Rev. CENIC Cienc. Quím.; Vol. 53. Número Especial. 064-086 Año. 2022. e-ISSN: 2221-2442.

REVISION BIBLIOGRAFICA

Sir Thomas Edward Thorpe (1845-1925) – The Distinguished British Chemist and historian of chemistry of the Second Half of the XIX Century

Thomas Edward Thorpe (1845-1925) - El químico británico distinguido e historiador de la química de la segunda mitad del siglo XIX

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Recibido: 14 de julio de 2021; Aceptado: 28 de febrero de 2022;

ABSTRACT

Sir Thomas Edward Thorpe (1845-1925) was one of the most prominent chemists of the second half of the 19th century. He studied phosphorus oxides and fluorine compounds. He is known for his works on the determination of the atomic weights of chemical elements and for his books on chemistry and the history of chemistry. The purpose of this paper is to familiarize readers with the important events in the life of Thorpe and his writing and research activities, in particular some of his experimental results, as well as his selected publications.

Keywords: T. E. Thorpe, Inorganic chemistry, Oxides of phosphorus, Fluorine compounds, Great Britain – XIX century.

RESUMEN

Sir Thomas Edward Thorpe (1845-1925) fue uno de los químicos más destacados de la segunda mitad del siglo XIX. Estudió óxidos de fósforo y compuestos de flúor. Es conocido por sus trabajos sobre la determinación de los pesos atómicos de los elementos químicos y por sus libros sobre química e historia de la química. El propósito de este artículo es familiarizar a los lectores con los acontecimientos importantes en la vida de Thorpe y sus actividades de escritura e investigación, en particular algunos de sus resultados experimentales, así como sus publicaciones seleccionadas.

Palabras claves: T. E. Thorpe, Química inorgánica, Óxidos de fósforo, Compuestos de flúor, Gran Bretaña - siglo XIX.

INTRODUCTION

The important events in the Thorpe's life

Thomas Edward Thorpe was called "one of the outstanding figures" in chemical research (T[hutton], 1925, p.xviii), and a man who contributed "to the advancement of knowledge in many directions" (Stubbs, 1925, p. 210). Ninety-six years have passed since his death, but in that time very little has appeared in the literature about this eminent man. He went down in the history of chemistry as a researcher of the phosphorus and fluorine compounds, as the author of works on the atomic weights of certain chemical elements. He was also known for his books on chemistry and the history of chemistry.

Thorpe was born in Barnes Green, Harpurhey, near Manchester on December 8, 1845, and he was the eldest of the eight children of George Thorpe, a Manchester cotton merchant, and Mary (née Wild) (Hammond, 2020; Halton, 2015, p. 27; T[utton], 1925, p. xviii).

After study at the Hulme Grammar School, he continued his education (1863-1867) in Chemistry at the Owens College, now Manchester University, where he worked as research assistant to Henry Enfield Roscoe (1833-1915), the Professor of Chemistry. He assisted him "in research on the photochemistry and on the chemistry of vanadium" (Gay & Griffith, 2017, p. 79).

In the autumn of 1867, at the age of twenty-two, he went to study at the University of Heidelberg, where his interest in chemistry was inspired and directed by Robert Bunsen (1811-1899). In the Bunsen's laboratory he met, among others, the American chemist Gideon Emmet Moore (1842-1895), "who had the misfortune to be stone-deaf but who taught himself German and spoke it fluently without having heard a sound of the language" (Roscoe, 1906, p. 86), and the German chemist Victor Meyer (1848-1897), who remained his close friend. He wrote about his stay in Heidelberg at that time in *Victor Meyer Memorial Lecture* (1900) as follows:

At Heidelberg, as in many other centres of chemical instruction, there was a small Chemical Society, composed of the Extraordinary Professors, the Privat-docenten, and assistants, together with the senior or more active students in the various laboratories who were elected into it by favour of the teachers. In my time it numbered amongst its members [Emil] Erlenmeyer [(1825-1909)], [Albert] Ladenburg [(1842-1911)], [August Friedrich] Horstmann [(1842-1929)], [Ernst] Ludwig [(1842-1915)], [Emil] Cohen [(1842-1905)] (the mineralogist), Rose, and [Adolph] Emmerling [(1842-1906)]. Its president was Bunsen, and the occasions on which he took the chair were the red-letter days of the session (p. 170).

During Thorpe's stay in Heidelberg, the most unfortunate event happened. Here is what he wrote about it in one of his letters to Roscoe (1906):

I could run on interminably with my reminiscences of "Papa" Bunsen, as we affectionately termed him. How affectionately we, and not only his own students but the whole University, regarded him may be illustrated by the following incident of which I was witness. It was during my time in Heidelberg that Bunsen experienced the explosion which nearly cost him the sight of his remaining eye. It occurred at night time when he was alone in the laboratory, and was probably due to the escape of occluded hydrogen from a large quantity of reduced mixed platinum metals over which he incautiously held a lighted taper. Next morning the rumour ran round the town that Bunsen was blinded, and the Wrede Platz was packed with students and burghers anxiously inquiring if the news were true. No certain information could be gained, and the crowd swayed backwards and

forwards throughout the day waiting for tidings. It was late in the afternoon before a proper examination could be made, when it was discovered that the eye was safe (p. 86).

Bunsen also wrote about the explosion in his laboratory in a letter to Roscoe (1906) on May 24, 1869 as follows:

It is still rather difficult for me to write as my hands are not quite healed, but I cannot delay any longer my answer to your friendly sympathetic letter, as I do not wish you to be uneasy about me. The cause of the explosion is to me still quite inexplicable. I had prepared about a pound of a mixture of metallic rhodium and iridium by reduction with zinc according to a method which I have described, and dried it on a water-bath to 100°C. On lightly touching the finely divided metals, not yet quite cold, with my finger, the whole mass exploded as rammed-in powder does; and this is all the more puzzling, as I have often rubbed the same sort of powder violently in a mortar in similar quantities from other platinum residues entirely without danger, and heated similar preparations of this kind red-hot in vacuo without any gas being given out, and certainly no hydrogen gas. My left hand, with the first finger of which I touched the mass, saved my eyes, as my face and eyes were only superficially burned by the flames which penetrated through my fingers. My eyes are now unhurt, with the exception of singed eyebrows and eyelashes, and so the whole explosion will leave no serious results behind (pp. 82-83).

After completing his studies (1867-1869) at the University of Heidelberg, Thorpe, at the age of 24, received the degree of Doctor of Philosophy (Ph.D.) and the degree of Master of Arts (M.A.). In the archives of *the Royal Society of London* there are letters sent by him, among others to his mother. In one of them, dated April 21, 1869, he "describing his examination day, visiting around 20 professors and attending a closed-door conclave in the Senate Chamber. … His award of Doctor of Philosophy and Master of Arts from Heidelberg" ("Record. MS/373/1/76", n.d.).

After his stay in Heidelberg, he moved to Bonn, where he worked for several months for August Kekulé (1829-1896). He, in collaboration with Kekulé, completed his experimental research *Ueber die Aethylbenzoesäure* (Thorpe & Kekulé, 1869; Kekulé & Thorpe, 1869). The German chemist Richard Anschütz (1852-1937), professor of chemistry at the University of Bonn, in his biographical book on Kekulé published in 1929, wrote about this experimental study as follows:

Professor der Chemie am College of Science and Technologie in London Bedeutendes leistete. Sie bewiesen, daß die nach Kekulés Methode aus Bromäthylbenzol mit Natrium und Kohlensäure bereitete Aethylbenzoesäure identisch ist mit der Säure, die F i t t i g aus Diäthylbenzol, dem Produkt von Natrium und Bromäthyl auf Bromäthylbenzol, durch Oxydation mit Salpetersäure erhalten hatte (Professor of Chemistry at the College of Science and Technology in London made significant contributions. They proved that the ethylbenzoic acid prepared according to Kekulé's method from bromoethylbenzene with sodium and carbonic acid is identical to the acid which [Rudolf] Fittig [1835-1910)] had obtained from diethylbenzene, the product of sodium and bromoethyl on bromoethylbenzene, by oxidation with nitric acid) (p. 386).

In 1870, he returned to Britain and was elected to the Professorship of Chemistry in the Andersonian College of Glasgow. In the same year he married Caroline Emma Watts, the daughter of the Dr. John Watts, who was a Chairman of the Manchester School Board and the Union of Lancashire and Cheshire Inistitutes (Waterson & Shearer, 2006, p. 934).

In 1874, he was appointed Professor of Chemistry in the the Yorkshire College of Science in Leeds (B[edson], 1926, p. 1039). Eleven years later, in 1885, he went to London, where as successor of Edward Frankland (1825-1899), he became Professor of

Chemistry at the Normal School of Science and Royal School of Mines at South Kensington, later known as the Royal College of Science, and from 1907 as the Imperial College of Science and Technology.

In 1894, Thorpe left academic life. He became Director of the Government Laboratory in Somerset House London, and remained in this post until 1909. Then, he accepted the invitation to resume the Professorship of General Chemistry at the Imperial College of Science and Technology at South Kensington, and worked there until 1912, when he was succeeded by Sir William Tilden (1842-1926).

He died of a heart attack in Whinfield, Salcombe (South Devon) on February 23, 1925, at the age of eighty. In the same year, the British chemist Alfred Edwin Howard Tutton (1864-1938) published his obituary in *Nature*. He wrote in it:

Sir Edward Thorpe thus passes from our ken in his eightieth year, full of honours as of years, and with a published record of scientific work which it is given to few scientists to achieve. He leaves no children, so that our sympathy will therefore go out in all the greater measure to his lifelong companion, Lady Thorpe, who has so devotedly watched over and cared for him, and made his home a paradise (p. 345).

Thorpe's participation in the scientific celebrations abroad

In 1892, Thorpe and his wife participated in the Celebration of the Tercentenary of the University of Dublin (Ireland). He was one of 24 people who received the Honorary Degree of *Doctor of Sciences* on Wednesday, July 6 ("Records of the Tercentenary", 1894, pp. 113, 119). Six years later in 1900, he visited Berlin to participate in the conference devoted to the 200th Anniversary of the *Königlich Preußischen Akademie der Wissenschaften* (Royal Prussian Academy of Sciences). Figure 1 is a photography made during this celebration ("200th Anniversary of Berlin", 1900). The American biochemists Benjamin Harrow (1888-1970) inserted this photo on the one of first pages of his book entitled *Eminent Chemists of Our Time.* He also wrote that it "showing several eminent chemists was taken at one of the international scientific gatherings" (Harrow, 1920, p. 8).

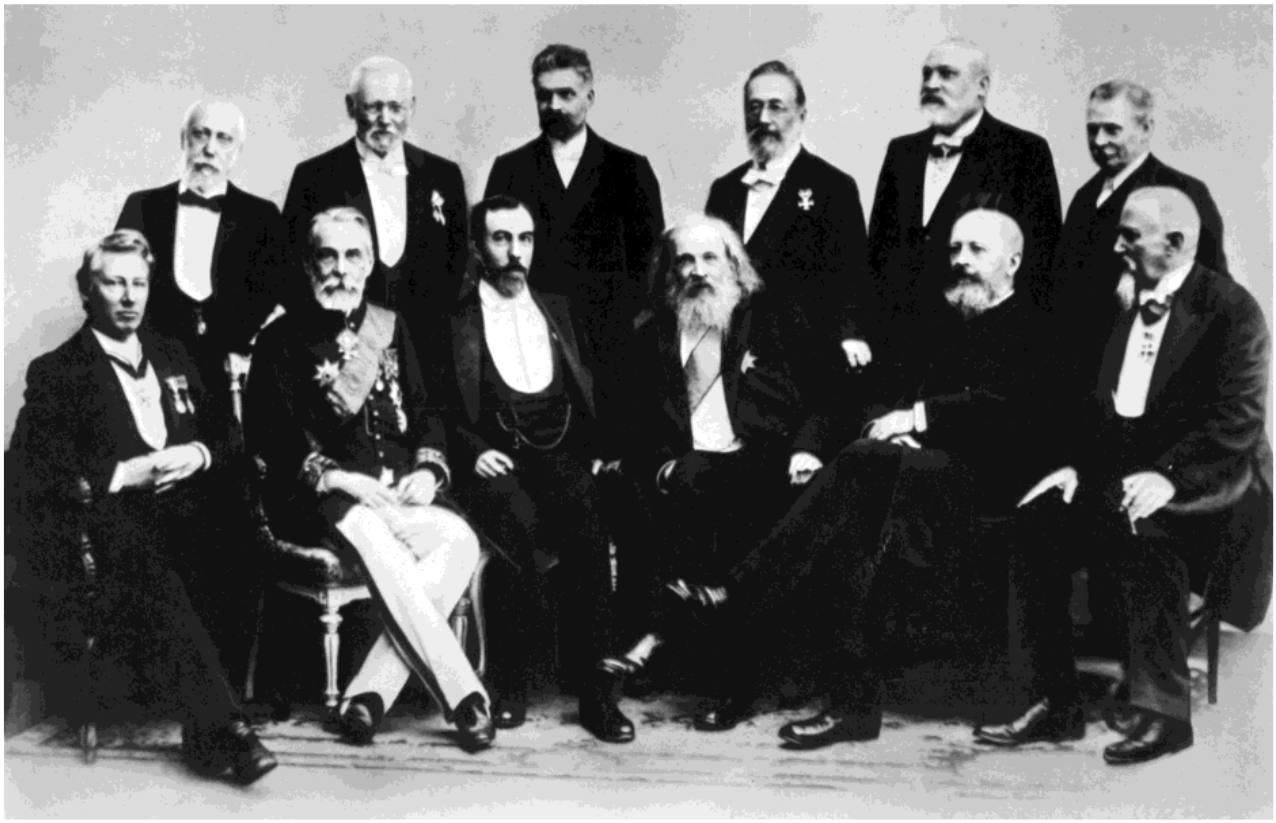

***Fig. 1**. Thorpe with the group of the prominent chemists ("200th Anniversary of Berlin", 1900).*

Photograph was published by Harrow thanks to the kindness of the Dutch chemist Ernst Julius Cohen (1869-1944) (Donnan, 1948). Thorpe is first from the right in the second row; to his right are the German chemist Clemens Alexander Winkler (1838-1904), who discovered germanium in 1886, the German chemist Hans Heinrich Landolt (1831-1910), the Finnish chemist and historian of chemistry Edvard Hjelt (1855-1921), the Danish chemist Sophus Mads Jørgensen (1837-1914), and the German chemist and historian of chemistry Albert Ladenburg. Seated from the left to right in the front row are the Dutch chemist Jacobus Henricus van't Hoff (1852-1911), who won the Nobel Prize in Chemistry in 1901, the Russian - German chemist Friedrich Konrad Beilstein (1838-1906), the Scottish chemist William Ramsay (1852-1916), who found neon, argon, krypton, and xenon in air and was awarded the Nobel Prize in Chemistry in 1904, the Russian chemist D. I. Mendeleev, who discovered the Periodic Law in 1871, the German chemist Adolf von Baeyer (1835-1917), who received the Nobel Prize in Chemistry in 1905, and the Italian chemist Alfonso Cossa (1833-1902).

From 25 to 28 September 1906, he took part in the Quatercentenary Celebrations of the University of Aberdeen (Scotland) ("The Quatercentenary Celebrations", 1906, p. 576; Anderson, 1907, p. 264).

Thorpe's works

The list of works published by him includes a number of articles and books that appeared in print for fifty-seven years from 1867 to 1924 (Thorpe, 1867; Thorpe, 1924). He conducted research on a wide range of subjects. The majority of these are the papers presenting the results of his experimental works, published in *Journal of the Chemical*

Society, *Transactions* as well as in other British and German journals. Among them are his original articles devoted to the relation between the molecular weights of inorganic substances and their specific gravities (Thorpe, 1880a), the researches on the estimation of arsenic in fuel (Thorpe, 1903a), in brewing materials (Thorpe, 1903b), in wall-papers (Thorpe, 1906a) as well as articles on the measurement of the viscosity of organic substances (Thorpe & Rodger, 1894).

He carried out the determinations of the atomic weights of titanium (Thorpe,1883; Thorpe, 1885) and radium (Thorpe, 1908). In addition, he published in the *Journal of the Chemical Society* in 1887 his works on the atomic weights of gold and silicon written in collaboration with A. P. Laurie and J. W. Young, respectively (Thorpe & Laurie, 1887; Thorpe & Young, 1887).

Thorpe, jointly with Tutton published in the *Journal of the Chemical Society* several papers with the results of research on the oxides and other compounds of phosphorus. The first paper published in 1886 concerned new phosphorus tetroxide (P_2O_4) (Thorpe, & Tutton, 1886). The second article described the isolation and determination of the constitution and properties of oxide with the formula P_4O_6 (Thorpe & Tutton, 1890). The third paper described a number of reactions of this oxide, for instance obtaining pure phosphorus pentabromide, presented in such an equation: $5P_4O_6 + 20Br_2 = 8\ PBr_5 + 6P_2O_5$ (Thorpe & Tutton, 1891, p. 1021). The fourth article, published in *Zeitschrift für anorganische Chemie* in 1892, concerned another compound, phosphorus sulphoxide obtained according to the equation: $P_4O_6 + 4S = P_4O_6S_4$ (Thorpe & Tutton, 1892, p. 5).

He also carried out researches on some volatile fluorine substances. In collaboration with J. W. Rodger, he obtained a new gaseous compound, *thiophosphoryl fluoride* (PSF_3) (Gay & Griffith, 2017, p. 81). When the mixture of arsenic trifluoride and phosphorus thiochloride is heated in a sealed glass tube at 150°C, the following reaction take place: $AsF_3 + PSCl_3 = AsCl_3 + PSF_3$ (Thorpe & Rodger, 1889, p. 306).
In 1892, he collaborated with Walter Kirman in research on *fluosulphonic acid*, $SO_2(OH)F$ (Thorpe & Kirman, 1892). One year later, this paper was also published in *Zeitschrift für anorganische Chemie* (Thorpe & Kirman, 1893).

He took part in four solar eclipse expeditions in 1870, 1878, 1886, and 1893 (Roscoe & Thorpe, 1871; De W. Abney & Thorpe, 1889; De W. Abney & Thorpe, 1896). In July 1878, he traveled to La Junta, Colorado (U.S.A.) to observe the solar eclipse. Before returning to Britain, he carried out a magnetic survey along the fortieth parallel, between the Atlantic and the Great Salt Lake Utah (Thorpe, 1880b). Eight years later, in 1886, he carried out a magnetic survey of the British Isle (Rücker & Thorpe, 1889).

A large number of the results of the experimental research carried out by him were published in *Berichte der deutschen chemischen Gesellschaft*, *Justus Liebigs Annalen der Chemie*, *Angewandte Chemie*, *Annalen der Physik* and *Zeitschrift für anorganische Chemie* ("Wiley Online Library", 2020). Most of them were German translations of articles previously published in British journals.

Thorpe's other works in chemistry

In 1873, the first edition of his *A Manual of Inorganic Chemistry* was published in New York. A year later, the first volumes of this textbook was published by William Collins, Sons & Company in London (Thorpe, 1874a). A new edition of *A Manual of Inorganic Chemistry* appeared in 1877 (Thorpe, 1877a; Thorpe, 1877b). This textbook was reprinted twice in 1896 and 1898.

The first edition of his *Quantitative Chemical Analysis* was published in London by Longmans Publishing House in 1873 (Thorpe, 1873). A year later, this book was

published in New York (Thorpe, 1874b). This book has been published many times. Its 11th edition was published in 1894, and the 13th impresion was published in 1902 (Thorpe, 1894; Thorpe, 1902a).

In 1874, the first edition of a book written by Thorpe together with the chemist Matthew Moncrieff Pattison Muir (1848-1931) under the title *Qualitative Chemical Analysis and Laboratory Practice* was published (Thorpe & Muir, 1874). The sixth edition of this book was published in 1890, and ninth impression in 1898. Editions of this book were also reissued in 1909, 2012 and 2017 ("WorldCat. Qualitative", n.d.).

In 1878, a book under the title *Coal*. *Its history and Uses* was published. He was its editor. There are two chapters with a common title *The Chemistry of Coal*, which were written by him (Thorpe, 1878, pp. 164-223).

In London, in 1891 a new edition of Thorpe's *A Series of Chemical Problems with Key for Use in Colleges and School* was published (Thorpe, 1891a). In the preface to this book, Roscoe wrote:

THE following complete series of Questions and Problems in Elementary Chemistry will prove a great boon to those engaged either in teaching or in learning the science. They were prepared by my friend DR. THORPE, with special reference to our junior classes in Owens College, in which my "Elementary Chemistry" is used; but they will of course also be available where any other modern text-book is employed (p. V).

A three-volume edition of his *A Dictionary of Applied Chemistry* was published in 1890-1893 (Thorpe, 1890a; Thorpe, 1891b; Thorpe, 1893a). Subsequent five-volume editions of the *Dictionary* were published in 1912-1913, 1918-1919, and 1921-1924 (Thorpe, 1921a; Thorpe, 1921b; Thorpe, 1922a; Thorpe, 1922b; Thorpe, 1924). After Thorpe's death, the chemists Martha Annie Whiteley (1866-1956) and Jocelyn Field Thorpe (1872-1940) continued working on the *Dictionary* as coeditors (Gay & Griffith, 2017, p. 106). Later, after J. F. Thorpe death in 1940, Whiteley became "editor-in-chief of the eleven-volume fourth edition of *Thorpe's Dictionary of Applied Chemistry* (1937-1954)" (Creese, 1997, p. 42).

In 1899, Thorpe as a Principal Chemist of the Government Laboratory published a *Report to the Secretary of State for the Home Department on the Use of Phosphorus in the Manufacture of Lucifer Matches* (Thorpe, 1899, pp. 1-77).

He was one of the five scholars who edited *The Scientific Papers* of an English chemist and natural philosopher Henry Cavendish (1731-1810) for the printed edition (Thorpe, Chree, Dyson, Geikie, & Larmor, 1921). He is also an author of books reviews published in *Nature*, for instance, about the French chemist Antoine-Laurent Lavoisier (1743-1794 (Thorpe, 1890b), the Finnish chemist Johan Gadolin (1760-1852) (T[horpe], 1911a), chemical climatology (Thorpe, 1872), and service chemistry (Thorpe, 1920c).

Thorpe's books on the history of chemistry

In 1894, the first edition of his *Essays in Historical Chemistry* was published in London (Thorpe, 1894). The second edition of this book was published eight years later (Thorpe, 1902b), and the third in 1911 (Thorpe, 1911a). It was also published in 1923, 1931, 1972, 2009, and 2013 ("WorldCat. Essays in", n.d.).

Thorpe's book on the life of the English chemist and natural philosopher Humphry Davy (1778-1829) was first published in 1896 by Cassel & Company in London (Thorpe, 1896a). In the same year, this book was published in New York by Macmillan & Co., Limited (Thorpe, 1896b). This book was reissued several times in the 20th and 21st

centuries (1901, 2007, 2010, 2013, 2017, 2020) ("WorldCat. Humphry", n.d.).

He is the author of a book on the life of the English chemist and natural philosopher Joseph Priestley (1733-1804). It was published in London and in New York in 1906 (Thorpe, 1906). The reprints of this book have appeared many times, in 1976, 1993, 2010, 2012, and 2018 ("WorldCat. Joseph", n.d.).

In the years 1909-1910, in the London Publishing House "Watts & Company" his two-volume *History of Chemistry* was published (Thorpe, 1909b; Thorpe, 1910). This book was also published in 1914, 1921, 1924, 1930, 1972, 2015, and 2019 ("WorldCat. History of", n.d.). In 1911, his book under the title S*toria Della Chimica*. *Versione Dall'inglese* was published in Italy in the translation of Rinaldo Pitoni (1864-1940) (Thorpe, 1911b).

CONCLUSION

Thomas Edward Thorpe was one of the prominent British chemist of his time. He was elected a foreign corresponding member of *Imperatorskaya Sankt-Peterburgskaya akademiya nauk* (the Imperial St. Petersburg Academy of Sciences) on December 7, 1913 ("Torp Tomas Edvard", 2002). In 1871, he became Fellow of *the Chemical Society* ("List of the", 1909, p. 113), and a member of *British Association for the Advancement of Science* ("Report of the", 1900, p. 92). *The Royal Society of London* elected him a Fellow on June 1, 1876 ("List of Fellows", 2020, p. 141). On April 17, 1894, he became an honorary member of *the Manchester Literary & Philosophical Society* ("Memoirs and Proceedings", 1916, p. lxiii). He was awarded the Honoray Degree of LL.D. [Doctor of Laws] at the University of Glasgow in 1895 ("The University of", n.d.). *The Royal Society of London* elected him Foreign Secretary on November 30, 1899 ("The Record of", 1912, p. 209). On April 6, 1900, he was elected an honorary Fellow of *the Royal Society of Edinburgh* ("Transactions of the", 1901, p. 915). In 1902, he became a member of *the International Committee on Atomic Weights* (Holden, 1984, p. 7). In 1904, he was awarded the Honorary Degree Doctor of Science (D.Sc.) at Yorkshire College of Science, Leeds ("Honorary Graduates", n.d.).

On August 1, 1912, he was appointed to *the Royal Commission on Fuel and Engines* by the King of the of the United Kingdom of Great Britain and Ireland and of the British Dominions George V (1865-1936) ("The London Gazette", 1912, pp. 5721-5722). In 1921-1922, he was President of the British Association for the Advancement of Science (BAAS). On September 7, 1921, due to his absence owing to indisposition at the 89th BAAS meeting in Edinburgh, his 24-page Presidential address was read out by Principal Sir J. Alfred Ewing (1855-1935), Vice-President of the Association ("British Association for", 1922, pp. v, xxx, 1-24).

In 1881-1909, he received several distinctions and decorations for his achievements and his government service. In 1881, he was the first to receive the Longstaff Prize, known as the Longstaff Medal, which is awarded to the Fellow of the Chemical Society who has done the most to advance chemical science (" List of the", 1909, p. 10).

On November 9, 1889, the English physiologist Michael Foster (1836-1907), secretary of the Royal Society, in a letter sent to him wrote: "that the President and Council of the Royal Society have awarded him the Royal Medal for his 'researches on Fluroine Compound' and for his 'determination of the Atomic Weights of Titanium and Gold'" ("Record. NLB/3/909", n.d.).

On May 24, 1900, he was appointed a Companion of the Order of Bath (C.B.) by Queen Victoria (1819-1901) ("The London Gazette", 1900, pp. 3629-3630). On July 22,

1909, he was knighted at Buckingham Palace by the King of the United Kingdom of Great Britain and Ireland and Emperor of India Edward VII (1841-1910) ("The London Gazette", 1909, p. 5805).

After Thorpe, not only his papers and books survived. In addition, several of his portraits were produced. One of them was included by Anschütz in his book about life and works of Kekulé (Anschütz, 1929, p. 386). His portrait, taken in 1917 by the photographer Walter Stoneman (1876-1958), is in the collection of the *National Portrait Gallery* in London ("Sir Thomas Edward", n.d.).

His two other portrait photographs are available in the archives of the Royal Society ("Reference number IM/Maull/004597", n.d.; "Reference number IM/Maull/004598", n.d.). Five his portraits taken in different years are in *The Royal Society Picture Library*. In the first photography, he is depicted standing and leaning with one elbow on a laboratory bench ("Portrait of Thomas Edward", 1900-1910). The second photo shows a group portrait of him, the Swedish chemist Svante August Arrhenius (1859-1927), and Roscoe ("Group portrait of three", 1910-1915). His third portrait photograph was made in the 1870s ("Portrait of Thomas Edward", 1870s). In the fourth photo he is seated and half turned ("Portrait of Thomas Edward", 1872-1874), and in the fifth image, he is shown along with seven other professors at Andersonian College ("Group portrait of Andersonian", 1900).

Thorpe was the author of Obituaries and Memorial Lectures on the chemists of his time. He wrote an *Obituary Notices* of the British chemists Edward Sonstadt, 1829-1908 (Thorpe, 1909a), Henry Roscoe, 1833-1915 (T[horpe], 1917), Sydney Lupton, 1850–1918 (Thorpe, 1919), and James Emerson Reynolds (1844-1920) (Thorpe, 2020a) as well as the Danish chemist Julius Thomsen, 1826-1909 (T[horpe], 1911b) and the Dutch chemist Antoine Paul Nicolas Franchimont (1844–1919) (Thorpe, 1920b). He was also the author of *Memorial Lectures* on the German chemists Herman Kopp (1817-1892) and Victor Meyer, and the Swedish chemist Per Teodor Cleve (1840-1905), which were published in the *Journal of the Chemical Society, Transaction* in 1893-1906 (Thorpe, 1893b; Thorpe, 1900; Thorpe, 1906b).

Thorpe was not only an excellent yachtman, but also he wrote two books on this subject. In 1905 appeared his *A Yachtsman's Guide to the Dutch Waterways* (Thorpe, 1905). Eight years later, in 1913, his second book was published under the title *The Seine from Havre to Paris* (Thorpe, 1913).

Tutton in his *Obituary Notice* published in *Proceedings of the Royal Society of London* in December, 1925 wrote about him as follows:

An able and incisive speaker, compelling attention (in spite of his short stature) both by his resonant voice and his always interesting matter, a brilliant lecturer and experimenter, a faithful teacher, who never make himself clearly uncerstood, and an original investigator of keen penetration, infinite resource, consummate manipulative skill, scrupulous accuracy and its ever-accompanying quality of neatness, Sir Edward Thorpe not only inspired those who had the good fortune to study under him, but impressed the honourable mark of thoroughness and trustworthiness on the department of British Science which he so well represented. The spirit of research ever emanated from him and vivified all his teaching, and it may be hoped, and indeed believed, that its leaven has quickened the spirits of a band of devoted students, striving to emulate his fine example and to work for the honour of British Science and the acquirement of true knowledge for its own sake, throughout the whole of the Empire (pp. xxiii-xxiv).

This outstanding British chemist and historian of chemistry took forever a well-defined place in the history of chemistry. His name is associated with studies of

phosphorus chemistry and fluorine compounds. He is known for his papers on the determination of the atomic weights of some chemical elements. The results of his original experimental studies have been published in scientific journals in Great Britain and Germany. His book on the history of chemistry has been published many times, not only in Great Britain, but also in Italy. His five-volume *A Dictionary of Applied Chemistry* had three editions during his lifetime, and after his death, it also served chemists in an extended fourth edition.

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