



Ellen H. Swallow Richards
Courtesy MIT Museum

Ellen H. Swallow Richards (1842–1911) **-Women Scientists in American History**

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DEI moment

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Ellen H. Swallow Richards



Richards c. 1890s

From *The Life of Ellen H. Richards*
by Caroline L. Hunt, 1912

Women's Advocate, Sanitation Engineering Pioneer

One of America's first female professional chemists and the first woman to be accepted by a scientific school, Ellen H. Swallow Richards is best known for pioneering the field of sanitary engineering. Richards performed an unprecedented survey in 1890 that led to the first state water-quality standards in the nation. She is credited for making important contributions to the understanding of environmental systems.

Paving Pathways in Academia

Richards developed an interest in chemistry while at Vassar College in Poughkeepsie, NY. Upon graduation, she applied for various industrial chemistry apprenticeships, but she was rejected from every one. Instead, she made her way to the male-only Massachusetts Institute of Technology (MIT) in 1871, where she was admitted as a special student, making her the [first woman in America to enter a scientific school](#).

From 1873 to 1878, Richards taught chemistry without a salary or title. Recognizing the need for practical facilities for women to conduct research, [she helped establish the Women's Laboratory at MIT, which opened in 1876](#). In 1879, Richards was recognized as an [assistant professor](#) in chemical analysis, industrial chemistry, and applied biology, though still without pay.

Pioneering Sanitation Engineering

When MIT opened the nation's first laboratory of sanitary chemistry in 1883, [Richards was appointed assistant chemist](#). Within that time, she participated in [sewage treatment research](#), analyzing as many as 40,000 samples. Her work is distinguished in the final report: “The accuracy of the work and the no less important accuracy of the records were mainly due to [Richards's great zeal and vigilance](#).”

In 1890, MIT established a sanitary engineering program, and Richards was appointed instructor. At the request of the Massachusetts State Board of Health, Richards and her assistants performed a water-quality survey of Massachusetts' inland water bodies, many of which were already polluted with industrial waste and municipal sewage. According to the [Chemical Heritage Foundation](#), “The scale of the survey was unprecedented: it led to the first state water-quality standards in the nation and the first modern municipal sewage treatment plant”

From 1887 to 1897, Richards served as [official water analyst](#) for the State Board of Health. [She continued as an instructor at MIT until her death in 1911.](#) She and her colleague, A. G. Woodman, also wrote a classic text in the field of sanitary engineering: *[Air, Water, and Food from a Sanitary Standpoint \(1900\)](#)*. Richards is the [author of more than 15 books, numerous articles, and reports in environmental science and engineering.](#)

Sources

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- 3) Ellen H. Swallow Richards. (n.d.). *Chemistry in History*. Retrieved from <http://www.chemheritage.org/discover/chemistry-in-history/themes/public-and-environmental-health/public-health-and-safety/richards-e.aspx>.