CUMMINGS, Louise D. November 21, 1870–May 9, 1947.
University of Toronto (BA 1895, MA 1902), Bryn Mawr College (PhD 1914).

Louise Duffield Cummings was the daughter of Anne (Morison), born in about 1836 in Scotland, and James Cummings, born in about 1821 in Ireland. She was born in Hamilton, Ontario, Canada, where at the time of the 1881 Canadian census her father's occupation was described as collector. At that time, five children in the household were listed: James, 23; Richard, 22, a teacher; Alice, 20; Sam, 15; and Louisa, 10.

Louise's brother Richard earned a BA from the University of Toronto in 1878 and became a physician in Wayne, Michigan. Alice was a pianist who taught at one time at St. Margaret's College for Ladies, a private high school in Toronto. Samuel, who graduated in medicine from Toronto with an MB in 1888, became a surgeon who was noted for his pioneering work with X-rays for the diagnosis and treatment of medical problems.

Louise Cummings attended public schools and the Hamilton Collegiate Institute in Hamilton, Ontario, before being admitted to the University of Toronto in 1889. After attending in 1889–90, she was away for a year. In 1891–92, she returned to Toronto as a second-year student and remained 1892–93 as a third-year student. She was not in attendance 1893–94 but was a fourth-year student in 1894–95. She won the William Mulock scholarship in mathematics her second year and half of the physics scholarship her third year. Cummings received her bachelor's degree from Toronto in 1895 with first class honors in mathematics.

Cummings spent most of the next five years in graduate study in mathematics at four different institutions. Although she was not listed as a graduate student, she continued her study at Toronto in 1895–96 under the direction of Alfred T. DeLury, who was later to become head of the department. The next year, 1896–97, she held a Bennett fellowship, one of two given annually to women in the graduate school (then called the department of philosophy) for study at the University of Pennsylvania. In 1897–98 she was a student at the University of Chicago, and the following year she was a resident fellow in mathematics at Bryn Mawr College. She supervised examinations at Toronto in 1897 and held a fellowship by courtesy in mathematics during the second semester of 1899–1900 at Bryn Mawr. During her first year at Bryn Mawr she gave two presentations, on Galois fields and on graphical representation of groups, to the Mathematical Journal Club. Other speakers for the year included professors Scott and Harkness of Bryn Mawr and Morley of Haverford, and four students, including Grace Bareis and Emilie Norton Martin.

Cummings studied at the Ontario Normal College in Hamilton during the year 1900–01. She returned to Toronto in 1901 to continue her studies and to teach mathematics at St. Margaret's. Her master's degree was awarded by the University of Toronto in 1902.

In the fall of 1902, Cummings joined the faculty at Vassar College in Poughkeepsie, New York, where she remained until her retirement more than thirty-three years later. The other new member of the Vassar mathematics department that year was Elizabeth B. Cowley. While there Cummings was instructor 1902–15, assistant professor 1915–19, associate professor 1919–27, professor 1927–35, and professor emeritus after her retirement. She was on leave for the second semesters of 1931–32 and 1934–35.

Louise Cummings continued her studies at Bryn Mawr College at various times while on the faculty at Vassar. She was a graduate scholar during the first semester 1905–06 and during the second semester 1912–13, when she was in residence at Bryn Mawr for the academic year. She received her doctorate from Bryn Mawr in 1914 with subjects mathematics, applied mathematics, and physics. Both Henry Seely White of Vassar and Charlotte A. Scott of Bryn Mawr had a role in her dissertation work. White, who had earned his PhD at Göttingen in 1891, came to Vassar as professor in 1905 and remained until his retirement in 1936. In her dissertation vita Cummings acknowledges her indebtedness to Scott "for helpful criticism and unfailing interest in the preparation of this paper" and to White "who suggested . . . the subject of [the] dissertation." She published a dozen papers over twenty years, and her work is discussed in Hutchinson's 1977 article, "Women in Combinatorics." Two of her papers were coauthored with White, who was president of the AMS 1907–08, and Frank Nelson Cole, who was secretary of the AMS 1896–1920. This work was mentioned by E. T. Bell in his article on algebra in the *Semicentennial Addresses of the American Mathematical Society* and in T. S. Fiske's 1927 obituary of Cole in which he notes that "Miss Cummings developed the earliest examples" of a certain type (p. 775).

Cummings attended many meetings of the AMS and MAA and often gave presentations at the AMS meetings. In 1924 she was appointed to the MAA committee to formulate the details for awarding the newly established Chauvenet prize. She also attended the International Congress of Mathematicians (ICM) in Toronto in 1924 and in Zurich in 1932. She was given an honorary DSc degree by the University of Toronto at the university's centennial celebration in 1927. The Carnegie Foundation granted her a retiring allowance beginning February 24, 1936.

After suffering from severe arthritis for several years, Louise Cummings died in 1947 at the age of seventy-six at the home of her niece in Wayne, Michigan. She was buried in the Hamilton, Ontario, cemetery.

Organizational affiliations: AMS, MAA, AAAS.

Dissertation:
1914 On a method of comparison for triple-systems. PhD dissertation, Bryn Mawr College, directed by Charlotte Angas Scott. Printed version, 1914, Press of the New Era Printing Co., Lancaster, PA, reprinted from *Trans. Amer. Math. Soc.* 15:310–27.

Publications:
1913 Note on the groups for triple systems. *Bull. Amer. Math. Soc.* 19:355–56. Reviews: *JFM* 44.0263.04 (E. Lampe); *Rev. semestr. publ. math.* 22, pt. 1: 5 (D. J. Korteweg).
1914 On a method of comparison for triple-systems. *Trans. Amer. Math. Soc.* 15:310–27. Published version of PhD dissertation. Reviews: *JFM* 45.0349.02 (K. Böhm); *Rev. semestr. publ. math.* 23, pt. 1: 8 (P. Mulder). Presented by title to the AMS, New York City, 25 Apr 1914; abstract: *Bull. Amer. Math. Soc.* 20:514 #11.
1915 with H. S. White. Groupless triad systems on fifteen elements. *Bull. Amer. Math. Soc.* 22:12–16. Reviews: *JFM* 45.1264.02 (G. Szegö); *Rev. semestr. publ. math.* 24, pt. 2: 3 (D. J. Korteweg). Presented to the AMS, New York City, 24 Apr 1915; abstract: *Bull. Amer. Math. Soc.* 21:488 #12.
1917 with F. N. Cole and H. S. White. The complete enumeration of triad systems in fifteen elements. *Proc. Natl. Acad. Sci. USA* 3:197–99. Reviews: *JFM* 46.1431.04 (M. Plancherel); *Rev. semestr. publ. math.* 26, pt. 1: 12 (D. J. Korteweg). Presented as "Enumeration of all triad systems on fifteen letters" by title to a meeting of the National Academy of Sciences, Cambridge, MA, 13–15 Nov 1916. Also presented to the AMS: (1)

Providence, RI, 8 Sep 1914: by H. S. White as "Triple-systems on 31 letters; a reconnaissance," and by L. D. Cummings, read by H.S. White, as "The trains for 42 non-congruent triple-systems on 15 elements"; abstracts: *Bull. Amer. Math. Soc.* 21:69 #23 and #24; (2) New York City, 31 Oct 1914: by H. S. White as "Census of the triad system on 15 letters"; abstract: *Bull. Amer. Math. Soc.* 21:164 #5; (3) Palo Alto, CA, 4 Aug 1915: by title by F. N. Cole as "Note on the triad systems in 15 letters"; abstract: *Bull. Amer. Math. Soc.* 22:9 #15; and (4) New York City, 28 Oct 1916: by F. N. Cole as "Complete census of the triad systems in fifteen letters"; abstract: *Bull. Amer. Math. Soc.* 23:160–61 #7.

1918 An undervalued Kirkman paper. *Bull. Amer. Math. Soc.* 24:336–39. Reviews: *JFM* 46.0107.01 (G. Szegö); *Rev. semestr. publ. math.* 27, pt. 1: 4 (D. J. Korteweg). Presented as "The two-column indices for triad systems on fifteen elements" to the AMS, New York City, 27 Oct 1917; abstract: *Bull. Amer. Math. Soc.* 24:171 #2.

1919a The trains for the 36 groupless triad systems on 15 elements. *Bull. Amer. Math. Soc.* 25:321–24. Review: *Rev. semestr. publ. math.* 28, pt. 1: 2 (D. J. Korteweg). Presented to the AMS, Hanover, NH, 5 Sep 1918; abstract: *Bull. Amer. Math. Soc.* 25:55 #10.

1919b with F. N. Cole and H. S. White. *Complete Classification of the Triad Systems on Fifteen Elements.* Mem. Nat. Acad. Sci. USA, 14, no. 2. Part 1: Triad systems on 15 elements whose group is of order higher than unity, by H. S. White, 5–26. Part 2: Trains for triad systems on 15 elements whose group is of order higher than unity, by L. D. Cummings, 27–68. Part 3: Groupless triad systems on 15 elements, by H. S. White and L. D. Cummings, 69–72. Part 4: Structure as defined by interlacings, head, and semiheads; a complete census of triad systems in fifteen elements, by F. N. Cole, 73–80. Part 5: Sequences and indices for all groupless triad systems on 15 elements, by L. D. Cummings, 81–89. Presented to the AMS as noted in **1917**.

1925 A new type of double sextette closed under a binary (3,3) correspondence. *Bull. Amer. Math. Soc.* 31:266–74. Reviews: *JFM* 51.0492.02 (W. Fr. Meyer); *Rev. semestr. publ. math.* 32, pt. 2: 14 (D. J. Korteweg). Presented to the AMS, New York City, 25 Oct 1924; abstract: *Bull. Amer. Math. Soc.* 31:102 #2.

1928 Cyclic systems of six points in a binary correspondence. In *Proceedings of the International Mathematical Congress held in Toronto, August 11–16, 1924*, ed. J. C. Fields, 1:725–27. Toronto: Univ. of Toronto Press. Presented to the ICM, Toronto, August 1924. Review: *JFM* 54.0698.04 (H. Pietsch).

1932a Heptagonal systems of eight lines in a plane. *Bull. Amer. Math. Soc.* 38:700–702. Review: *JFM* 58.0676.02 (M. Steck). Presented to the AMS, New York City, 26 Mar 1932; abstract: *Bull. Amer. Math. Soc.* 38:193 #116.

1932b Hexagonal systems of seven lines in a plane. *Bull. Amer. Math. Soc.* 38:105–10. Reviews: *JFM* 58.0676.01 (M. Steck); *Zbl* 003.41005 (E. A. Weiss). Presented to the AMS, New York City, 31 Oct 1931; abstract: *Bull. Amer. Math. Soc.* 37:821–22 #359.

1933 On a method of comparison for straight-line nets. *Bull. Amer. Math. Soc.* 39:411–16. Presented to the ICM, Zürich, 5 Sep 1932; abstract: *Verhandlungen des Internationalen Mathematiker-Kongress: Zürich 1932* 2:188. Review: *JFM* 59.0610.01 (F. Schaale).

Abstract not listed above:

1922 Hesse's associated points and the Weddle surface. *Bull. Amer. Math. Soc.* 28:163 #28. Presented to the AMS, Toronto, ON, 28 Dec 1921.

References to: AmMSc 3–7; BiDWSci; BioWMath; Poggendorff 5–6; WomScSearch.

"Louise E. Cummings, Mathematician, Dies." *Toronto Star*, 10 May 1947.

"*De Mortuis.* Louise Duffield Cummings." Annual Report. Carnegie Foundation for the Advancement of Teaching. 1946–47, 41:68–69.

Hutchinson, Joan P. "Women in combinatorics." *AWM Newsletter* 7 (Jan-Feb 1977): 3–7.

Other sources: PhD dissertation vita 1914; Bryn Mawr College Archives; University of Pennsylvania Archives; University of Toronto Archives; Vassar College Archives; Bell,

"Fifty Years of Algebra in America"; Grinstein, "Some 'Forgotten' Women of Mathematics"; Kenschaft, "The students of Charlotte Angas Scott"; T. S. Fiske, "Frank Nelson Cole," *Bull. Amer. Math. Soc.* 33 (1927): 773–77; Canadian Census 1881.

Last modified: August 4, 2009.