Rev. CENIC Cienc. Quím.; Vol. 53. Número Especial. 152-172. Año. 2022. e-ISSN: 2221-2442.

REVISION BIBLIOGRAFICA

Edgar Fahs Smith (1854-1928) – the Eminent American Chemist and Historian of Chemistry of the Second Half of the XIX Century and the First Quarter of the XX century

Edgar Fahs Smith (1854-1928) - el eminente químico estadounidense e historiador de la química de la segunda mitad del siglo XIX y el primer cuarto del siglo XX

Aleksander Sztejnberg[a, *] (0000-0003-2443-763X)

[a] **University of Opole, Oleska.**
* a.sztejnberg@uni.opole.pl

Recibido: 14 de julio de 2021; Aceptado: 23 de abril de 2022;

ABSTRACT

Edgar Fahs Smith (1854-1928) was one of the great American chemists. He has done a lot of experimental studies. He carried out researches in the fields of organic, inorganic, and analytical chemistry, elektrochemistry and mineralogy. He developed the rotating anode. He wrote many works in the field of history of American chemistry. The purpose of this paper is to familiarize readers with the important events in the life of Smith. In addition, his participation in the preparation of the first visit of Marie Curie (1867-1934) to the USA in 1921 is described and literature on his selected articles and books is presented.

Keywords: E. F. Smith, Electrochemistry, History of American Chemistry, Marie Curie, United States – XIX-XX centuries.

RESUMEN

Edgar Fahs Smith (1854-1928) fue uno de los grandes químicos estadounidenses. Ha realizado muchos estudios experimentales. Realizó investigaciones en los campos de la química orgánica, inorgánica y analítica, la elektroquímica y la mineralogía. Desarrolló el ánodo giratorio. Escribió muchas obras en el campo de la historia de la química estadounidense. El propósito de este artículo es familiarizar a los lectores con los eventos importantes en la vida de Smith. Además, se describe su participación en la preparación de la primera visita de Marie Curie (1867-1934) a Estados Unidos en 1921 y se presenta literatura sobre sus artículos y libros seleccionados.

Palabras claves: E. F. Smith, Electroquímica, Historia de la Química Estadounidense, Marie Curie, Estados Unidos - siglos XIX-XX.

INTRODUCTION

The important events in the Smith's life

Edgar Fahs Smith (1854-1928) (Figure 1) was called “chemist of world fame and one of the country’s leading and best known educators” (Anonymous, 1928a), a man “of international reputation not only as a chemist but as an administrator and historian” (Kendall, 1928, p. 93), “a distinguished and versatile chemist” (D., 1928) and “an eminent chemist, a distinguished educator and a public spirited citizen, … [and] most enthusiastic worker in the cause of history of science” (Browne, 1928, p. 375). Ninety-four years have passed since his death, but during this time few articles about this illustrious American scientist were published.

Edgar Fahs Smith (1854-1928) was born in Westmanchester Township (York County, Pennsylvania) at King's Mill (“Smith, E. F. Recollections”, n.d.) on May 23, 1854, and he was the son of Gibson Smith and his wife Susannah Elizabeth (Fahs) Smith (Farrington, 2000, p. 142; Farrington, 2004-2005).

Fig. 1. *E. F. Smith (1854-1928) at the age of twenty-four (“Edgar Fahs Smith”, 1878).*

In his Memoirs (“Smith, E. F. Recollections”, n.d.), he wrote:

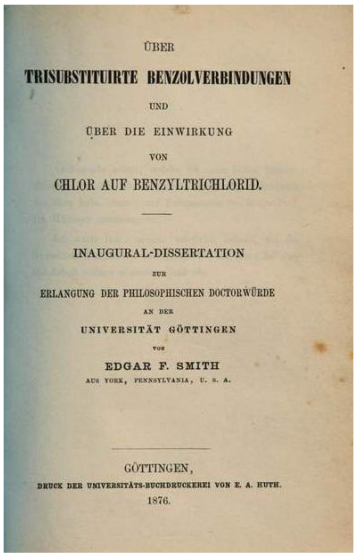
When I reached two and a half or three years of age, my parents moved into the town of York. Mother taught me my letters and also to spell and read. My first school was conducted by a noble woman named Miss Becky Welchens. The scholars were of both sexes. I remained in the school about two years, when I was transferred to a boy’s school. Here I studied arithmetic and geography and made pretty good progress, but for some reason was sent to another school, … This second school did not bear a very good reputation. … From this school I passed to what was called the Cottage Hill College. It was conducted by members of the United Brethren Church. It was coeducational. Here I

began the study of Latin under Professor Hammond. … From this school, I passed to the York County Academy, one of the noblest educational foundations in the country (pp. 1-2).

In 1872, he entered the Junior class of Pennsylvania College at Gettysburg. He graduated two years later with a Bachelor of Science degree. His chemist teacher Samuel Philip Sadtler (1847-1923) encouraged him to continue his studies in Germany. In the years 1874-1876, he studied chemistry under Friedrich Wöhler (1800-1882) at the Univeristy in Göttingen (Kendall, 1928, p. 93).

On 1876, he defended his doctoral dissertation entitled *Über Trisubstituirte Benzolverbindungen und über die Einwirkung von Chlor auf Benzyltrichlorid* (About Trisubstituted Benzene Compounds and About the Action of Chlorine on Benzyl Trichloride) and received his Ph.D. Figure 2 shows the title page of his dissertation (Smith, 1876).

Fig. 2. *Title page of E. F. Smith's doctoral dissertation (Göttingen: Druck Der Universität-Buchdruckerei von E. A. Huth, 1876).*


ÜBER

TRISUBSTITUIRTE BENZOLVERBINDUNGEN

UND

ÜBER DIE EINWIRKUNG

VON

CHLOR AUF BENZYLTRICHLORID.

INAUGURAL-DISSERTATION

ZUR

ERLANGUNG DER PHILOSOPHISCHEN DOCTORWÜRDE

AN DER

UNIVERSITÄT GÖTTINGEN

VON

EDGAR F. SMITH

AUS YORK, PENNSYLVANIA, U. S. A.

GÖTTINGEN,

DRUCK DER UNIVERSITÄTS-BUCHDRUCKEREI VON E. A. HUTH.

1876.

After returning from Germany to the United States in 1876, he became an Assistant in Analytical Chemistry (1876-1881) to Professor Frederick Augustus Ghent (1820-1893) of the Towne Scientific School of the University of Pennsylvania.

On April 10, 1879, he married Margie Alice, née Gruel in Gettysburg (Farrington, 2004-2005). The spouses had no children (Farrington, 2000, p. 144).

In 1881, he became Professor of Chemistry at Muhlenberg College (Allentown, Pennsylvania), and two years later, he began worked as Professor of Chemistry (1883-1888) at Wittenburg College (Springfield, Ohio) (Browne, 1928, p. 377; Joyce, 1919, p. 368). In 1888, he returned to Philadelphia and became Professor of Analytical Chemistry at the University of Pennsylvania. Four years later, he was appointed Head of the University's Department of Chemistry. In 1898, he was chosen Vice-Provost and in 1911, he was appointed Provost of the University. “During his forty-four years of teaching and administrative work, he gained the title of “the best beloved college professor in America” (Kendall, 1928, p. 93).

In 1920, he retired. Six years later, the University of Göttingen honored him again, renewing, after fifty years (1876-1926) his Doctor of Philosophy degree (Taggart, 1928, p. 6; Taggart, 1932, p. 614).

He “became ill in 1926 and his condition worsened until he was hospitalized in 1928” (Brandolisio, 2020, p. 6). On May 3, 1928, he died of pneumonia in the University

of Pennsylvania Hospital (Browne, 1928, p. 375; Mekker, 1937, p. 106; Taggart, 1932, p. 613). His funeral took place in Philadelphia on May 7, at Holy Trinity Church (Browne, 1928, p. 375).

He left behind a collection that was named after him. The *Edgar Fahs Smith Memorial Collection* is "one of the foremost international historical collections of chemistry books and manuscripts" ("Smith Memorial Collection", 2021). Lynne Farrington wrote about gift of this collection to the University of Pennsylvania by Smith's wife as follow as (Farrington, 2004-2005):

In 1931, three year after her husband's death, Margie Smith presented her late husband's collection to the University, together wit an endowment, so that it might continiue to grow and serve scholars of the history of chemistry. Her generosity spurred further generosity in the form of additional gifts to the collection from Smith's former students and colleagues. For her efforts, the University of Pennsylvania awarded her the honorary degree of Master of Arts (Man; Margie Alice Gruel Smith, p. 1).

In 1928, an article about Smith's collection appeared in *The Scientific Monthly* (Anonymous, 1928b). Four years later, Eva Armstrong's paper about this collection was published in the *Journal of Chemical Education*. She wrote that the collection "comprises a library of rare books and reprints on chemistry; engravings and portrait prints of chemists; and a collection of autograph letters and manuscripts" (Armstrong, 1932, p. 652). A year later, another Armstrong's paper about the collection appeared in the same journal (Armstrong, 1933).

In 2000, a commemorative booklet entitled *The Edgar Fahs Smith Memorial Collection in the History of Chemistry* was published in Washington, D.C., produced by the American Chemical Society's National Historic Chemical Landmarks program ("The Edgar Fahs", 2000).

Edgar F. Smith and the first visit of Marie Curie (1867-1934) to the United States in 1921

The French physicist Marie Curie née Maria Sklodowska, born in Warsaw in the Congress Kingdom of Poland (the Russian Empire), was twice a laureate of the Nobel Prize: in the field of physics (1903), and chemistry (1911) "in recognition of her services to the advancement of chemistry by the discovery of the elements radium and polonium, by the isolation of radium and the study of the nature and compounds of this remarkable element" ("The Nobel Prize", 2021; Curie, 2021). Her first visit to the United States lasted from May 11 to June 25, 1921. She was accompanied by her daughters, Irene (1897-1956) and Eve (1904-2007) (Korzeniowska, n.d., p. 3; Lubenau, 2012).

Dominika Korzeniowska (n.d.) wrote about the purpose of this visit as follows:

Its main purpose was to receive from the US President Warren G. Harding (1865-1923)[Harding, 1921] a gift of a gram of radium worth $ 100,000. The funds for its purchase were raised as part of a collection, mainly among American women, whose originator was the journalist Marie Mattingly Meloney (1878-1943), known in her professional life as Mrs. William Brown Meloney (p. 1).

On February 14, 1921, Edgar F. Smith, president of the American Chemical Society (ACS), sent a letter in French to Marie Curie. Here is an excerpt from it ("Marie Curie. Voyage", 1921):

Dear Madame Curie:

The American Chemistry Society, which has the honor of counting you as its Honorary Members since 1919, was very pleased with the news of your next arrival in the United States at the beginning of May. We are happy to inform you, Madam, that the members of

your own profession, that is to say that of Chemistry, is honored by your visit and are very anxious to place at your disposal all their facilities; from you, render all the honors which are due to you and to hope to present to them, the opportunity to know you and to hear you. We too, on our side, are also anxious to assist you in any way possible to make your stay in the United States as pleasant as it is profitable, and to strive to make all the projects and plans that have led you to us succeed honour your visit (pp. 22-23).

Marie Curie agreed to attend a luncheon given in her honour on Tuesday, May 17, 1921 at the Hotel Waldorf Astoria in New York (Anonymous, 1921a).

Edgar F. Smith was Chairman of the Executive Committee for the Entertainment of Mme Curie. On May 14, J. E. Zanetti, secretary and treasurer of this Committee, sent a letter to Mrs. William Brown Meloney informing Mrs. Curie of the program for May 17 ("Letter from the", 1921). He wrote in it:

Dear Madame:

For the information of Madame Curie, I beg to enclose copies of the speeches of Dean Pegram and Dr. Wood. I have as yet to hear from Dr. Moore, who will be the third speaker, and who will greet Madame Curie in the name of chemists. Professor Edgar F. Smith, Provost of the University of Pennsylvania and President of the American Chemical Society, will preside at the luncheon and introduce the speakers. The order of the speeches will be Dean Pegram, Dr. Moore, Dr. Wood, and then we hope that Madame Curie will consent to address the chemists of New York (p. 26).

During luncheon E. F. Smith said, among other things ("Address of Dr.", 1921):

This memorable occasion -- yes, historic occasion -- brings to mind words of one of the world's greatest poets: Honored be woman! She beams on the sight Graceful and fair, like a being of light; lluminating our thorn-covered way, -- Atp, indeed, does the thought of the poet apply to her, whom, in this hour, we welcome to our country, expectant of her coming -- eager from North to Sougth and from East to West -- to look into her eyes, and catch from her lips the story of her brilliant, epoch-making achievements. … Never since the dawn of Creation had the world imagined that in its cosmic material there could lie hidden such an enigmatic substance as Radium; … So in this moment, let us together bid welcome -- yes -- thrice welcome to our shores, Madame Curie -- Discoverer of Radium and Polonium -- Benefactor of humanity -- Splendid representative of fair France, our sister Republic" (pp. 30-31).

He also invited Madame Curie to receive an honorary degree from the University of Pennsylvania. However, due to poor health, she could not participate in the ceremony herself. Mrs. Meloney informed about this in a telegram sent to him and to Dr. Mary Cary Thomas from Bryn Mawr College on May 22, 1921 ("Télégramme adressé à", 1921):

Physicians issued the following statement tonight quote we find madame Curie in a very feeble condition it would be unwise to subject her to the strain of great excitement or long ceremonies. Stop. she insists upon trying to carry out the program arranged for her but it is most certainly imperative that all unnecessary effort on her part be avoided Madame Curie has never been strong the hardships of the war and a serious illness two years ago have left her with little reserve strength but with care and the laboratory assistance which is now assured her she should be able to continue her important work it is necessary to avoid excitement that she should be subjected to any strain at this time signed doctor B L Hardin Washington D C and Dr Edward H Rogers of New York endquote if possible we arrive scheduled time Madame Curie daughters can represent her if it meet approval of your committees. Marie Meloney (pp. 128-129).

The honour awarded by the University of Pennsylvania was received by the daughter of Madame Curie, Irene (Anonymous, 1921b; Anonymous, 1921c).

A journalist for *Evening Public Ledger-Philadelphia* wrote on Monday, May 23, 1921 (Anonymous, 1921b):

Mademoiselle Irene Curie, the twenty-three-year-old daughter of Madame Curie, co-discoverer of radium, arrived here at noon today to receive two degrees in behaf of her distinguished mother. The honorary degree of doctor, of medicine will be confered by the president of the Board of Corporators of the Women's Medical College of Pennsylvania at 3 o'clock. The honorary degree of doctor of laws will be confered by the University of Pennsylvania at 4:30 o'clock. … The attractive young daughter who at such an early age will stand on the stage at the University of Pennsylvania to reap the honors it took her renowned mother a lifetime to accumulate, was blissfully unconscious of the fierce white light of fame that was to beat upon her when she arrived in Philadelphia (p. 1).

Smith's works

The list of Smith's published scientific papers includes one hundred and seventy-five works that appeared in print for fifty years from 1877 to 1927. There are the articles published in United States, among other in the journals *American Chemical Journal*, *Journal of the American Chemical Society* and *Journal of Chemical Education.* Many of his papers were published in the German journal *Berichte der deutschen chemischen Gesellschaft* (Mekker, 1937, pp. 139-145).

Smith's first works in the field of organic chemistry were published in 1877 in the *Proceedings of the American Philosophical Society* (Smith, 1877a; Smith, 1877b). In the same year, his article about a new method for the decomposition of chromic iron was published (Smith, 1877c). In the following years, he focused his research on mineralogy, analytical chemistry and electrochemistry.

In 1883, he and D. B. Brunner wrote an article on minerals from Berks County, PA., which was published in the *American Chemical Journal* (Brunner & Smith, 1883). In the same year, his paper on minerals from Lehigh County, PA. was published in the same yournal (Smith, 1883). He then worked at Muhlenberg College. In his Memoir ("Smith, E. F. Recollections", n.d.) he wrote:

Having mineralogy as one of my subjects, it occurred to me it would be a good thing to make weekly or biweekly trips in the spring and fall into the mountains surrounding Allentown, Pa. where the College was located. And … I may state that in the two years of my connection with Muhlenberg, the boys became deeply interested in mineralogy and we brought to the attention of students of the subject a number of minerals which had never been known as existing in Lehigh County. Among others, corundum. This last had never been spoken of in regard to its occurrence in that part of the State, and yet we found crystals that weighed anywhere from one-half pound [0.2268 kg] to twenty-five pounds [11.34 kg] (p. 17).

In 1889, his article on action of the gas from As_2O_3 and HNO_3 upon *p*-oxybenzoic acid was published in the *Journal of the Franklin Institute* (Smith, 1889).

In 1895, he and Elizabeth Allen Attkinson wrote an article on the separation of iron from beryllium (Atkinson & Smith, 1895). In the same year, he and Philip Maas wrote a paper entitled *Eine Neubestimmung des Atomgewichts des Molybdäns* (A Redetermination of the Atomic Weight of Molybdenum), which was published in the *Zeitschrift für analytische Chemie* (Smith & Maas, 1895). Three years later, his article entitled *Action of Sulphur Mnochloride upon Minerals* appeared in the *Journal of the American Chemical Society* (Smith, 1898a) and *the Chemical News* (Smith, 1898b).

In 1903, his paper *The Use of a Mercury Cathode in Electrochemical Analysis* was

published in the *Journal of the American Chemical Society* (Smith, 1903). Two years later, he and Julia Langness wrote an article on rapid precipitation of antimony in the electrolytic way, which was published in the same journal (Langness & Smith, 1905).

Much of his experimental studies were carried out using the rotating anode, "which changed the timescale of electrochemical analysis from hours to minutes and greatly improved its precision. He used the instrument to crush error underfoot by revising some element atomic weights" (Borman, 2012, p. 1).

His article on the use of the rotating anode in electro-analysis was published in 1904 in the *Journal of the American Chemical Society* (Smith, 1904). Three years later, he and Edgar T. Wherry, published their results of experimental study on use of this anode in the electrolytic precipitation of uranium and molybdenum (Wherry & Smith, 1907). In the same year, he and Lily Gavit Kollock wrote an article entitled *The Effect of Sulphuric Acid on the Deposition of Metals when using a Mercury Cathode and Rotating Anode* (Kollock & Smith, 1907).

Some of his last chemical articles on soluble tungstates were published in 1926 in the *Proceedings of the American Philosophical Society* (Smith, 1926a; Smith, 1926b).

In 1922, his paper in the field of historical chemistry entitled *Samuel Latham Mitchill–A Father in American Chemistry*. was published in *The Journal of Industrial And Engineering Chemistry* (Smith, 1922).

Between 1929 and 1944, many of his articles appeared in the *Journal of Chemical Education*. For instance, a year after his death, his six-part article about the American chemist Charles Mayer Wetherill (1825-1871) was published in this journal (Smith, 1929a; Smith, 1929b; Smith, 1929c; Smith, 1929d; Smith, 1929e; Smith, 1929f). His other articles include, among others, essays on the early American chemists such as John Griscom (1774-1852) (Smith, 1943a), James Curtis Booth (1810-1888) (Smith, 1943b), James Blythe Rogers (1802-1852) (Smith, 1943c), M. Cary Lea (1823-1897) (Smith, 1943d), Jacob Green (1790-1841) (Smith, 1943e), Franklin Bache (1792-1864) (Smith, 1943f) and Martin Hans Boyè (1812-1909) (Smith, 1944).

Smith's books on chemistry

His and John Marshall's *Chemical Analysis of the Urine* was published in 1881 in Philadelphia (Smith & Marshall, 1881).

In 1890, he wrote a book entitled *Electro-chemical Analysis* (Smith, 1890). A second edition of this book appeared four years later (Smith, 1894), and a third was published in 1902 in Philadelphia (Smith, 1902). In 2012, at the ACS Meeting at the University of Pennsylvania, one of the attendees Gary P. Patterson said (Borman, 2012):
Smith was one of the most prolific electrochemists in the period 1879 to 1918. His monograph 'Electro-chemical Analysis' was first published in 1890 and went through six editions until 1918. He was a consummate experimentalist and subjected at least 20 metals to electrochemical analysis. He was a master of electrochemical separations (p. 1).

His and Harry Frederick Keller's book entitled *Laboratory Notes. Non-Metals. Arranged for the Use of Students in General Chemistry*, was published in 1890 (Smith & Keller, 1890). A year later, the second edition of the book under title *Experiments Arranged for Students in General Chemistry* by the same authors appeared in Philadelphia (Smith & Keller, 1891). The third edition of this book was published in 1895 (Smith & Keller, 1895) and the fifth in 1904 (Smith & Keller, 1904).

The Fifth edition of his book entitled *Electro-Analysis* was published in 1911 in Philadelphia (Smith, 1911). In 1913, his text-book entitled *The Theories of Chemistry*

appeared in Philadelphia (Smith, 1913). Five years later, he and Walter K. van Haagen wrote a book entitled *The Atomic Weights of Boron and Fluorine*, which was published in Washington (Smith & Van Haagen, 1918).

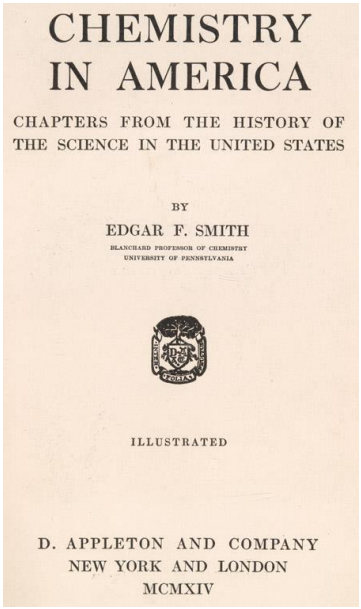
Smith's books on history of American chemistry

In 1914, his book (Figure 3) entitled *Chemistry in America* was published in New York and London. He dedicated it to his students (Smith, 1914, p. iii).

In 1917, his book under the title *The life of Robert Hare, an American chemist, 1781-1858* was published in Philadelphia (Smith, 1917). A year later, his *James Woodhouse. A Pioneer in Chemistry 1770-1809* appeared in this city (Smith, 1918).

Two of his books: *James Cutbush, an American chemist, 1788-1823* (Smith, 1919a) and *Chemistry in Old Philadelphia* (Smith, 1919b) were published in 1919, in Philadelphia.

His book about the English chemist and natural philosopher Joseph Priestley (1733-1804), who lived in United States from 1794, was published in 1920 in Philadelphia (Smith, 1920). His 28-page brochure entitled *Priestelyana* appeared four years later


CHEMISTRY
IN AMERICA
CHAPTERS FROM THE HISTORY OF
THE SCIENCE IN THE UNITED STATES
BY
EDGAR F. SMITH
BLANCHARD PROFESSOR OF CHEMISTRY
UNIVERSITY OF PENNSYLVANIA
ILLUSTRATED
D. APPLETON AND COMPANY
NEW YORK AND LONDON
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(Smith, 1923).

Fig 3. *Title page of Edgar Fahs Smith's Chemistry in America. Chapters from the History of the Science in the United States (New York and London: D. Appleton and Company, 1914).*

Chemistry books translated by Edgar Fahs Smith

In 1878, he translated *Grundriss Der Quantitativen Chemischen Analyse In Beispielen* (Classen, 1878a) by the German chemist Alexander Classen (1843-1934). This book was published in the United States under the title *Elementary Quantitative Analysis* (Classen, 1878b).

In the USA, *Kurzes Lehrbuch der Anorganischen Chemie* of the Russian-German chemist Victor von Richter (1841-1891) (Sztejnberg, 2020) in Smith's English translation was very popular. The first (1883) American edition of this textbook was published in Philadelphia (Richter, 1883). During Richter's lifetime, the second (Richter, 1885b) and third (1887, 1888, 1889, 1890) American editions appeared (Kaji & Brooks, 2015).

After Richter's death, fourth American (1892, 1893, 1894, 1896, 1898, 1899) and fifth (1900, 1901,1902, 1903, 1904, 1905, 1909) American editions appeared in Philadelphia. It is also important to emphasize the fact that the American edition of Richter's *Text-book of Inorganic Chemistry* in Smith's translation was also published in London in four editions (1884, 1886, 1892, 1896) and in Tokyo in two editions (1893, 1897) (Kaji & Brooks, 2015).

The American edition of Richter's textbook under title *Chemistry of the Carbon Compounds or Organic Chemistry* in the Smith's translation was first published in Philadelphia in 1886 (Richter, 1886). He translated it from the fourth (1885) German edition of Richter's *Kurzes Lehrbuch der Organischen Chemie oder der Chemie der Kohlenstoffverbindungen*. The second American edition of this textbook appeared in 1892 (Richter, 1892), and the third in 1899-1900 (Richter, 1899; Richter, 1900). In the years 1902-1913, the third American edition of this textbook was resumed in Philadelphia and London.

In 1897, he translated two books by Felix Oettel on electrochemistry: *Anleitung zu Elektrochemischen Versuchen* (Oettel, 1894) and *Elektrochemische Übungsaufgaben. Für das Praktikum sowie zum Selbstunterricht* (Oettel, 1897a). The first book in Smith's translation was entitled *Introduction to Electrochemical Experiments* (Oettel, 1897b) and the second was published under the title *Practical Exercises in Electrochemistry* (Oettel, 1897c).

CONCLUSION

Edgar Fahs Smith (1854-1928) was the eminent American chemist of the second half of the 19th century and first quarter of the 20th century. He received many scientific honours. Among them, there are membership of the Academy of Sciences and Scientific Societies as well as medals and decorations.

In 1898, he became a member of the National Academy of Sciences. He was elected a member of the American Philosophical Society. He was chosen President of this Society from 1902 to 1908, and he was elected President of the American Chemical Society three times in 1895, 1920 and 1921. In 1928, he became President of the History of Science Society (Sokal & Erikson, 1999, p. S321).

He was an honorary member of the Philadelphia College of Pharmacy and Science, American Electrochemical Society, Sociéte de Chimie Industrielle, American Institute of Chemistry, and Chemical, Mining, and Metallurgical Society of South Africa (Mekker, 1937, p. 139).

He received many honorary degrees, among them from University of Pennsylvania (1899, 1906 and 1920), University of Dublin (1912), University of Pittsburgh (1912,

1915), Yale University (1914), Lafayette College (1924) and Wittenberg Uniersity (1927) (Taggart, 1932, p. 615).

On Wednesday, May 20, 1914, in a meeting at the Franklin Institute of the State of Pennsylvania, he received the Elliott Cresson Medal (Farrington, 2004-2005).

On March 2, 1922, the award of the Chandler Medal by Columbia University was made to him for ”contributions in the field of historical chemistry” (Mekker, 1937, p. 139).(Smith, 1922). He received the *Officier de la Légion d'honneur* (Officer of the Legion of Honour) in 1923 for ”distinguished services to chemistry” (Mekker, 1937, p. 139).

In 1926, he received the Priestley Medal (Anonymous, 2008; Slosson, 1926, p. 374). It is awarded by the American Chemical Society since 1923, for “distinguished services to chemistry” (“ACS. Priestley Medal”, n.d.). The photograph showing him receiving this Medal can be found in an article by Slosson (1926, p. 374).

In 1921, Harrison Hale dedicated his book entitled *American Chemistry* to him. In the dedication he wrote: “To / EDGAR FAHS SMITH / AMERICAN CHEMIST /WHOSE LOVE OF COUNTRY AND DEVOTION TO / CHEMISTRY HAVE LONG BEEN AN INSPIRATION/” (Hale, 1921, p. iii).

Some authors wrote about his life and works. For instance, in 1928, an article about him appeared in *The Scientific Monthly* (Kendall, 1928). In te same year, C. A. Browne's paper about Smith was published in *Isis* (Browne, 1928). William McPherson wrote an article entitled *Some Experiences of Dr. Edgar F. Smith as a Student under Wöhler* also in 1928 (McPherson, 1928). In 1931, Charles Franklin Thwing wrote an article about him, which was published in the *Science* (Thwing, 1931).

In 1932, Walter T. Taggart wrote about him in his article published in the *Journal of Chemical Education* (Taggart, 1932). In the same year, an article entitled *Sidelights on the Life of Dr. Edgar Fahs Smith* edited by Harrison Hale appeared in the same journal (Hale, 1932).

In 1959, Herbert S. Klickstein wrote a paper about his contributions to the history of chemistry (Klickstein, 1959). Lisa Mae Robinson defended his doctoral thesis entitled *The Electrochemical School of Edgar Fahs Smith, 1878-1913* in 1986 (Robinson, 1986).

William D. Williams wrote an article about some his memorabilla in 1991 (Williams, 1991). An article about him by Lynne Farington, reprinted from the Penn Library Collections, was published in 2000 (Farrington, 2000).

After Smith, not only his papers and books survived. In addition, several of his portraits were produced. One of them was included in the *Story of Philadelphia*, edited by John St. George Joyce (1919, p. 367). Another of his portraits can be found in the book by George E. Nitzsche (1914, p. 19).

His oil painting portrait entitled *Dr. Edgar Fahs Smith, Provost University of Pennsylvania* by the American painter Hugh Henry Breckenridge (1870-1937) was painted in 1913 (“Pennsylvania Academy of”, n.d.). Another of his oil paintings was painted by the American painter Louis Hasselbusch (1863-1939) in 1922 (“Edgar Fahs Smith”, 1922).

His photo, taken probably in 1925, is in the Edgar Fahs Smith Chemistry Collection. It shows him and the French chemist Paul Sabatier (1854-1941) (“[Paul Sabatier and”, 1925?). In another photograph shows a group portrait of him and his students or visitors (“[Edgar Fahs Smith”, 19--).

His other portrait photograph is available in the University Archives (“Edgar Fahs Smith”, 1890). Another portrait, shows him sitting at his desk in the morning after his election as Provost of the University (January 1, 1911) (“Edgar Fahs Smith”, 1911).

Another his photograph was taken on the steps of the John Harrison Laboratory of

Chemistry, which he directed for thirty-three years. This building "was the gift of Charles Custis Harrison [(1844-1919), Provost of the University in 1894-1910] and his brothers Alfred C. Harrison, and W. W. Harrison. The laboratory was named for their grandfather, John Harrison" (Nitzsche, 1914, p. 91). He is shown in the photograph along with his students ("[Smith at the", n.d.; "Edgar Fahs Smith", 1890s?). Two of his female Ph.D. students Alice MacMichael Jefferson (1901) and Lily G. Kollock (1899) are standing directly next to him (Farrington, 2004-2005). Between 1894 and 1908, eight of his other female students carried out their doctoral dissertations under his supervision at the John Harrison Laboratory of Chemistry. There was among them Fanny R. M. Hitchcock (1894), Mary E. Penington (1895), Elizabeth A. Atkinson (1898), Sarah P. Miller (1904) Alice L. Davison (1905) Julia Langness (1906) Anna L. Flanigen (1906), and Mary E. Holmes (1908) (Mekker, 1937, p. 147).

On June 12, 1926, two years before his death, a statue was erected in his honour on University of Pennsylvania campus near the John Harrison Laboratory of Chemistry (Bohning, 1988; Brandolisio, 2020, p. 6). Upon the front of the statue is the following inscription: "/ EDGAR FAHS SMITH / PROVOST / 1911-1920 / TEACHER / INVESTIGATOR / FRIEND /" ("Smith, Edgar Fahs", n.d.).

The photograph showing Edgar F. Smith and John Cromwell Bell (1861-1935), former Attorney-General of Pennsylvania and a Trustee of the University, standing in front of the Smith's statue can be found in an article by Slosson (1926, p. 376).

From October 19, 2004 to March 4, 2005, the exhibition entitled *The Nine Lives of Edgar Fahs Smith* held at the Kamin Gallery at the University of Pennsylvania. The aim of the exhibition was to show his career background. Its curator was Lynne Farrington. Currently, materials from the exhibition are available on-line at the Schoenberg Center for Electronic Text & Image at the University of Pennsylvania. In addition to information about the most important events in his life, there are also his photographs and photocopies of his personal documents, grouped in nine periods of fhs life: Student, Scientist, Educator, Historian, Administrator, Man, Citizen, Collector and Legacy (Farrington, 2004-2005).

The American chemist Marston Taylor Bogert (1868-1954) in his address delivered at the meeting in memory of Edgar Fahs Smith, in Philadelpia, on December 4, 1928, said, that he was, among other (Bogert, 1929):

[an] educator, who with rare charm and power, portrayed to tens of thousands of his fellow Americans, both students and others, the multifarious and marvelous ways in which chemistry contributes to the advancement of civilization and to the prosperity and happiness of the individual, … quide, counselor and loyal friend to all who were so forunate as to know him and especially as older brother to all younger chemists. … author of books on theoretical and applied chemistry, some of which have gone through many editions … translator of books in other languages, … biographer of American chemists and historian of American chemistry, … member of numerous scientific organizations, … original investigator in the fields of organic, inorganic, analytical and elektrochemistry (pp. 557-558).

Edgar Fahs Smith, as an illustrious American chemist, went down in the history of chemistry, and his name was written in it forewer. It was made possible thanks to his scientific achievements and services rendered over the period of 52 years, from September 1876, to May 3, 1928, as well as his books and an excellent collection on the history of chemistry and chemists, which "became the foundation for the Edgar Fahs Smith Collection at the University of Pennsylvania library" (Powers, 2020, p. 577).

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This article has no conflict of interest