

A NATIONAL HISTORIC  
CHEMICAL LANDMARK

# THE EDGAR FAHS SMITH MEMORIAL COLLECTION IN THE HISTORY OF CHEMISTRY

UNIVERSITY OF PENNSYLVANIA  
PHILADELPHIA, PENNSYLVANIA  
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AMERICAN CHEMICAL SOCIETY  
Division of the History of Chemistry and  
The Office of Communications



The Smith Collection in 1949, when it was located in Edgar Fahs Smith's former office in the John Harrison Laboratory at the University of Pennsylvania.

This booklet commemorates the designation of the Edgar Fahs Smith Memorial Collection in the History of Chemistry as a National Historic Chemical Landmark. The designation was conferred by the American Chemical Society, a nonprofit scientific and educational organization of 161,000 chemists and chemical engineers.

The Smith Collection is located in the Walter H. and Leonore Annenberg Rare Book and Manuscript Library at the University of Pennsylvania in Philadelphia, Pennsylvania. The university was founded in 1740 by Benjamin Franklin. Its four undergraduate and 12 graduate and professional schools currently have a combined student body of over 21,000 and a faculty of more than 4300.

A plaque marking the ACS designation was presented to the university on March 16, 2000. The inscription reads:

The Edgar Fahs Smith Memorial Collection in the History of Chemistry is one of the oldest, most diverse, and most significant collections of chemistry books, manuscripts, and images in the United States. During more than 40 years at the University of Pennsylvania, Edgar Fahs Smith (1854–1928) shared his great interest in the culture and history of chemistry through teaching, lecturing, and writing. The collection began as Smith's personal library and at his death consisted of some 3000 printed volumes, 600 manuscripts, and 1800 images; since then it has grown to more than 15,000 volumes, 100 linear feet of manuscripts, and 4000 images. The collection remains an essential resource for historians and chemists alike.

*On the cover:* Edgar Fahs Smith in his office in the John Harrison Laboratory, taken on the day of his investiture as provost of the University of Pennsylvania, January 1, 1911.

*Background:* Illustration from Feuer Buech, a manuscript treatise on munitions and explosive devices (Germany, 1584).

*Acknowledgments:*

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# EDGAR FAHS SMITH AND THE HISTORY OF CHEMISTRY IN AMERICA

Any serious student of the history of chemistry in America will eventually seek out the Edgar Fahs Smith Memorial Collection, one of the foremost international historical collections of chemistry books and manuscripts. The core of the collection is the personal library of Edgar Fahs Smith (1854–1928), who, during his long career as professor of chemistry and later provost at the University of Pennsylvania, was also a collector of chemistry books and manuscripts. Smith is rightly credited, perhaps more than any other person, as a pioneer in the study of the history and culture of chemistry in the United States during the early decades of the twentieth century.

Throughout his long and active career he cultivated a deep interest in the history of his discipline and inculcated this perspective in his students through his teaching and prolific writing in the field. An ardent bibliophile, Smith collected books, manuscripts, portraits, autographed letters, and memorabilia of famous chemists for use in his classes and for research.

Today's chemists, working in a highly specialized and frenetic world, may find Smith's devotion to studying the history of chemistry a curious affectation. The explanation for his sustained interest lies in the values that Smith and other chemists of his generation brought to their work. These values sprang from their shared experiences in American colleges and German universities in the late-nineteenth century. Edgar Fahs Smith and many other aspiring scientists of his time completed their doctoral training at the University of Göttingen. Their time in German laboratories gave them a new vision of scholarly research, programs for institution building, and a commitment to the moral and cultural value of university study that permeated German academe. Smith and his colleagues, Theodore W. Richards at Harvard, Charles F. Chandler at Columbia, and Ira Remsen at Johns Hopkins, played leading roles in the transformation of American academic life at the turn of the century. They were comfortable with the production of new Ph.D.s and the publication of research, yet still sensed that graduate study in chemistry in the United States was thought to lack the moral value of studies in the traditional liberal arts.

To combat this idea, Edgar Fahs Smith used "historical chemistry," as he called it, to remind new chemists of the humanistic side of their endeavor and to counter a view of scientists in American universities as industrial technicians. Thus, his avocational interest complemented his professional role. Smith expressed these sentiments in his last book, *Old Chemistries* (New York, 1927):

"The criticism that chemistry is absolutely commercialized is frequently heard and, further, that it is the commercial value of the science alone which claims the thought of chemists. Such views are widely prevalent. But other ideas exist, and chemistry teachers especially know that to them the discarded 'old chemistries' bring many other messages, messages in history, in philosophy, in economics, in social relations, in art, in international relations, in literature, and in a wide and extensive culture."

His collection of classic texts, images, and related material was stored in his office in the Harrison Laboratory. This attractive and comfortable room was filled to overflowing with antique furniture, portraits of chemists and other memorabilia, and was, in the words of a contemporary, "... a perfect expression of his own ideals."

Following Smith's death his library was given to the University of Pennsylvania with an endowment through the generosity of his widow. It reopened as the Edgar Fahs Smith Memorial Collection in the History of Chemistry on March 1, 1931.



Edgar Fahs Smith, 1901.

# THE COLLECTION

The Smith Collection has few peers in the wide range of chemistry-related works it holds. Over the years, the collection has grown from the approximately 3000 printed volumes and 600 manuscripts that constituted Smith's original library, to the 15,000 books, manuscripts, and pamphlets it holds today. It also includes an important

collection of nearly 4000 photographs and engravings of scientists, alchemists, chemical apparatus, and laboratories, of which 1800 were collected by Smith himself. Finally, there are several examples of original chemical apparatus that Smith collected over the years. The collection has grown substantially in the past seven decades, thanks to the dedication of its first curator, Eva Armstrong, and to the efforts of her successors, but it retains the imprint of the man who began the collection, Edgar Fahs Smith. The highlights below illustrate some of its notable strengths and give a sense of its breadth and depth of coverage of chemistry and its allied sciences and technologies.



Frontispiece from Friedrich Accum, *A Treatise on the Art of Brewing* (London: Longman, Hurst, Rees, Orme, and Brown, 1820).

## Early Works

Smith assembled a great deal of material relating to alchemy and Renaissance alchemists. He collected many alchemical manuscripts, including an English translation of Alexander von Suchten's *De secretis antimonii*, which purportedly contains annotations in the hand of an early American alchemist, John Winthrop, the first colonial Governor of Connecticut. Among the printed alchemical works is a copy of Elias Ashmole's *Theatrum Chemicum Britannicum* (1652), presented to Smith by friends at Columbia University, that was originally owned by Sir Isaac Newton (and contains his autograph notes).

The collection has representatives of early pharmacology, including many works, both printed and manuscript, of receipts (recipes) for various medical ailments. One German manuscript, written in 1683, is a pharmacopoeia, or medical miscellany, containing remedies and treatments for various diseases, probably copied into a single volume for the use of an early physician.

The works of both Robert Boyle (1626–1691) and Joseph Priestley (1743–1794) are well represented in the Smith Collection, with the Boyle imprints comprising the most comprehensive collection in North America. Boyle, among whose works was *The Sceptical Chymist* (1661), is perhaps best known for his experiments with early air pumps, which led to the eponymous Boyle's Law, an expression of the inverse relationship between the pressure and the volume of air.

Priestley, best remembered for the discovery of oxygen (which he knew as “dephlogisticated air”), was sympathetic to the French Revolution, and these sympathies forced him to leave his home in Birmingham, England. Eventually he went into exile in America, where

he continued his work, “giv[ing] inspiration and impetus to a host of young Americans to press forward in chemistry.” Among the Priestley manuscripts in the Smith Collection are letters written by him to the National Assembly of France accepting citizenship but declining the invitation to join the Assembly. A copy of the law conferring French citizenship upon Priestley and others can be found with the printed Priestley materials.



Illustration from Elias Ashmole, *Theatrum Chemicum Britannicum* (London: Printed by J. Grismond for Nathaniel Brooke, 1652).

## Practical Applications

The practical application of chemistry is represented by numerous texts on topics such as soap making and dyes, perfumes and cosmetics. Works on the production of beer, wine, and liquors also abound, including the German translation of Hieronymus Brunschwig's *Kleines Distillierbuch* (1500), William Y-Worth's *The Compleat Distiller* (1705), and Friedrich Accum's *A Treatise on the Art of Brewing* (1820).



Title page from John Babington, *Pyrotechnia, or, A Discourse of Artificial Fire-Works* (London: Printed by Thomas Harper, for Ralph Mab, 1635).

the Venice 1550 edition of *Pirotechnia*, by Vannoccio Biringucci. First published in 1540, Biringucci's book may well be the earliest printed work to mention the subject. It is also important as one of the first systematic texts on mining and metallurgy, preceding Agricola's more famous *De Re Metallica* by 16 years.

## Science in Early America

The collection is exceptionally rich with print and manuscript resources from early America, when Philadelphia was the center of scientific activity. The first chair of chemistry in North America was established at the University of Pennsylvania Medical School in 1769. Benjamin Rush, a leading American physician and political activist, was the first to hold this chair, serving as professor of chemistry from 1769 to 1789. Manuscript lecture notes, both by Rush and by some of his students, can be found in the collection. Although it disbanded between 1805 and 1810, the celebrated Chemical Society of Philadelphia, founded in 1792, was very active at the turn of the century. The Smith Collection holds a copy of the society's *Annual Oration Delivered Before the Chemical Society of Philadelphia, January 31st, 1801*, published in 1802 and reprinted by Smith in his *Chemistry in America* (1914). Robert Hare's "aqueous sliding rod hydro-oxygen eudiometer," an instrument for measuring and analyzing gases, illustrated and described in Hare's *Compendium of the Course of Chemical Instruction in the Medical Department of the University of Pennsylvania* (1827), is probably the most important apparatus in the collection.

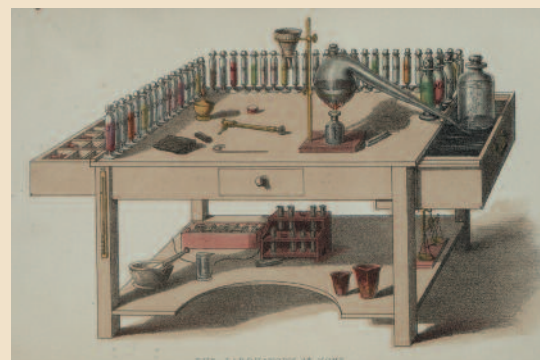
The collection acquired another dimension with the 1950 acquisition of Massachusetts Institute of Technology chemist and explosives expert Tenney L Davis's library of pyrotechnical literature. However Smith's colleague, Walter Taggart,

was the source of

According to Smith, "one of the most delightful chemical texts which circulated abroad and in America in the first half of the nineteenth century" was Jane Marcet's *Conversations on Chymistry*. This work was enormously influential in developing interest in chemistry among the young, and more than 160,000 copies were sold in this country before 1853. The Smith Collection holds more than 30 copies printed before 1850, in both London and American editions, including the first American edition of 1806.

## The Collection Today

The Smith Collection is an active and growing collection, used by a wide variety of patrons in a multitude of ways. It is a source for conservators restoring old paintings who are interested in the chemical composition of the early paints and varnishes with which they are working, and for brewers, vintners, and distillers who are interested in recovering old recipes and in learning about the history of their crafts. Historians of science find a wealth of material having to do not only with chemistry, but also with physics and alchemy.



Frontispiece from G. W. Septimus Piesse, *The Laboratory of Chemical Wonders* (London Longman, Green, Longman, and Roberts, 1860).

New acquisitions of older materials on chemistry and its historical antecedents are made regularly, with funding from the two Smith Collection endowments established through the generous foresight of Smith's widow, Margie Gruel Smith. Among recent additions are *Pharmacologia Anti-empirica, or, A Rational Discourse of Remedies both Chymical and Galenical* (1683), by Walter Harris; *L'Art du Distillateur Liquoriste* (1775), by Jacques-François Demachy; two eighteenth-century medical manuscripts; and a small cache of books dealing with animal magnetism. The collection is also the beneficiary of gifts of books, manuscripts, and images from myriad donors.

# EDGAR FAHS SMITH

Edgar Fahs Smith was born in York, Pennsylvania, on May 23, 1854. He graduated from the Pennsylvania College of Gettysburg in 1874. His chemistry professor, Samuel P. Sadtler (who later became a leading industrial consultant and one of



Edgar Fahs Smith during the annual meeting of the American Chemical Society in Philadelphia, 1926.

Smith's colleagues in the Philadelphia chemical community), encouraged him to pursue doctoral studies at the University of Göttingen. There, in two years, he obtained his Ph.D. under the direction of Friedrich Wöhler, one of the most internationally renowned chemists of the time. Upon his return to the United States he married Margie Alice Gruel, whom he had met while a student at Pennsylvania College. Smith began his teaching career at the University of Pennsylvania, and apart from a short period teaching at Muhlenberg and Wittenberg Colleges, spent his entire career there.

He started as an instructor from 1876 to 1881, then returned in 1888 as professor of analytical chemistry. He became chairman of the chemistry department in 1892 and reorganized it on the German model of a teaching and research laboratory designed to produce qualified professional chemists. The department's success in research under his direction brought Smith recognition in the chemistry community, including selection as American Chemical Society president in 1895 and election to the National Academy of Sciences in 1898.

During the 1890s Smith began to offer his students at Penn a course of lectures on the history of chemistry, probably among the first such courses offered at an American university. His typed lecture notes, reflecting his view that chemistry's past reveals its rich culture and its humanism, are preserved in the Smith Collection.

A proven administrator, Smith was named vice provost of the university in 1898, then provost

(at that time the chief executive officer) in 1911. Over the next decade, he presided over Penn's transformation into a major research institution. Despite his demanding administrative schedule, he still cultivated his long-standing interest in the history of chemistry. Smith's major works in the field—*Chemistry in America* (1914), *The Life of Robert Hare* (1917), *James Woodhouse* (1918), and *Priestley in America* (1920)—were all completed during his tenure as provost. He also maintained an active public life, serving on the U.S. Assay Commission, and the Electoral College and the Commission for Revision of the Constitution of Pennsylvania. He retired from the university in 1920 and devoted the last eight years of his career to pursuing historical research on American chemistry and advancing its cause. Twice again president of the American Chemical Society—in 1921 and 1922—he was instrumental in founding the society's Divisions of Chemical Education and of the History of Chemistry. Through his collecting, his institutional activities, and his publications, Edgar Fahs Smith helped to create the history of chemistry in the United States. He died in Philadelphia on May 3, 1928.



Edgar Fahs Smith with students in the John Harrison Laboratory, University of Pennsylvania. Smith's research was directed toward methods of electrochemical analysis, atomic weight determinations, and the chemistry of inorganic complexes, and he and his graduate and post-doctoral students carried out research reported in 169 articles.

## FURTHER READING

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### Internet Resource

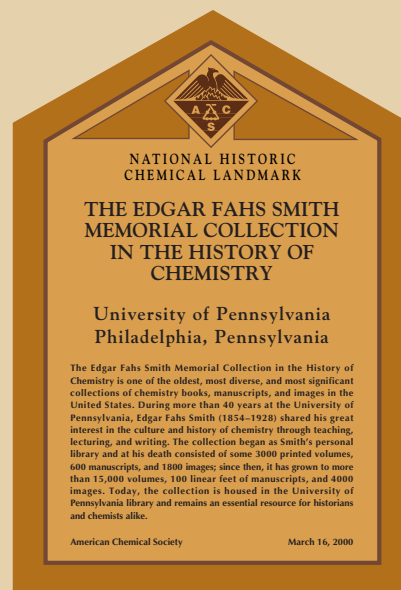
Edgar Fahs Smith Memorial Collection.  
<http://www.library.upenn.edu/special/smith.html>  
(accessed March 2000)

## THE NATIONAL HISTORIC CHEMICAL LANDMARKS PROGRAM

The National Historic Chemical Landmarks Program recognizes our scientific and technical heritage and encourages the preservation of historically important achievements and artifacts in chemistry, chemical engineering, and the chemical process industries. It provides an annotated roster to remind chemists, chemical engineers, students, educators, historians, and travelers of an inspiring heritage that illuminates both where we have been and where we might go when traveling the diverse paths to discovery.

A historic chemical landmark represents a distinctive step in the evolution of chemical science and technology. Designations of sites and artifacts note events or developments of clear historical importance to chemists and chemical engineers. Collections mark the contributions of a number of objects with special significance to the historical development of chemistry and chemical engineering.

The Division of the History of Chemistry began this program in 1992. An international ACS committee, composed of chemists, chemical engineers, and historians of science and technology, works with the Office of Communications and is assisted by the Chemical Heritage Foundation. Together, these organizations provide a public service by examining, noting, recording, and acknowledging particularly significant achievements in chemistry and chemical engineering. For further information, please contact the ACS Office of Communications, 1155 Sixteenth Street, N.W., Washington, D.C. 20036; 800-227-5558, ext. 6274; e-mail: [nhclp@acs.org](mailto:nhclp@acs.org).



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