradition of Euclid and thought him to be a great original thinker. According to Morten N. Cohen's biography, "he did not tamper with Euclid's text, but sought to clarify it, to make it available to new generations, to make Euclid meaningful for his time."[3],383) His first attempts at making Euclid's work more readily understandable were *Euclid, Books I, II,* which were published privately in 1875 and then by Macmillan in 1882; their eighth editions were brought out during Dodgson's lifetime.[3],384) His other publications on geometry include *A Syllabus of Plane Geometry*

(1860), *Notes on the First Two Books of Euclid, Designed for Candidates for Responsions* (1860), *The Formulae of Plane Trigonometry* (1861), and *Curiosa Mathematica, Part I, A New Theory of Parallels* (1888), in which Dodgson "presented his own ideas on dealing with [Euclid's] parallel axiom."[1];[3],384)

His most famous work on geometry, however, was a four-act comedy entitled *Euclid and His Modern Rivals* (1879), which he created not as an attack on non-Euclidean geometry as is commonly thought, but "to defend using Euclid's *Elements* as a method of teaching geometry."[7] The play started out as a pamphlet in 1876, at which Dodgson would work continuously. On September 23, 1877, he wrote in his diary of his new idea "of throwing my pamphlet … into an entirely different form, viz., a series of dialogues between 'Geometer' on the one hand and Euclid … on the other. The dramatic form will popularize it, and will make any 'chaff' much less out of place than in a regular treatise."[3],384) The result was a mathematical work on Euclid and his non-Euclidean brethren, written with Dodgson's whimsical literary wit. According to Volume 4 of the DSB, the play centers around a mathematics lecturer, Minos, in whose dreams Euclid argues for the validity of his *Elements* with such modern rivals "as Legendre and J. M. Wilson and, naturally, routs the opposition."[6] At one point the ghost of Euclid states before disappearing, "we will meet again when you have reviewed my Modern Rivals one by one. If you had any slow music handy, I would vanish to it: as it is… [*Vanishes without slow music*]"[7] Volume 20 of the DSB goes on:

> "Euclid sums up saying: - 'Let me carry with me the hope that I have
> convinced you of the importance, if not the necessity, of retaining my
> order and numbering, and my method of treating straight lines, angles,
> right angles, and (most especially), parallels. Leave me those untouched,

and I shall look on with great contentment while other changes are made …."'[7]

Determinants

According to Volume 20 of the Complete Dictionary of Scientific Biography (DSB), Dodgson's work in the theory of determinants is one of the two areas of mathematical science in which his work is fully recognized.[7] In 1866, he published *An Elementary Treatise on Determinants* in the journal *Proceedings of the Royal Society.* The book, *An Elementary Treatise on Determinants with Their Application to Simultaneous Linear Equations and Algebraical Geometry,* to which he appended his Royal Society paper, was published by Macmillan in 1867.[(3),256] His method, as laid down in these publications, was one of "computing Determinants arithmetically by 'condensation,' and for applying the process to solving simultaneous Equations."[(3),265] Victor J. Katz quotes Dodgson's Theorem in *A History of Mathematics* as follows:

> **Dodgson's Theorem:** *If there are m equations, containing n variables (n ≥ m), and if there are among them r equations which have a nonvanishing order r determinant of their unaugmented matrix; and if when these r equations are taken along with each of the remaining equations successively, each set of* r + 1 *equations has ever order* r + 1 *determinant of its augmented matrix equal to zero, then the equations are consistent. If any nonvanishing order r determinant of the system of r equations is selected, then the n – r variables whose coefficients are not contained in it may have arbitrary values assigned to them. For each such set of arbitrary values, there is only one set of values for the other variables, and the remaining equations are dependent on these r equations.* [(9),696]

Cohen's biography states that the "treatise continues to be valuable" even today.[(3),266] According to Cohen, Edward Wakeling wrote in a private letter that "Dodgson's method is 'computerisable'; it does not require the usual intermediary decisions to be made in the calculation; the procedure is robust."[(3),266] Francine Abeles added in "Determinants and Linear Systems, Charles L. Dodgson's View" that

"[c]ompared to the standard method of his time … Dodgson's method is a model of computational simplicity. … It is possible that Dodgson produced the first proof in print of … [a] fundamental theorem on rank."[3],266)

Elections

The other area of mathematical science in which Dodgson is recognized is the subject of elections and voting theory. His interest in the area stemmed from tennis tournaments (or rather, betting and rationality in tennis tournaments) and proportional representation.[7] His first publication in 1873 was a pamphlet that discussed different methods at arriving at fair majorities, and advocated the use of a matrix notation for multiple decisions.[6] His most significant contributions to this area were *Parliamentary Elections* and *The Principles of Parliamentary Representation*, both published in 1884.[1] Francine Abeles states that in these Dodgson presents "a complete and unified approach to the electoral reform issues which were being discussed at the time, but in doing so he developed and contributed ideas to game theory which are well in advance of the 1880s."[1]

Logic

Dodgson viewed logic as a game, a recreational tool that honed his mathematical and reasoning skills. It is interesting to note that all his logical works were published not under his own name, as his academic writings were, but under his literary pseudonym of Lewis Carroll. His first book on the topic, *The Game of Logic* (1886), was intended to make logic easy and entertaining to children of all ages, "by casting syllogisms amusingly instead of dryly and adding spice to explanatory material."[3],446) A syllogism, according to the Encyclopedia Britannica Online, is a valid deductive argument having

two premises and a conclusion."[10] The following syllogism appeared in Dodgson's book *Symbolic Logic* (1896), which left the conclusion unexpressed:

"All my sons are slim.
No child of mine is healthy who takes no exercise.
All gluttons who are children of mine are fat.
No daughter of mine takes any exercise."[10]

Dodgson had a distinct taste for word games, and often introduced acrostics, a puzzle or poem in which the first letter of each line spells out a word or name, into his logical and even literary works. The poem at the end of *Through the Looking Glass*, for example, spells the name Alice Pleasance Liddell.[11] Dodgson's dedication to *The Game of Logic* was to the daughter of the illustrator of his book *The Hunting of the Snark,* Climène Mary Holiday. The acrostic in this poem, however, is revealed in the second letter of each line:

I charm in vain: for never again
All keenly as my glance I bend,
 Will Memory, goddess coy,
 Embody for my joy
Departed days, nor let me gaze
 On thee, my Fairy Friend!

Yet could thy face, in mystic grace,
A moment smile on me, 'twould send
 Far-darting rays of light
 From Heaven athwart the night,
By which to read in very deed
 Thy spirit, sweetest Friend!

So may the stream of Life's long dream
Flow gently onward to its end,
 With many a floweret gay,
 A-down its willowy way:
May no sigh vex, no care perplex,
 My loving little Friend![[3],447)

Dodgson's other logical area of expertise was in the creation of cryptograms or ciphers. Between 1858 and 1875, he created five ciphers, most of which were used in his correspondence with children.[11] All his ciphers were based on substitution systems, in which a letter or the value of a letter is substituted by another letter or value, and most involved using a keyword as the basis of the cipher. Without this keyword, he believed, the cipher(s) would be unbreakable, "even if the plaintext were available" for all to see.([11],700) His first four ciphers, the Key-Vowel cipher (1858), the Matrix cipher (three days later in1858), the Alphabet cipher (1868), and the Telegraph cipher (April 1868) were all used to communicate with child friends. His final cipher, however, the *Memoria Technica* (1875) was created as a method of remembering logarithms or complicated numbers by composing verses.([11],705) For example, "to remember the date Cromwell was made Protector, 1653, Dodgson wrote the couplet:

Ambition was thy fault:
Thine own self to ex<u>al</u><u>t</u>.

The integers: 6, 5, 3 (1 being understood) are enciphered by the letters: 'x', 'l','t' using the scheme below:

<u>1 2 3 4 5 6 7 8 9 0</u>
b d t f l s p h n z
c w j qu v x m k g r"([11],704)

Using this method, Dodgson was able to remember any number correct to seven places.([11],705) This cipher was also used in letters to friends, and he taught it as a memory aid to his students in several local schools.([11],706) His talent as a logician helped him to create the means with which he often memorized numbers or algorithms, and provided an added layer of entertainment in his correspondence with children.

The 'Alice' Books

"[Dodgson] was fond of children…, of Tuesdays, and of the number 42," states Martin Gardner in *The Universe in a Handkerchief*.[(8),12] Indeed Dodgson's friendships with children – particularly little girls – has long been the subject of some controversy. He delighted in entertaining his young guests with stories from his ever vivid imagination, poetry, and games of his own invention, and kept up correspondence with countless children throughout his adult life, often losing interest when they grew up. His fondness for photographing, among other things, young girls in varying states of undress has often called into question Dodgson's sexuality. One of his favorite photography subjects was Alice Liddell, the youngest daughter of the dean of Christ Church, Henry George Liddell.[1] Alice later recalled in 1932 how she and her sisters: "…used to sit on the big sofa on each side of him, while he told us stories, illustrating them by pencil or ink drawings as he went along … He seemed to have an endless store of these fantastical tales, which he made up as he told them, drawing busily on a large sheet of paper all the time."[1] One of these "fantastical tales" went on to become one of the most famous stories in English literature.

The official version of the creation of *Alice's Adventures in Wonderland* has become something of legend. Both Dodgson and Alice Liddell told the story of the day in 1862 that they and her two sisters were enjoying a rowing party on the nearby river, when "came the old petition of 'Tell us a story," and so began the ever-delightful tale."[(4),96] Dodgson recalled in 1887 "how, in a desperate attempt to strike out some new line of fairy-lore, I had sent my heroine straight down a rabbit-hole, to begin with, without the least idea of what was to happen afterwards."[2]

Richard Duckson, who was also present during the famous rowing party, recalled that when they had taken the girls back to their home at the Deanery, "Alice said, 'Oh, Mr. Dodgson, I wish you would write out Alice's adventures for me.' He said he would try, and he afterwards told me that he sat up nearly the whole night, committing to a M.S. book his recollections of the drolleries with which he had enlivened the afternoon."[4],91

Henry Kingsley, the noted author, later visited the Liddells and happened upon the manuscript Dodgson had written out at Alice's request. He "made it very clear" that Dodgson must publish the work, and after three years of polishing, adding, and editing, it was. The first (limited) edition of *Alice's Adventures in Wonderland* (originally *Alice's Adventures Under Ground*) was published by Macmillan with illustrations by John Tenniel in 1865.[6];[4],126 The success of this work motivated Dodgson to write a sequel, and in 1872, *Through the Looking-Glass* was published.[4],214

Other Literary Work

Alice's Adventures in Wonderland was not Dodgson's first foray into the world of literature and poesy. Nor was it his first publication under his famous pseudonym, which was derived by reversing the order of his first two names (Lutwidge Charles), Latinizing them (Ludovic Carolus), and Anglicizing them (Lewis Carroll). The earliest instance of an item being published under this name was a poem called 'Solitude,' which appeared in 1856.[2] His first collection of verses were published as *Phantasmagoria and Other*

Poems (1869) and were later separated, added to, and republished as *Rhyme? and Reason?* (1883) and *Three Sunsets and Other Poems* (1898).[2] *Rhyme? and Reason?* also contained *The Hunting of the Snark* (1876), a narrative poem that is considered "literature of the highest order" and "rivaled only by the best of Edward Lear."[2]

In 1885, he published *A Tangled Tale,* a collection of short stories and puzzles, and later returned to novel writing in the style of the *Alice* books in *Sylvie and Bruno* (1889) and its sequel *Sylvie and Bruno Concluded* (1893). At the time of his death in 1898, Dodgson was working on a collection of forty-two "delightfully diverting mind-benders," which were published along with his diaries and other manuscripts posthumously.[1]

Death

In early January 1898, Dodgson caught a cold that quickly turned into a bronchial infection. He had suffered a constantly from "bronchial trouble through his later years, owing in part, no doubt, to the miasmal river climate of Oxford."[3,526] His conditioned worsened rapidly, and on January 14, 1898, Rev. Charles Lutwidge Dodgson, aged sixty-five, died in Guildford, Surrey (England). "Obituaries appeared in papers all over the world, funeral wreaths arrived from many admirers, the family were inundated by letters of condolence."[3,529]

Conclusion

Charles Dodgson's work in both the literary and mathematical arenas continue to flourish today, over a hundred years after his death. His *Alice* books still have been translated into dozens of languages, and several of words of his own creation – such as

'chortle', a combination of the words 'snort' and 'chuckle' – have been added to the English language.   His work on determinants and elections is still relevant in mathematical texts today, and his logic puzzles still delight readers all over the globe. And although his two areas of work for which he is best known – literature and mathematics – seem to be mutually exclusive, it is easy to see how in Dodgson's (or Lewis Carroll's) world they were inextricably and undeniably linked; he could not have his logic without his nonsense.

Chronology

1832 (Jan)	Born in Daresbury, Cheshire
1843	Moved to Croft, Yorkshire
1844 (Aug)	Attended Richmond School
1845 (Nov)	Left Richmond School
1846 (Jan)	Attended Rugby School
1849 (Dec)	Left Rugby School
1850 (May)	Matriculated at Christ Church, Oxford University
1851 (Jan)	Attended Christ Church, Oxford University
1854 (Dec)	Awarded B.A., First Class in Mathematics Granted Fellowship of Oxford University
1855	Appointed Mathematical Lecturer at Christ Church
1856 (Mar)	Acquires first camera[1]
1861 (Dec)	Ordained deacon[12]
1862 (Jul)	Rowing party with Liddell girls; told the story that later became *Alice's Adventures in Wonderland.*
1866	*Alice's Adventures in Wonderland* published
1867	*An Elementary Treatise on Determinants* published
1871	*Through the Looking Glass* published
1876	*The Hunting of the Snark* published
1879	*Euclid and His Modern Rivals* published
1880	Gave up photography (last photograph believed taken in July)[12]
1881	Resigned post as Mathematical Lecturer
1884	Work on *Parliamentary Elections* published
1886	*The Game of Logic* published
1896	*Symbolic Logic, Part I* published
1898 (Jan)	Died in Guildford, Surrey Buried in The Mount Cemetery, Guildford.

List of Published Works

1845   *Useful and Instructive Poetry* (manuscript - published 1954)[12]

1850-53   *The Rectory Umbrella* (manuscript – published 1932)[2]

1855.62   *MischMasch* (manuscript – published 1932)[2]

1856   'Solitaire' – first poem published under name 'Lewis Carroll'[2]

1860   *A Syllabus of Plane Geometry*
Notes on the First Two Books of Euclid

1861   *The Formulae of Plane Trigonometry*

1865   *Alice's Adventures in Wonderland*

1867   *An Elementary Treatise on Determinants*

1869   *Phantasmagoria and Other Poems*

1872   *Through the Looking Glass*

1875   *Memoria Technica*

1876   *The Hunting of the Snark*

1879   *Euclid and His Modern Rivals*
Doublets (a word game)[12]

1883   *Rhyme? and Reason?*

1884   *Parliamentary Elections*
The Principles of Parliamentary Representation

1885   *A Tangled Tale*

1886   *The Game of Logic*

1888   *Curiosa Mathematica, Part I, A New Theory of Parallels*

1889   *The Nursery 'Alice'* (an adaptation for younger children)[12]
Sylvie and Bruno

1893   *Sylvie and Bruno Concluded*
Curiosa Mathematics, Part II, Pillow Problems

1896   *Symbolic Logic, Part I*

1898   *Three Sunsets*

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