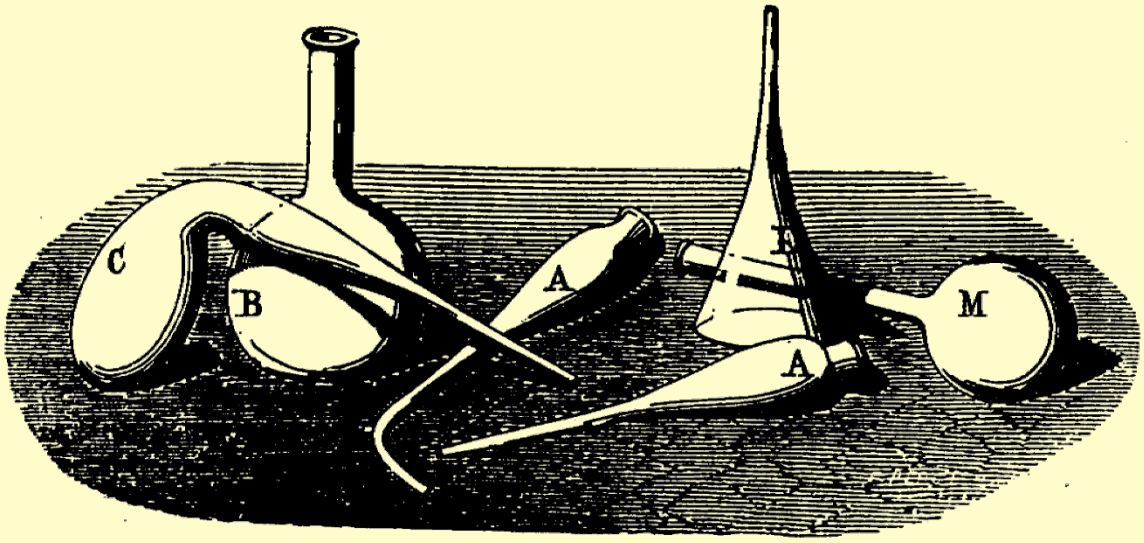
American Chemical Society

DIVISION OF THE HISTORY OF CHEMISTRY



NEWSLETTER, PROGRAM & ABSTRACTS

Spring 2025 ACS National Meeting
San Diego, CA
March 23-27

Christine Hahn, Program Chair

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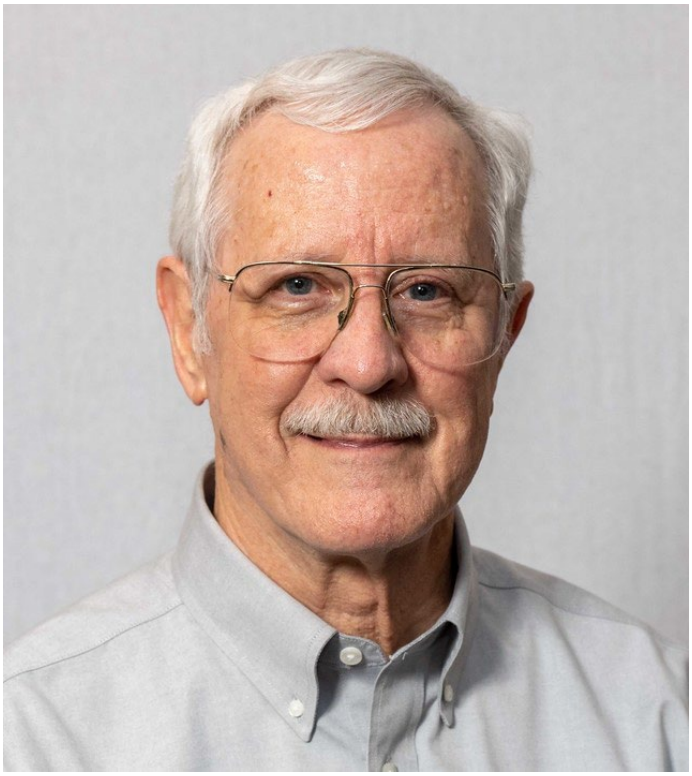
Mission Statement

The Division of the History of Chemistry (HIST) of the American Chemical Society (ACS) seeks to advance knowledge and appreciation of the history of the chemical sciences among chemists, educators, students, historians of science, and the broader public by

- Encouraging research and scholarship in history of the chemical sciences;
- Providing a welcoming environment for the discussion of history of chemistry in a variety of venues, particularly in symposia at national ACS meetings;
- Serving as a resource for chemical scientists in general, and members of the ACS in particular, who seek to understand the roots of their discipline, sub-discipline, or interdisciplinary subject;
- Recognizing major achievements from the past in the chemical sciences and the individuals who made those achievements;
- Publishing a scholarly journal in history of chemistry;
- Interacting with other organizations interested in the history of science; and
- Adding value to the ACS by helping it achieve its vision and missions.

Division Governance

Message from the HIST Division Chair



As I begin my two-year stint as HIST Chair, I want to thank my two immediate predecessors, Art Greenberg and Seth Rasmussen, for the excellent patterns they set. Moreover, I want to thank Vera Mainz for being the glue that keeps HIST on track and moving forward. Would that we could clone her. Thanks also to Nick Tsarevsky for his years as HIST Program Chair. He is the newly elected HIST Chair-Elect and will assume the Chair in 2027. Congratulations to Christine Hahn as she takes on the Program Chair responsibilities. A special thanks goes to Carmen Giunta as editor of The Bulletin for the History of Chemistry.

We are in a time of some turmoil as ACS changes the pattern of fall ACS meetings. We will no longer have HIST Sunday in-person programs, with divisional sessions beginning on Mondays. There will, however, be broader ACS programming on Sundays. Fortunately, the spring meetings will continue with the old pattern, so HIST programming will begin on Sunday.

ACS also changed the membership model in 2022, so HIST and most other divisions lost membership. HIST did gain 31 members in 2024. We hope to build on that pattern. HIST is active in

Division Row at Sci Mix, increasing HIST visibility. As part of the HIST Strategic Plan updated in 2024, HIST will have a greater presence at ACS regional meetings. We are planning HIST sessions at half of the 2025 regional meetings, and we hope to have similar sessions at the other half in 2026.

HIST initiated ChemHIST Talks in 2024. These free video lectures follow each national meeting, with two talks from the national meeting reprised as ChemHIST Talks. HIST collaborated with AGRO to develop AGRO's webinar program "Seaweed: The Perennial and Renewable Plant." Thanks to Solito Sumulong and Gary Patterson for taking the lead on that project. Jeff Seeman continues his efforts on the Citations of Chemical Breakthrough Awards with three 2024 recipients. The complete list of awardees from 2006 is on the HIST website https://acshist.scs.illinois.edu. HIST continues to work with other divisions on joint programming at national meetings. Most recently, HIST and COMP cosponsored the CINF program "Celebrating the Life and Legacy of Dr. Olga Kennard."

Congratulations to Seth Rasmussen from the North Dakota State University as the recipient of the 2025 Joseph B. Lambert HIST Award. His award symposium will be held at the fall ACS meeting in Washington, D.C. Congratulations also to Peter Childs of the University of Limerick for the 2023 Paul R. Jones Outstanding Paper Award from The Bulletin for the History of Chemistry.
We hope to see you in San Diego March 23-25.

DIVISION OF THE HISTORY OF CHEMISTRY COUNCILORS' REPORT
American Chemical Society – Hybrid Council Meeting
August 21, 2024, Denver, CO

Actions of the Council

A. Elections Results

1. Candidates for Council Policy Committee

By electronic ballot, the Council elected Donna Friedman, Matthew Grandbois, Diane Grob Schmidt, and Kimberly Woznack for three-year terms (2025 – 2027) on the Council Policy Committee (CPC). Sheila Murphy was elected for a two-year term from 2025 – 2026 to fill the unexpired term of Jeanette Van Emon, who was elected to the ACS Board of Directors.

2. Candidates for Committee on Committees

By electronic ballot, the Council elected Allison Aldridge, Mary Engelman, Katherine Johnson, Daniel Rabinovich, and Brian Mathes for three-year terms (2025 – 2027) on the Committee on Committees (ConC).

3. Candidates for Committee on Nominations and Elections

By electronic ballot, the Council elected Peter Dorhout, Holly Davis, Kevin Edgar, Donivan Porterfield for three-year terms (2025 – 2027) on the Committee on Nominations and Elections (N&E).

B. Other Council Actions

1. Highlights from Reports and Key Actions

- On the recommendation of CPC, Council approved the Petition for Global Representation on Council, as amended on the Council floor [Yes 375 (90.58%) / No 39 (9.42%)]. This petition allows for the creation of Global Electoral Zones for the election of Councilors by ACS members living outside the territory of existing Local Sections. The petition was amended [Yes 400 (97.09%) / No 12 (2.91%)] to count these Councilors elected by Zones with Councilors elected by Local Sections for the purpose of calculating the number of Councilors elected by Divisions as shown in the equation below. This petition will be referred to the ACS Board of Directors for confirmation.

$$\frac{\text{Councilors elected by Local Sections + Councilors elected by Zones}}{\text{Councilors elected by Divisions}} = \frac{80}{20}$$

- On the recommendation of ConC, and with concurrence of CPC, Council approved [Yes 394 (99.49%) /No 2 (0.51%)] the Petition to Amend the Name of the Committee on Technician Affairs (CTA) to the Committee on Chemical Technical Professionals (CTP). This change recognizes the fact that the term "technician" does not adequately reflect the variety of titles used for these positions across the broader chemical enterprise.
- On the recommendation of ConC, and with concurrence of CPC, Council approved [Yes 393 (99.75%) /No 1 (0.25%)] continuance of the Committees on Ethics; Nomenclature, Terminology and Symbols; and Project SEED and, subject to the concurrence by the ACS Board of Directors, the Committees on Chemical Safety; Chemistry and Public Affairs; Community Activities; Minority Affairs; Professional Training; Science; Senior Chemists; Women Chemists; and Younger Chemists.
- On the recommendation of the Committee on Economic and Professional Affairs (CEPA), Council approved the Academic Professional Guidelines, as amended to reflect the shared responsibility and accountability with the academic institution, faculty, and other mentors in creating a safe environment, [Yes 392 (98.49%) / No 6 (1.51%)] and the Chemical Professional's Code of Conduct [Yes 382 (96.71%) /No 13 (3.29%)].
- On the recommendation of the Committee on International Activities (IAC), Council approved the creation of the following International Chemical Sciences Chapters, subject to the concurrence of the ACS Board of Directors: Bangladesh [Yes 375 (96.40%) / No 14 (3.60%)], East and Northeast India [Yes 377 (96.67%) / No 13 (3.33%)], and West India [Yes 370 (96.61%) / No 13 (3.39%)].
- The Committee on Constitution and Bylaws (C&B) reported the certification of bylaws for a total of 11 units with five Local Sections: Columbus, Permian Basin, Inland Northwest, Midland, and Pensacola; three Divisions: Divisions of Colloid and Surface Chemistry (COLL), Environmental Chemistry (ENVR), and Biochemistry and Chemical Biology (BIOL); and three International Chemical Sciences Chapters: Switzerland, Egypt, and Guangdong, China.
- The Committee on Younger Chemists (YCC), in celebration of their 50th anniversary, encourages early career chemists to join ACS. Through September, new members can join ACS for a 50% discount off their first year of annual dues by using discount code YCC24 when joining online.

2. Resolutions

- The Council passed several resolutions:
  - In memory of deceased Councilors;
  - In sincere appreciation of the Colorado Section, host Section for the ACS fall 2024 meeting, the Divisional program chairs, symposium organizers, and ACS staff for the planning and execution of the meeting;
  - In appreciation of the outgoing Chair of Council, Mary K. Carroll.
- Meeting Attendance
  ACS Fall 2024 was held from August 18 – 22, 2024. As of August 22, there were 11,569 registrations (10,245 in-person and 1,324 online).

C. HIST Councilors

Mary Virginia Orna is serving as a member of the Senior Chemists Committee (SCC) and of its Executive Committee. She serves as the Champion on Tutorials for the SCC Inreach Subcommittee. She also serves as Co-Chair of the Partnerships Subcommittee and the Co-Champion of the Undergraduate Networking Activity. She will term off her position on Council as of Dec. 31, 2024.

Roger Egolf has been appointed as an Associate on the Divisional Activities Committee (DAC) and its Governance subcommittee. This is the subcommittee that looks at petitions coming to Council and reviews the Annual Reports from the Divisions.

Submitted by Mary Virginia Orna and Roger Egolf

News and Announcements

Awards

The recipient of the 2025 Joseph B. Lambert HIST Award of the Division of the History of Chemistry (HIST) of the American Chemical Society is Seth C. Rasmussen. Professor Rasmussen is a member of the faculty in the Department of Chemistry and Biochemistry at North Dakota State University, Fargo, ND. The HIST Award is for outstanding achievement in the history of chemistry and is international in scope. This award is the successor to the Dexter Award (1956-2001) and the Sydney M. Edelstein Award (2002-2009), also administered by HIST.

The HIST Award consists of an engraved plaque and a check for $1500 and will be presented to Professor Rasmussen at the fall national meeting of the American Chemical Society in Washington, DC, in August 2025. Additional information about the award can be found on the HIST website at

http://acshist.scs.illinois.edu/awards/hist_award.php

Professor Seth C. Rasmussen receives the Joseph B. Lambert HIST Award for Outstanding Achievement in the History of Chemistry for 2025 for his historical scholarship and revolutionary efforts to create a vibrant worldwide community of historians of chemistry.

A casual perusal of Professor Rasmussen's CV would reveal a typical academic chemical trajectory. He was raised in Washington State and received his B.S. in Chemistry from Washington State University in 1990. He ventured East to Clemson University to further advance his craft of synthetic chemistry with John Peterson and obtained his Ph.D. in inorganic chemistry in 1994.

He returned to the West at the University of Oregon as a Postdoctoral Fellow with James Hutchinson, where he developed expertise in semiconducting organic polymers and stayed on at Oregon as an Instructor of organic chemistry.

He joined North Dakota State University at Fargo in 1999 and is now Professor of Chemistry (2012). He spent his first sabbatical leave (2018) in Australia as a Fulbright Senior Scholar with the Centre for Organic Electronics in Newcastle. He is very active in the Divisions of the ACS that deal with polymers, and with his local Section.

Seth became active in HIST sometime around 2001, particularly after a chance meeting during a graduate school recruiting visit at the University of Wisconsin, Eau Claire. His Host was David Lewis (the 2018 winner of the HIST Award), and after spending most of dinner discussing the history of chemistry, they became fast friends and have blessed HIST ever since. After a flurry of both individual talks and the organization of symposia, Seth was recruited to be the Program Chair of HIST (2008-2017). In this role, he stimulated great symposia, recruited an international array of

speakers, and placed HIST firmly in the international community of the history of chemistry. Naturally, he went on to serve as HIST Chair for 2021-2022.

Another fortuitous event occurred in 2010 at the San Francisco ACS Meeting. Springer was hosting a social event at a local microbrewery, where Seth met Springer Editor Elizabeth Hawkins. While discussing the publication of books and journals in chemistry, the topic turned to history. This ultimately led to an invitation to help launch a new series, *Springer Briefs in the History of Chemistry*. In addition to his own three contributions to this series, he has edited 21 others from its inception in 2011 to 2025. Based on the success of this series, a second longer-form series, *Perspectives on the History of Chemistry,* was founded in 2019; 8 titles have since been published or are in press. Seth continues to serve as Series Editor for both series and these additions to the venues for publications in the history of chemistry are entirely due to his efforts.

Seth Rasmussen is now uniformly respected in the worldwide community of the history of chemistry. He is a Fellow of the Royal Society of Chemistry, the American Chemical Society, and was one of the second cohort of HIST Fellows. He serves on editorial and advisory boards of journals and represents HIST on various international bodies in the history of chemistry.

In addition to all Seth's "administrative" accomplishments, he has made major contributions to the understanding of the history of chemistry. One of his areas of specialization is the history of glass. There were glasses on earth long before there were humans. Some of this material arrived from other regions of the universe. Seth presented the early history of these materials in his highly popular monograph: *How Glass Changed the World* (2012). The success of this work has led to an expanded and revised edition to be released later this year. He is now recognized worldwide as an important scholar of early silica glass.

Another of Seth's areas of personal interest is ethanol. It has been a part of human culture for thousands of years. His wide-ranging monograph, *The Quest for Aqua Vitae* (2014), can be viewed as required reading for anyone interested in this subject and was recognized with a Gourmand Award for the Best Drinks History Book published in Germany for 2014.

In addition to his work in the history of chemistry, Seth is a scientific leader in the field of conjugated organic polymers (semiconducting polymers capable of conductivities rivaling metals). Thus, it is no surprise that he began contributing to the history of this field as well, becoming the first to fully document the history of these materials back to 1834. This combination of technical expertise and historical analysis characterizes all of Seth's work. His first monograph in this area is *Acetylene and its Polymers: 150+ Years of History* (2018). This was followed with a technical book on the chemistry of these materials in 2013 (which also included a bit of history) and a much more substantial history monograph *The Origins and Early History of Conjugated Organic Polymers: Organic Semiconductors, Synthetic Metals, and the Prehistory of Organic Electronics* (2025) is currently in production at Oxford University Press.

HIST is proud to award its Joseph B. Lambert HIST Award for Outstanding Achievement in the History of Chemistry to one of its own rising stars, Seth C. Rasmussen.

Submitted by Vera Mainz

Obituaries

Edwin Thomas "Tom" Strom

June 11, 1936 – October 26, 2024

Tom Strom died October 26, 2024, at age 88, in Palma de Majorca, Spain while on vacation with his daughter and her husband. He was a chemist, teacher, editor, writer, and follower of Christ.

Edwin Thomas Strom was born June 11, 1936, in Des Moines, Iowa. His mother was a Swedish immigrant, Maria Kristina Johansson Strom, and his father was Edwin Lewis Carolina Strom, himself the son of Swedish immigrants. His parents and half-brothers, Norman Edwin Strom and William Val Strom, preceded him in death. Tom was also preceded in death by his wife of 65 years, Charlotte Faye Williams Strom), who died in August 2023, and his son, Eric William Strom, who died in May 2024.

Tom Strom grew up in Des Moines, Iowa, and graduated first in his class at North Des Moines High School. He attended the University of Iowa on an Iowa Merit Scholarship and graduated with a B.S. Chemistry degree in 1958. He married his wife, Charlotte, the day after graduation. At the University of Iowa, he was a member of Phi Eta Sigma and Phi Lambda Upsilon honorary fraternities, and Theta Xi social fraternity. He received awards in both his junior and senior years as the outstanding student in chemistry. He went to graduate school at the University of California at Berkeley, graduating in 1961 with an M.S. Chemistry degree in nuclear chemistry. There followed graduate school at Iowa State University as an NIH Fellow, where he received a Ph.D. in physical organic chemistry under mentor Glen Russell in 1964.

He joined Mobil Research and Development Corp. in Dallas in January 1964, but shortly thereafter entered the U.S. Army Chemical Corps as a 1st Lieutenant to fulfill an ROTC obligation. He rejoined Mobil in March 1966, as a Senior Research Chemist. He retired from Mobil in December 1995. He had been teaching chemistry in night school at institutions such as Dallas Baptist University, El Centro Community College, UT-Dallas, and UT-Arlington (UTA), so after retiring from Mobil, he immediately joined the faculty at UTA as an Adjunct Professor, where he taught organic, polymer, and industrial chemistry for more than forty years until May 2020. Scores of his students wound up in medical, dental, and pharmacy programs. As a researcher, he had around 50 publications, and he held 25 U.S. patents and numerous foreign patents.

He was active in church, community, and professional affairs. He was a member of the American Chemical Society (ACS), the Society of Petroleum Engineers (SPE), and the International Electron Paramagnetic Resonance Society. He served ACS for many years as a Counselor and was also on the ACS Committees on Economic and Professional Affairs and International Relations. He won the Wilfred T. Doherty Award of the Dallas-Fort Worth Section of the ACS in 1989. Tom was Editor for over 27 years of the ACS regional publication, The Southwest Retort,

and wrote many articles, book reviews, and editorials for that magazine.

He was the co-editor of six books on the history of chemistry:

• 100 Plus Years of Plastics. Leo Baekeland and Beyond
• Pioneers of Quantum Chemistry
• The Foundations of Physical Organic Chemistry. 50 Years of the James Flack Norris Award
• The Posthumous Nobel Prize in Chemistry. Volume 1. Correcting the Errors and Oversights of the Nobel Prize Committee
• The Posthumous Nobel Prize in Chemistry Volume 2. Ladies in Waiting for the Nobel Prize
• Pioneers of Magnetic Resonance

For the last five of those six books, he wrote or co-wrote chapters on famous chemists.

In 2009 he was honored to be one of the inaugural groups of ACS Fellows, and he served the ACS Division of the History of Chemistry as Chair in 2011-2012. At the time of his death, he was Book Review Editor for the journal Bulletin for the History of Chemistry. With SPE he served many years on the International Oil Field Chemistry Symposium Committee.

When integration came to Southwest Oak Cliff in 1971, he worked in the area of neighborhood stabilization. He headed a group of interveners in the DISD school desegregation suit to see that integrated areas of Oak Cliff would not be subjected to forced busing. He also was a member of the Tri-Ethic Committee monitoring the DISD desegregation efforts. A member of Oak Cliff Presbyterian Church from 1983 on, he served on the Session of that congregation, and he participated in the church's Great Banquet programs.

Tom was a classical music buff and played the piano reasonably well. He loved the composers Rachmaninoff, Puccini, Delius, Rutter, and Debussy, and he was a tireless promoter of the music of Swedish composer Wilhelm Peterson-Berger. He had a fine, but subtle sense of humor, an example of which is present in this obituary. He enjoyed reading, and an important hobby was Egyptology. He was a member of the North Texas Chapter of the American Research Center in Egypt. He was also a long-time, 50+ years, member of the Oak Cliff Lions Club.

Excerpt from the obituary on Dr. Strom at the UTA Chemistry and Biochemistry website.

"Tom Strom was a wonderful person and a true all-rounder — a dedicated scientist, an inspiring teacher, a gifted writer, and a committed public servant,' said Rasika Dias, professor and chair of the Department of Chemistry and Biochemistry. 'His contributions to our department and the wider chemical community were substantial. Passionate and active in his research until the end, Tom inspired all who knew him. He will be deeply missed."

His family, friends and church community feel the same – Tom was an inspiration and will be missed in the hearts of all those fortunate enough to know him.

Link to UTA article on Dr. Strom: https://www.uta.edu/academics/schools-colleges/science/news/2024/11/14/in-memoriam-e--thomas-strom--longtime-adjunct-professor-in-chemistry

To honor Tom's memory as an Adjunct Professor in the Chemistry and Biochemistry Department, the University of Texas at Arlington has set up a memorial scholarship in his name. The family asks that any contributions be made to one of the following.

• UTA Edwin Thomas Strom Memorial Scholarship https://www.give.uta.edu/strom
• Agape Fund or Scholarship Fund of Oak Cliff Presbyterian Church https://www.ocpres.com/give

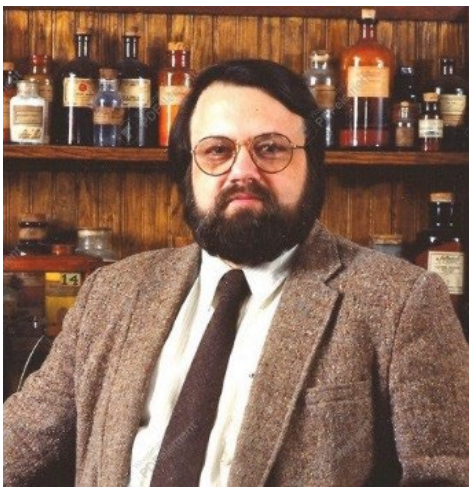
From: Edwin Strom, Ph.D. Obituary - Dallas, TX

Submitted by Christine Hahn

William Barry Jensen
March 25, 1948 – November 2, 2024

Professor William Jensen died on November 2, 2024 in Cincinnati, Ohio, at the age of 76. Jensen, son of a sign painter and librarian, was born in Marshfield, Wisconsin. He went to school in Wausau, Wisconsin. He became interested in chemistry at an early age and, after reading *Discovery of the Elements* by Mary Elvira Weeks, he also became interested in the history of chemistry. In 2013, Jensen wrote *Memoirs of an Amateur Chemist: Growing up a Science Nerd in the 1960s*, an autobiography detailing his earliest memories, such as receiving his first chemistry kit, collecting pieces of glassware, and winning science fairs. These memoirs were published electronically by the Oesper Collections in 2024 and can be found here:
https://hdl.handle.net/2374.UC/768605

Jensen studied chemistry at the University of Wisconsin – Madison, taking a bachelor's degree in 1970, a master's degree in 1972 and a doctorate in inorganic chemistry in 1982. He was then appointed assistant professor of inorganic chemistry at the Rochester Institute of Technology from 1983 to 1986, before becoming Oesper Professor of the History of Chemistry and Chemistry Education at the University of Cincinnati. There he was also curator of the Oesper Collection on the History of Chemistry, the largest such collection in the United States after that at the Smithsonian Museum. He had an *Ask the Historian* column in the *Journal of Chemical Education*. From 1988 to 1995, he was the founding editor of the *Bulletin for the History of Chemistry*. He was awarded the 2005 Edelstein Award for Outstanding contributions to the History of Chemistry by the History division of the American Chemical Society. As a chemical historian, he was primarily concerned with the history of physical and inorganic chemistry at the end of the 19th and beginning of the 20th centuries, as well as the history of chemical apparatus. He endeavored to bring the history of chemistry closer to more chemistry students, detached from the history of science.



Jensen was an article contributor to *Encyclopedia Britannica*. He was also a caricaturist for MeasureNet Technology Ltd.. In 2010, Jensen published a book of his caricatures of famous scientists which the Oesper Collections published digitally in 2024. *Chymists: That strange class of mortals: Caricatures of famous chemists with a few physicists and biologists added*, can be found here:
https://hdl.handle.net/2374.UC/768601

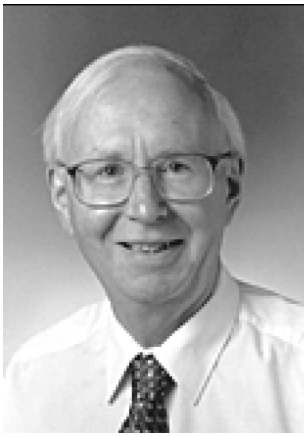
In 1982, an influential article by Jensen appeared in the Journal of Chemical Education, suggesting that group 3 in the periodic table should contain lutetium and lawrencium instead of lanthanum and actinium. This question has been much debated in literature. Jensen was a member of a 2015–2021 IUPAC project to decide on the composition of group 3, chaired by Eric Scerri; so far it has produced a provisional report (written by Scerri), which was in support of Jensen's 1982 conclusion.

Jensen's books published by the Oesper Collections can be found here:
https://hdl.handle.net/2374.UC/768600
and include books on the origins of the chemistry community in Cincinnati, OH, titles previously mentioned, and his beloved history of chemistry textbook, *Philosophers of Fire*.

From: William B. Jensen - Wikipedia

Submitted by Christine Hahn

William Hodson "Bill" Brock
1936 – February 16, 2025



Professor William H. "Bill" Brock was born 1936 in Brighton, England. He was a British chemist and historian of science.

Brock studied chemistry at University College London from 1956 on a scholarship, graduating with a bachelor's degree in 1959. Even then, he turned to the history of chemistry and took courses in the history of science at the University of Leicester, where he became a lecturer and later professor of the history of science in 1959. In 1966 he received his doctorate with a dissertation on William Prout. From 1966 to 1990 he directed the Victorian Studies Centre at the University of Leicester, an interdisciplinary center of study during the Victorian era. He retired in 1998 and lived in Seaford, East Sussex.

He was a visiting scholar in Toronto (1977), Melbourne (1985, 1989) and Philadelphia (1990 to 1991). After his retirement, he was also an honorary visiting professor at the Centre for the History and Cultural Studies of Science at the University of Kent.

In addition to the history of chemistry, on which he wrote a standard work in English, which has also been translated into German, Spanish, Polish and Japanese, dealing with the social history of the natural sciences and mathematics of the Victorian period, the history of science education and the development of scientific journals. He dealt with Justus von Liebig and his student August Wilhelm Hofmann (and edited their correspondence) and with the debate about the existence of the atom in the 19th century.

In 1995 he received the Dexter Award of the ACS History of Chemistry division, and he received the Liebig-Wöhler Friendship Prize of the Göttingen Chemical Society. In 1997 he received the Justus von Liebig Medal of the Medical Sciences History Society and in 2000 the award for work on the history of the Justus Liebig University Giessen for his biography of Liebig. In 2009, he received the Roy G. Neville Prize for Biography or Bibliography from the Chemical Heritage Foundation (for his book on William Crookes).

From 1993 to 2006 he was president of the Society for the History of Chemistry and Alchemy, and from 1968 to 1983 he edited its journal *Ambix*. He published the following works:

- *The Fontana History of Chemistry* (London, 1992), *Norton History of Chemistry* (1993)
- *From Protyle to Proton: William Prout and the Nature of Matter, 1785–1985* (CRC Press 1985)
- *Science for All: Studies in the History of Victorian Science and Education.* (Aldershot 1996)
- *H. E. Armstrong and the Teaching of Science 1880–1930.* (1973)
- with Jack Meadows: *The Lamp of Learning: Taylor & Francis and the development of science publishing.* (Taylor & Francis 1984, 2nd edition 1998)
- with D. M. Knight, D. Dallas: *The Atomic Debates.* (Leicester University Press 1967 and New York: Humanities Press); Brock: *The Atomic Debates: Brodie and the rejection of atomic theory*
- *Liebig and Hofmann in their letters (1841–1873)* (Weinheim: Verlag Chemie 1984)
- *Justus von Liebig: The Chemical Gatekeeper.* (Cambridge University Press 1998)
- *William Crookes (1832–1919) and the Commercialization of Science.* (Ashgate 2008)

From: William Hodson Brock – Wikipedia

Translated and submitted by Christine Hahn

HIST News

From the HIST Historian's Desk

It has been a very busy year for the Historian of HIST.

The Springer book, ***From Heat to Thermal Science – A History of Thermodynamics,*** is now in the editing phase.

In my continuing project to engage the other Divisions, I helped organize and participated in a webinar with AGRO on Seaweed.

The webinar for 2025 is with ACS on the History of Quantum Chemistry. I will present the history in the pre-computer era and Henry F. (Fritz) Schaeffer III will talk about the history up to 2025. (Carmen Giunta is also on this project.)

The symposium at the New Orleans meeting on "The Birth of the 3rd Dimension" was a big success. My paper on "René Just Haüy and the Contribution of Crystallography to 3-Dimensional Chemistry" is now in press with Springer.

The symposium on "Chemistry in the 18th Century" for the March 2025 ACS meeting was planned and the research for the special issue of the Bulletin has been carried out.

Submitted by Gary Patterson

***Do you wish to continue to receive the* Bulletin *in the mail*?**

HIST members and subscribers to the *Bulletin for the History of Chemistry* are being polled to ask if they wish to continue receiving the *Bulletin* in hard copy or if online access is sufficient. Beginning with the next issue (50(1) in Spring 2025), hard copies will go only to those members and subscribers who specifically request it. If you have not responded to the survey, you may do so at

https://tinyurl.com/Hardcopy-Bulletin-Survey

Members and subscribers who do not respond to the survey will have only online access to the *Bulletin*.

This move is being made to curb the rising costs of producing the *Bulletin*, driven by printing and mailing costs. For further information, see the letter from the editor that was published in *Bull. Hist. Chem.*, 2024, *49*(2), 93 or contact the editor, Carmen Giunta, at giunta@lemoyne.edu. The executive committee is trying to avoid raising HIST membership dues. Having said that, it welcomes donations to defray costs of production. Donations may be sent to Secretary-Treasurer Vera Mainz, 2709 Holcomb Drive, Urbana, IL 61802.

Submitted by Carmen Giunta

Other announcements of interest to HIST members

Historic sites of chemistry

With the "Historic Sites of Chemistry" program, the German Chemical Society (GDCh) is honoring achievements of historical importance in chemistry. Places of work of important chemists are recognized as places of remembrance in a ceremonial act. The aim of this program is to keep the memory of the cultural heritage of chemistry alive and to bring chemistry and its historical roots more into the public eye.

The table informs about all Historic sites of the German Chemical Society:

Year	Historic site
2023	The König Building of the TU Dresden with the historical dye collection
2019	The Göttingen Old Chemical Laboratory
2018	The Pützer tower from Merck
2017	August Wilhelm von Hofmann and the establishment of the German Chemical Society in Berlin
2016	Johann Wolfgang Döbereiner and the Hellfeld House in Jena

2015	Johannes Hartmann and the "Laboratorium Chymicum Publicum" in Marburg
2014	Friedrich August Kekulé and the Old Chemical Institute Bonn
2013	Dr. Otto Roelen and the Ruhrchemie plant in Oberhausen
2013	Chemical Laboratory Fresenius Wiesbaden
2012	Former salicylic acid factory Dr. Friedrich von Heyden in Radebeul
2011	Robert Bunsen's place of work in Heidelberg
2010	Wolfen Industry and Film Museum
2009	Ernst Beckmann's place of work in Leipzig
2008	Karl Ziegler's place of work in Mülheim / Ruhr
2006	Hans Meerwein's place of work in Marburg
2005	Wilhelm Ostwald's place of work in Großbothen
2004	Clemens Winkler's place of work in Freiberg
2003	Justus von Liebig's place of work in Giessen
2002	Fritz Straßmann's place of work in Mainz
1999	Hermann Staudinger's place of work in Freiburg

The first memorial plaque was installed at the Institute of Macromolecular Chemistry at the University of Freiburg in a joint initiative by ACS and GDCh to commemorate the founding of polymer science by Nobel Prize laureate Hermann Staudinger (1881–1965). The award as Historical site of Chemistry is dedicated exclusively to places where those chemists had been working who made outstanding contributions to the development of chemical sciences or chemical industry. The aura of the original, the sensory uniqueness of the historic site and its ambience is a central selection criterion. In addition, the site must be in Germany and publicly accessible; because it is the public to which chemistry wants to present itself as an indispensable element of the modern knowledge society: as a science of the transformation of materials, which at the same time transforms the world in which we live. For more information: https://en.gdch.de/gdch/historical-sites-of-chemistry.html

The König Building of the TU Dresden with the historical dye collection

Submitted by Gisela Boeck

An Update from The Oesper Collections

As many of you are likely aware, the Oesper Collections are a premier collection of scientific instrumentation, books, journals, photos, and prints related to the history of chemistry located at the University of Cincinnati. These collections were founded by Ralph E. Oesper, first recipient of the Dexter Award and were curated, grown, and expertly nourished from 1986-2024 by our late friend and colleague William “Bill” Jensen, who received the Edelstein Award in 2005. The ACS recognized the Oesper Collections as a National Historic Chemical Landmark in March 2022.

I am writing to share that I am now the curator and primary contact for the Oesper Collections. My name is Mark Chalmers and I have been working with the Oesper Collections as a Science & Engineering Librarian at UC since 2018. As I have taken on a leadership role with the collections recently, I've been able to secure support to help extend my work bringing life to the museum by increasing visibility, awareness, tours, and partnerships with courses in different colleges and student organizations.

Thanks to the incredible Historic Landmark designation, I was able to secure more than 100 linear feet of display cases in a building on our campus that is undergoing renovations. These displays offer a great opportunity to bring the Oesper Collections out in front of students and engage them with rich and fascinating objects and narratives from the history of chemistry. This is an active project as the displays will be installed later this summer in ~July. In other good news, we are actively recruiting for a staff position to support dedicated open hours for the museum. I would also like to share that I have recently been able to digitally publish some of Bill's books. Favorites include his beloved caricatures and his *Philosophers of Fire* textbook, which was the subject of his Edelstein award paper.

I look forward to meeting you all in San Diego. I'm excited to work with you all to help bring the Oesper Collections into alignment with the new HIST vision statement and strategic plan. As many of these collections were developed to support Bill's research in the history of chemistry, I'm eager to be a conduit to these collections for the community of chemical historians. I welcome HIST members to reach out about research opportunities or to schedule visits to explore these valuable materials firsthand.

Submitted by Mark Chalmers
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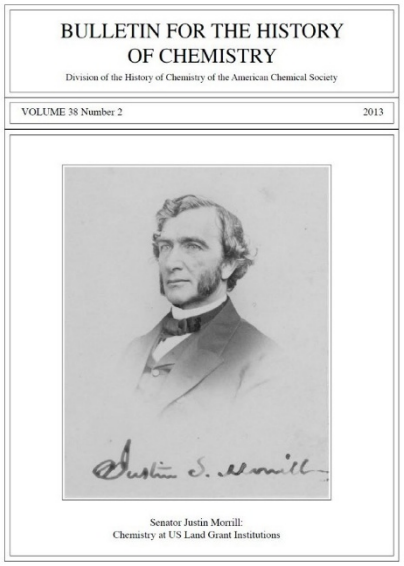
Curator, Oesper Collections
Science & Engineering Librarian
University of Cincinnati

BULLETIN FOR THE HISTORY OF CHEMISTRY

A publication of the Division of the History of Chemistry of the American Chemical Society

Available online: http://acshist.scs.illinois.edu/bulletin/index.php

PAPER SUBMISSIONS: Articles of 4-20 pages, double-spaced (excluding references) should be submitted electronically by email attachment to the Editor, Carmen Giunta, at giunta@lemoyne.edu.
The title of the article should be of reasonable length (up to 15 words); a subtitle may be included if appropriate. Authors should strive to make the title descriptive of the specific scope and content of the paper. Preferred file formats for submissions are .doc, .docx, and .rtf.
Full instructions for authors can be found at http://acshist.scs.illinois.edu/info/bull-info.php



All matters relating to manuscripts, etc. should be sent to:

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Manlius, NY 13104
Email: giunta@lemoyne.edu

HIST Programming

Message from the HIST Program Chair

As mentioned earlier in this Newsletter by the new HIST Division Chair, Joe Jeffers, the Program Chair also has changed. In the last few years I worked with Nick Tsarevsky, who served in this position for seven years. We have organized together several HIST symposia for SWRM and National Meetings. In this way I have become more familiar with HIST and its Executive Committee members. It is my great honor and pleasure to serve as the new Program Chair for HIST. As Joe Jeffers pointed out, programming for the National Meetings is changing, and it is my task to make the best out of it within the new frames set by the ACS. Earlier this year, I attended the ACS Leadership Institute workshop on the Future of Meetings, where I learned more on the new strategies and features. The HIST half-day sessions at the fall meetings are now limited to four, while joint programming and virtual symposia are highly encouraged. The workshop was a great opportunity for networking, and I hope this will benefit the future HIST programming.

During this spring meeting, we will enjoy three symposia. On Sunday, we will start with "Light and Science: A Historical Perspective" organized by Nick Tsarevsky and me. We will learn about the history of photochemistry, photography, spectroscopy, and photochemicals. Monday is dedicated to the "Chemistry of the 18th Century" organized by Gary Paterson, who has invited several outstanding science historians. At the end of the symposium, we will have a panel discussion. I want to thank Gary Paterson for his enthusiasm and efforts to organize this symposium. We may need to organize a "Part II" symposium of the 18th Century Chemistry, since there is a lot of enormously interesting material to discuss. The third symposium, "Tutorials and General Papers," will take place on Tuesday morning. There are two talks dealing with 200 years' anniversaries: one on the discovery of aromatic compounds, presented by David Lewis, and another talk on the second Centennial Oxygen Meeting, by Roger Egolf. Finally, we will have two poster presentations on Tuesday at noon, one on the history of gun powder presented by Justin Hunter, and the other on celebration of the elements by David Cordes, who created some visual art to complement the elemental poems and sonatas, on which Nick and I have been working for the last few years.

Looking at the upcoming HIST meetings, there are plenty of interesting themes and proposed symposia, as a result of our networking activities. For Fall 2025, at Washington, D.C., we will have our HIST Award Symposium Honoring Seth Rasmussen, the recipient of the 2025 Joseph B. Lambert HIST Award. My congratulations to Seth Rasmussen again here! In addition, we will offer a symposium on the History of Quantum Chemistry. This will be a joint symposium with PHYS and COMP, and it will be a part of the celebration of the International Year of Quantum Science and Technology in 2025. Some of the invited speakers have already confirmed their participation. I very much look forward to this symposium. Furthermore, in Fall 2025 there will be a symposium "In Honor of Prof. George Schweitzer" organized by NUCL and co-sponsored by HIST. George Keen Schweitzer was an inorganic chemist and radiochemist at the University of Tennessee at Knoxville, deceased September 20, 2024, at age 99. It should be noted that he was very involved in the history and philosophy of sciences.

For the spring of 2026 Meeting in Atlanta, we envision a symposium on the history of nomenclature, symbols, and terminology. For the Fall 2026 Meeting in Chicago, a symposium is scheduled on Frank Wigglesworth Clarke, organized by Gary Paterson and Carmen Giunta. This will be a part of celebrating the 150th anniversary of the ACS as F. W. Clarke was the founder of the ACS and served as ACS President in 1901. Moreover, as F. W. Clarke is considered the "Father of Geochemistry," GEOC will hopefully sponsor a half-day session for this symposium.

There are more potential joint symposia with AGFD, SCHB, and other Divisions and Committees. Regarding the new trend of "innovative programming," we may consider virtual symposia for international presenters, since hybrid symposia are no longer possible. For those who cannot travel, this would be an important step towards "innovating programming." I have some plans to contact international speakers and would be happy to organize virtual symposia in the future. We may discuss this option more in our Executive Committee Meeting and I will keep you posted about future developments in my column.

Now I welcome you to our spring 2025 Meeting at San Diego, and wish you all a pleasant stay, enjoyable program, and safe travels.

Christine Hahn, HIST Program Chair

HIST SYMPOSIA, Spring 2025 ACS National Meeting (March 23-27, 2025)

Schedules and abstracts are listed at the end of this Newsletter.

UPCOMING MEETINGS AND HIST DEADLINES

Subject to change. Check the HIST website (https://acshist.scs.illinois.edu/) for updates.

Fall 2025 ACS National Meeting (Washington, DC, August 17-21, 2025)

HIST Award Symposium Honoring Seth C. Rasmussen (Invited), David Lewis, 816 Third Avenue, Eau Claire, WI 54703 Phone: 715-563-2633, Email: lewisd@uwec.edu

History of Quantum Chemistry (Invited and seeking contributions), joint symposium with COMP and PHYS, Nicolay V. Tsarevsky, Department of Chemistry, Southern Methodist University, Dallas, TX 75275, Phone: 214-768-3259, Email: nvt@smu.edu, and Christine Hahn, Department of Chemistry, Texas A&M University-Kingsville, Kingsville, TX 78363, Phone: 361-593- 3592, Email: Christine.Hahn@tamuk.edu

Tutorial and General Papers (Seeking contributions) Nicolay V. Tsarevsky, Department of Chemistry, Southern Methodist University, Dallas, TX 75275, Phone: 214-768-3259, Email: nvt@smu.edu, and Christine Hahn, Department of Chemistry, Texas A&M University-Kingsville, Kingsville, TX 78363, Phone: 361-593- 3592, Email: Christine.Hahn@tamuk.edu

HIST Nominal co-sponsored NUCL symposium:

In Honor of Prof. George Schweitzer (Invited), Deborah Penchoff, Department of Chemistry, University of Central Florida, 4111 Libra Dr., Orlando, FL 32816, Email: deborah.penchoff@ucf.edu

Spring ACS 2026, National Meeting (Atlanta, GA, March 22-26, 2026)

History of Nomenclatures, Terminology, and Symbols. (Invited and contributed) Joint symposium with NTS Committee, Hayley Brown, Email: hbrown1@dow.com, Sharon Haynie, Email: lorimers@earthlink.net, Nicolay V. Tsarevsky, Department of Chemistry, Southern Methodist University, Dallas, TX 75275, Phone: 214-768-3259, Email: nvt@smu.edu, and Christine Hahn, Department of Chemistry, Texas A&M University-Kingsville, Kingsville, TX 78363, Phone: 361-593- 3592, Email: Christine.Hahn@tamuk.edu

History of Chemists with Disabilities, (Invited and contributed) joint symposium with Committee on Chemists with Disabilities (CWD), David Lewis, 816 Third Avenue, Eau Claire, WI 54703 Phone: 715-563-2633, Email: lewisd@uwec.edu, Carmen J. Giunta PO Box 522, Manlius, NY 13104, Phone: 315-632-4992, Email: giunta@lemoyne.edu

Tutorial and General Papers (Seeking contributions) Christine Hahn, Department of Chemistry, Texas A&M University-Kingsville, Kingsville, TX 78363, Phone: 361-593- 3592, Email: Christine.Hahn@tamuk.edu

Fall 2026 ACS National Meeting (Chicago, IL, August 23-27)

HIST Award Symposium, TBA

Past ACS Presidents: Frank Wigglesworth Clarke (1847-1931) (Invited and contributed), joint symposium with GEOC, Gary Patterson, Vancouver, WA 98661, Phone: 412-480-0656, Email: gp9a@andrew.cmu.edu, Carmen Giunta, PO Box 522, Manlius, NY 13104, Phone: 315-632-4992, Email: giunta@lemoyne.edu, and Ian Bourg, Princeton, New Jersey 08544, Phone: 609-258-4541, Email: bourg@princeton.edu

Tutorial and General Papers (Seeking contributions) Christine Hahn, Department of Chemistry, Texas A&M University-Kingsville, Kingsville, TX 78363, Phone: 361-593- 3592, Email: Christine.Hahn@tamuk.edu

Future Meetings

Proposed Symposia

History of Small Businesses, (Invited and contributed), joint symposium with SCHB, Xu Simon, xufits@gmail.com, Nicolay V. Tsarevsky, Department of Chemistry, Southern Methodist University, Dallas, TX 75275, Phone: 214-768-3259, Email: nvt@smu.edu, and Christine Hahn, Department of Chemistry, Texas A&M University-Kingsville, Kingsville, TX 78363, Phone: 361-593- 3592, Email: Christine.Hahn@tamuk.edu

History of Agricultural Chemistry, (Invited and contributed), joint symposium with AGFD, Karley Mahalak, Karley.mahalak@usda.gov, kmahalak11@gmail.com, Christine Hahn, Department of Chemistry, Texas A&M University-Kingsville, Kingsville, TX 78363, Phone: 361-593- 3592, Email: Christine.Hahn@tamuk.edu

For updates and additional information, e.g., on symposia at regional ACS meetings, please check the HIST website (https://acshist.scs.illinois.edu/)

Final Program

DIVISION OF THE HISTORY OF CHEMISTRY (HIST)

C. Hahn, *Program Chair*

Sunday, March 23, 2025: Morning session

Location: San Diego Convention Center, Room 29C

Light and Science: A Historical Perspective

N. V. Tsarevsky, C. E. Hahn, *Organizers*, *Presiding*

8:00 Introduction. **C. Hahn, N. V. Tsarevsky**

8:05 Role of light in the history of chemistry. **G. Patterson**

8:35 Fixing the image: Photochemical innovations of 19th century photography. **K. Konkol**

9:05 Casting light on the invisible: The electromagnetic radiation from Aristotle and Newton to Damadian and AI. **N. Mateeva**, D. Eniola, C. Magloire, R. Alo

9:35 Intermission

9:55 Spectroscopy in the early 20th century: Progress toward a transformative method. **A. Haddy**

10:25 Built-up layers of misinformation: The case of Katie Blodgett's non-reflective thin films. **M. Schott**

Sunday, March 23, 2025: Afternoon session

Location: San Diego Convention Center, Room 29C

Light and Science: A Historical Perspective

N. V. Tsarevsky, C. E. Hahn, *Organizers*, *Presiding*

2:00 Historical-critical analysis of the nature of cathode rays. **Y. S. Bernal Rubiano**, A. D. Rincon

2:30 Polystyrene and beyond: An early history of photopolymerization. **S. Rasmussen**

3:00 Azobenzene and light: A journey through history. **K. D. Sayala**, S. Bandyopadhyay

3:30 Intermission.

3:50 Let there be light: A philatelic history of electromagnetic radiation **D. Rabinovich**

4:20 Photochemistry through the ages: From ancient observations to modern marvels. **C. Azad**

Sunday, March 23, 2025: Evening

Location: San Diego Convention Center, Room 29C

5:30 – 7:30 HIST Executive Committee Meeting

Monday, March 24, 2025: Morning session

Location: San Diego Convention Center, Room 29C

Chemistry of the 18th Century

G. Patterson, *Organizer, Presiding*

8:00 Introduction to the history of chemistry in the 18th century. **G. Patterson**

8:30 Friedrich Hoffmann (1660-1742) and his contributions to chemistry. **N.V. Tsarevsky**

9:00 Georg Ernst Stahl: The origins and his motivation for the development of the phlogiston theory. **C. Hahn**

9:30 Carl Sheele's experiments on the coloring principle in Prussian blue. **S. Koch**

10:00 Intermission

10:30 Enlightened chemistry of air and fire. **M. Kim**

11:00 Enlightened chemistry of air and fire II. **M. Kim**

11:30 Attempts to quantitate chemical affinity tables. **A. Greenberg**

Monday, March 24, 2025: Afternoon session

Location: San Diego Convention Center, Room 29C

Chemistry of the 18th Century

G. Patterson, *Organizer, Presiding*

2:00 Joseph Priestley and the new chemistry in America. **J. Powers**

2:30 Henry Cavendish (1731-1810) and his contributions to chemistry and physics. **C. Giunta**

3:00 Law of conservation of matter: Lomonosov and Lavoisier. **D. E. Lewis**

3:30 Intermission

4:00 Torbern Bergman (1735-1784): A life dedicated to science. **N. V. Tsarevsky**

4:30 Fourcroy and chemistry at the end of the 18th century. **G. Patterson**

5:00 Chemistry and scientific revolution. A historiographical perspective. **B. Van Tiggelen**

5:30 Panel discussion of chemistry in the 18th century. **G. Patterson**

Monday, March 24, 2024: Evening session

Location: San Diego Convention Center, Hall B2/C

HIST Sci-Mix Division Row

8:00 PM – 10:00 PM

Tuesday, March 25, 2025: Morning session

Location: San Diego Convention Center, Room 29C

Tutorial and General Papers

N. V. Tsarevsky, C. E. Hahn, *Organizers*, *Presiding*

8:00 Chemistry of purple and violet through the ages. **E. Bosch**

8:30 Bringing significant chemical discoveries to life: a travel class connecting chemistry with cultural events. **S. Hamilton, S. Hubbard**

9:00 Mystery of the coast salish woolly dogs. **A. Smalley**

9:30 Two centuries of aromatic hydrocarbons. **D. Lewis**

10:00 Intermission

10:20 Marie Maynard Daly and the mid-century race to quantify nucleic acid components. **M. Schott**

10:50 Second centennial of oxygen at the Third Biennial Conference on chemical education: How the 1874 Priestley House meeting was commemorated 100 years later. **R. Egolf**

11:20 Chemistry for nurses through textbooks and manuals: The life of Harry Clarence Biddle. **W. Palmer**

Tuesday, March 25, 2025: Noon

Location: San Diego Convention Center, Hall B2/C

Tutorial and General Papers

N. V. Tsarevsky, C. E. Hahn, *Organizers*

HIST Poster Session

12:00 – 2:00 pm

#754
Effect of charcoal type and organic additives on the performance of medieval black powders. D. Blaine, J. O. E. Melendez-Eyster, A. Nguyen, D. Riegner, **J. Hunter**

#755
Celebrating the chemical elements with music, poetry, and visual art. **D. Cordes**

ABSTRACTS

4171453

Role of light in the history of chemistry

Gary D. Patterson*, gp9a@andrew.cmu.edu.* Chemistry, Carnegie Mellon University, Pittsburgh, Pennsylvania, United States

Chemistry is the science that studies “matter” and its changes. Light has no “rest mass” and some current natural philosophers might choose to exclude light from the world of chemistry. But it was observed very early that light can change one form of matter into another, and matter constantly emits light. This talk will focus on the role of light in the conceptual world of 17th and 18th century chemistry. It will be shown that deep thinkers during these two centuries correctly inferred that light needed to be included within the world of chemistry.

4198586

Fixing the image: Photochemical innovations of 19th century photography

Kristine Konkol, *kristine.konkol@asurams.edu*. Department of Natural Sciences, Albany State University, Albany, GA, United States

The 19th century was a period of invention that not only revolutionized image capture but also propelled advances in photochemistry. The development of photography represents a pivotal convergence of chemistry and light-induced processes, emerging from decades of experiments with light-sensitive materials. For example, both Thomas Wedgwood and Humphry Davy made early attempts at capturing images, though they struggled with fixing the images permanently. In the late 1820s, Joseph Nicéphore Niépce successfully produced the first fixed photographic image using bitumen of Judea, but his method was hindered by long exposure times and limited clarity. Louis Daguerre’s invention of the daguerreotype in the 1830s involved using silver-coated copper plates treated with iodine vapor to form light-sensitive silver iodide. These plates were then developed with mercury vapor and fixed with sodium thiosulfate, significantly improving both the speed and resolution of image capture while stabilizing and preserving the images. Though Daguerre’s process was commercially successful, it was eventually replaced by other methods such as the collodion process, which used glass negatives and allowed for multiple copies of an image with even shorter exposure times. This talk will explore the chemical innovations that shaped these early photographic methods and the key discoveries that preceded them, tracing the chemical evolution of photography through the 19th century.

4198229

Casting light on the invisible: The electromagnetic radiation from Aristotle and Newton to Damadian and AI

Nelly N. Mateeva*, nellymateeva@yahoo.com. Danielle Eniola, Carneisha Magloire, Richard Alo* Chemistry, Florida Agricultural and Mechanical University, Tallahassee, Florida, United States,

Light has always been an object of fascination for our ancestors. For centuries, the lightness and the darkness have been romanticized or villainized simply by relating them instinctively to the known, the visible, and the unknown, the invisible. It has been less than two centuries since people began to understand the nature of light and how its interaction with the material world creates the perception of our surroundings. Many phenomena have been observed, but explanations have come much later. Aristotle suggested that colors result from mixtures of white and black in different ratios, and for 2000 years, this concept was not questioned. In 1660, Newton demonstrated that white light consists of seven different colors. The concepts of the quantum theory, the discovery of the photoelectric effect, and the rapid development of the research on the interaction between electromagnetic radiation and matter led quickly to the employment of light for the benefit of humanity.The competition between developing a concept and developing the necessary technology for practical purposes governed the progress made during the last century. Nowadays, the possibilities for utilizing these phenomena are endless. Less than a century separates the use of X-rays for diagnostic purposes and the discovery of the MRI machine. The interaction of light and matter is the basis of all analytical methods. The rapid progress in AI applications offers unimaginable opportunities until a decade ago. In this presentation, we review the history of the understanding and the application of electromagnetic radiation in human life and outline the future of this phenomenon.

4198983

Spectroscopy in the early 20th century: Progress toward a transformative method Women chemists and the development of molecular structure theory: Three cases

Alice Haddy*, aehaddy@uncg.edu.* Chemistry and Biochemistry, UNC Greensboro, Greensboro, North Carolina, United States

UV-visible spectroscopy is widely used today for routine characterization and quantification of a broad range of chemical species. The early 20th century was an important period in the development of the spectroscopic technology that was incorporated into the reliable lab instruments we know today. Spectrometers had their origins in the early 19th century when Joseph Fraunhofer used a prism-based spectroscope to observe the solar spectrum. The introduction of a flame light source by Gustav Kirchhoff and Robert Bunsen and the correlation of absorption with concentration by August Beer and others set the stage for the development of more sophisticated instruments. In the early years of the 20th century, the Fery spectrograph made possible the systematic study of organic compounds in the UV

region by Emma Carr and colleagues. At that time, intensities were estimated by determining the thickness of a solution required to achieve total absorption. The development of the phototube facilitated accurate determination of intensities. This made possible the use of colorimetry methods for accurate quantification of species by measuring absorption intensities, thereby reducing the need for wet chemical analysis. Various instruments were designed and became commercially available, such as the Evelyn colorimeter in 1936, which had double photocells. It was often used for clinical studies, such as that of Leon Greenberg and David Lester, who determined the metabolic fate of the analgesic acetanilide and its derivatives in the late 1940s. In 1941, Arnold Beckman introduced the DU quartz spectrophotometer, which included both UV and visible sources. Over the next few decades, these and similar commercially available instruments became common and indispensable laboratory features.

4180427

Built-up layers of misinformation: The case of Katie Blodgett's non-reflective thin films

Margaret Schott, *m-schott@northwestern.edu*. Department of Chemistry, Northwestern University, Chicago, Illinois, United States

On December 27, 1938, General Electric announced a scientific breakthrough for coating glass with a non-reflective material. The press release stated that "Dr. [Katharine] Blodgett has been able to nullify or neutralize rebounding light rays" and that "the non-glare treatment of glass promises to have a wide spread application in the field of camera, telescope and all other types of lenses." The surface coating was built up by the repetitive addition of monolayers of a long-chain fatty acid salt, up to a thickness of ¼ the wavelength of light. Although patented, Blodgett's glass-coating method was never commercialized because the resulting thin films were too soft and could easily be wiped off. More than four-score years later, however, a slow-moving game of 'telephone' in the popular press and elsewhere has morphed Blodgett's discovery into “the” technology used today for glass-coating applications ranging from periscope sights to museum glass to projector lenses. One persistent example is the exaggerated claim that her thin-film coating was used in movie-house projectors for showing "Gone with the Wind". Not so! It was inorganic coatings such as magnesium fluoride that were marketed for commercial applications requiring low reflectance. This talk will make the case for a creeping form of scientific hagiography that appears difficult to eradicate from public view.

4199082

Historical-critical analysis of the nature of cathode rays

Yeimy Stephania Bernal Rubiano, ysbernalr@upn.edu.co. *Aura Daniela Rincon,* Universidad Pedagógica Nacional, Bogotá, Columbia

Throughout the 19th century, cathode rays became a central topic in scientific investigations, capturing the attention of numerous scientists who sought to unravel their nature. Among these researchers, Heinrich Hertz, J.J. Thomson, and Jean Perrin offered distinct perspectives and experimental editing that significantly contributed to characterizing these rays. While Hertz endeavored to demonstrate that cathode rays were not electrical currents by studying their interaction with electromagnetic fields, Perrin made a pivotal contribution by being the first to recognize the charge-carrying properties of cathode rays. Thomson, on the other hand, advanced the understanding further by identifying the negative charge of these rays, a breakthrough that played a crucial role in the study of the electron. The purpose of this text is not to focus on the discussion of who was right, but rather to compare the hypotheses of these three scientists, which provide insights laid the foundational principles of science as we know it today. This analysis examines how each author takes a stance in relation to the leading scientific theories of the time, and how their work was influenced by factors such as electromagnetic effects, corpuscular behavior, or wave-like behavior, all of which were essential in the characterization of cathode rays. This historical-critical analysis a specific and consistent description of the apparatus developed by each of these scientists to support their hypotheses, acknowledging the crucial role that experimental work plays in the development of scientific ideas and who minor details and changes in the experimental editing by each of one led to errors and successes, which significantly contributed to a deeper understanding of this phenomenon.

4185431

Polystyrene and beyond: An early history of photopolymerization

Seth C. Rasmussen*, seth.rasmussen@ndsu.edu.* Chemistry and Biochemistry, North Dakota State University, Fargo, North Dakota, United States

The polymerization of monomeric species upon irradiation with light, commonly known as photopolymerization, is generally dated to the 1845 observation by John Blyth and August Hofmann that styrole (styrene) could be converted to metasytrol (polystyrene) by the action of light, while samples held in the dark remained unreacted over years. This was followed by similar observations relating to vinyl chloride in 1872 and isoprene in 1887. Discussion of these early observations will be presented in order to develop an initial historical progression of the early study of photopolymerization processes. As this time period also overlaps with early efforts to understand the nature of polymers and polymerization, efforts will be made to place this work within the proper context of the growing understanding of polymerization at the time.

4193023

Azobenzene and light: A journey through history

Kapil Dev Sayala, *polykapil@gmail.com. Subhajit Bandyopadhyay***,** SEQENS North America Devens, Massachusetts, United States

First synthesized in the mid-19th century, Azobenzene's ability to undergo reversible isomerization between its trans and cis forms upon exposure to light was not fully recognized until 1937. Prior to the discovery of Azobenzene's light responsive behavior, this simplest class of aryl azo compound attracted interest due to its bright color, making it suitable for industrial applications (as synthetic dyes). Research in the 1950s laid the groundwork for understanding its photochemical properties. The characteristic photoisomerization behavior sparked interest among scientists, who later expanded azobenzene's applicability to materials science, leading to the development of materials, like actuators, molecular switches etc. that could alter their shape and mechanical properties in response to light stimuli. Drug delivery systems, enabling controlled, precise therapeutic release profile have also exploited azobenzene's photoisomerization property. This talk focuses on the journey of azobenzene i.e., its evolution from a simple organic compound to a central player in photochemistry.

4181529

Let there be light: A philatelic history of electromagnetic

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This presentation will use postage stamps and other philatelic materials to illustrate the history and applications of electromagnetic radiation, with an emphasis on visible light, *i.e.,* light perceived by the human eye. Topics to be discussed include the pioneering research of Newton to develop the corpuscular theory of light, the contributions of Huygens and Fresnel to elaborate the wave theory of light, and the impact that the work of Faraday, Maxwell, Planck, Einstein, de Broglie, and others had on our understanding of electromagnetic radiation. The importance of light in the process of photosynthesis, the role of light in the chemistry of vision, and the many uses of lasers in the modern world will also be described in this presentation.

4204082

Photochemistry through the ages: From ancient observations to modern marvels

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The study of light and its interaction with matter has provided the essential basis of development in scientific understanding throughout the ages, especially within the area of photochemistry. The aim of this talk is to trace the development of light-mediated processes as a transformative factor in chemical research, from classical experimentation to contemporary breakthroughs of technology and theory. It will also review some critical historical developments in the study of light from early philosophical speculations on the nature of light and color to the breakthroughs of the 19th and 20th centuries that named modern photochemistry. Central to this historical narrative will be the evolution of our understanding of photochemical reactions, including foundational experiments in ultraviolet light absorption, the photoelectric effect, and quantum yield analysis. It also looks at recent advances in the use of light in catalysis, synthetic photochemistry, and sustainable energy applications—such as artificial photosynthesis and solar cells. This will be brought to life in a lecture that looks back at historical and contemporary standpoints, with the emphasis on how photochemistry has become the utterly indispensable instrument to solve the problems of present-day science.

4173222

Introduction to the history of chemistry in the 18th century

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The history of chemistry in the 18th century is much more complicated and substantially more interesting than many of the hagiographic depictions of this era. Many chemical communities were pursuing both technical and philosophical progress in this century. This talk will outline the major lines of inquiry and the major figures involved in this heterogeneous world. While it might be supposed that alchemy had been “banished” from the world of chemistry in the 18th century, it was definitely not the case. The programme established by Boyle in the 17th century was continued. The Newtonian approach to physical reality was still too difficult to make much progress, but many chemists were "Newtonians.” While the philosophical stance of Descartes was not the only way forward, many French chemists employed this paradigm to solve chemical problems. The spectre of Aristotle still hovers over chemistry and dominated certain communities in the 18th century. New experimental techniques were invented and produced active experimental communities. New physical phenomena were discovered and studied, such as electricity. An approach to the Natural History of chemical phases was emerging. And a truly quantitative approach to chemical reactions was established in its modern form. This was a lively time and should lead to lively discussion.

4186295

Friedrich Hoffmann (1660-1742) and his contributions to chemistry

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Friedrich Hoffmann, the son of a physician of the same name, was born and died in Halle, and spent most of his life in that city, but during his long and productive life he travelled to various cities in Germany and visited Holland and – importantly – England where he met Robert Boyle and was influenced by his work of on analytical chemistry. Hoffmann's scientific studies began under Georg Wolfgang Wedel (1645-1721) in Jena where he obtained his M.D. degree in 1681 with a dissertation on the "Cinnabar of Antimony." In 1694, he was appointed to the first chair of medicine at the newly established University of Halle and taught there until his death 48 years later, with the exception of a short and somewhat stressful stay (1709-12) as the physician to the king of Prussia in Berlin. Hoffmann recruited another Wedel-trained physician-chemist, Georg Ernst Stahl (1660-1734), to Halle, but the relationship by all accounts was far from amicable. Hoffmann's personal library, currently at the Marienbibliothek in Halle, attests to his broad interests and contains books not only on medicine and chemistry, but also on philosophy, theology, history, and economy. He published a very influential book on the chemical analysis of mineral waters, in which several complementary tests were often described for various analytes. In addition, he published some of the earliest studies on the toxicology of carbon monoxide, the photochemistry of silver salts, and magnesia (which he demonstrated how to distinguish from lime). Hoffmann also studied organic compounds and wrote on the preparation of ether, which, in the form of a solution in alcohol was used widely under the name "Hoffmann's anodyne drops." He was an extremely prolific author and many of his medical and chemical works were published and re-published numerous times, and were translated in the 18th Century into French, English, and even Russian. He was indeed a widely respected (and decorated) scientist, becoming a Fellow of the Royal Society in 1719. In this talk, the most impactful works and discoveries of this erudite natural philosopher will be highlighted.

4185334

Georg Ernst Stahl: The origins and his motivation for the development of the phlogiston theory

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Georg Ernst Stahl was born in 1659, only a decade after the end of the Thirty Year's War, which left deep scars in society. Famine and diseases reduced the German population in some areas to a third. Stahl studied medicine from 1679-1684 at the University in Jena. Besides medicine he was very interested in chemical processes since his youth, especially in smelting, fermentation, and dyeing. From 1694-1715 he held a chair of medicine at the University of Halle, where he also taught chemistry. Stahl was strongly influenced by the Pietism movement of the 17th century. He recognized that society can only grow out of the

hardships left from the war if building up a strong economy. He thought this can only be possible if the businessmen understand deeper the chemical processes involved in their trades such as smelting or fermentation. Stahl was very critical of the current theories of his time on the nature of matter, such as the definition on “elements” and the concept of “corpuscles”. His goal was to eliminate from sciences vague alchemistic views and scholasticism. Influenced by Descartes, Boyle, Lemery, Becher, Kunckel and other modern “chymists” he developed a new reaction theory originally derived from smelting processes but also observed in fermentation, where particles are transferred from substance to another carrying the property of “flammability”. He published his views for the first time 1697 in his “Zymotechnia fundamentalis”. Later he called these particles *phlogiston*. Stahl’s reaction theory was a real progress for his time: it was the first overarching chemical theory. It became a dominant chemical concept in the 18th century in Europe for 50 years until with the deeper study of gases and the discovery of oxygen by Lavoisier, the phlogiston theory was repealed. However, with his theory Stahl laid the foundation for the modern view of oxidation-reduction processes and provided the necessary step for its development.

4196647

Carl Sheele's experiments on the coloring principle in Prussian blue

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Prussian Blue, [$Fe_4(Fe(CN)_6)_3$] was first prepared in the first decade of the 18th century by two alchemists, Diesbach and Dippel. It was the first synthetic pigment and an instant commercial success. Its synthesis was a closely guarded trade secret until it was published by Woodward in 1724 without referencing Diesbach and Dippel. The synthesis was an alchemist’s delight because they had prepared Prussian blue without access to any cyanide-containing starting materials. Dried ox blood was one of the starting materials. For almost the rest of the 18th century, it was a major challenge to discover the source of the intense blue color. In 1783, Carl Scheele published his extensive studies on Prussian blue. He essentially took it apart and put it back together, discovering in the process HCN, KCN, and $K_4[Fe(CN)_6]$. His work is filled with the scientific method. Several examples will be discussed. HCN has killed more people than any other chemical compound. It is ironic that HCN is now considered by many Origin of Life researchers to be the primordial compound from which all others biological molecules are made. KCN was the first synthetic ligand, and like generations of inorganic chemists to follow him, who discover a new ligand, Scheele reacted it with many different metal compounds. Two reactions will be discussed. The reaction with gold was developed 100 years later into the process that is still used today in gold mining, not without frequent environmental disasters. We are trying to reproduce Scheele’s reaction of KCN with $FeSO_4$ which we think might give the unknown compound $Fe(CN)_2$

4176201

Enlightened chemistry of air and fire

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Historians who characterized Lavoisier's work on air as leading to the Chemical Revolution pondered how he could foresee "a revolution in chemistry and physics" before he even embarked on the research. In interpreting his approach as an application of physics to chemistry, they highlighted the conservation of weight and heat in the chemical equation as the inalienable logic underlying his endeavor. Considering Lavoisier's unusual path to chemistry as an enlightened youth well-educated in a broad range of natural sciences, however, we need to better understand what "physics [*la physique*]" and "chemistry" meant for the enlightened public and how they made sense of invisible entities such as air and fire which lay beyond routine chemical analysis or physical measurements. This paper will consider how the public sphere of enlightened sciences might have informed Lavoisier's approach to the subject of air and heat. While chemical analysis was limited to solid and liquid substances, public discussions of weight, fire, heat, air, magnetism and electricity involved subtle matters that were related to chemical concerns. Discussions of fire often included its role in chemical actions, while air quality was a significant part of medical thought well before Priestley's methods of differentiating the "different kinds of air" subjected them to chemical analysis. Lavoisier would have seen that adding air to the domain of chemistry would induce a serious disruption, or a "revolution," not just in chemical practice but also in the larger domain of natural sciences concerning weight, heat, and fire. By focusing on what he could measure with instruments, he would change the very definition of chemical substance and draw new boundaries between chemistry and physics.

4186824 - Enlightened chemistry of air and fire II

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This talk is the Plenary lecture of the Symposium on Chemistry of the 18th Century. It continues the story started with **4176201**.

4179926

Attempts to quantitate chemical affinity tables

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In 1718 Étienne François Geoffroy published the first table of chemical affinities. Considered by some to be a kind of "ur-periodic table", Geoffroy's table was purely qualitative as were most of the versions that followed during the 18th century. In Élémens de Chymie Théorique (1749), Pierre-Joseph Macquer devoted an entire chapter to the topic of chemical affinity tables. Macquer eventually was one who attempted to provide quantitative values into his tables. Major problems developed very quickly, most notably when Claude Louis Berthollet discovered the law of mass action suggesting that reaction conditions played a significant role in observed chemical affinities. In the late 19th century, Hermann von Helmholtz proposed free energy as the thermodynamic driving force. This presentation will provide a brief overview of attempts to quantify chemical affinities.

4181961

Joseph Priestley and the new chemistry in America

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In 1794 the chemist, natural philosopher, and Unitarian minister, Joseph Priestley, emigrated to the United States, ultimately settling in the relatively remote town of Northumberland, PA. He hoped not only to build a home and a new congregation, but also to continue his defense of the phlogiston theory of combustion. By the time Priestley left Britain, most chemists and natural philosophers in Europe had accepted Antoine-Laurent Lavoisier’s oxygen theory. Perhaps America would be amenable to his ideas? Unfortunately for Priestley, this was not the case. This paper will examine one of Priestley’s final attempts to defend the phlogiston theory, his pamphlet, *On the Doctrine of Phlogiston Established* (1796), and its rebuttal by three American chemists, Samuel Latham Mitchell, John MacLean, and Joseph Woodhouse. Each of these chemists had become well-versed converts of Lavoisier’s new chemistry through various avenues before Priestley’s arrival in the U.S. Ultimately, this paper will contribute to our understanding of the spread of the Chemical Revolution to America.

4189314

Henry Cavendish (1731-1810) and his contributions to chemistry and physics

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Henry Cavendish was a natural philosopher who made fundamental contributions to the disciplines of chemistry and physics. In chemistry, he carried out experiments on gases, or on "airs" to use the terminology of his time. He is commonly credited with the discovery of hydrogen, which he named "inflammable air." He was also one of the first to recognize the compound nature of water. Both of these statements are more complicated than they seem, as will be explained in the presentation. Cavendish's work in chemistry has been described as a "catalyst for the Chemical Revolution." His influence lasted even longer, though: one of his "Experiments on air" was cited in 1895, more than a century after its publication, as the basis of a method for isolating the previously unknown gas argon. In physics he is best known for his experiments on gravity, which permit a rather accurate determination of what is now called the Newtonian gravitational constant. Cavendish also did important work in heat and electricity.

4189785

Law of conservation of matter: Lomonosov and Lavoisier

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The Law of the Conservation of Matter traces its origins to the work of two eminent scientists chemists of the 18th century: the Russian, Mikhail Vasil'evich Lomonosov (1711-1765), and the Frenchman, Antoine Laurent (de) Lavoisier (1743-1794). Lomonosov was a true polymath, making contributions in the literature, education and science. He formulated his Law of the Conservation of Matter in 1756, and based on the experiments he used to demonstrate it, he also became a strong opponent of Boyle's support of the theory of phlogiston. Lomonosov was a poet, whose contributions shaped Russian literature, and he was a major force in the growth of higher education in Russia, serving as a founder of Moscow University, which now carries his name. Lavoisier was French noble who is frequently referred to as the Father of Modern Chemistry. His work placed the Law of Conservation of Mass on a firm footing, and his work signaled the death knell of the phlogiston theory. Lavoisier joined the Fermiers Généraux, the hated tax farmers of France, and this was to lead to his execution by guillotine at age 50. The development of the Law will be covered in terms of its two protagonists will be discussed.

4188305

Torbern Bergman (1735-1784): A life dedicated to science

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One of the first truly outstanding Swedish chemists of the 18th Century, Torbern Bergman, was born in the family of a tax-collector who insisted that his son received academic training (at the University of Uppsala) as a theologian or lawyer. Fortunately for the development of natural science, Bergman decided to concentrate on mathematics and later botany and entomology. His master's thesis, which he defended in 1758, was on mathematics. In the early 1760s, he became an adjunct in mathematics and physics, and studied the electrical and optical properties of minerals, e.g., tourmaline. In 1764, he was elected to the Swedish Academy, and three years later, he was appointed professor of chemistry, even though he had done no original work on the subject. In a little over a decade, until his virtual retirement in 1780 due to poor health (he died in 1784 at the early age of 49), he made discoveries that influenced future chemistry research for many decades. Half-seriously, it has been averred that his major discovery was that of Carl Wilhelm Scheele (1742-1786), but in fact he made numerous important contributions to the fields of analytical and physical chemistry. Not only did he perfect wet qualitative and quantitative analysis of minerals, metals, salts, and mineral waters, but he was also instrumental in the dissemination of an important early analytical tool for dry analyses – the blowpipe. His work on chemical affinities (or "attractions"), although based on erroneous ideas, was very influential and served as the basis of improved and corrected theories. Bergman represented chemical processes using what now justifiably be seen as some of the first reaction schemes or chemical equations. In addition, he was an outstanding educator who supervised several impactful dissertations and contributed to the popularization of chemistry, for instance, with his essay of 1779 (in Swedish and German) and 1783 (translation in English) on the "Usefulness of Chemistry, and Its Application to the Various Occasions of Life." His reputation was truly international, and, outside of Sweden, he was a member of the Academies of Berlin, Göttingen, Torino, and Paris, a Fellow of the Royal Society (1765), and a member of the American Philosophical Society (1779). Bergman's most important contributions to chemistry will be described in this talk.

4171520

Fourcroy and chemistry at the end of the 18th century

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While the 18th century is often forgotten by "modern" academic chemists, it is extremely instructive for modern historians of Chemistry. The history of French chemistry is both complicated and rewarding. A perceptive view of the state of French chemistry in 1792 was published by Antoine-Francois de Fourcroy (1755-1809): *Philosophie Chimique ou Verite Fondamentales de la Chimie Modernes.* This work will be discussed in detail and used to evaluate the progress in chemistry at the end of the 18th century.

4195977

Chemistry and scientific revolution. A historiographical perspective

Brigitte Van Tiggelen, *vantiggelen@memosciences.be***,** Science History Institute, Philadelphia, Pennsylvania, United States

Lavoisier's name, along with some of his collaborators and/or colleagues, is associated with the "chemical revolution" and the foundation of "modern chemistry". The term "revolution" is even used by Lavoisier himself and his peers, to refer to the novelty of experimental approaches and theories, and a clear break with the past, along with a claim of having fathered this refoundation of an existing science transforming it into a modern science. The *topoi* of "scientific revolution" seems inevitable when studying 18th century chemistry, and has fueled many debates among historians of science, with a surge at the time of bicentenial celebrations of the publication of the *Méthode de Nomenclature Chimique (1787)*, the *Traité élémentaire de chimie (1789)* et not the least the beheading of their author, Antoine-Laurent Lavoisier (1794). But what did the term mean to, and how was it associated with the establishment of a modern science by chemists and their contemporaries at the end of 18th and the beginning of the 19th century? And what is the meaning associated with it in the writing of the history of science, knowing that the "chemical revolution" comes as one of the archetypical example of such a historiographical concept?

4173776

Panel discussion of chemistry in the 18th century

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One of the goals of this symposium is to stimulate discussion of the complicated state of chemistry in the 18th century. After all the talks have been given, a panel discussion will be held to allow both remaining issues and clear examples of consensus to be debated. The results of this event will be summarized in the published version of the symposium.

4198116

Chemistry of purple and violet through the ages

Eric Bosch*, ericbosch@missouristate.edu.* Department of Chemistry and Biochemistry, Missouri State University, Springfield, Missouri, United States

This talk will provide an overview of the chemical history of natural and synthetic sources of inorganic and organic purple pigments, lakes and dyes through the ages. This will include Tyrian Purple, Mauveine, Dioxazine Purple, Cobalt Violet, Manganese violet and Quinacridone Purple. Along with the discovery and development of these pigments, modern developments with regard to Tyrian Purple and Mauveine will be presented.

4197931

Bringing significant chemical discoveries to life: a travel class connecting chemistry with cultural events

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There is frequently a disconnect between what students learn in their chemistry classes and how that impacted what they learn in their history classes. From advances in warfare that shaped the face of the globe to materials that allowed humans to build skyscrapers and create artwork to the women's liberation movement, chemistry played a significant part in all of these historical advances. In 2022-2023, Dr. Sharon Hamilton and Dr. Sara Hubbard developed a class focused on how science – and especially chemistry – influenced history and culture. Students taking the course learn about the significance of historic scientific discoveries and how these discoveries paved the way to the future. Students also learn how to use a handheld x-ray fluorescence (XRF) spectrometer and are able to analyze a variety of samples, including cultural heritage items from the Ouachita Baptist University archives and special collections. Upon completion of the semester-long class, students travel with the faculty to three areas in Europe to visit places of scientific historical importance. This presentation will highlight some of the history of chemistry that students learn in the course, as well as sites that are visited during the trip. Students' impressions of the class will be discussed and how it has helped them connect the concepts of scientific discoveries to the world today. We will also discuss lessons learned from our first trip and the changes they inspired for our current course.

4170169

Mystery of the coast salish woolly dogs

***Arwyn Smalley,** alsmalley@stmartin.edu.* Chemistry, Saint Martin's University, Lacey, Washington, United States

Early European explorers to the Pacific Northwest commented that the native people kept flocks of fluffy, white dogs. They were compared to Pomeranians in appearance, although they were somewhat larger, and they were shorn at regular intervals throughout the year – not unlike sheep. Despite being a common sight in the 18th century, the practice of raising and keeping these dogs had almost disappeared by 1860, and the breed was considered extinct by the end of the 19th century. For context, European explorers brought diseases that devastated the native people throughout the 18th and 19th centuries, and the tribal populations were significantly reduced and sometimes totally wiped out. In addition, the "treaties" forced natives to give up many of their traditional practices, including keeping dogs and weaving. By the beginning of the 20th century, all that was left of the weaving tradition were a few grandmothers who had learned to weave as children, and who might talk about or pass on the tradition in secret to their own children and grandchildren. As a result of this cultural destruction, by the mid- to late-20th century, some researchers questioned whether dog fibers

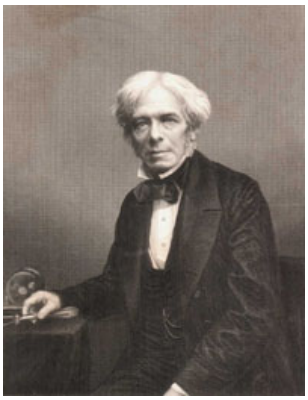
had actually been used to create blankets, and whether dog hair had been used in any significant way to produce blankets. Multiple Coast Salish blankets exist in museums worldwide, but it was very difficult to determine the fiber type using physical means. New scientific techniques in the late 20th and early 21st centuries have provided new ways to analyze the blankets. I will describe these scientific innovations and what new information they brought to solve the mystery of the Coast Salish woolly dogs.

4183316

Two centuries of aromatic hydrocarbons

***David E. Lewis**, lewisd@uwec.edu.* Chemistry and Biochemistry, University of Wisconsin-Eau Claire, Eau Claire, Wisconsin, United States

In a paper in the *Philosophical Transactions* read before the Royal Society on June 16, 1825, Michael Faraday (1791-1867) announced the discovery of a new hydrocarbon that he called "bicarburet of hydrogen," which we now know as benzene. Faraday's achievement was reassessed in 1968 by the analytical chemist and pioneer of capillary chromatography, Rudolf Ernst Kaiser (1930-2021), who reported that the mixture that Faraday started from had over 300 components at the 100 ppm or higher level. Faraday's hydrocarbon remains a fascinating molecule whose lack of reactivity despite its molecular formula that clearly defines it as being highly unsaturated. The concept of aromaticity and methods for assessing it have remained a topic of interest for chemists and physicists alike. Faraday's discovery and its legacy will be discussed.



Michael Faraday, FRS (1791-1867)

4199068

Marie Maynard Daly and the mid-century race to quantify nucleic acid components

Margaret Schott, *m-schott@northwestern.edu*. Department of Chemistry, Northwestern University, Chicago, Illinois, United States

In the years leading up to the 1953 announcement of the structure of DNA, several research groups were hard at work developing different techniques to quantify the nucleoside / nucleotide components of DNA and RNA. Chargaff is usually credited with discovering the "rule" stating that the quantity of pyrimidines (C+T) and purines (A+G) are present in equivalent amounts in double-stranded DNA. Yet other chemists and biochemists, including Marie Maynard Daly, also played important roles in advancing nucleic acid science during the late 1940s and early 1950s. This presentation will examine key publications by Daly and others documenting various methods for the separation and quantification of nucleic acid components across different species, including bacteria, yeast, and animal and human tissues: (i) paper chromatography – Erwin Chargaff at Columbia University; (ii) liquid-liquid countercurrent extraction – Lyman Craig at Rockefeller Institute for Medical Research; (iii) ion-exchange column chromatography – Waldo Cohn at Oak Ridge National Laboratory; and (iv) column chromatography on potato starch – Marie Maynard Daly at Rockefeller Institute for Medical Research. Without a doubt, this was a period of intense research activity aimed at deciphering patterns in nucleic acid composition. A close look at manuscript submission and publication dates raises some intriguing questions about who should be given credit for discovering Chargaff's rule.

192862

Second centennial of oxygen at the Third Biennial Conference on chemical education: How the 1874 Priestley House meeting was commemorated 100 years later

Roger A. Egolf*, rae4@psu.edu.* Penn State Lehigh Valley, Center Valley, Pennsylvania, United States

Many papers have been written, and many talks have been given about the Centennial of Oxygen meeting held at Priestley House in 1874 that celebrated Joseph Priestley's discovery of Oxygen on August 1st, 1774. Many consider that meeting to be the forerunner of the formation of the American Chemical Society. However, to the best of my knowledge there has never been a paper or talk about the Second Centennial Celebration, again held at Priestley House on the occasion of the 200th anniversary of Priestley's discovery on August 1st, 1974. This meeting was held in conjunction with the Third Biennial Conference on Chemical Education, held that year at Penn State University. Over 300 attendees at the BCCE traveled the 70 miles by chartered bus to Priestley House where they heard a lecture by Sir Derek Barton. Barton received the Second Centennial of Chemistry Award, an award that will not be given again for another 100 years.

4186122

Chemistry for nurses through textbooks and manuals: The life of Harry Clarence Biddle

***William Palmer**, bill_palmer15@hotmail.com.* STEM, Curtin University, Perth, Western Australia, Australia

One of the larger groups for whom chemistry laboratory manuals were written was students training to be nurses, though separate manuals for trainee nurses were not written until the 1920s. This paper will provide the story of an author of laboratory chemistry manuals, Harry Clarence Biddle, whose manuals had a lengthy history. Harry Clarence Biddle was born on 28th August 1885 in Kenton, Ohio. His father, Clarence C. Biddle worked as a 'landlord'. His mother was Lucy Biddle and Harry wrote to her frequently. A selection of these letters is available via Ancestry. Harry Biddle graduated from Wabash in June 1909, and was granted a fellowship in Ohio State University, where he obtained his master's degree. Biddle taught chemistry at public and nursing schools in the Cleveland area from about 1912 until he retired. He wrote numerous articles on teaching chemistry to trainee nurses from 1925 onwards. He contributed to chemistry textbooks and manuals for high school students and also for trainee nurses. Contemporary reviews of his work are generally favourable. Some of the student answers from manuals written by Biddle in the Bill Palmer chemistry manual collection will be discussed. After he retired in 1945, he gave his profession as a science books author in the Federal Census of 1950, indicating that he worked long into retirement. He passed away on 4th December 1969, aged 84.

4195971 (Poster Board #754)

Effect of charcoal type and organic additives on the performance of medieval black powders

Dolin Blaine, Janez Orr, Elijah Melendez-Eyster, Andrew Nguyen, Dawn Riegner, ***Justin Hunter,*** *justin.hunter@westpoint.edu.* United States Military Academy West Point, New York, United States

The purpose of this study is to analyze black powder recipes to aid historians in their interpretation of medieval texts and to determine if medieval artillerists empirically understood the effect of organic additives and charcoal type on black powder performance. Laboratory analyses include a combination of thermal techniques, specifically bomb calorimetry and differential scanning calorimetry (DSC) to analyze heat release. On firing ranges located at the U.S. Military Academy, we utilize high-speed imagery to capture cannonball velocity fired from a replica medieval cannon. Cannonball velocities, post-shot cannon residue, and heat release of the recipes are analyzed to determine comparative performance. Pairing the laboratory data with the live-fire data of the same recipes enables quantitative and predictive analysis of black powder performance. This is a continuation of previous work, which involved analysis of various ratios of the three main ingredients of black powder. Further testing is being conducted which involves varying the type of charcoal and additives to determine which factors, ratio, additives, or charcoal type impacts the performance most.

4195727 (Poster Board #755)

Celebrating the chemical elements with music, poetry, and visual art

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This work describes a new project that uses an interdisciplinary approach to exploring the science, history, and culture of the chemical elements. Chemists use music, poetry, and visual art to examine the unique nature of selected elements such as hydrogen, helium, sulfur, chlorine, and mercury.