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THE EDGAR FAHS SMITH MEMORIAL
LIBRARY ON THE HISTORY
OF CHEMISTRY

By DR. WALTER T. TAGGART

There stands on the campus of the University of Pennsylvania a bronze statue of Provost Edgar Fahs Smith, with the inscription: Teacher—Investigator—Friend. Few of the thousands who daily pass this memorial realize that within a few steps, in the John Harrison Laboratory of Chemistry, this distinguished educator labored for over forty years as professor of chemistry, as vice-provost, and as provost. Here he was surrounded by the literary treasures which he had acquired and used to such great advantage in spreading the knowledge of his chosen science.

Five years ago, through the generosity of Dr. Smith's widow, Mrs. Margie A. Smith, there was founded, and later endowed by her, The Edgar Fahs Smith Memorial Library on the History of Chemistry. This library, consisting of over five thousand items relating to the history of chemistry, can truly be said to contain the classics of the subject. Among these are the works of the great chemists—Geber, Stahl, Berzelius, Priestley, Lavoisier, Dalton, Avogadro, Davy, Liebig, Kekulé, Pasteur, Arrhenius, Mendeléeff, Ramsay, and many more. Many of these original publications are presentation copies to distinguished chemists and bear the authors' signatures.

Fine engravings, autograph letters of signers of the Declaration of Independence, members of the Continental Congress, and others connected with the early history of the University of Pennsylvania, constitute a part of the collection. Here, also, are fine examples of early American stipple engravings, in particular, those of David Edwin. In addition to Dr. Smith's own publications, with their translations into foreign languages, are his typewritten lecture notes on the history of chemistry. One has only to glance at these volumes to realize his special interest in this field.

The purpose of this article is to give an idea of the general scope and character of the collection rather than a detailed account of its contents. A few of the rare items pertaining to chemistry are described in the following paragraphs.

Raymond Lully, 1235-1315. *De secretis naturae*, Cologne, 1567; *Codicillus*, Cologne, 1572. These works are attributed to Lully, a voluminous writer on alchemical subjects. He described the making of nitric acid and aqua regia and studied their action on metals.

Philippus Ulstadius. *La ceil des philosophes*, Paris, 1550. Ulstadius first published this work in Latin in 1525. It deals with the subject of distillation, substances prepared by that process, and their use in medicine. The methods noted by him are taken from the works of Arnold de Villa Nova, Albertus Magnus, Raymond Lully and others. Ferguson¹ states: "The woodcuts of apparatus, retorts, flasks, receivers, furnaces, etc. are identical with those in the folio editions of Geber, printed by Grüninger in the early part of the 18th century."

Andreas Libavius, d. 1616. *Syntagmatis selectorum vndiquaque et perspicue traditorum alchymiae arcanorum*, Frankfurt, 1611. This folio is one of the treasures of the collection. It was presented to Dr. Edgar F. Smith by Provost Josiah H. Penniman, who purchased it in New England. It bears the inscription "This book came from California in the Brig Sam French, 1851. Eastport, Maine." This volume, which was brought around Cape Horn during the gold rush period, leads one to wonder who possessed it in that interesting period in California. On the title-page is the inscription "Collegii Societatis Jesu Bambergensis"—mute evidence that it was possibly the property of a Jesuit priest in one of

¹ *Bibliotheca chemica*, by John Ferguson. Glasgow, 1906.

the old Spanish missions. Libavius was among the first to describe chemical reactions in plain language, and is credited by Ferguson with writing the first real text-book on chemistry. This edition antedates the 1615 edition noted by Ferguson.

Jean Baptiste van Helmont, 1577-1644. *Ortus medicinalae*, Amsterdam, 1648. This is the first edition of the collected works of van Helmont, published after his death by his son. It was printed by Louis Elzevir, son of the founder of the famous Elzevir press. The volume contains a rare frontispiece, showing portraits of van Helmont and his son, Franciscus Mercurius, with the coats of arms belonging to the various properties of van Helmont and his wife.

Johann Rudolf Glauber, 1604?-1668. *Opera chymica*, Frankfort, 1658. 2 vols. This is one of the best editions of Glauber's works, and contains the original illustrations on distillation which are so frequently reproduced in other publications.

Robert Boyle, 1627-1691. *Nova experimenta physico-mechanica de vi aeris elastica*, Rotterdam, 1669; *The sceptical chemist*, Oxford, 1680. Robert Boyle, one of the foremost natural philosophers of his time, was a voluminous writer on many subjects. In addition to the 1680 edition of *The sceptical chemist* the library contains a Latin edition published at Rotterdam in 1668. This book had a revolutionary influence upon the science of the time. "The spring and weight of the air," noted above, was Boyle's first scientific work. He was the first to define an element clearly, and showed that a compound is made up of two or more constituents. He is best known for his law of the compressibility of gases.

Johann Kunckel von Löwenstern, 1630?-1703. *Ars vitraria experimentalis*, Frankfort and Leipzig, 1689. Brandt prepared phosphorus in 1669, but its elementary nature was established by Kunckel and Boyle. Kunckel's book on the art of glass making was one of the best works of the period upon the subject. It contains his portrait and numerous fine engravings.

Hermann Boerhaave, 1668-1738. *Elementa chemicarum*, Leyden, 1732. This was one of the most popular text-books of the eighteenth century. The first edition, which appeared in Latin in 1724, was a compilation by Boerhaave's students of his lectures on chemistry. This edition was issued with-

out the knowledge or authority of Boerhaave. The publication underwent numerous unauthorized translations and revisions. The first authentic edition appeared in Leyden in 1732 in two quarto volumes. The authenticity of this edition is evidenced by Boerhaave's own signature upon the reverse side of the title-page. An interesting feature of this edition is a printer's error omitting pages 423-424 in volume 1, and duplicating pages 187-188 in their place. Dr. Tenney L. Davis declares that, in his opinion, the personality of Boerhaave is more clearly portrayed in the spurious edition, which contains numerous anecdotes in the language in which he addressed his students; Boerhaave omitted these in his more formal edition.² An English translation of this edition by Peter Shaw appeared in London in 1741.

Albaro Alonso Barba, fl. 1640. *Arte de los metales*, Madrid, 1740. First edition. Barba lived in the village of Lepe in Andalusia. He became a priest and went to South America in the service of a church at Potosi. There he had the opportunity of studying the mining procedures in vogue at the time, and through his interest in metals became an expert assayer. In this book he discusses various processes, the secrets of which were zealously guarded by the Spaniards. Edward Montagu, Earl of Sandwich, kinsman and patron of the famous Samuel Pepys, procured a copy of Barba's book while serving as an ambassador to Spain. Montagu had a fair knowledge of science, and translated two of the five parts of Barba's volume. The translation of the first part appeared in 1670; in 1674 Montagu published a volume containing translations of two parts of Barba's book. The original work by Barba was presented to Dr. Smith by Professor E. Moles of the University of Madrid. Later Dr. Smith succeeded in procuring a copy of the translation by the Earl of Sandwich. The work is interesting because it throws light upon the theories and practices in the working of metals at that time.

Antoine Laurent Lavoisier, 1743-1794. *Traité élémentaire de chimie*, Paris, 1789, 3 vols. The immortal Lavoisier, founder of modern chemistry, is represented in the Smith collection by the first edition of this work, with plates engraved by Madame Lavoisier. The publication is important because of the revolution in chemistry effected by Lavoisier.

²"The vicissitudes of Boerhaave's text-book of chemistry" by Tenney L. Davis. Brussels, 1928. Reprinted from *Isis*, no. 33 (v. 10), March, 1928.

He sent two copies of the first edition to Benjamin Franklin on February 2, 1790, by the hand of his friend, M. de Coulens de Caumont. In the letter of transmission Lavoisier wrote: "The French scholars are divided at this moment between the old and the new doctrine. I have on my side M. de Morveau, M. Berthollet, M. de Fourcroy, M. de la Place, M. Monge, and in general the savants of the Academy. The scholars of London and England have gradually abandoned the doctrine of Stahl but the German chemists adhere to it. This then is the revolution which has occurred in an important branch of human knowledge since your departure from Europe. I look upon this revolution as well advanced, and it will be complete if you join with us Now that you have been informed as to what has transpired in chemistry, it might be well to speak of our political revolution We deeply regret your absence at this time from France; you would have been our guide and could have shown us the limits beyond which we should not pass." Four years after penning this letter, Lavoisier, a victim of the political revolution, died on the guillotine.

In 1787 Lavoisier and three colleagues, Guyton de Morveau, Berthollet, and de Fourcroy published a volume entitled "*Méthode de nomenclature chimique*", in which such familiar terms as oxides, sulphates, oxalates, etc., appear for the first time. An early American reaction to the simplification in chemical nomenclature was evidenced by the publication in Hanover, N. H., in 1799, of a pamphlet entitled "A new nomenclature of chemistry proposed by Messrs. de Morveau, Lavoisier, Berthollet and Fourcroy, with additions and improvements by Lyman Spalding, M.B. Lecturer on Chemistry in Dartmouth University." A reproduction of the rare brochure, an original copy of which is in the Smith Memorial Library, has recently been issued by the American Pharmaceutical Association.

Elias Ashmole, 1617-1692. *Theatrum chemicum britannicum*, London, 1652. This is one of a number of rare books presented to Dr. Smith by a group of friends at Columbia University, College of the City of New York, and the Chemists' Club. *Theatrum chemicum* is a compilation by Elias Ashmole, founder of the Ashmolean collection now at Oxford University, and consists of a series of old English poems on alchemy by Thomas Norton, George Ripley, Chaucer, Edward Kelly, John Dee, and others. This item is one of two

in the collection containing the book-plate of Sir Isaac Newton.

A page from a manuscript written by the great Russian chemist, Mendeléeff, was presented to Dr. Smith by Madame Mendeléeff. Mendeléeff's outstanding contribution to chemistry was his arrangement of the elements according to the periodic system. He also wrote one of the standard text-books in chemistry. Recently one of Mendeléeff's periodic tables sent from the United States was mistaken by Soviet officials for a dangerous code message and was refused admission to Russia through the mails, proving once more that a prophet is not without honor save in his own country.

Another interesting autograph letter is from the celebrated German chemist, Friedrich Wöhler, who is noted for his isolation of the metal aluminum and for his synthesis of urea from inorganic substances. The latter contribution revolutionized organic chemistry. It was under this master of chemistry that Dr. Smith took his degree of Doctor of Philosophy in the year 1876. The letter, translated below, is of further interest since it was addressed to George F. Barker, formerly professor of physics in the University of Pennsylvania: "Göttingen, August 19, 1877. Let me express my heartiest thanks for the great honor which the American Chemical Society has shown me by appointing me an honorary member. When one is in the 78th year of life, as I now am, when one's strength no longer permits him to further participate in the development of science, such a distinction is a two-fold source of joy, as a sign that the younger generation in its path of rapid progress has not forgotten us, and that the incapacitated comrades even on the other side of the ocean, are still remembered."

In connection with the recent world-wide celebration of the two hundredth anniversary of the birth of Joseph Priestley, the discoverer of oxygen, material was loaned by the Smith Memorial Library for a Priestley exhibit which was held in the rooms of the Historical Society of Pennsylvania. This represented only a small portion of the wealth of Priestley material available here. A document of international interest written by Priestley bears the date "Clapton, Sept. 13, 1792, Year of Liberty 4." It is addressed "To the members of the National Assembly of France." In this letter Priestley acknowledges an invitation to become a member of the French convention and a citizen of France. He declines

membership in the convention but accepts citizenship for himself and his son.

This special library, young as it is, has fortunately inherited the friendship and interest of Dr. Smith's distinguished colleagues in chemistry, who are enthusiastic over the possibilities of the collection as a contribution to the history of science. These men have been generous in contributing material, representing hundreds of books, portraits, and autograph letters, thus doing for it what Mr. Henry Reed Hatfield has done for chemistry in the University Library by installing and equipping a room for the Walter Hatfield Library of Chemistry, a memorial to his brother. In the near future the Smith memorial collection will receive from Dr. Charles A. Browne, of the Bureau of Chemistry and Soils in Washington, D. C., a considerable part of his valuable private collection. Dr. Browne is one of America's foremost scholars in the history of chemistry. To him we are also indebted for one of our greatest treasures, "Conversations with Edgar Fahs Smith," being excerpts from Dr. Browne's diary over a period of years.

Mr. Frederick E. Brasch, Chief of the Smithsonian Division of the Library of Congress, has generously served as consultant in the preparation of a catalogue of the Smith Memorial Library, which we hope will soon appear in print. The Library is fortunate in having the services of Miss Eva V. Armstrong as Curator. As Dr. Smith's former secretary she assisted in assembling the collection.

DR. ROSENBACH'S GIFT

From Dr. A. S. W. Rosenbach the Library has recently received a most valuable gift of four incunabula, examples of early products of the press at Venice, Basel, Nuremberg, and Strassburg, printed between 1475 and 1495. The following description of the books has been contributed by Mr. Clifford B. Clapp, Superintendent of the cataloging department of the Library:

The earliest of the four books is part three of the *Summa* of Alexander de Ales or de Hales, entitled *Super tertium sententiarum*; a large copy, with original manuscript foliation, bound in the old leather and wood boards, wormed. This was printed in 1475 by J. de Colonia and J. Manthen, who may be interpreted as Johann of Köln and Johann Man-