ON THE HISTORY OF PRUSSIAN BLUE: THOMAS EVERITT (1805-1845) AND EVERITT'S SALT

Alexander Kraft, Gesimat GmbH, Berlin, kraftalex@aol.com

Introduction

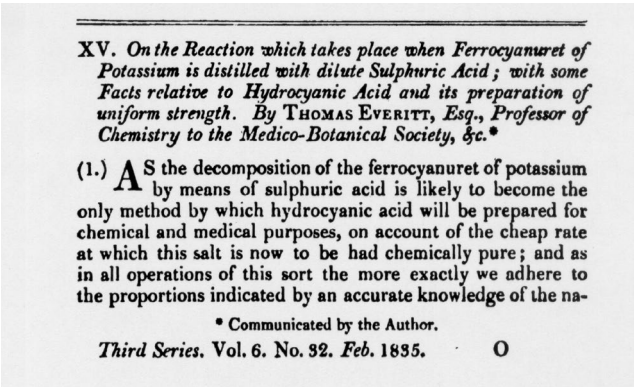
Recently, we reported several aspects of the history of the blue pigment, Prussian Blue (1). The reduced form of Prussian Blue is a white powder that is frequently called Everitt's salt. In this article, through a short biography of this white powder's namesake, English chemist Thomas Everitt, we examine how this substance came to be known as Everitt's salt.

Everitt's Salt: Ferrous Ferrocyanide

Ferrous ferrocyanide, or iron(II) hexacyanoferrate(II), is the fully reduced form of Prussian Blue. The substance is also known by alternative names, such as Prussian White, Berlin White or, historically, Williamsons's salt (2) or white prussiate of iron. The name Everitt's salt has been used for more than 170 years and is still used today (3).

Ferrous ferrocyanide is formed by precipitation upon mixing an aqueous solution of hexacyanoferrate(II) with a solution of iron(II) salt(s). Everitt's salt can also be produced by reducing Prussian Blue either by using a reducing compound or by electrochemical means. Alternatively, Prussian Blue (iron(III) hexacyanoferrate(II), ferric ferrocyanide) can be prepared through the oxidation of Everitt's salt. Air oxidizes ferrous ferrocyanide rapidly to create Prussian Blue. The reversible electrochemical redox reaction between the uncolored Everitt's salt and the deep blue colored Prussian Blue is the basis for the use of Prussian Blue as an electrochromic material (4). The reduction of Prussian Blue to Everitt's salt by certain reducing substances is one cause of the sometimes observed fading of its blue color in paintings (5). Everitt's salt is also temporarily formed by photochemical reduction when cyanotype photographs are overexposed to light (6). In the modern production process for the pigment Prussian Blue, Everitt's salt is formed as an intermediate product. In this industry, the pasty mixture of white ferrous ferrocyanide with water is often called white paste (7). The paste is oxidized using hydrogen peroxide, alkali metal chlorate or dichromate to create the end product of Prussian Blue.

The key publication by Thomas Everitt (1805-1845), which led to the name Everitt's salt, was written in December 1834 and published in February 1835 in *The London and Edinburgh Philosophical Magazine and Journal of Science* (8) under the title "On the Reaction which takes place when Ferrocyanuret of Potassium is distilled with dilute Sulfuric Acid; with some Facts relative to Hydrocyanic Acid and its preparation of uniform strength." In this article (see Figure 1), Everitt describes his experiments to prepare dilute aqueous solutions of hydrocyanic acid for medical and chemical purposes. His goal was to provide a method to reproduce dilute aqueous solutions of hydrocyanic acid with a defined concentration.



XV. *On the Reaction which takes place when Ferrocyanuret of Potassium is distilled with dilute Sulphuric Acid; with some Facts relative to Hydrocyanic Acid and its preparation of uniform strength. By* THOMAS EVERITT, *Esq., Professor of Chemistry to the Medico-Botanical Society, &c.**

(1.) AS the decomposition of the ferrocyanuret of potassium by means of sulphuric acid is likely to become the only method by which hydrocyanic acid will be prepared for chemical and medical purposes, on account of the cheap rate at which this salt is now to be had chemically pure; and as in all operations of this sort the more exactly we adhere to the proportions indicated by an accurate knowledge of the na-

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Figure 1*. The title and the first lines of Thomas Everitt's article from 1835 (8), which led to the name of Everitt's salt for the reduced colorless form of Prussian Blue.*

The background of this research was the use of such solutions for medical purposes in the 19th century (9). As hydrocyanic acid is highly poisonous, overdosing could lead to dangerous or even deadly accidents. Everitt had bought and analyzed medicinal hydrocyanic acid from several producers in London that were purported to have a consistent concentration of hydrocyanic acid ("Scheele's strength" = 5%), but he found that the concentration varied between 1.4 and 5.8%.

According to Everitt's method, yellow potassium ferrocyanide dissolved in water is distilled after the addition of dilute sulfuric acid (approximately 20%). This procedure leads to the production of hydrocyanic acid, which escapes as a gas. Everitt reports that, during the reaction, a yellow insoluble salt is formed. He also reports that potassium bisulfate stays dissolved in the solution. The reaction performed by Everitt can be written as:

$$2\ K_4Fe^{II}(CN)_6 + 6\ H_2SO_4 \rightarrow$$
$$6\ HCN + 6\ KHSO_4 + K_2Fe^{II}Fe^{II}(CN)_6 \quad [1]$$

The insoluble salt reported by Everitt is indeed ferrous ferrocyanide ($K_2Fe^{II}Fe^{II}(CN)_6$). Everitt also reports that this yellow salt can be converted to Prussian Blue. However, he remarks that "the theory of the subsequent conversion of the salt into Prussian blue by moistening it with dilute sulphuric acid and exposing it to air is consequently unknown." He then speculates that potassium "is dissolved out" and that "the action of oxygen is essential to the change." This oxidation of ferrous ferrocyanide to Prussian Blue can be written as:

$$4\ K_2Fe^{II}Fe^{II}(CN)_6 + 4\ H_2SO_4 + O_2 \rightarrow$$
$$4\ KFe^{III}Fe^{II}(CN)_6 + 4\ KHSO_4 + 2\ H_2O \quad [2]$$

Ironically, Thomas Everitt was not the first person who prepared and described ferrous ferrocyanide. He even states in his article, "I am well aware that in the 46th volume of the *Annales de Chimie et de Physique*, p. 77, M. Gay Lussac states that a white salt is produced during this reaction."

In fact, ferrous ferrocyanide is an uncolored compound with a white appearance when in the form of a powder—not yellow, as described by Everitt. It is possible that Everitt's yellow salt was contaminated with a different yellow compound.

Gay-Lussac's (10) article with observations on Prussian Blue was published in 1831 (11). In this paper, he describes, among other things, the same experiment that Everitt performed four years later and reports the precipitation of a white powder ("poudre blanche").

Other scientists of the time also produced a white substance upon repeating Everitt's experiments. For example, Jonathan Pereira (12) wrote in 1839: "The salt here called biferrocyanide of potassium is termed, by Mr. Everitt, the *yellow salt*. I have prepared it with the greatest care, but have always found it to be white. Gay Lussac also says it is white. By exposure to the air it becomes blue" (13).

Colorless ferrous ferrocyanide was also prepared prior to the 1830s by methods other than those described by Gay-Lussac and Everitt. These alternative methods were the chemical reduction of Prussian Blue and the direct precipitation through the use of ferrocyanide and a ferrous salt. These methods were described in detail in 1797 by the French chemist Proust (14), who called ferrous ferrocyanide the white prussiate ("Prussiate blanc") (15). The reducing agent employed by Proust was hydrogen sulfide.

The term "Everitt's salt" appears for the first time in a chemistry textbook written by the Irish chemist Robert Kane (1809-1890) and published in 1842 (16). Thus, although Everitt was not the first chemist to prepare and describe ferrous ferrocyanide, and although he erroneously described it as a yellow instead of a white powder, the substance was nevertheless named after him.

This raises the question why ferrous ferrocyanide was called Everitt's salt and not Proust's or Gay-Lussac's salt? We believe the cause is the following: The name Everitt's salt was first used in English language textbooks and scientific articles probably because the authors were much more familiar with English language scientific articles then with foreign language ones. In the English scientific literature Everitt was indeed the first to describe ferrous ferrocyanide.

Who was Thomas Everitt?

Scant and not completely correct biographical information on Thomas Everitt can be found in two obituaries from the 1840s (17, 18). The following biography is based on these obituaries and on some additional materials collected from various other sources, including genealogical sources and contemporary journals and magazines.

Thomas Everitt was born in Caister next Yarmouth (today Caister on Sea), Norfolk, England, on August 12, 1805 (19). His christening is recorded as having occurred on September 15, 1805 (20). His parents, the farmer George Everitt (1761-1850) and Jane Everitt née Clowes (1767-1853), married in Caister on October 5, 1790. For more than 40 years, George Everitt was the tenant of the Caister Castle estate. Caister Castle (21), a 15th century moated fortress, currently houses a motor museum. Even in George Everitt's time it was mentioned that "the greater part of Caister castle is a picturesque ruin" (22). Figure 2 shows this castle as it looked in 1799. In 1847, George Everitt is described as "a truly patriarchal farmer, the father of eleven and the grand-father of forty-seven children" (22).

***Figure 2**. View of Caister Castle, drawn by Thomas Hearne (1744-1817), engraved by William Byrne (1743-1805), published in 1799. Caister Castle was the home of the Everitt family.*

Everitt studied at the universities of Glasgow, Paris and Göttingen (Germany). In both of the above-mentioned obituaries, it is stated that he received his chemical education "principally in the schools of Germany" (18), or, more precisely, "in Göttingen in the laboratory of Professor Friedrich Stromeyer (23)" (17).

It can be proven that Everitt studied chemistry at the University of Göttingen for approximately one year from November 1828 (24) until September 1829 (25) so that he could study under Stromeyer for two terms. During this time, Stromeyer gave lectures on "theoretical chemistry with the necessary experiments" six hours a week, from Monday to Saturday, always starting at 9 am. Practical exercises in the "academic laboratorium" were held on Mondays and Wednesdays from 1 to 3 pm (26).

No information on Everitt's studies in Glasgow and Paris could be found; only the fact that he studied there before he came to Göttingen could be established (24). In Göttingen, Everitt finished his university education in Chemistry, but did not acquire a Ph.D.

It is not known when exactly Everitt came back to England, where he began a career as a public teacher of chemistry in London. Most of his teaching took place in various medical schools, which flourished in London during the first half of the 19th century. These medical schools often offered courses in chemistry. First, we find him in the fall of 1830 as a chemistry teacher in the Theatre of Medicine and Chemistry (27), No. 1, Dean Street, Borough (28), also called Grainger's School. He also taught a course on chemical manipulation in the same institution "to gentlemen wishing to study this science more especially, in the laboratory connected with the Theatre" (29).

In 1831, Everitt became teacher of chemistry to the pupils at the Little Windmill Street School of Medicine in London (30), introduced by Dr. George G. Sigmond (31). Together with two colleagues (Jewel (32) and Sigmond), he also lectured on Forensic Medicine at this institution (33). In addition, he continued to be an active teacher at Grainger's School, his first professional station in London, then called the "Theatre of Anatomy and Medicine, Webb-street, Maze-Pond, Southwark." Here, he gave lectures on Materia Medica together with a colleague named Dr. Whiting (34). In the following years, including the session of 1834-35, he lectured at two institutions: Materia Medica at Grainger's School in Southwark and Chemistry and Chemical Jurisprudence at Little Windmill Street (35). In the 1834 list of London medical schools, Everitt is listed for the last time as a lecturer in Chemistry and (together with Dr. Sigmond and Dr. Jewel) Medical Jurisprudence at the "Theatre of Anatomy in Little Windmill Street, Golden Square," and also as a lecturer (together with Dr. Whiting) for "Materia Medica, Pharmacy, and Therapeutics" at the "Theatre of Anatomy and Medicine, Webb-street, Maze Pond, Borough" (36). In 1834, Everitt lived in 28, Golden

Square, Soho, London, in the vicinity of Little Windmill Street (8).

Back in England in 1830, Everitt also became an active member in the Medico-Botanical Society (March 9, 1830). On June 22, 1830, he "was elected to fill the office of Professor of Chemistry to the Society" (37). The Medico-Botanical Society (38) was a relatively short-lived scholarly society, founded 1821 by John Frost (39) in London and lasting only until 1852. In this society, which held regular meetings, Everitt delivered presentations on the work of different chemists, but also presented samples of his own work. For instance, he reported on the detection and analysis of hydrocyanic acid (in 1830), on opium (in 1831), on the mode of obtaining oxalic acid from the vegetable kingdom (in 1833), on the work of French and German chemists with iodine (in 1833), on the chemical composition and comparative strength of medical hydrocyanic acid (in 1835), on tests for arsenic and on the presence of arsenic in several new types of candles (in 1837) and on his analytical procedure to detect opium in the stomach of humans (in 1839). Additionally, Everitt gave public presentations at the Western Literary Institution (on recent discoveries of Faraday in electrochemistry in 1837) and at the Royal Institution (on Liebig's method of analyzing organic bodies in 1839).

In 1835, a school of medicine was established at the Middlesex Hospital. On June 8, 1835, Everitt was named the chair of Chemistry. When the school of medicine opened on October 1, 1835, Everitt was a member of the staff as lecturer in Chemistry (40). To take this position, he ended his employment at the Little Windmill Street School, but did not end his second lectureship at Grainger's School in Borough until after the 1837-38 session.

Everitt's employment at the Middlesex Hospital was his primary occupation during his short lifetime. The job included not only the lectureship, but also a position as the head of the hospital's laboratory. In this position, he performed many analytical tasks for the hospital and for other clients. During his career, Everitt was generally known as "an accomplished analyst" (17).

Everitt was involved in the resolution of two poison scandals of his time. The first scandal became known as "Death in the candle" (41). On a June evening in 1837, Everitt prepared to retire. After blowing out a candle, he smelled garlic. As a chemist, he knew that this scent could be caused by arsenic. The candle was of a new type, a so-called "composition candle" (42). Everitt decided to analyze the candle and others which were sold in London at the time. After analyzing several of these new candles and finding arsenic in each of them, Everitt reported his findings in a lecture before the Medico-Botanical Society on June 28, 1837. In October 1837, the Westminster Medical Society (43) established a special Committee on Arsenicated Candles. Three chemists, including Everitt, performed experiments with composition candles to detect arsenic and to determine its concentration and level of danger. In December 1837, a final report from this committee was presented before the society and published (44). This report proved the existence of arsenic in the candles and the danger of the fumes when burning these candles. Thereafter, arsenicated candles were no longer produced or sold in England.

The second scandal concerned a new invention called Harper and Joyce's stove, which was promoted by, among others, the leading English chemist of the day, William T. Brande (45). This stove, which should require no chimney and should only be used with a special so-called "prepared fuel," was constructed in a manner so that all combustion products remained in the rooms in which the heating device was installed. According to the inventors, this process should not be dangerous because of the new "prepared fuel." Everitt was frequently consulted by medical colleagues and his pupils, who wanted his professional opinion about the nature of the "prepared fuel" and on the combustion products of Harper and Joyce's new heating-boxes. Therefore, he began a thorough investigation of the stove, the "prepared fuel" and the combustion products.

On April 21, 1838 Everitt presented his findings before a well-attended meeting of the Westminster Medical Society (46). Everitt demonstrated that the new "prepared fuel" was simply high-quality charcoal and that the combustion product was mainly "carbonic acid gas." Everitt concluded in his presentation that the statement of the inventors that "if their prepared fuel be used no deleterious gas or vapour is produced, is incorrect" and that "in no case ought these boxes to be used for heating dwelling rooms, unless provision be made for carrying off the products of combustion." Although some of these stoves continued to be sold, Everitt's presentation certainly slowed down the commercial success of this device. However, it took several more years and the deaths of several victims before Harper and Joyce's patent stove was equipped with a pipe (47), which in turn led to the loss of the asserted advantage of this invention.

On August 1, 1838, Everitt married Mary Ann Bicknell (1817-1858) in St. Matthews, Brixton, county of Surrey (today in the London Borough of Lambeth) (19).

In 1839, the Everitt family lived in 6, Torrington Square, Bloomsbury (today in the London Borough of Camden).

In 1839, Thomas Everitt became a corresponding member of the scholarly society Naturforschende Gesellschaft in Basel, Switzerland (founded in 1817 and still existing today). This membership was perhaps promoted by Christian Friedrich Schönbein (48), who performed several experiments together with William R. Grove (49) in Everitt's laboratory in the Middlesex Hospital the same year. Everitt's laboratory in the Middlesex Hospital seems to have been well equipped, especially for low temperature experiments, because Grove and Schönbein conducted experiments on the behavior of ammonium amalgam at a low temperature. This work was only published by Schönbein (50) and Grove (51), not by Everitt. However, both scientists mentioned the help and kindness of Everitt in their publications.

After two years with only one lecturing position, Everitt became lecturer in Chemistry at the College for Civil Engineers in Putney (52), a private institution in the vicinity of London. This institution opened on May 1, 1840, and Everitt is listed among its 12 professors (53). Therefore, in the early 1840's, he again held the position of Chemistry lecturer at two different institutions. In 1842, the Governor General of Canada asked Michael Faraday to recommend a suitable English candidate for the Professorship of Chemistry at the University of Toronto, Upper Canada. The second of the candidates Faraday asked was Everitt, but he declined the position (54).

Everitt was also among the founding members of the Chemical Society of London (founded February 23, 1841) and was an active member of its first Council (55). The Jubilee Album that was prepared for the celebration of 50 years of existence of the Chemical Society in 1891 contains Everitt's signature (56). In a meeting of the Chemical Society on February 17, 1845, it was recommended that Everitt should retire as a council member (57). At this time, he was already gravely ill.

In 1843, eight years after beginning his career at the Middlesex Hospital, it was reported that "the chair of chemistry was vacated in consequence of ill health, at the close of the session 1842-43, by Mr. Everitt. Its duties were temporarily performed during the following session by Dr. Bence Jones (58), and in 1844 the appointment was conferred on Dr. Fownes" (59, 60). In September 1843, Everitt is for the last time mentioned as a lecturer in Chemistry for the winter session of the Middlesex Hospital School of Medicine (61), which was scheduled to begin on October 2, 1843, but came to an end that year. On May 15, 1845, "the apparatus, chemicals, books etc. of Thomas Everitt ..., who from ill health is compelled to relinquish his avocations" were sold at auction (62).

Due to his worsening severe illness, he became an inmate of the Lady Ellis lunatic asylum at Southall Park (63), near London. Thomas Everitt died there on July 26, 1845, in a tragic accident. The details of the accident are reported in a coroner's inquest (64). According to this source, he was "affected with paralysis and had recently been in so debilitated a state as to render occasional ablutions of his entire body necessary. With this view he was put into a bath of about the temperature of ninety degrees between eight and nine o'clock ... and while there received an extensive scald from a sudden" irregular gush of hot water. The cause was a defect in the boiler apparatus, and his death was a consequence of the severe burn he received. Everitt was buried in Norwood Churchyard in Southall. He was survived by his "dear wife Mary Ann" (65) and two children Mary (1839-1918) and Herbert (1840-1931) (66). In 1850, Thomas' widow Mary Ann Everitt née Bicknell married again. Her second husband was Andrew Edgar (1815-1873), a barrister-at-law.

Because he was "an unfrequent contributor to the scientific literature of his time" (17), only a few original scientific articles written by Thomas Everitt can be found. In addition to his paper on the production of hydrocyanic acid (8) in 1835, he also wrote about economical means of procuring pure salts of manganese (67) in the same year, on medicinal Prussic acid (68), on several novelties in a new edition of the London Pharmacopeia (69) in 1837 and on the leaf stalks of garden rhubarb as a source of malic acid (70) in 1843.

Acknowledgments

I thank Dr. Günther Beer from the Museum of Chemistry in Göttingen for providing information on Everitt's stay in Göttingen and on Stromeyer's lectures during this time.

References and Notes

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2. Alexander W. Williamson (1824-1904), English chemist, FRS, best known for his research on ether. In 1848 he published his research on Prussian Blue in which he also described the formation of ferrous ferrocyanide: A. W. Williamson, "On the Blue Compounds of Cyanogen and Iron," *Mem. Proc. Chem. Soc.,* **1848**, *3*, 125-140.
3. The following are a few examples. K. Ogura and M. Kaneko, "Reduction of CO to Methanol by Everitt's Salt Using Pentacyanoferrate(II) or Pentachlorochromate(III) and Methanol as Homogeneous Catalysts," *J. Mol. Catal.,* **1985**, *31*, 49-56. T. Ohzuku, K. Sawai, and T. Hirai, "On a Homogeneous Electrochemical Reaction of Prussian Blue/Everitt's Salt System," *J. Electrochem. Soc.,* **1985**, *132*, 2828-2834. A. Xidis and V. D. Neff, "On the Electronic Conduction in Dry Thin Films of Prussian Blue, Prussian Yellow, and Everitt's Salt," *J. Electrochem. Soc.,* **1991**, *138*, 3637-3642. J. J. Garcia-Jareno, A. Sanmatias, J. Navarro-Laboulais and F. Vicente, "The Role of Potassium and Hydrogen Ions in the Prussian Blue ⇄ Everitt's Salt Process," *Electrochim. Acta,* **1998**, *44*, 395-405. J. Agrisuelas, J. J. Garcia-Jareno, D. Gimenez-Romero and F. Vicente, "Innovative Combination of Three Alternating Current Relaxation Techniques: Electrical Charge, Mass, and Color Impedance Spectroscopy. Part II: Prussian Blue ⇄ Everitt's Salt Process," *J. Phys. Chem. C,* **2009**, *113*, 8438-8446.
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6. M. Ware, *Cyanotype: The History, Science and Art of Photographic Printing in Prussian Blue*, National Museum of Photography, Film and Television, Bradford, UK, 1999, 125-126.
7. G. Buxbaum, *Industrial Inorganic Pigments*, Wiley-VCH, Weinheim, New York, 2nd ed., 1998, 131-133.
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9. For the use of hydrocyanic acid as a remedy see: M. P. Earles, "The Introduction of Hydrocyanic Acid into Medicine. A Study in the History of Clinical Pharmacology," *Med. Hist.,* **1967**, *11,* 305-312.
10. Joseph Louis Gay-Lussac (1778-1850) was an eminent French chemist and physicist. Beginning in 1809, he was professor of chemistry at the École Polytechnique in Paris and, beginning in 1808, was professor of physics at the Sorbonne University in Paris. Everitt possibly studied in Paris under Gay-Lussac.
11. J. L. Gay-Lussac, "Faits pour servir a l'histoire du bleu de Prusse," *Ann. chim. phys,* **1831**, *46*, 73-80.
12. Jonathan Pereira (1804-1853), English physician, chemist and pharmacologist.
13. J. Pereira, *The Elements of Materia Medica; Comprehending the Natural History, Preparation, Properties, Composition, Effects, and Uses of Medicines. Part I*, Longman, Orme, Brown, Green, and Longmans, London, 1839, 237.
14. Joseph Louis Proust (1754-1826), French chemist who defined the law of definite proportions.
15. J. L. Proust, "Recherches sur le Bleu de Prusse," *Ann. chim.,* **1797**, *23*, 85-101.
16. R. Kane, *Elements of Chemistry: Including the Most Recent Discoveries and Applications of the Science to Medicine and Pharmacy, and to the Arts*, Hodges and Smith, Dublin, 1842, 868.
17. "Annual Report of the Council [in 1846]," *Mem. Proc. Chem. Soc.*, **1848**, *3*, 140-143 (141).
18. "Mr. Everitt," *The London Medical Directory*, Churchill, London, 1846, 182-183.
19. F. A. Crisp, Ed., *Visitation of England and Wales, Volume 17*, privately printed, 1911, 37.
20. International Genealogical Index, The Church of Jesus Christ of Latter-day Saints, FILE EVERITT-1805, Created by FamilySearch™ Internet Genealogy Service, Nov. 25, 2010.
21. The construction of Caister Castle, a moated quadrangle fortress, began in 1432 and was completed around 1446. The construction was commissioned by Sir John Fastolf (1378-1459), an English knight who came to wealth during the Hundred Years' War in France. Caister Castle was one of the first major brick buildings in England. After Fastolf's death, Caister Castle came into the possession of the Paston family, John Paston (1421-1466) being Fastolf's friend, adviser and lawyer. In 1599, the Paston family moved their residence to Oxnead, Norfolk. In 1659, the Pastons sold the Caister Castle estate to a London merchant. Thereafter, the castle came into decay and the Caister Castle estate was rented to farmers.
22. "Antiquarian Researches," *Gentleman's Magazine*, **1847** (Sept.), 292-303 (298).
23. Friedrich Stromeyer (1776-1835), German chemist, Professor of Chemistry at the University of Göttingen, discoverer of cadmium. For his biography see G. Lockemann and R. E. Oesper, "Friedrich Stromeyer and the History of Chemical Laboratory Instruction," *J. Chem. Educ.,* **1953**, *30*, 202-204.
24. G. von Selle, *Die Matrikel der Georg-August-Universität zu Göttingen 1734-1837,* August Lax Verlagsbuchhandlung, Hildesheim, 1937, 284. Here the entry on Nov. 14, 1828 is: "Thomas Everitt, England, chem., ex ac. Glasgow und Paris. V: Rentier in Caister, Norfolk".
25. "Verzeichnis der öffentlichen und Privat-Lehrer, der Mitglieder der academischen Behörden und der Studirenden auf der Georg-August-Universität Göttingen auf das halbe Jahr von Ostern 1829 bis Michaelis 1829 bey der Aufzeichnung den 30 May 1829," SUB 8 Hlp, IV, 54/5.

Here the entry for Everitt is: "Everitt M 28. Norfolk, Chemie, Oppermann 122d, Kurzen".

26. Göttingische gelehrte Anzeigen… 1828. 6 Sept. 1828. [Vorlesungen WS 1828/1829] 1436 Naturlehre.
27. This private medical school was also known as the Theatre of Anatomy and Medicine, or Grainger's School. It was founded in 1819 by Edward Grainger (1797-1824) and continued by his brother Richard Dugard Grainger (1801-1865). The school closed in 1842.
28. Today, Borough is an area in the London Borough of Southwark. Dean Street is Webb Street today. Evidently, the street name changed between autumn 1830 and autumn 1831.
29. "Hospitals and Schools," *The Lancet*, **1830**, Sept. 25, 15.
30. Little Windmill Street School of Medicine was a private medical school founded in 1822 by George Dermott. Little Windmill Street is now part of Lexington Street, Soho, London.
31. George Gabriel Sigmond (1794-1847), English physician, son of a dentist from Bath who emigrated from Poland, Licentiate of the Royal College of Physicians beginning in 1826, leading member and Professor of Toxicology of the Medico-Botanical Society.
32. George Jewel, surgeon, Member of the Royal College of Surgeons.
33. "List of Lecturers at the London Medical Schools, Session 1831-32," *The Lancet*, **1831**, Oct. 1, 13-16.
34. John Whiting (?-1873), M.D., Member of the Royal College of Physicians, Physician to the Royal Dispensary.
35. "Account of the Metropolitan Hospitals, Medical Schools and Lecturers, for the Session Commencing October 1832," *The Lancet*, **1832**, Sept. 29, 5 and 10.
36. "List of Medical and Surgical Schools in London, Session 1833-1834," *London Med. Surg. J.,* **1833**, *4*, 262-278 (271-272).
37. "Literary and Scientific Intelligence. The Medico-Botanical Society," *Gentleman's Magazine*, **1830**, (Aug.) 158.
38. The Medico-Botanical Society was founded in London in 1821. The Society's objectives were the investigation of the medicinal properties of plants, the study of the materia medica of all countries, and the making of awards for original research on these subjects. The focus of the Society was the collection, cultivation, study and exploitation of medicinal plants. Fellows, including those drawn from the medical professions, attended lectures, submitted reports and awarded annual medals for the encouragement of medical botany. A journal, *The Transactions of the Medico-Botanical Society,* was published between 1829 and 1840 (Volume 1, Part I to IV). After 1845 the activities of the Society declined. It was broken up in 1852 because of a lack of money and support. Its property was sold privately.
39. John Frost (1803-1840), founder, spiritus rector and first director of the Medico-Botanical Society of London beginning in 1821. In 1830, he was expelled from the society because of his arrogant behavior and in 1832, due to financial liabilities, he fled from England to Paris. Frost died as a physician in Berlin.
40. W. J. E. Wilson, *The History of the Middlesex Hospital During the First Century of its Existence*, Churchill, London, 1845, 172-174.
41. "Death in the Candle," *The Lancet*, **1837**, July 8, 556.
42. J. C. Whorton, *The Arsenic Century: How Victorian Britain Was Poisoned at Home, Work, and Play*, Oxford University Press, Oxford, 2010, 169-171.
43. The Westminster Medical Society was founded in 1809 as an adjunct to the Great Windmill Street Medical School. In 1850, the Westminster Medical Society and the Medical Society of London (founded in 1773) merged under the latter's name. This society still exists today.
44. *Report of the Committee of the Westminster Medical Society on Arsenicated Candles*, Ibotsen and Palmer, London, 1837.
45. William Thomas Brande (1788-1866), English chemist, Professor of Chemistry at the Royal Institution beginning in 1813.
46. "Westminster Medical Society," *The Athenaeum*, **1838**, April 28, 306-307.
47. J. Timbs, Ed., *Manual of Domestic Economy*, David Bogue, London, 1847, 14.
48. Christian Friedrich Schönbein (1799-1868), German-Swiss chemist, discoverer of ozone, inventor of the fuel cell, beginning in 1835, professor of Chemistry at the University of Basel, Switzerland, friend of William R. Grove.
49. William Robert Grove (1811-1896), jurist and scientist from Wales, FRS beginning in 1840, pioneer of the fuel cell technology and inventor of the Grove cell, a nitric acid battery.
50. C. F. Schönbein, "Notiz über das Ammonium-amalgam," *Ann. Phys. Chem.*, **1840**, *49*, 210.
51. W. R. Grove, "On Some Electro-Nitrogurets," *Philos. Mag.*, **1841**, *3.Ser. 19*, 97-104.
52. The College for Civil Engineers in Putney was established in May 1840. The attending students were architects and surveyors, civil engineers and engineers for the army, navy and colonial service. The school closed in 1852 because of financial difficulties. During this time, Putney was a town near London. Today Putney is a district in the London Borough of Wandsworth.
53. "Literary and Scientific Intelligence. College for Civil Engineers," *Gentleman's Magazine,* **1840** (May), 515.
54. F. A. J. L. James, Ed., *The correspondence of Michael Faraday, Volume 3, 1841-1848*, The Institution of Electrical Engineers, London, 1996, 74-75.
55. Chemical Society, *The Jubilee of the Chemical Society of London: Record of the Proceedings Together with an Account of the History and Development of the Society 1841-1891*, Harrison and Sons, London, 1896.
56. R. Warington, *Album Containing Letters and Papers Relating to the Formation and Early History of the Chemical Society with Portraits of Many of the Original Fellows*,

1891. This album is located in the Historical Collection of the library of the Royal Society of Chemistry.

57. "February 17, 1845. The President in the Chair," *Mem. Proc. Chem. Soc*., **1845,** *2*, 300.
58. Henry Bence Jones (1813-1873), English physician and chemist.
59. George Fownes (1815-1849), English chemist, studied chemistry from 1837-1839 at the Middlesex Hospital under Thomas Everitt. In 1844, he became Everitt's successor as chemistry lecturer at the Middlesex Hospital. He published a successful textbook on chemistry in 1844.
60. Ref. 40, pp 175-176.
61. Advertisement, *Provincial Med. J. Retrospect Med. Sci*., **1843**, *6* (No. 156, Sept. 23), 537.
62. Advertisement, *The Athenaeum*, **1845**, May 10, 1845, p. 449.
63. Southall was a village west of London and is now part of the London Borough of Ealing. The private lunatic asylum for a few ladies and gentlemen of the upper social classes in Southall Park was established in 1839 by Sir William Charles Ellis (1780-1839) and his wife Lady Mildred Ellis (approximately 1786-1879). The asylum was continued by Lady Ellis and later by Dr. Robert Boyd. The asylum burnt to the ground in 1883, killing the owner and five others.
64. "Coroner's Inquest," *The Annual Register, or a View of the History and Politics of the Year 1845*, F. & J. Rivington, London, 1846, 119-120 of Chronicle.
65. Public Record Office of The UK National Archive, Catalogue Reference: Prob 11/2029, "The last Will and Testament of me Thomas Everitt of No. 6 Torrington Square in the parish of Saint George Bloomsbury in the county of Middlesex, Professor of Chemistry," Sept 5, 1844, proved at London Jan. 28, 1846.
66. Public Record Office of The UK National Archive, Catalogue Reference: Prob 11/2115, "The last Will and Testament of me George Everitt of Caister Castle near Great Yarmouth in the county of Norfolk, Esquire," Nov. 6, 1848, proved at London Jan. 10, 1851.
67. T. Everitt, "Economical Means of Procuring Pure the Salts of Manganese, and of Analyzing the Minerals which Contain Manganese and Iron," *Philos. Mag*., **1835**, *3.Ser. 6,* 193-196.
68. T. Everitt, "Medicinal Prussic Acid," *The Lancet,* **1835**, Apr. 11, 52-53. This is a response to a critical comment to Ref. 8.
69. T. Everitt, "Review of Some of the Prominent Novelties of the New Edition of The London Pharmacopœia; and a Few Specimens of the 'Great Care, Pains, and Industry' with which the Old Edition has been 'Revised, Corrected, & Reformed,'" *London Med. Gaz.,* **1837**, *19*, 528-531.
70. T. Everitt, "The Leaf Stalks of Garden Rhubarb as a Source of Malic Acid," *Mem. Proc. Chem. Soc*., **1843**, *1*, 193-197. He presented this paper during a meeting of the Chemical Society of London on Jan. 17, 1843.

About the Author

Alexander Kraft, Ph.D. in Physical Chemistry (semiconductor electrochemistry) from Humboldt University in Berlin, 1994, is co-founder and one of the managing directors of Gesimat GmbH, Berlin, Germany, a company that developed a smart switchable glazing incorporating a thin electrochromic Prussian Blue film. Before starting at Gesimat in 1998, he developed electrochemical water-treatment technologies and devices. He continued working in this field as a scientific adviser until 2006. His research on the history of Prussian Blue started in 2007.