**COWLEY, Elizabeth B.** May 22, 1874–April 13, 1945.
Indiana Normal School (BS 1893), Vassar College (BA 1901, MA 1902), Columbia University (PhD 1908).

Elizabeth Buchanan Cowley was born in Allegheny (now part of Pittsburgh), Pennsylvania, the eldest and by 1900 the only surviving child of five born to Mary Junkin (Buchanan) (1853–1937) and John Cowley (b. 1843). Mary Junkin Buchanan was born in Ohio; she attended public schools in Allegheny and the Pittsburgh Female College (now Chatham College), from which she received a Mistress of English Literature [or Language] degree in 1870. On February 27, 1873, in Allegheny, Mary Buchanan married John Cowley of Pennsylvania. Mary B. Cowley was a volunteer supervisor of playgrounds in Pittsburgh for most of the first decade of the century before being elected supervisor of playgrounds and vacation schools. She was a member of the school board in Pittsburgh and was engaged in other civic and cultural activities, some of which are indicated in her entry in *Woman's Who's Who in America 1914–1915*. In 1900 John Cowley was an auditor; he was deceased by 1914.

Elizabeth Cowley attended the public schools of Allegheny after which she studied for two years before receiving a BS degree in 1893 from Indiana Normal School (now Indiana University of Pennsylvania). She taught for the next four years in public schools in Pennsylvania and was given a life diploma by the state.

Cowley entered Vassar College in September 1897 and received her BA degree four years later. She was awarded the graduate scholarship in mathematics and astronomy for the next year and received her MA degree from Vassar in 1902. Cowley remarked in the vita accompanying her later PhD dissertation, "Through the courtesy of Professor [Mary W.] Whitney an opportunity was given to me to work out the definitive orbit of a comet. Dr. [Caroline E.] Furness gave valuable advice and Miss [Ida] Whiteside assisted in calculations." The paper was published as **1907d** with Whiteside, a fellow graduate student, as coauthor. In 1940 Cowley referred to it as a "Prize Paper" (Owens questionnaire).

In 1902 Cowley was appointed instructor in mathematics at Vassar and continued at that rank until 1913. She attended the summer sessions at the University of Chicago 1903–05, where she had twelve weeks of mathematics and physics each year. She began work at Columbia University during the second semester of the academic year 1905–06 and remained for summer school in 1906 and the next academic year, 1906–07. Her doctorate was awarded by Columbia in 1908. She wrote in the vita accompanying the dissertation, "I desire to express my gratitude to all my teachers, but especially to Professor Keyser, who is able in an unusual degree to inspire his students with a hearty enthusiasm for study. To Professor Henry S. White, as head of my department at Vassar College, I am indebted for encouragement, criticism, and sympathy with my work."

Cowley remained at Vassar, except for leaves of absence, until 1929. She was assistant professor 1913–16 and associate professor 1916–29. While at Vassar she continued her studies, was active in a number of mathematical societies, and published regularly. She reported in 1914 that she had studied at the universities in Göttingen and Munich as well as those indicated above. She attended the International Congress of Mathematicians (ICM) held at Cambridge, England, in 1912. She belonged to two foreign mathematical societies and was a charter member of the

MAA. She was particularly active in the MAA during its first decade. She served on the program committee for the annual meeting at the University of Chicago in 1917 and was elected to the MAA council to serve January 1918–January 1921. However, in 1920 the MAA incorporated and she automatically became a member of the new board of trustees with a term ending in December 1920. She also stood for election to vice president in 1921 and 1925. In addition to contributing the articles and reviews indicated below, Cowley contributed to a number of other educational and popular publications, writing on her 1940 questionnaire for Helen Owens that she had published 100 articles. She also served on the editorial board of the abstracting journal *Revue semestrielle des publications mathématiques* and was a regular reviewer for the journal from 1908 until 1926. Furthermore, among the twenty-four book reviews she published in the *Bulletin* of the AMS, seventeen were reviews of books written in French, German, Italian, or Spanish.

Cowley had a leave of absence from Vassar 1926–29 and was promoted to professor while on leave. She resigned her position at Vassar in June 1929 to return to Pittsburgh to be with her mother. She wrote in 1937 that she "came to do a special piece of work" (Owens questionnaire). She immediately took a teaching position in a Pittsburgh high school and continued teaching until 1938, near the time of her mother's death. She was active in local professional organizations: she was sponsor for various activities of the Pittsburgh public high schools, she became president of the mathematics section of the Pennsylvania State Education Association in 1934, and she was for a time president of the Association of Teachers of Mathematics of Western Pennsylvania.

Cowley's mathematical interests were broad. During the 1920s she published and spoke on historical topics. During that period she also studied crystallography because she had read some work on phases of atomic structure that interested her. Later her publications were more in the field of mathematics education, and in December 1934 she directed a symposium on "Methods of making mathematics interesting" by Pittsburgh teachers at an NCTM meeting held in Pittsburgh at the same time as the annual MAA meeting. She gave many invited talks at schools and one to the Central Association of Science and Mathematics Teachers. In 1941 she wrote a book about public education in the United States as exemplified by Massachusetts, Pennsylvania, Michigan, and California.

In her entry in the 1914 *Woman's Who's Who of America*, Cowley reported that she was a member of the Daughters of the American Revolution and of the National Plant, Flower and Fruit Guild; that she was in favor of women's suffrage; and that she enjoyed outdoor sports. In 1940, after she had retired from teaching, she indicated that she was traveling and writing, and that poetry that she had written had been published.

At some time after her mother's death and her own retirement from teaching in Pittsburgh, Elizabeth Cowley moved to Fort Lauderdale, Florida. She suffered a stroke in 1941 that left her unable to speak or use her right side. A newspaper item in 1943 described how she had "overcome her handicap completely through her indomitable spirit and strong determination to carry on." It then described how, with only her left hand, she was able to keep up her writing and correspondence, embroider, weave, and sew; at the time of the article she had made seven large Red Cross afghans to aid the war effort. Elizabeth Cowley died in her residence in Fort Lauderdale, Florida, at age seventy in 1945 and was cremated.

**Organizational affiliations:** AMS, MAA (charter member), Circ. Mat. di Palermo, Deutsch. Math.-Verein., AAAS, Phi Beta Kappa.

**Dissertation:**

**1908** Plane curves of the eighth order with two real four-fold points having distinct tangents and with no other point singularities. PhD dissertation, Columbia University. Printed by Press of the New Era Printing Co., Lancaster, PA.

**Selected publications:**

**1907a** Review of *A First Course in Analytical Geometry, Plane and Solid, with Numerous Examples*, by C. N. Schmall. *Bull. Amer. Math. Soc.* 13:246–47.

**1907b** Review of *Lehrbuch der analytischen Geometrie*, vol. 1: *Geometrie in den Grundgebilden erster Stufe und in der Ebene*, by L. Heffter and C. Koehler. *Bull. Amer. Math. Soc.* 13:247–49.

**1907c** Review of *Nichteuklidische Geometry*, by H. Liebmann. *Bull. Amer. Math. Soc.* 13:511–12.

**1907d** with I. Whiteside. Definitive orbit of the comet 1826.II *Astron. Abh. Ergänzungshefte Astron. Nachr.* 2, no. 13.

**1909** Review of *La Géométrie analytique Générale*, by H. Laurent. *Bull. Amer. Math. Soc.* 15:363–64.

**1910** Review of *Coordinate Geometry*, by H. B. Fine and H. D. Thompson. *Bull. Amer. Math. Soc.* 16:314–18.

**1911** Review of *Synthetische Theorie der Cliffordschen Parallelen und der linearen Linenörter des elliptischen Raumes*, by W. Vogt. *Bull. Amer. Math. Soc.* 17:315–16.

**1913** Review of *Spezielle Flächen und Theorie der Strahlensysteme*, by V. Kommerell and K. Kommerell. *Bull. Amer. Math. Soc.* 19:253–54.

**1914a** Review of *Lezioni di Geometria proiettiva ed analitica*, by E. Ciani. *Bull. Amer. Math. Soc.* 20:419–21.

**1914b** Review of *Ueber die Theorie benachbarter Geraden und einen verallgemeinerten Krümmungsbegriff*, by W. F. Meyer. *Bull. Amer. Math. Soc.* 20:324–25.

**1915a** Review of *Die neuzeitliche Entwicklung des mathematischen Unterrichts an den höheren Mädchenschulen Deutschlands inbesondere Norddeutschlands*, by J. Schröder. *Bull. Amer. Math. Soc.* 21:244–46.

**1915b** with W. B. Berry and C. C. Grove. Round Table on the Teaching of Calculus. *Math. Teacher* 8:65–72.

**1917a** Comprehensive examinations. *Math. Teacher* 1:30–34. Review: *Sch. Rev.* 26:553.

**1917b** Review of *Compendio de Álgebra de Abenbéder* [known as Ibn Badr], trans. and with an introduction by J. A. Sánchez Pérez. *Bull. Amer. Math. Soc.* 23:325–26.

**1918** Review of *Differential Calculus*, by H. B. Phillips, and *Integral Calculus*, by H. B. Phillips. *Bull. Amer. Math. Soc.* 24:488–89.

**1920** College algebras. Review of *College Algebra*, by E. B. Skinner, *Advanced Algebra*, by W. C. Brenke, and *A First Course in Higher Algebra*, by H. Merrill and C. E. Smith. *Bull. Amer. Math. Soc.* 26:323–29.

**1921** Review of *Descriptive Geometry*, by E. Kenison and H. C. Bradley. *Bull. Amer. Math. Soc.* 27:334–35.

**1922** Review of *Storia della Geometria Descrittiva dalle Origini sino ai Giorni Nostri*, by G. Loria. *Bull. Amer. Math. Soc.* 28:414.

**1923a** An English text on mathematics written about 1810. *Amer. Math. Monthly* 30:189–93. Reviews: *JFM* 49.0007.04 (E. Salkowski); *Rev. semestr. publ. math.* 34 (pt. 1): 7 (R. C. Archibald). Presented to the MAA, Rochester, NY, 6 Sept 1922; abstract: *Amer. Math. Monthly* 29:286 #7.

**1923b** A humanized course in mathematics for the first year in a woman's college. *Education* 44:92–99.

**1923c** An Italian mathematical manuscript [Columbia X511 Al 3]. In *Vassar Mediæval Studies, by Members of the Faculty of Vassar College* edited by C. F. Fiske, 377–405. New Haven, CT.: Yale Univ. Press.
**1923d** Review of *Introduction à la Géométrie Non-Euclidienne*, by A. MacLeod. *Bull. Amer. Math. Soc.* 29:424.
**1923e** Review of *Lehrbuch der darstellenden Geometrie für technische Hochschulen*, vol. 2, 3rd ed., by E. Müller, and *Vorlesungen über darstellende Geometrie*, vol. 1: *Die linearen Abbildungen*, by E. Müller, rev. by E. Kruppa. *Bull. Amer. Math. Soc.* 29:478–79.
**1923f** Review of *Nichteuklidische Geometrie*, 3rd rev. ed., by H. Liebmann. *Bull. Amer. Math. Soc.* 29:424.
**1924** Review of *Lehrbuch der Analytischen Geometrie*, vol. 2: *Geometrie im Bündel und im Raum*, by L. Heffter. *Bull. Amer. Math. Soc.* 30:279.
**1925** Review of *Complementi di Geometria Descrittiva—visibilita—ombre—chiaroscuro—prospettiva lineare*, by G. Loria. *Bull. Amer. Math. Soc.* 31:466.
**1926a** Note on a linear diophantine equation. *Amer. Math. Monthly* 33:379–81. Reviews: *JFM* 52.0142.05 (H. Grunsky); *Rev. semestr. publ. math.* 34, pt. 1: 21 (R. C. Archibald). Presented as "Note on a generalization of the old puzzle of 8, 5, and 3 pint vessels" to the AMS, New York City, 28 Oct 1922; abstract: *Bull. Amer. Math. Soc.* 29:9–10 #21. Also presented as "Further generalizations of the old mathematical puzzle of three vessels with capacities of 8, 5 and 3" to the AMS, Cambridge, MA, 28 Dec 1922; abstract: *Bull. Amer. Math. Soc.* 29:115 #48.
**1926b** Review of *An Introductory Account of Certain Modern Ideas and Methods in Plane Analytical Geometry*, by C. A. Scott. *Bull. Amer. Math. Soc.* 32:295.
**1927** Some suggestions on the technique of teaching plane geometry. *Math. Teacher* 20:370–74.
**1928a** Review of *Examen des Différentes Méthodes Employées pour Résoudre les Problèmes de Géométrie*, by G. Lamé. *Bull. Amer. Math. Soc.* 34:381.
**1928b** Solid geometry and the new curricula. *Amer. Math. Monthly* 35:251–53. Review: *JFM* 54.0075.02 (G. Feigl).
**1929a** A reply to "The position of the high school teacher of mathematics." *Math. Teacher* 22:14–17.
**1929b** Review of *Vorlesungen über Darstellende Geometrie*, vol. 2: *Die Zyklographie*, by E. Müller, edited from the manuscript by J. L. Krames. *Bull. Amer. Math. Soc.* 35:737.
**1929c** The vocabulary of plane geometry. *J. Ed. Res.* 20:392–94.
**1930** Are corollaries indispensable in plane geometry? *Sch. Sci. Math.* 30:319–20.
**1931** Review of *A Short History of Mathematics*, by V. Sanford. *Bull. Amer. Math. Soc.* 37:333.
**1932** *Plane Geometry*. New York: Silver, Burdett & Co. Reviews: *High Sch. J.* 15:183,185; *Math. Teacher* 26:117; *Sch. Sci. Math.* 32:679–80 (C. A. Stone); Three modern textbooks in secondary-school mathematics. *Sch. Rev.* 475–77 (J. S. Georges).
**1933** A mathematical fantasy. *Sch. Sci. Math.* 33:535–36.
**1934a** Geometry's tribute to tradition. *Sch. Sci. Math.* 34:266–74. Review: *Sch. Rev.* 43:142 (R. R. Breslich).
**1934b** *Solid Geometry*. New York: Silver, Burdett & Co. Reviews: *Math. Teacher* 26:117; *Natl. Math. Mag.* 9:119–20 (P. K. Smith); *Sch. Sci. Math.* 35:332 (C. A. Stone).
**1934c** Technical vocabularies for plane and solid geometry. *J. Ed. Res.* 27:344–54. Preliminary report **1929c**. Presented in absentia at the ICM, Zürich, 4–12 Sept 1932; abstract: *Verhandlungen Kongress Zürich, 1932* 2:357–58.
**1937** Ratio and proportion in high school curriculums. *Sch. Sci. Math.* 37:1079–88. Presented as "Function concepts in high school curriculums" at the ICM, Oslo, 13–18 Jul 1936.
**1941** *Free Learning*. Boston: B. Humphries. Reviews: *Ed. Res. Bull.* 21:185 (J. D. Teller); *Peabody J. Ed.* 19:233.

**Abstract not listed above:**
**1935** Mathematics and character education. *Amer. Math. Monthly* 42:344 #4. Presented to the MAA, Grove City, PA, 13 Oct 1934.

**References to:** AmMSc 2–6, BioWMath, WhoWWA.
"Invalided Educator Overcomes Handicap and Aids Red Cross," *Fort Lauderdale* (*FL*) *Daily News*, 26 Apr 1943.

**Other sources:** PhD dissertation vita 1908; Owens questionnaires 1937, 1940; Vassar College Archives; communication with Indiana University of Pennsylvania Archives and with Alumnae and Alumni of Vassar College (AAVC); WomWWA (Cowley, Mary Junkin Buchanan); US Census 1870, 1880, 1900, 1920 PA; Florida death certificate.

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