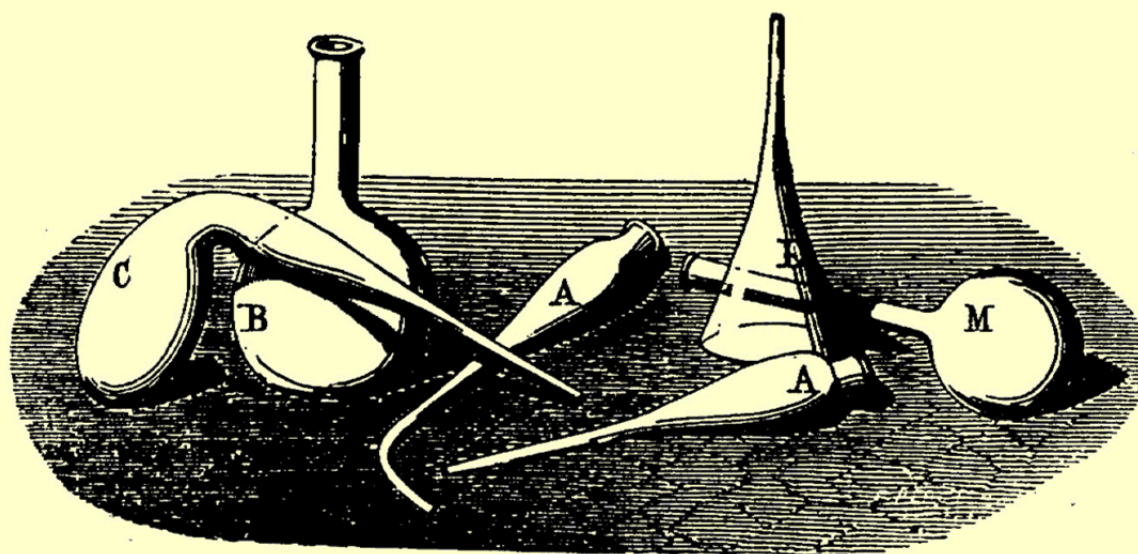




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American Chemical Society
**DIVISION OF THE
HISTORY OF CHEMISTRY**



NEWSLETTER, PROGRAM & ABSTRACTS

253rd ACS National Meeting
San Francisco, CA
April 2-6, 2017

S. C. Rasmussen, 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, 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

I am very excited and honored to be the Chair of HIST for the next two years. HIST has a long and distinguished history since its formation as a probationary section of ACS in 1921 (formal status as a Division was conferred in 1927). While we do serve as a forum for members to share their historical work with others, we also have the important mission of demonstrating how critical the history of chemistry is to the actual scientific enterprise by engaging with as many of the other divisions as possible at ACS and other regional meetings. I plan to encourage that activity and build on the great success we already have in that area. We have a great lineup of symposia for the upcoming ACS meetings in San Francisco and Washington, DC, the Citation for Chemical Breakthroughs program is going strong, and the HIST Award for Outstanding Achievement in the History of Chemistry was revived in 2012 and the list of deserving awardees just shows how dynamic and healthy the history of chemistry field is. Indeed, I am happy to say that the 2017 HIST Award winner is Jeffrey I. Seeman, a prolific historian and tireless advocate for HIST and the history of chemistry overall.



In addition to building up awareness and membership for HIST within the ACS, I will be an active participant and external meetings and promote the activities of HIST to others, including the History of Science Society, the Society for the History of Alchemy and Chemistry, and the various European history of chemistry divisions through the network being built up with the Chemical Heritage Foundation's Heritage Council-Europe. My hope is to at least increase affiliate membership of HIST by non-ACS members and to promote the *Bulletin of the History of Chemistry* far and wide. With your help, I foresee an excellent future for HIST and the history of chemistry.

Finally, my thanks to Gary Patterson for his fine leadership of HIST for the last two years and to all of the amazing officers and other volunteers who make this division great and who have made my transition as smooth as possible!

Ronald Brashear, HIST Chair

Report of Councilors, Division of the History of Chemistry

252nd ACS National Meeting – Philadelphia, PA, August 24, 2016

Election Results: Elected Council Committees

By electronic ballot, the Council elected Harmon B. Abrahamson, Lissa A. Dulany, Andrea B. Twiss-Brooks, and Sally B. Peters for a 2017-2019 term, Martin D. Rudd for a 2017-2018 term, and Karl S. Booksh and Ella L. Davis for a one-year term, 2017, on the Council Policy Committee.

By electronic ballot, the Council elected Lisa M. Balbes, Thomas H. Lane, Amber S. Hinkle, Alan M. Ehrlich, and Alan A. Hazari for a 2017-2019 term and Neil D. Jespersen for a one-year term, 2017, on the Committee on Nominations and Elections.

By electronic ballot, the Council elected Wayne E. Jones, Jr., D. Richard Cobb, Stephanie J. Watson, Dee Ann Casteel, and Emilio X. Esposito for three year terms, 2017-2019, on the Committee on Committees.

Other Council Actions

Continuation of Select Committees. On the recommendation of the Committee on Committees, the Council voted to approve the continuation of the Committee on Analytical Reagents, and the Committee on Chemical Abstracts Service, subject to confirmation by the Board of Directors.

Change in Local Section Territory. On the recommendation of the Committee on Local Section Activities, the Council approved a petition from the Permian Basin Local Section to annex the Texas counties of Pecos and Brewster, and the petition from the Upper Peninsula Local Section to annex unassigned and adjacent territory, and one Michigan county (Menominee) now currently assigned to the North-west Wisconsin Local Section.

Unemployed Members' Dues Waiver. On the recommendation of the Committee on Membership Affairs, the Council approved a petition to amend the ACS Bylaws to extend the Unemployed Members' Dues Waiver, which will extend waivers for unemployed members' dues from the current two years to three years, subject to confirmation by the Board of Directors.

Chemical Professional's Code of Conduct. On the recommendation of the Committee on Economic and Professional Affairs, the Council approved the

Chemical Professional's Code of Conduct, subject to confirmation by the Board of Directors.

Charter Bylaws. On the recommendation of the Committee on Constitution and Bylaws, the Council approved the Bylaws for Divisions in Probationary Status and the Charter Bylaws for New Local Sections.

International Chemical Sciences Chapters. On the recommendation of the Committee on International Activities, the Council approved the establishment of ACS International Chemical Sciences Chapters in Greater Beijing, Southwestern China, and Iraq, subject to confirmation by the Board of Directors.

Resolutions

The Council passed resolutions in memory of deceased Councilors; acknowledging President Donna Nelson's service as presiding officer of the Council; and in gratitude for the officers and members of the Philadelphia Local Section, the host Section for the 252nd National Meeting, the divisional program chairs and symposium organizers, and ACS staff.

Special Discussion

The Council conducted a special discussion to gather input on proposed recommendations from the ACS Presidential Task Force on the U.S. Employment of Chemists. The task force has been examining and considering all known influences that can impact employment in the chemical sciences. Councilors were invited to share their thoughts, comments, and suggestions on the proposed suggestions to date, in preparation for the report's expected release later this year.

Highlights from Committees Reports

Nominations and Elections (N&E)

The Committee on Nominations and Elections solicits Councilors' input of qualified individuals for President-Elect and/or Directors for future consideration. Suggestions may be sent to nomelect@acs.org. N&E has established the Vote 20/20 Task Force, charged with examining all aspects of nominations and elections for ACS national offices, and designing an enhanced process to be in place by the year 2020.

The committee welcomes ideas from all members as to how nominations and elections should be handled. Send comments to vote2020@acs.org.

Budget and Finance (B&F)

The Society's 2016 Probable 1 Budget calls for a Net from Operations of \$17.3 million. This is \$3.9 million higher than the Approved Budget but only \$723,000 higher than 2015. Total revenues are projected to be \$528.8 million, essentially on budget, and 3.3% higher than the prior year. Total expenses are projected at \$511.5 million, which is 0.6% favorable to budget, and 3.3% higher than 2015.

The Committee considered several program funding requests for 2017, and on its recommendations, the Board subsequently approved funding for the Atlantic Basin Conference on Chemistry, the ChemIDP Program; and the International Student Chapter Program.

Activities of HIST Councilors

Mary Virginia Orna – is completing her term on the Local Sections Activities Committee (LSAC). She awaits appointment to another committee for 2017.

Roger Egolf – is also completing his term on his committee, the Divisional Activities Committee (DAC) and awaiting his next appointment. This year, he chaired the DAC subcommittee on Governance and Annual Reports and participated in the DAC Strategic Planning meeting in Washington D.C in June.

Mary Virginia Orna, Roger A. Egolf, Councilors

Additional information can be found at www.acs.org, at the bottom of the page, click 'About ACS', then 'Financial'. There you will find several years of the Society's audited financial statements and IRS 990 filings.

Philadelphia Meeting Attendance

As of Tuesday evening, August 23 the total number of attendees, including students, exhibitors, and guests came to a grand total of 12,800.

Petitions to Amend Constitution and Bylaws

New petitions to amend the Constitution or Bylaws must be received by the Executive Director no later than December 14 to be included in the Council agenda for consideration at the spring 2017 meeting in San Francisco. Contact the Committee on Constitution and Bylaws with any questions or requests for information at bylaws@acs.org.

News

HIST Included in C&EN's 10 most popular articles from 2016

The April 11, 2016 article "Notable chemists who should have won the Nobel" was selected as one of the 10 most read articles of 2016. This article by Stu Borman was a detailed write up of the HIST symposium "*The Posthumous Nobel Prize in Chemistry. Correcting the Errors and Oversights of the Nobel Prize Committee*," organized by Tom Strom, and highlighted several of the presentations given as part of the symposium. Highlighted talks included Carmen Giunta's talk on Dmitri Mendeleev, Tom Strom's talk on Wallace Carothers, Eamonn Healy's talk on Michael Dewar, Charles Perrin's talk on Louis Hammett, and Pierre Laszlo's talk on Howard Simmons. Brief mention was also given to Burtron Davis' talk on BET theory and Gary Patterson's talk on Herman Mark. The article

generated a significant number of comments by readers of the online version of the article and both the online comments and the total number of readers illustrates the continued interest ACS members have in the history of our discipline, particularly when it comes to the lives and work of notable figures of chemistry. The original article can be found online at <http://cen.acs.org/articles/94/i15/Five-chemists-should-won-Nobel.html>.

CAS expands its coverage back to 1830 with ChemZent™

Since 1907, CAS (Chemical Abstracts Service) has been dedicated to finding, collecting, and organizing all publicly disclosed chemical information. In keeping with its role as the Keepers of Chemistry, CAS recently expanded its coverage back to 1830 with the historical content of the oldest collection of

**Pharmaceutisches
Central Blatt.**

3. December 1842. **N. 54.**

Redaction: Dr. A. Weislig.

INHALT. Peligot, über das Uran. — Mithle, über die Zersetzung der Quecksilbersalze durch alkalische Chlorüre. — Ueber die Opianensäure, von Liebig und Wöhler. — Ueber die Verwandlung des Baidriäts in Borneo-campher und Laurineocampher, von Gerhardt.

Kl. Meyer. Reinigung der Salpeters. von Salza., nach Anthon. — Darstellung von Chlorblei, nach Anthon.

PELIGOT, über das Uran.
Wir haben zwar die Hauptresultate dieser wichtigen Arbeit bereits mitgetheilt, indessen macht es die seitdem erschienene ausführliche Abhandlung des Verf. doch nöthig, manche interessante Details nachzutragen.
Bei Darstellung seiner Präparate ging der Verf. stets von dem aus der Pechblende dargestellten salpeters. Salze aus. Er bereitete sich dasselbe so, dass er die durch Schlämmen von einem grossen Theile der thonigen Gangart befreite Pechblende in Salpetersäure auflöste, die Lösung zur Trockne verdampfte, den Rückstand mit W. behandelte, wobei ein ziegelrothes Gemenge von schwefels. Bleioxyd, Eisenoxyd und arsenika. Eisenoxyd zurückblieb, filtrirte, die grünlichgelbe Lösung bei gelinder Wärme concentrirte und

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2. Uranium (Uran)
By: PELIGOT.

We have the Hauptresultate this important work already mit-getheilt, however, makes it the erscheinere detailed form of embodiment of the process but nothing, some interesting detail after zabragen. In preparation of its preparations was the process always from which the pitch screen displayed Salpeters. Salts of. He prepared the same so that it by sludges from a large Theile of thorsgen gangue freed pitch stop in nitric acid aulöste, the solution to dryness evaporated and the residue with AY. treated, such that a brick Roth's mixture of sulfur, lead oxide, iron oxide and arsenika. Iron oxide left, filtrirte, green, yellow solution at gelinder heat concentrate and cool less. The krysaltrisch solidified mass less it in glass funneling draining, krysaltrische again from pure water, wusch the obtained prismatic Krystalle in a little water, löste it back to ether and was given by voluntary evaporation fine prism of Salpeters. Uranium oxide, which it again made of hot waters unkrystallirte. — All mother liquor has been with waters diluted by hydrogen sulfide copper, lead and Arsenik precipitated filtrir; almost dryness evaporated, the residue with waters treated and symmetric warm as above. The method is very economical and rapidly, preferably for processing large quantities. — Röstet the pitch diaphragm previously, so do less nitric acid, the cold prepared solution giebt immediately Krystalle 'of Salpeters. Uranium oxide, there remains much uranium oxide in the residua. 13. Jahrgang54 Uranchlorür; representations is brought a mixture of gler-flat Thellen coal and by annealing the Salpeters. Salt obtained uranium oxide in the first half of one refractory, by a thin sheet metal casing secured glass tube, drying the mixture in the Bohrer itself by a dry air stream and heated then the tube as the organic analysis for Rothfäulen while dry chlorine gas through. Immediately appear rotthe vapours which are a little further to many, schwarzgrün, metal bright Octaedern condensieren while a mixture of carbonic acid and Kohlenoxyd gas escaping. It is traveling to the chlorine development continued until no Chlorur more forms, and still a little longer. The Chlorür does not decomposition fairly easily from one place of Röhre zur other drive. For esaufzubewahren, should the Röhre absehbened, and at both Enden zugreifen, because in air zerflüsses in few minutes, Halmandas chlorine kong pass, soot the residue pure carbon. The weighing said Chlorür are because of its Zorflüssigkeit very difficult. Results of analysis is dissolved the weighed quantity of water, makes the solution acidic; by nitric acid, falls on this a chlorine by silver solution. The silver chloride abfiltrirte liquid is brought to the boil, they are by oxidation yellow dyeing, then the uranium oxide by ammonia precipitated. The N-H, Uranoxyd-Ammoniak, is as rapidly as possible is washed out, still on the filter again in Salzs. dissolved — about present silver deposit — the solution again by ammonia precipitated, the precipitation rapidly washed, dried, in a platinum crucible strongly calmed, with Salpeters, poured over and again calmed. The Council has a black oxide of almost crastner composition when rapidly cool lies. For slow cooling absorbirt it some oxygen. The

QUICK LINKS
0 Tags, 0 Comments

SOURCE
Chemisches Zentralblatt
Volume110 Book 2
Issue1
Pages13
Journal
1939
CODEN:CHZEA6

Original Source: Physic. Rev. [2] 55, 797-98, 15/4, 1939, New York, Columbia Univ.

COMPANY/ORGANIZATION
New York, Columbia Univ.

ACCESSION NUMBER
CZ:1939:29747
CHEMZENT

PUBLISHER
Verlag Chemie GmbH

2. Production of neutrons from with neutrons irradiated uranium (Erzeugung von Neutronen aus mit Neutronen bestrahltem Uran)

By: Anderson, H. L.; Fermi, E.; Haustein, H. B.

(Vgl. above Ref.) Authors examining how much neutrons upon irradiating said uranium with neutrons are released and whether this number the total number of all the absorbed neutrons exceeds. To this end, a neutron source in the central point of a piston 13 cm diameter mounted in a 90 cm high W.-tank of 90 cm diameter has been present. It was in a rhodium metal sheet induced activity determined in verschied. Spacing in the waters had been mounted. The measurements made in the presence and absence of uranium oxide in the piston. In use one Rn-Be-Neutronenquelle was in the presence of uranium an increase of the total activity by 6 % found it would one form 2 neutrons for each captured neutron correspond. But from (n, 2-n)-Prozessen result, as the energy of the Rn-Be-Neutronen several 10 @ volts. In repetition of Experiments with by Ra-gamma-Strahlen from Be triggered photo neutrons having an energy of less than 10 @ e V, was at a large distance from an increase in the activity of the Rn in presence of uranium by 30%. It follows from this that neutrons with one power larger than that of the photo neutrons is in the uranium are formed differently. This is consistent with the Szilard and trn (cf. next. REF.) corresponds. Close to the vessel is the active in presence of uranium only 60% of that without uranium, this is based on the absorption of neutrons in the uranium, the total effective cross section extending therefrom to round 5-10 *24 cm2. The Roberts, Meyer and Wang (see above Ref.) observed delayed neutrons to supply the here described effects no contribution, when, after removal of the neutron source was here no activation of rhodium more instead.

Indexing

Concepts

measurements

Substances

7440-16-6 Rhodium
7440-61-1 Uranium
7440-31-5 Tin

Tags

QUICK LINKS
0 Tags, 0 Comments

SOURCE
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Verlag Chemie GmbH

1939. II. A. AUFRUF DER MATERIE. 13

keiner als 10⁴ ist u. etwa 0,5-10⁴ eV beträgt. Auch von mit schnellen Li-Neutronen bestrahltem Thoriumnitrat werden verzögerte Neutronen emittirt. Ihre Intensität ist etwa 1/4 so groß wie die der beim Uran beobachteten. Ihre HZ. beläuft sich etwa die gleiche zu sein. (Physic. Rev. [2] 55, 664, 1/4, 1939, Washington, D. C. Carnegie Inst. Dep. of Terrestrial Magnetism.)

H. L. Anderson, E. Fermi und H. B. Haustein. Erzeugung von Neutronen aus mit Neutronen bestrahltem Uran. (Vgl. vorst. Ref.) Vff. untersuchen, wieviel Neutronen beim Bestrahlen des Urans mit Neutronen frei werden u. ob diese Zahl die Gesamtzahl aller absorbierten Neutronen übersteigt. Zu diesem Zweck wurde eine Neutronenquelle im Mittelpunkt eines Kolbens von 18 cm Durchmesser angebracht, der sich in einem 90 cm hohen W.-Tank von 90 cm Durchmesser befand. Es wurde die in einem Rhodiumblech induzierte Aktivität bestimmt, das bei verschied. Abständen im W. angebracht war. Die Messungen erfolgten bei Ggw. u. Abwesenheit von Uranoxyd im Kolben. Bei Verwendung einer Rn-Be-Neutronenquelle wurde bei Anwesenheit des Urans ein Anstieg der Gesamtaktivität um 6% gefunden. Es würde dies einer Entstehung von 2 Neutronen für jedes eingedrungene Neutron entsprechen. Dies kann auch in einem (n, 2-n)-Prozess resultieren, da die Energie der Rn-Be-Neutronen mehrere 10⁴ V beträgt. Bei Wiederholung der Vers. mit durch Ra-gamma-Strahlen aus Be ausgelösten Photoneutronen, deren Energie kleiner als 10⁴ V ist, ergab sich bei großem Abstand ein Anstieg der Aktivität des Rh bei Ggw. von Uran um 30%. Es folgt daraus, daß Neutronen mit einer Energie, die größer als die der Photoneutronen ist, im Uran entstehen müssen. Dieser Befund stimmt mit dem von SZILARD u. ZIEMEN (vgl. nachst. Ref.) überein. Nahe am Gefäß betrug die Aktivität bei Ggw. von Uran nur 60% von der ohne Uran, dies beruht auf der Absorption von Neutronen im Uran, dessen gesamter Wirkq.-Querschnitt sich hierzu um rund 5-10²⁴ cm² ergibt. Die von ROBERTS, MEYER u. WANG (vgl. vorst. Ref.) beobachteten verzögerten Neutronen liefern zu den hier beschriebenen Effekten keinen Beitrag, denn nach Entfern. der Neutronenquelle fand hier keine Aktivierung des Rhodiums mehr statt. (Physic. Rev. [2] 55, 797-98, 15/4, 1939, New York, Columbia Univ.)

Leo Szilard und Walter H. Zinn. Gleichzeitige Ausendung schneller Neutronen bei der Wechselwirkung von langsamen Neutronen mit Uran. Es ist anzunehmen, daß die beim Zerplatzen des Urans in ausgereiftem Zustand entstehenden Bruchstücke, die einen Neutronenüberschuß besitzen, im Augenblicke ihrer Entstehung Neutronen aussenden und daß die Zahl dieser Neutronen größer als 1 für jedes Zerplatt ist. Außerdem lassen sich verzögerte Neutronen erwarten, die aus den Bruchstücken ausgedrängt werden, nachdem diese Bruchstücke einen oder mehrere beta-Prozesse durchgemacht haben. Solche verzögerten Neutronen mit einer HZ von 12 Sek. wurden inzwischen von ROBERTS, MEYER u. WANG (vgl. vorst. Ref.) beobachtet. Vff. versuchen eine

Note the blue marker that identifies the record of interest within the PDF.

chemical information: *Chemisches Zentralblatt*. The following presents how CAS made this content accessible in ChemZent™ and the wealth of data that scientists can find in these records.

Chemisches Zentralblatt is the first journal of chemistry abstracts. Published in German, it covers the literature from 1830 to 1969. CAS obtained the rights to the Chemisches Zentralblatt archive and built a customer-ready solution that provides access to the more than three million patents and journal abstracts. After machine-translation into English, scientists at CAS added standardized terminology (CAS Index Terms) and CAS Registry Numbers® to each record to make it easy for researchers to find information of interest. Customers can search ChemZent using the power of SciFinder®. When they find a record of interest, a pointer identifies the location of the abstract within the PDF.

ChemZent chronicles some of the most important events in the history of chemistry and the contributions of scientists who formulated the theories

and hypotheses that shaped the foundation of today's chemistry.

ChemZent has proven popular with libraries and intellectual property professionals. Other groups who find it valuable include researchers interested in the history of chemistry and professors who are expanding their curriculum. In addition, process scientists who are exploring simpler chemistry methodologies often find these abstracts useful, since so many of these articles were written before the advent of high tech labs and digital equipment.

Once purchased, an organization will be able to enjoy access to ChemZent in perpetuity. CAS has arranged for Portico to provide archival access, ensuring that the information in these irreplaceable records is preserved for use by future generations. To learn more about ChemZent and other CAS solutions, please visit the CAS website at <http://www.cas.org/index>.

Sabine Kuhn, CAS

Ladies in Waiting for Nobel Prizes: Overlooked Accomplishments of Women Chemists

The HIST symposium on “The Posthumous Nobel Prize in Chemistry” last March at the San Diego ACS meeting received a surprising amount of coverage. Stu Borman wrote a two and half page piece for an April issue in *C&EN*, and readers of the magazine rated that article as the 10th most popular article in 2016 in *C&EN*. However, that symposium lacked any coverage of women chemists also deserving of Nobel Prizes. Our HIST symposium for Tuesday, Aug. 22, at the ACS National Meeting in Washington, D.C. will attempt to restore balance. The symposium, titled above, is being co-sponsored by the ACS Women Chemists Committee (WCC). Furthermore, Vera Mainz applied successfully for a DAC grant to sponsor a performance of the theatre piece “No Belles” following the symposium. This play, presented by the Portal Theatre Group from the Pacific Northwest, tells the tale of eight female scientists: six are Nobel Prize winners; two (Rosalind Franklin and Lise Meitner) are not. The keynote speaker for the symposium is Magdolna Hargittai, who is author of THE book on women scientists, *Women Scientists: Reflections, Challenges, and Breaking Boundaries* (Oxford University Press, 2015).

We hope that WCC will provide several speakers for the symposium, but we also welcome contributions from our faithful HIST members. There are some obvious individuals who should be featured, for example, Rosalind Franklin, Lise Meitner, and Ida Noddack, but we also hope to hear presentations about women chemists who are unknown to most of us, but who shouldn't be. To avoid too many people speaking about the same person, we ask that you submit the topic of your proposed talk to either Vera Mainz (mainz@illinois.edu) or E. Thomas Strom (tomstrom@juno.com; or estrom@uta.edu). Abstracts are due by April 10. **If you are interested in presenting but need a woman chemist to highlight, please let us know. We have compiled a list of women nominated for Nobel Prizes who did not make the final cut.**

The symposium “The Posthumous Nobel Prize in Chemistry. Correcting the Errors and Oversights of the Nobel Prize Committee” is currently being

turned into an ACS Symposium Book edited by Tom Strom and Vera Mainz. This August symposium would make a fitting sequel, provided the numbers of significant but overlooked women chemists are sufficient. We think they are, and we look forward to all of you demonstrating that fact.

Vera Mainz, E. Thomas (Tom) Strom

HIST Facebook Page Still Growing

The international community following the HIST Facebook page has continued to expand; now exceeding **1900 likes!** As can be seen in the table below, HIST now has a Facebook following that is comparable to most of the 'big' divisions of the ACS, which speaks to the strong interest in the history of chemistry throughout the scientific community.



Division	Followers	Division	Followers
PHYS	2666	ORGN	2070
ANYL	2570	HIST	1923
INOR	2393	CHED	1489
POLY	2124	PMSE	778

The majority of those reached via Facebook are still younger people (72% are aged 18-34, with 36% aged 18-24) and the majority of our followers (~61%) reside in India, Egypt, and the US (although the number of followers in Mexico is also growing). All in all, 87% of our followers are from various international communities (44 different countries!), without traditional access to HIST.

The University of Florence launches a New History of Chemistry Journal

A new international journal in the history of chemistry, *Substantia*, has been launched by the University of Florence. This peer-reviewed, English-language journal will be published in electronic format twice a year and will be fully open-access. The scope of the journal intends to include connections between chemistry and other horizons of human activities, and the historical aspects of chemistry. Pierandrea Lo Nostro, of the "Ugo Schiff" Chemistry Department, will serve as the journal's Editor-in-Chief and several HIST members are serving on the journal's advisory board. Starting

March 15th, *Substantia* can be found on the web at www.fupress.net/sbustanita and the first issue will be published later this spring.

Archaeological Chemistry Symposium Planned for 2019

HIST is planning a symposium on archaeological chemistry to be held at the spring meeting of the American Chemical Society in Orlando, FL, March 31-April 4, 2019. The tentative title of the symposium is “Archaeological Chemistry: Art and Archaeology in the Ancient and Medieval World.”

Papers on any subject that address this general topic, especially those that integrate chemistry with archaeology, those directed at answering social, political, and economic questions about ancient cultures, and those that incorporate the use of new technologies, are welcome. Please communicate your interest in participating in the symposium along with a tentative paper title and possible co-authors to either of the co-organizers: Seth Rasmussen (seth.rasmussen@ndsu.edu) or Mary Virginia Orna (maryvirginiaorna@gmail.com).

Seth Rasmussen, Mary Virginia Orna

News from the Chemical Heritage Foundation

The [Chemical Heritage Foundation](http://www.chemicalheritage.org) (CHF) fosters an understanding of chemistry’s impact on society. An independent nonprofit organization, we strive to inspire a passion for chemistry, highlight chemistry’s role in meeting current social challenges, and preserve the story of chemistry across centuries. CHF maintains major collections of instruments, fine art, photographs, papers, and books. We host conferences and lectures, support research, offer fellowships, and produce educational materials. Our museum and public programs explore subjects ranging from alchemy to nanotechnology.

Robert G. W. Anderson Named President of Chemical Heritage Foundation

Robert Anderson, former Director of the British Museum has been selected as the President and CEO of the Chemical Heritage Foundation. He has been interim President since July 28, 2016, stepping into the role from his position as Vice Chair of CHF’s Board of Directors. “The process of searching for a new president and CEO took us far afield but in the end we found the perfect person close to home: Robert Anderson, former Director of the British Museum, longtime CHF board member, and internationally recognized historian of science, has agreed to share his knowledge and expertise to lead CHF into the future. We are so fortunate to have Robert step into this role,” said Laurie Landeau, Chair of CHF’s Board of Directors. Anderson assumes his new role effective immediately.

Anderson has wide-ranging interests in the history of chemistry, including the history of scientific instrumentation, the work of Joseph Black and Joseph Priestley, the history of museums, and the involvement of the working class in material culture. He has been Director of the British Museum, London, where he presided over the creation of the £110 million Great Court; Keeper of Chemistry at the

Science Museum, London; and Director of the National Museums of Scotland in Edinburgh. Anderson is a recipient of numerous awards and honors, including the Dexter Award of the ACS and the Paul Bunge Prize which he was awarded in 2016 for a lifetime of “outstanding achievement in writing about and promoting the understanding of historic scientific instruments.”

Robert G. W. Anderson graduated from St John’s College, University of Oxford, and has held posts at the Royal Scottish Museum, the Science Museum, London, and the National Museums of Scotland, Edinburgh. He later became director of the British Museum, London. He has held visiting academic posts at the Institute for Advanced Study, Princeton University, and at the Centre for Research in the Arts, Social Sciences, and Humanities at the University of Cambridge (2002–2003). He is an emeritus fellow of Clare Hall, Cambridge, and has served as vice chair of the Chemical Heritage Foundation’s Board of Directors since 2012.

Chemical Heritage Foundation Receives Sparks! Ignition Grants for Libraries Award

The Institute for Museum and Library Services (IMLS) has selected CHF to receive a Sparks!

Ignition Grants for Libraries award for a cutting-edge project on linked data. The grant supports CHF's work to add linked-data functionality into Hydra, an open-source digital collection platform used by institutions worldwide to provide access to their digital content, by enabling CHF staff to link to authoritative external sources. The IMLS grant also allows CHF to work with consultants to select and integrate a new database for caching externally held data, giving staff local control.

Michelle DiMeo, CHF's director of digital library initiatives, who will be coordinating the project, says of the award, "We are very excited to receive this support. This linked-data project will improve cataloging workflow for librarians and curators while

reducing the possibility of human error. What's more, it will give us a chance to work with Hydra users and software developers across the country and set a best-practice model for other libraries and museums experimenting with this new technology." The yearlong grant began on October 1, 2016.

Sparks! Ignition Grants for Libraries are a special funding opportunity within the IMLS National Leadership Grants for Libraries program. These small grants encourage libraries and archives to test and evaluate specific innovations in the ways they operate and the services they provide. Sparks Grants support the deployment, testing, and evaluation of promising and groundbreaking new tools, products, services, or organizational practices.

News from the Society for the History of Alchemy and Chemistry

Founded in 1935, the Society for the History of Alchemy and Chemistry (SHAC) has consistently maintained the highest standards of scholarship in all aspects of the history of alchemy and chemistry from early times to the present. The Society has a wide international membership of over 200 with members from 28 countries.

Franklin-Lavoisier Prize awarded to Professor Lawrence Principe

Professor Lawrence Principe, a Member of the SHAC Council, has been awarded the 2016 Prix Franklin-Lavoisier by the CHF and the Fondation de la Maison de la Chimie in recognition of 'his remarkable contributions to the understanding of the history of the chemical sciences. The prize, consisting of a silver medal and a monetary award, was conferred during a formal ceremony in Paris on 9 November 2016. The Franklin-Lavoisier Prize acknowledges commendable work in the preservation and highlighting of any aspect of our common scientific or industrial heritage in the fields of chemistry and its related applications, the promotion of the history of the chemical and molecular sciences and industries, or the fostering of closer Franco-American ties and the promotion of significant activities in the chemical sciences or industries.

Lawrence M. Principe is the Drew Professor of Humanities at Johns Hopkins University in the Department of History of Science and Technology and the Department of Chemistry. He earned undergraduate degrees in chemistry and in liberal studies at the University of Delaware (1983), a PhD in organic chemistry at Indiana University (1988), and a PhD in history of science at Johns Hopkins

University (1996). He currently teaches both history of science and organic chemistry.

Principe's research focuses on the late medieval and early modern periods (1400-1750), with particular emphasis on the history of alchemy/chemistry and the interactions of religion/theology and science. His books include *The Aspiring Adept: Robert Boyle and His Alchemical Quest* (1998) and *Alchemy Tried in the Fire: Starkey, Boyle, and the Fate of Helmontian Chymistry* (coauthored with William R. Newman; Chicago, 2004), winner of the 2005 Pfizer Prize. He has also authored two books for general readership: *The Scientific Revolution: A Very Short Introduction* (2011) and *The Secrets of Alchemy* (2013), and produced the DVD courses 'Science and Religion' and 'History of Science to 1700' for the Teaching Company.

Over the past few years Principe's research has dealt predominantly with chymistry in France during the 17th and 18th centuries. He is now completing a book about the intellectual, theoretical, social, and institutional changes within chymistry at the Parisian Royal Academy of Sciences from 1666 to the 1720s. The book is provisionally entitled *Wilhelm Homberg and the Transmutations of Chymistry at the Académie Royale des Sciences*. SHAC extends its congratulations to Professor Principe on what is a notable achievement.

News from the History of Science Society

The History of Science Society is the world's largest society dedicated to understanding science, technology, medicine, and their interactions with society in historical context. It was founded in 1924 to foster interest in the history of science and its social and cultural relations.

New Reference Resource: IsisCB Cumulative

A new open access resource was released this month: IsisCB Cumulative, a digitized version of the Isis Cumulative Bibliography of the History of Science, spanning sixty years from 1913 to 1975. The full text is available as seven large HTML files corresponding to the seven volumes of the Isis Cumulative Bibliography covering that period.

IsisCB Cumulative is a companion to IsisCB Explore, a research tool launched last year that includes data from the Isis Bibliographies from 1974 to the present, and is the result of two years of effort that included scanning, transcribing, and encoding 5000 pages of text. The files contain nearly 154,000 citation records to works in the history of science, all of which are classified by historians of science and subject bibliographers.

The current release of these volumes as individual HTML files is meant to provide temporary access to the digitized data, which will eventually be added to

the IsisCB Explore. IsisCB Cumulative and IsisCB Explore contain data accumulated and published annually and semi-annually in the journal Isis since its founding. Established by George Sarton, this bibliography has been continued by various scholars and librarians, including John Neu, Magda Whitrow, Joy Harvey, and, currently, Stephen Weldon.

The online publication of IsisCB Cumulative was made possible by the Alfred P. Sloan Foundation, the History of Science Society, the University of Oklahoma Libraries, and the University of Oklahoma History of Science Department. The digitization efforts were overseen by Stephen Weldon, Sylwester Ratowt, and Conal Tuohy. Tuohy (see his website) parsed the transcribed text and created the HTML file (gitHub for the project). For more information about the Isis bibliographies see the project's website: <http://isiscb.org> or contact Stephen Weldon, editor of IsisCB, directly at spweldon@ou.edu.

BULLETIN FOR THE HISTORY OF CHEMISTRY

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

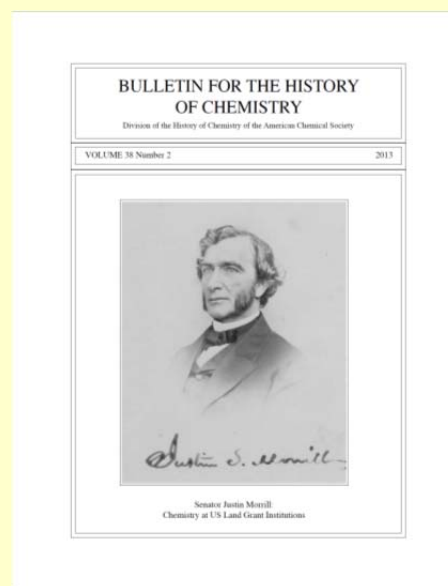
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Full instructions for authors can be found at <http://www.scs.illinois.edu/~mainzv/HIST/info/bull-info.php> or in the back cover of all issues of the *Bulletin*.

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

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HIST Programming

Message from the HIST Program Chair

Yes, it is time once again for the pre-meeting update on HIST programming. Our upcoming spring national meeting brings us back to San Francisco and we have a pretty full program. Our spring programming will consist of three focused symposia, including the day and a half symposium on the public perception of chemistry organized by Dan Rabinovich and Nick Tsarevsky. In addition, we have two half-day symposia; one on the golden age of industrial chemistry (cosponsored by YCC and SCC) and a second on the chemistry and history of physical design. We also have two full general papers sessions; one Sunday morning and the second Wednesday morning. I hope to see everyone at one of more of the HIST sessions!

In signing off, I need to share a bit of recent news. I have been informed that I have been selected as a 2017-2018 Fulbright Scholar, which will take me out of the country and keep me from continuing in my ongoing duties as the HIST Program Chair. As such, 2017 will be my final year in the office. I will share more details about the future of the office and HIST programming in the next newsletter, but in the meantime please continue to share any programming ideas, suggestions, or feedback with me as usual (either in person or at seth.rasmussen@ndsu.edu).

Seth C. Rasmussen, HIST Program Chair



HIST SYMPOSIA, 253rd ACS Meeting in San Francisco, CA, April 2-6, 2017

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

Golden Age of Industrial Chemistry

The Division of the History of Chemistry will be co-sponsoring this symposium with the Younger Chemists Committee and the Senior Chemists Committee. The half-day session will feature several speakers that will help tell the story of influential chemists, research organizations, and businesses that have helped shape the chemical industry into what we know today and will provide an excellent opportunity to network across organizations within the Society. We hope to see you there! The symposium will be held **Sunday Afternoon**, April 2, at the Grand Hyatt San Francisco - Redwood B.

J. E. Simpson, M. Grandbois, Organizers

Chemistry Through the Eyes of Non-chemists: Evolution of the Public Perception of Chemistry

Chemistry has often been misunderstood due to its complexity, the perception that it is only available to a small and exclusive circle of practitioners, and the general lack of awareness of how it can be rationally used and sometimes misused to attain specific goals. Over the past several centuries, chemistry has been seen by and presented to the public as both all-powerful and evil. The perception of chemistry over time has been affected by numerous factors, ranging from its ability to solve daunting technological problems and improve the quality of life to its capacity to cause, just as efficiently, harm and suffering. This symposium will trace the capricious evolution of the public image of chemistry and related scientific disciplines, as depicted by the arts and the popular media. It will attempt to explain how the changes in perception have been affected by various socio-economic factors and the potential of chemistry to enable either good or bad. The symposium will be held **Monday Morning, Monday Afternoon, and Tuesday Morning**, April 3-4, at the Grand Hyatt San Francisco - Redwood B.

D. Rabinovich, N. V. Tsarevsky, Organizers

Chemistry & the Design of Physical Objects: Innovation from 1950 to the Present

In this upcoming symposium, presenters will explore different dimensions of the myriad intersections between chemical innovations and innovations in the design of physical objects. Presenters come from a variety of fields and positions, including architecture and museum exhibition management. This symposium will also feature a roundtable discussion between participants and the audience, seeded with questions on interdisciplinarity, funding for interdisciplinary work, and publication opportunities. Dr. Stephanie E. Vasko, symposium chair (Research Associate & Program Manager for the Toolbox Dialogue Initiative at Michigan State University, 2017 AAAS Community Engagement Fellow), was inspired to call together scholars on this topic by the connections she saw between her formal training as a chemist and her experience participating in the 2015 National Endowment for the Humanities “Teaching The History Of Modern Design: The Canon And Beyond” Summer Institute.

Vasko states “It’s my hope that by having this experimental symposium at the national meeting that we can bring together chemists, materials scientists with those from the humanities not only to explore past interactions between these fields, but to work together moving forward and form fruitful interdisciplinary partnerships.” The symposium will be held **Tuesday Afternoon**, April 4, at the Grand Hyatt San Francisco - Redwood B.

S. Vasko, Organizer

UPCOMING MEETINGS AND HIST DEADLINES

Subject to change. Check the HIST website (<http://www.scs.illinois.edu/~mainzv/HIST/>) for updates.

254th ACS Meeting, Washington, DC, August 20-24, 2017

Submit your abstract via the new online Meeting Abstracts Programming System (MAPS) by **April 10th, 2017**. If you do not have access to a computer for use in the submission or are having difficulties in submitting your abstract, contact Seth Rasmussen (seth.rasmussen@ndsu.edu). Check the call for papers in *Chemical and Engineering News* or www.acs.org for changes in the abstract deadlines.

HIST Tutorial and General Papers. (**Seeking contributors**) Seth C. Rasmussen, Department of Chemistry and Biochemistry, North Dakota State University, NDSU Dept. 2735, P.O. Box 6050, Fargo, ND 58108-6050, Phone: (701) 231-8747, email: seth.rasmussen@ndsu.edu

Ladies in Waiting for Nobel Prizes. Overlooked Accomplishments of Women Chemists. (Invited and **Seeking contributors**) Vera Mainz, 2709 Holcomb Drive, Urbana, IL 61802, Phone: (217) 328-6158, email: mainz@illinois.edu; E. Thomas Strom, Department of Chemistry and Biochemistry, University of Texas at Arlington, P. O. Box 19065, Arlington, TX 76019-0065, Phone: (817) 272-5441, Email: tomstrom@juno.com

Past Presidents: Daryl Busch. (Invited and **Seeking contributors**) Jan Hayes, 6829 Barbara Lee Circle, Sacramento, CA 95842, email: jmhayesacs@gmail.com

History as Outreach: Celebrating the ACS Landmarks Program's 25th Anniversary. (Invited) Keith Lindblom, Phone: (202) 872-6214, email: k_lindblom@acs.org

256th ACS Meeting, New Orleans, March 18-22, 2018

HIST Tutorial and General Papers. (**Seeking contributors**) Seth C. Rasmussen, Department of Chemistry and Biochemistry, North Dakota State University, NDSU Dept. 2735, P.O. Box 6050, Fargo, ND 58108-6050, Phone: (701) 231-8747, email: seth.rasmussen@ndsu.edu

Final Program

HIST

DIVISION OF THE HISTORY OF CHEMISTRY

S. C. Rasmussen, *Program Chair*

SUNDAY MORNING

Section A

Grand Hyatt San Francisco - Warfield

General Papers

S. C. Rasmussen, *Organizer*

J. S. Jeffers, *Presiding*

8:30 HIST 1: Concentration of power: Alchemy, mercantilism and the Vitrum Causticum of Ehrenfried Walter von Tschirnhaus. **N. Zumbulyadis**, A. F. Zumbulyadis

9:00 HIST 2: Pioneer of pyridine chemistry: Aleksei Yevgen'evich Chichibabin (1871-1945). **D. E. Lewis**

9:30 Intermission

9:45 HIST 3: Overview of the discovery of ruthenium. **P. Villarreal**, C. Hahn

10:15 HIST 4: Richard Willstätter in Munich. **M. O. Senge**

10:45 HIST 5: History of cuprene, part II: Polymerization of acetylene via electric discharge. **S. C. Rasmussen**

SUNDAY AFTERNOON

Section A

Grand Hyatt San Francisco - Warfield

Golden Age of Industrial Chemistry

Cosponsored by SCC and YCC

J. E. Simpson, *Organizer*

M. Grandbois, *Organizer, Presiding*

1:30 Introductory Remarks

1:45 HIST 6. Vladimir Nikolaevich Ipatieff: A sesquicentennial of contributions to the chemistry of high-pressure catalysis. **C. P. Nicholas**

2:15 HIST 7. J. B. F. Herreshoff and the expansion of the chemicals industry in early 20th century New York. **P. Spellane**

2:45 HIST 8. Golden age of chemistry: The miracle of instant! Polaroid and the amazing chemistry and innovations of instant photography. **J. C. Giordan**

3:15 Intermission

3:30 HIST 9. Evolution of innovation. **S. B. Butts**

4:00 HIST 10. R&D at Union Carbide Tarrytown Technical Center 1959 - 1990. **K. M. Lewis**

4:30 Concluding Remarks & Networking

Hollyweird Chemistry-- Invited, Oral

Sponsored by CPRC, Cosponsored by AGRO, CARB, CEI, ENFL, HIST, POLY, SCHB, SOCED and YCC

Textbooks & the Practice of Science: Before, During & After Gutenberg

Sponsored by CINF, Cosponsored by CHED and HIST[†]

SUNDAY EVENING

Grand Hyatt San Francisco - Redwood B

5:00 - 8:00 HIST Executive Committee Meeting

MONDAY MORNING

Section A

Grand Hyatt San Francisco - Warfield

Chemistry through the Eyes of Non-Chemists: Evolution of the Public Perception of Chemistry

D. Rabinovich, N. V. Tsarevsky, *Organizers, Presiding*

8:25 Introductory Remarks

8:30 HIST 11. Public embracement of chemistry: An historical perspective. **H. A. Lawlor**

9:00 HIST 12. Chemistry's public image: A historical look through the pages of C&EN. **M. Torrice**

9:30 HIST 13. Eighteenth century textbook of chemistry for women: Compagnoni's *La Chimica per le Donne*. **G. S. Girolami, V. V. Mainz**

10:00 Intermission

10:20 HIST 14. Once upon a Christmas cheery in the lab of Shakhashiri: Public engagement for 47 years and counting.... **B. Z. Shakhashiri**

10:50 HIST 15. Image of chemistry in newspaper and magazine ads. **N. V. Tsarevsky**

Textbooks & the Practice of Science: Before, During & After Gutenberg

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MONDAY AFTERNOON

Section A

Grand Hyatt San Francisco - Warfield

Chemistry through the Eyes of Non-Chemists: Evolution of the Public Perception of Chemistry

D. Rabinovich, N. V. Tsarevsky, *Organizers, Presiding*

1:30 HIST 16. Then and now: Art and the visual image of chemistry. **T. I. Spector**

2:00 HIST 17. Viewing chemistry through artists' eyes. **P. Goin, A. De Bettencourt Dias**

2:30 HIST 18. Guilt by association: Dietary recommendations and missed opportunities. **E. Schoffers**

3:00 Intermission

3:20 HIST 19. Changing images of chemistry in the public. **B. Bensaude Vincent**

3:50 HIST 20. Rashomon effect: Chemistry through the eyes of other chemists. **J. Seeman**

4:20 HIST 21. Unlikely popularizer of resonance theory in France. **P. Laszlo**

Textbooks & the Practice of Science: Before, During & After Gutenberg

Sponsored by CINF, Cosponsored by CHED and HIST[†]

MONDAY EVENING

Section A

Moscone Center - Hall D

Sci-Mix

S. C. Rasmussen, *Organizer*

8:00 - 10:00

HIST 26, HIST 28, HIST 30, HIST 32, HIST 33, HIST 34. See subsequent listings.

TUESDAY MORNING

Section A

Grand Hyatt San Francisco - Warfield

Chemistry through the Eyes of Non-Chemists: Evolution of the Public Perception of Chemistry

D. Rabinovich, N. V. Tsarevsky, *Organizers, Presiding*

8:30 HIST 22. My experience as science advisor for Breaking Bad. **D. J. Nelson**

9:00 HIST 23. Stealing the limelight: interactions between theatre and chemistry. **K. Shepherd-Barr**

9:30 HIST 24. From the elements to the atomic fire: An operatic perception of chemistry. **J. Andre**

10:00 Intermission

10:20 HIST 25. Science communication: The evolving role of postage stamps. **D. Rabinovich**

10:50 HIST 26. Periodic table of comic books. **J. P. Selegue**, F.J. Holler

11:20 HIST 27. Public Perceptions of Chemistry and the Chemical Heritage Foundation. **R. S. Brashear**

11:50 Concluding Remarks

TUESDAY AFTERNOON

Section A

Grand Hyatt San Francisco - Warfield

Chemistry & the Design of Physical Objects: Innovation from 1950 to the Present

S. Vasko, *Organizer, Presiding*

1:00 HIST 28. 100 Years of aluminium pioneers: From chemists to architects (1808-1908). **M. Stacey**

1:30 HIST 29. Chemical Architecture: Experiments in urethane foam environments of the 1960s. **G. Converse**

2:00 HIST 30. Withdrawn

2:30 Intermission

2:45 HIST 31. Second skin: The science and cultural impact of stretch. **C. Schneider**

3:15 HIST 32. Ease: Using seam bonding technology to create durable shirts for a girl with autism. **C. Glover, E. Riley, U. Desai**, G. Jun

3:45 HIST 33. Trading innovation across chemistry and design: A content analysis of synthetic fiber advertisements. **S. Vasko**

4:15 Panel Discussion

WEDNESDAY MORNING

Grand Hyatt San Francisco - Warfield

General Papers

S. C. Rasmussen, *Organizer, Presiding*

8:30 HIST 34. Was Markovnikov's Rule an inspired guess? ...No! **D. E. Lewis**

9:00 HIST 35. Paul Dirac: A Man at the Intersection of Science and Philosophy. **T. J. Fuhrer**

9:30 HIST 36. Periodic footprints in history, literature and cinema. **L. R. Ohrstrom**

10:00 Intermission

10:15 HIST 37. Drug repurposing: A bibliometric analysis by text-mining PubMed. **N. Baker**, S. Ekins, A.J. Williams, A. Tropsha

10:45 HIST 38. History of water chemistry monitoring and education on the Yukon River Watershed. **L. DeWilde**

HIST 1 - Concentration of power: Alchemy, mercantilism and the Vitrum Causticum of Ehrenfried Walter von Tschirnhaus

Nicholas Zumbulyadis, *nickz@frontiernet.net*, Alice F. Zumbulyadis. *Independent Scholar, Rochester, New York, United States*

Ehrenfried Walther von Tschirnhaus (1651-1708) was a Saxon mathematician, scientist and inventor during the early modern era. He considered himself primarily a mathematician, though his main effort, the derivation of a universal solution for polynomial equations of any order was doomed to fail. Tschirnhaus' most memorable contribution was the building of large and powerful, yet relatively light and inexpensive mirrors and double-lens systems. These so-called burning mirrors and lenses generated hitherto unattainable temperatures and represented vast improvements over previous such devices. The higher temperatures led to insights into thermal transformations at high temperatures, and paved the way for new materials. Tschirnhaus published five papers on burning mirrors and lenses. The papers are written in Latin and appeared in *Acta Eruditorum* between 1687-1697. We have completed the first English translation of all five papers. Outside our work, there is only one German translation of the fifth paper in Tschirnhaus' own hand, partially transcribed by Curt Reinhardt in 1912. The primary objective of our study was to present an unfiltered account of the construction of these devices and the novel observations they enabled. To better place his work in the cultural context of his time, we have also examined two other primary sources on Tschirnhaus, his extensive correspondence with Gottfried Wilhelm Leibniz and the list of books in his library compiled at the time of his death, books that presumably shaped his thinking. Seventeenth century economic thought was dominated by mercantilism, a national economic policy aimed at maximizing the use of domestic resources. The potential contributions of Chymistry to a mercantilist economy had already been discussed in the writings of J. J. Becher and R. Glauber. We will argue that Tschirnhaus' development of burning mirrors and lenses was an attempt at producing marketable inventions in the spirit of mercantilism.

HIST 2 - Pioneer of pyridine chemistry: Aleksei Yevgen'evich Chichibabin (1871-1945)

David E. Lewis, *lewisd@uwec.edu*. *Chemistry Department, UW-Eau Claire, Eau Claire, Wisconsin, United States*

Aleksei Yevgen'evich Chichibabin led one of the most eventful lives of any Russian chemist of the late nineteenth and early twentieth centuries. He produced over 250 papers, including seminal papers in pyridine chemistry and triarylmethyl radical chemistry in his career. A student of Markovnikov, he was forced to support himself as a journalist after Markovnikov's ouster from the Chair at Moscow. It took over 18 months after he had submitted his dissertation for the degree of *M. Khim.* before the degree was awarded. At the beginning of World War 1, Chichibabin helped organize Russian pharmaceutical manufacture, and after the war he continued in a leadership role in the Soviet pharmaceutical industry. In 1930, he left Russia after the death of his daughter, Natasha, in an explosion in a sulfonation plant. He spent the remainder of his life in Paris, where he worked in the laboratory of Tiffeneau, and at the Hôtel Dieu. Chichibabin's contributions to the development of pyridine chemistry (the Chichibabin pyridine synthesis and the Chichibabin amination reaction) will be discussed.

HIST 3 - Overview of the discovery of ruthenium

Pete Villarreal, *pete.villarreal@students.tamuk.edu*, Christine Hahn. *Texas A&M University Kingsville, Kingsville, Texas, United States*

It is of critical importance to understand not just the science behind important breakthroughs in chemistry, but also the method and story behind such discoveries. This research aims to explain the discovery of the element ruthenium and the contributions made by chemists such as Jędrzej Sniadecki, Gottfried Osann, Jöns Berzelius, and Karl Ernst Claus during its discovery. While history often credits Claus with full credit for the discovery of the element, the focus of this research is to show the lesser known efforts of chemists whose work was of deep importance to this discovery. Analysis of the methods used to discover ruthenium as well as how those methods have changed will also be provided.

HIST 4 - Richard Willstätter in Munich

Mathias O. Senge, sengem@tcd.ie. School of Chemistry, Trinity College Dublin, Dublin, Ireland

Richard Willstätter (1872–1942) a German chemist, received the Nobel prize for Chemistry in 1915 for his work on the constitution of chlorophyll and other plant pigments. He was also a pioneer in enzyme research and developed the first synthesis of cocaine. Using organic chemistry to investigate natural processes he used an approach still in use today in the biological sciences and laid the groundwork for biochemistry.

Much of his academic career was spend in Munich, where he took over Adolf von Baeyer's chair at the Ludwigs-Maximilians Universität in 1916. The approaching rise of the Nazi party and the earlier death of his wife and a son overshadowed his scientific work in the early 1920ties and he felt compelled to resign his chair in 1925, eight years before the NSDAP took power, to protest against the rise in anti-Jewish sentiment in German academia. Although almost 100 years ago, a prominent fundamental scientist taking a political stance, and being supported in this by many students, makes this an illuminating example for today's apolitical scientists.

HIST 5 - History of cuprene, part II: Polymerization of acetylene via electric discharge

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

Investigations into the polymerization of acetylene began in 1866 with the work of Berthelot, who produced a resinous material comparable to polystyrene upon heating acetylene at extreme temperatures. Continued studies on this material led to it ultimately being named cuprene by Sabatier in 1900 and it is generally characterized as a yellowish to brown material with an elemental composition near that of acetylene. In a recent presentation, I detailed the history of these efforts up through the early 1900s. Those efforts presented focused primarily on thermal polymerizations, usually catalyzed by species such as copper or copper oxide. However, recently discovered sources have revealed that the production of this material by electric discharge occurred earlier than generally recognized, dating back to the early 1870s with the work of Paul and Arnould Thenard. As such, the current presentation will detail the various reports of acetylene polymerization via electric discharge from 1874 to the early 1920s, with comparisons to the results of the previously discussed thermal polymerizations.

HIST 6 - Vladimir Nikolaevich Ipatieff: A sesquicentennial of contributions to the chemistry of high-pressure catalysis

Christopher P. Nicholas, Christopher.Nicholas@uop.com. UOP, Des Plaines, Illinois, United States

2017 marks the 150th anniversary of the birth of Vladimir Ipatieff, a linchpin in the development of catalysis as a method of organic synthesis. Born in Moscow, Russia on November 21, 1867, he studied math and science at military academies before instructing at the Mikhail Artillery Academy in St. Petersburg. Ipatieff finished a dissertation in 1895 with Favorskii in St. Petersburg on reactions of bromine with tertiary alcohols. The following year, he was sent abroad to study terpene derivatives, in Munich, Germany with Adolf van Bayer. Before returning to St. Petersburg in 1897 as Professor in the Artillery Academy, Ipatieff spent time in other locations in Germany and France, forging connections with other chemists.

At this point, the stage was set for the rest of his career: exploring the use of steel, particularly at pressure, in catalytic reactions; the use of Russian, German, French, and later English as languages in which to communicate scientific ideas; and the study of terpenes, both as molecules of interest and as probes to explore reaction mechanisms.

By 1928, Ipatieff had risen considerably with promotions to lieutenant general and as director of the Central Chemistry Laboratories, however, political problems loomed and he and his wife Barbara left for Germany in 1930, never again returning to the USSR. While in Germany that year, he met Gustav Egloff of Universal Oil Products (UOP) who, along with Hiram Halle, convinced Ipatieff to come to Chicago part-time as the Director of Chemical Research. By 1931, with the help of Northwestern University, where he was named lecturer, and later Professor, the Ipatieff's were living permanently in Chicago.

Ipatieff enjoyed twenty years of success in Chicago, building catalysis research at both UOP and Northwestern, including discoveries such as solid phosphoric acid (SPA), a heterogeneous catalyst still used today for acid catalyzed reactions such as olefin oligomerization. The talk will focus on Ipatieff's life and achievements, including the establishment of the Ipatieff Prize, given by the ACS every third year since 1947 to a researcher under the age of 40 for achievements in catalysis.

HIST 7 - J. B. F. Herreshoff and the expansion of the chemicals industry in early 20th century New York

Peter Spellane, pspellane@citytech.cuny.edu. Chemistry Dept, NYC College of Technology CUNY, Brooklyn, New York, United States

Newtown Creek, an industrial waterway in New York City, was a center for production of materials before the Civil War. Most of the production there involved the refining of raw materials or natural products; refined products included sugar, fertilizers, hide glue, glass, liquor, and hardwood dyes. Following the Civil War, the production at Newtown Creek increasingly relied on chemical reagents. In the early 1870s, William Nichols acquired and reorganized the Laurel Hill Chemical Company. Sulfuric acid would be the principal product of the new Nichols Chemical Company. The company's production and economic significance grew steadily after J. B. F. Herreshoff joined the company. Francis Herreshoff had studied of chemistry at Brown University and taught there before moving to New York, where he sought employment in industry. Nichols hired Herreshoff in 1876 when both men were roughly 25 years of age. Their work together, businessman trained in chemistry and chemical engineer with limited experience, continued for 40 years. Herreshoff's contributions to the fortunes of the Nichols Company and to the advancement of country's sophistication in chemical technology included methods for production of concentrated sulfuric acid, for production of sulfuric acid from pyrite ores, and for electrolytic production of high purity copper metal. This talk concerns J. B. F. Herreshoff's technologies relating to the production of pure copper and concentrated sulfuric acid.

HIST 8 - Golden age of chemistry: The miracle of instant! Polaroid and the amazing chemistry and innovations of instant photography

Judith C. Giordan, judy@jgiordan.com. ecosVC, Amherst, Massachusetts, United States

Considered one of the hottest start-ups in the time of large companies, Polaroid's science of instant photography grabbed the imagination of the public as much as did the marketing showmanship of its charismatic founder, Dr. Edwin Land. Join Judy Giordan, co-leader of the team to develop the last traditional integral color instant film product, SPECTRA, and Larry Friedman, who led developing the last color peel-apart Polaroid color film, POLACOLOR— think driver's licenses and 20x24 art prints – for a description of the science, innovations and magic of the Golden Days of Polaroid instant photography!

HIST 9 - Evolution of innovation

Susan B. Butts, sbbuttsdc@gmail.com. Susan Butts Consulting, Midland, Michigan, United States

Innovation, which can be described as the process of turning inventions into products, is a cornerstone of technology-based industries. Like many companies, Dow has experimented with various models for fostering and managing innovation. These approaches range from science-driven to business-driven, from single investigator activities to large team enterprises to collaborative endeavors with university faculty. Advantages and pitfalls of various innovation models will be explored through examples from my career at Dow in Central Research, Corporate R&D, and External Technology.

HIST 10 - R&D at Union Carbide Tarrytown Technical Center 1959 - 1990

Kenrick M. Lewis, kenrick.lewis@momentive.com. Momentive Performance Material, Tarrytown, New York, United States

Situated on the site of the former Butler Farm in East View, NY, the Union Carbide Technical Center was a large diversified, campus-style research and office complex. At its peak in the mid-1980's, there were about two thousand employees, approximately half of whom were engaged in laboratory-related research and development. The Center was established in 1959 when Carbide-sponsored researchers at The Mellon Institute were relocated to Tarrytown. The first building was a Technical Service Laboratory (later called the Chemicals Building). In the period, 1961 – 1969, construction was completed of the Union Carbide Research Institute (Corporate Research Laboratory), Home and Automotive Products Laboratory, Silicones R&D Laboratory, Spine Building and Linde Laboratory.

These buildings and the Center's infrastructure and supportive technical managers provided an environment conducive to productive research by committed visionary scientists. Research activities in the different laboratories included work on cryogenics, superconductivity, metallurgy, welding, gas separations, molecular sieve synthesis and catalysis, silanes and silicones, vinyl resins, phosphorimetry, carbon clusters and flash vacuum pyrolysis. My

presentation will highlight the research and scientific contributions of Edith Flanigen (Molecular Sieves), Lawrence Litz (Advanced Gas Reactors), Bernard Kanner (Silane Coupling Agents and Silicone Surfactants for Polyurethane Foams) and my collaboration with Donald McLeod in the discovery of methylchlorosilylene (CH_3SiCl) as the key intermediate in the Rochow-Müller Direct Synthesis of Methylchlorosilanes.

HIST 11 - Public embracement of chemistry: An historical perspective

Helen A. Lawlor, chescot@aol.com. Retired, Radnor, Pennsylvania, United States

It is hard to believe in today's world that there was actually a time when Chemistry was embraced by the public from a completely positive perspective. A time when society avidly attended lectures on key chemistry experiments and actively chose to bring the science into their own homes and into their own hands. This era is demonstrated best through the history and evolution of chemistry sets (most recently presented in an innovative exhibit created by the Chemical Heritage Foundation). What generated the public love of chemistry? What killed that love? And can anything be done to make that excitement, interest, and support, like the Phoenix, rise from the ashes?

HIST 12 - Chemistry's public image: A historical look through the pages of C&EN

Michael Torrice, m_torrice@acs.org. American Chemical Society, Pasadena, California, United States

For decades, chemists have worried about what the public thinks of their work. In the pages of Chemical & Engineering News through the years, ACS presidents and others have written about what they perceive as chemistry's image problem—in particular, these pieces express a feeling that the public views chemistry and chemicals in a negative light. In this talk, I'll take a historical look at these articles and the solutions the authors proposed to fix the problem. I'll also present data collected about chemistry's image and open up a discussion about the reality of the situation and how chemists might address it.

HIST 13 - Eighteenth century textbook of chemistry for women: Compagnoni's *La Chimica per le Donne*

Gregory S. Girolami¹, girolami@scs.uiuc.edu, Vera V. Mainz². (1) Univ of Illinois, Urbana, Illinois, United States (2) School of Chemical Sciences, University of Illinois at Urbana-Champaign, Urbana, Illinois, United States

Since the mid-1600s, an important way in which the public learned about chemistry was through textbooks written explicitly for women and girls. Often presented in the manner of a conversation, these books were only partly intended to educate women; an important additional motivation was to enable women to explain scientific knowledge to their children. Two relatively well-known books in this tradition were Marie Meurdrac's *La Chymie Charitable et Facile, en Faveur des Dames* (first edition, 1666) and Jane Marcet's *Conversations on Chemistry* (first edition, 1806). Far less known, however, but the first in this genre to present the new chemistry of Lavoisier, was *La Chimica per le Donne* (first edition, 1796) written by the Italian author and statesman Giuseppe Compagnoni (1754-1833). Based on a series of 101 letters written by Compagnoni to the Countess Marianna Rossi of Ferrara (née Gnudi; ca. 1755-1801), and closely modeled on a recently published book by the chemist Vincenzo Dandolo, Compagnoni's book covers the history of chemistry, elements and compounds, attraction, affinity, caloric, fire and light, the phlogistic versus the new chemistry, gases, combustion, acids and alkalis, salts, the old and new nomenclature, minerals, etc. Expressing skepticism over a woman's desire to learn a subject as dry and difficult as chemistry, Compagnoni is reassured by the countess that she indeed wishes to be initiated into the mysteries of Lavoisier's new ideas because chemistry 'has become the fashionable science.' The first Venetian edition of 1796 was followed by a second in 1797 and a third in 1805, as well as by an edition published in Naples in 1804 and a translation into Spanish (Barcelona, 1802).

HIST 14 - Once upon a Christmas cheery in the lab of Shkhashiri: Public engagement for 47 years and counting...

Bassam Z. Shkhashiri, bassam@chem.wisc.edu. Dept of Chemistry, Univ of Wisconsin-Madison, Madison, Wisconsin, United States

Michael Faraday, the noted English physicist and chemist, lived from 1791 to 1867. He was a gifted lecturer who began giving his Christmas Lectures for children and their families at the Royal Institution of Great Britain in the 1840s. Faraday loved simplicity, and he had a strong sense of the dramatic. His audience entered wholeheartedly into the world of science with his guidance. His ideas were considered very unorthodox at that

time, and children, who had not yet adopted conventional ideas, would react enthusiastically to the ones he presented. Throughout the 19 annual Christmas Lectures that he presented, Faraday did all he could to urge his listeners to see and judge for themselves, to experiment, and to question nature directly whenever anyone discovered something out of the ordinary. In December 1970, my first year on the faculty, I gave the first Wisconsin Christmas Lecture to students in my first-year chemistry class. Colorful displays and exciting chemical transformations were presented. Word spread that the Christmas Lecture was a fun event and the following year the lecture hall overflowed with students and their friends. In 1972 the Christmas Lecture was given in two evening sessions open to the public. In 1973 Wisconsin Public Television offered to videotape the program for broadcast during the week of Christmas. Thus began an uninterrupted collaboration between the Chemistry Department and UW-Extension to bring science to audiences throughout Wisconsin and on PBS stations. Since then, versions of the show have played to packed houses elsewhere across the country and around the world. The goal of the Christmas Lecture has remained the same over the years and around the globe: connectivity with the audience. The ultimate purpose is to trigger cerebral and emotional engagement to heighten the audience's joy in learning.

HIST 15 - Image of chemistry in newspaper and magazine ads

Nicolay V. Tsarevsky, nvt@smu.edu. Department of Chemistry, Southern Methodist University, Dallas, Texas, United States

Newspaper and magazine ads are a special art form, the aim of which is to promote and increase the appeal and sales rates of specific products or services. Ads target a very diverse (in terms of interests, taste, cultural background, and education) audience, and the message they deliver, and – as part of that – the images they present, should attract the attention of a maximum fraction of potential customers. Chemistry-related images, which include depictions of chemical equipment and processes, (al)chemists at work, chemical reaction equations, molecular structures, etc., have long been employed as powerful tools to make a very large variety of items – often completely unrelated to the chemical industry – appear more attractive to buyers. A number of such images, extracted from newspapers and magazines dating from the very early XXth century to today, will be presented in historical context, and their educational value will be discussed.

HIST 16 - Rashomon effect: Chemistry through the eyes of other chemists

Jeffrey Seeman, jiseeman@yahoo.com. University of Richmond, Richmond, Virginia, United States

The theme of this symposium is "to trace the capricious evolution of the public image of chemistry and related scientific disciplines." This may be due, at least in part, to the Rashomon effect, "the circumstance when the same event[s] is given contradictory interpretations by the individuals involved." The Rashomon effect not only pertains to the general public but also to individual chemists pursuing their professional pathways. Several recent and controversial examples of this phenomenon will be given and explored including E. J. Corey's claim of plagiarism against R. B. Woodward in the development of the Woodward-Hoffmann rules.

HIST 17 - Viewing chemistry through artists' eyes

Peter Goin, pgoin@unr.edu, Ana De Bettencourt Dias. University of Nevada, Reno, Reno, Nevada, United States

The future of STEM will include the letter 'a,' = STEAM. As art, science, and technology converge, artists and scientists not only will, but have examined how these various areas of knowledge influence one another. Foundation Professor of Art (photography) Peter Goin presents an overview of how practitioners in the Fine Arts have perceived the science of chemistry.

HIST 18 - Guilt by association: Dietary recommendations and missed opportunities

Elke Schoffers, elke.schoffers@wmich.edu. Chemistry Mailstop 5413, Western Michigan University, Kalamazoo, Michigan, United States

The phrase "You are what you eat" has many precursors. It was first attributed, word-by-word, to English nutritionist Victor Lindlahr. The quote was part of a longer statement in 1923, namely "Ninety per cent of the diseases known to man are caused by cheap foodstuffs. You are what you eat." Lindlahr was promoting a weight-loss diet based on "catabolic foods." His view was prescient.

Chemists know what the structures of food and their macronutrients look like. They are the carbohydrates, proteins and fats we find in supermarkets and kitchen pantries. Foods and the molecules they contain represent an easy avenue to relate to the general public. We now have access to abundant data, including food labels with chemical names. At the same time, the United States and large parts of the world suffer from the consequences of food excess despite abundant health advisories. This presentation will focus on the confusing messages of dietary recommendations, especially those advocated over the last 60 years. Should we eat eggs? Or should we avoid eggs because of cholesterol? It appears that science still does not have the answer. However, the science is very clear now. Unfortunately, the confusion has contributed to a perfect storm that has grown into a "diobesity" (diabetes+obesity) crisis. This presentation will outline how chemistry and its reputation are affected.

HIST 19 - Changing images of chemistry in the public

Bernadette Bensaude Vincent, *bernadette.bensaude-vincent@univ-paris1.fr. Department of Philosophy, Université Paris 1 Panthéon-Sorbonne, Paris, France*

This paper will focus on one specific aspect of chemistry which has deeply shaped its public image: the ambition to create life in a laboratory. The competition between the laboratory and the creator of life is a mythical image (Faust, Frankenstein) rooted in the alchemical tradition. It was still the hardcore of literary portraits of chemists in the early 19th century. This image which has created an association of chemistry with witchcraft, magics and charlatanerie has travelled through the centuries. In the 18th century the public image of chemistry has radically changed thanks to many successful and useful products issued from the chemistry laboratories. Chemistry came to be celebrated as a useful science, contributing to public welfare and the wealth of nations. Chemists were no longer perceived as dangerous people. Rather they became respectable professionals enjoying social recognition, often being in charge of political responsibilities. However the development of synthetic chemistry and more recently of synthetic biology revived the competition between chemistry and life. One purpose of this paper is to help understand how it turned out that the term "synthetic" became synonym of "chemical" and the antonym of natural or organics in the popular language.

HIST 20 - Then and now: Art and the visual image of chemistry

Tami I. Spector, *spector@usfca.edu. Chemistry, University of San Francisco, San Francisco, California, United States*

This talk employs an art historical lens to investigate the visual stereotypes of chemistry found in current portraits of chemists, depictions of chemical plants, and images of chemical glassware and the periodic table. Such images play a significant part in communicating the chemical profession to the public. They portray a visual image of chemistry that simultaneously conveys its negative cultural associations and aestheticizes chemistry by framing it within classical ideals of beauty and borrowing from revered motifs of modern and contemporary art.

HIST 21 - Unlikely popularizer of resonance theory in France

Pierre Laszlo^{1,2}, *pierrelaszlo@usa.net. (1) Chemistry, Ecole Polytechnique, Senergues, France (2) University of Liège, Liège, Belgium*

Gaston Bachelard, in France during the late Forties and early Fifties, had a major role in introducing and popularizing Linus Pauling's contributions and his book *The Nature of the Chemical Bond*, to French philosophers and intellectuals. In so doing, he bypassed the indifference and even downright hostility of those French chemists who, at the time, were in positions of power. Prior to having been called to teach philosophy at the Sorbonne, he had been a secondary school teacher for a number of years and had taught chemistry. Accordingly, he understood well Pauling's ideas. My talk will stress the irony of a philosopher acquainting the French public with the New Chemistry, while prominent chemists kept an hostile silence. Moreover, the political context was the profound influence of the French Communist Party and the hostility of Stalinist USSR to Pauling's Resonance Theory.

HIST 22 - My experience as science advisor for Breaking Bad

Donna J. Nelson, *djnelson@ou.edu. Chemistry, University of Oklahoma, Norman, Oklahoma, United States*

Dr. Nelson will relate her experiences serving as a science advisor for the TV show *Breaking Bad*. This will include how she became their advisor, some specific clips that she influenced, and impressions learned about Hollywood from the interactions.

HIST 23 - Stealing the limelight: Interactions between theatre and chemistry

Kirsten Shepherd-Barr, *kirsten.shepherd-barr@ell.ox.ac.uk*. English, University of Oxford, Oxford, United Kingdom

Theatre and chemistry have had a long and fascinating relationship, both in terms of how theatre has used chemical effects and materials and how it has depicted chemists and chemistry. This talk will explore both kinds of interactions in order to address the broader implications about theatrical engagements with science in light of the increasing popularity of “science plays.”

HIST 24 - From the elements to the atomic fire: An operatic perception of chemistry

Joao Paulo Andre, *jandre@quimica.uminho.pt*. Chemistry, University of Minho, Braga, Portugal

Throughout more than four hundred years of existence, the opera repertoire has been traditionally regarded as a repository of love, seduction, betrayal and vengeance stories. Nevertheless, opera plots often display numerous ideas, concepts and even personalities that belong to the domain of science, with special relevance for chemistry. From the four cosmogenic elements (water, fire, earth and air) to alchemy and from the ancient Greek Atomist School to the atomic bomb, this communication will be an operatic trip covering a time gap of nearly 2500 years.

HIST 25 - Science communication: The evolving role of postage stamps

Daniel Rabinovich, *drabinov@uncc.edu*. UNC Charlotte Chemistry, Charlotte, North Carolina, United States

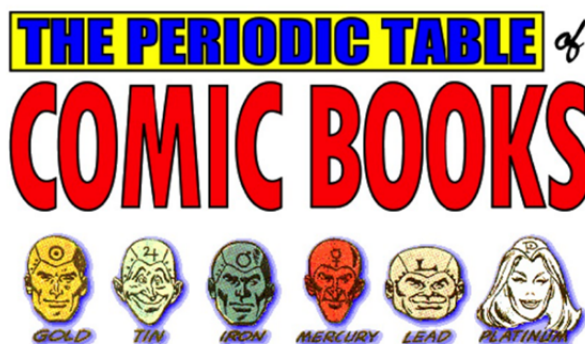
Postage stamps were introduced in Great Britain in 1840 as an expedient way to prepay for the mailing of a letter or package, a service that until then had to be paid by the recipient, not the sender. By the turn of the 20th century, stamps also became a simple yet effective medium to commemorate events and describe the history and culture of a country. The portrayal of topics in astronomy, biology, chemistry, geology, physics, and other sciences came a little later, and eventually stamps became an effective way to publicize a country's achievements in these fields. In this presentation, several stamps related to chemistry will be described, including their use to underscore industrial prowess, advance political agendas, or recognize individuals who have made lasting contributions to the chemical enterprise. In a similar vein, an overview of how the depiction of chemistry for the general public has evolved over time will be presented.



HIST 26 - Periodic table of comic books

John P. Selegue, *selegue@uky.edu*, **Floyd J. Holler**. Department of Chemistry, University of Kentucky, Lexington, Kentucky, United States

The current spate of Hollywood blockbusters based on superheroes has drawn increased scrutiny of their comic-book origins. Comic books have created an American mythology of super-powered beings "with powers and abilities far beyond those of mortal men." This presentation will address how the public perception of science, in particular chemistry, has steered the development of the popular (and lucrative) comic-book medium. Examples drawn from the comics themselves will demonstrate how comic books have both reveled in and exploited public misconceptions of science since Superman's arrival in 1938.



HIST 27 - Public perceptions of chemistry and the Chemical Heritage Foundation

Ronald S. Brashear, *rbrashear@chemheritage.org*. Chemical Heritage Foundation, Philadelphia, Pennsylvania, United States

This paper will look at how chemistry has been presented to various audiences at the Chemical Heritage Foundation, a museum, library, and center for research in the history of chemistry, chemical engineering, and related sciences and technologies. The depiction of chemistry and its impact on society is a core element of CHF's mission, but there are many ways that such a presentation can be done. As an independent institution that receives a great deal of support from the chemical community and wants to be a trusted voice to the public, CHF has to be very cognizant of how its messages are received and understood. Much like the Science Museum in London, CHF has spent a great deal of time presenting chemistry as a skillful science and the benefits of chemistry's products on the world with less emphasis on controversy. However, the times CHF has dealt with controversial issues, like asbestos, the reaction has been quite unexpected and informative. CHF's body of work will be informative in helping us understand chemistry's legacy and how to accurately present the science and its technologies in a way that people will take us seriously.

HIST 28 - 100 Years of aluminium pioneers: From chemists to architects (1808-1908)

Michael Stacey, *michaelstaceys4aa@icloud.com*. Architecture & Product Design, Michael Stacey Architects, London, United Kingdom

This paper explores the development of the chemistry of aluminium (Al), from its identification by Sir Humphry Davy in England, 1808, to the simultaneous discovery of the Hall-Héroult electrolytic process, for the reduction of alumina into liquid aluminium, in USA and France, 1886, by Charles M. Hall and Paul Héroult. Charles M. Hall was ably assisted by his sister Julia B. Hall whose contribution should be more clearly recognized. This scientific progress is paralleled by the uptake of Al in art and architecture. The paper observes that the development of the chemistry of Al was an international process. H. C. Ørsted in Denmark, 1825, produces significant quantities of Al. In Germany, 1827, F. Wöhler's develops a better process for the isolation of Al. In France, 1854, Henri Étienne Sainte-Claire Deville enhances Wöhler's method of isolating Al and the chemical production of Al commences in significant quantities, but it is expensive. This starts the decorative age of aluminium, for example the casting of Diane de Gabies by Paul Morin et Cie, in France, 1850-60. 1884, a cast Al pyramid caps the Washington Monument, USA. 1892, a cast aluminium sculpture of Eros is erected in Piccadilly Circus, London. The oldest extant aluminium in architecture is a ceiling installed at the Church of St Edmund, King & Martyr, Derbyshire, England. Aluminium sheet cladding of the dome of San Gioacchino, Rome, architect Raphael Ingami, 1897, and is still performing well today. 1903, the first powered flight was achieved in by Wright brothers at Kill Devil Hills, USA, using a cast aluminium engine. In Germany Alfred Wilm invents Duraluminium and Otto Wagner designs the Postsparkasse, Vienna. The first world class work of architecture that extensively uses Al, sheet, spinings and castings, it's decoartive and modern. Al is used by architects and aircraft designers, a case of a common technology, not technology transfer.

HIST 29 - Chemical architecture: Experiments in urethane foam environments of the 1960s

Grace Converse, *grace.converse@gmail.com*. University of Southern California, Venice, California, United States

Innovations in urethane foam technology in the 1960s piqued the interest of architects, designers, artists, and curators eager to test the aesthetic and functional possibilities of the material. In 1968, architect Ralph Drury and three graduate students from the Yale School of Architecture began what that they called "An Experiment in Chemical Architecture." Drury and the students constructed multiple igloo-like urethane foam structures at Yale to test the material's potential to take multiple architectural forms and its capacity withstand the elements. The prospects of urethane architecture spurred curator and museum director, Paul J. Smith, to feature "Chemical Architecture" in the 1968 exhibition, PLASTICS as Plastics at the Museum of Contemporary Crafts in New York. For Smith, the project was an unprecedented use of urethane foam and an exemplary creative use of plastics. My research examines the archival record of "Chemical Architecture" including the processes and questions set forth by architects in project descriptions, the critical and public response, corporate investment in the projects, and the history of urethane foam. I propose that urethane foam architecture exemplifies a merger between the arts, sciences, and industry that generated new forms in architecture and, in turn, perpetuated utopian ideas of modern living in the 1960s.

By using urethane foam as a primary building material architects created a new aesthetic for habitable spaces. In contrast to the sleek, hard-edged modernist architectural styles that became prominent in the US around the mid-twentieth century, chemical architecture appeared soft and had few flat surfaces or right angles. Foam was quickly sprayed into place rather than sawed, cut, nailed, or soldered, affording new formal qualities. Although architects were responsible for the creative production with urethane foam, chemical companies who manufactured the material supported architectural experiments. The Union Carbide Corporation supplied the material in the first iteration of the project at Yale, and at the museum, the Durez Division of Hooker Chemical Company (a subsidiary of Occidental Petroleum Corporation) provided materials, funds, and technical assistance. The experimental architectural projects I examine demonstrate a shared vision among chemical companies, architects, and the public that urethane foam could radically change the way we live.

HIST 30 - Adaptive clothing utilizing advanced textiles for female lymphedema patients

Grace Jun¹, *Gjun00@gmail.com*, **Vanessa Sanchez**². (1) *Parsons School of Design, New York, New York, United States* (2) *Wyss, Harvard University, Cambridge, Massachusetts, United States*

Adaptive clothing specially designed for those with disabilities is transforming fashion for the differently-abled user. From modified jeans for wheelchair users to tailored jackets for people with sclerosis, clothing offers the wearer several functions such as, comfort, a sense of empowerment and independence as well as social conformity. With an estimated \$250 billion industry in the United States for adaptive wear, research in this area is combining the fields of apparel design and textile chemistry with the law. Benefits of adaptive clothing for people with disabilities include closure modifications and patterning variations used to simplify donning or doffing clothing. These changes are of particular benefit to those with limited range of motion in the arms and chest area, as seen with female lymphedema patients, resulting from breast cancer surgery.

Recently, advanced textiles, created by optimizing chemical properties and fabric structure, have provided designers an array of functional materials for adaptive wear applications. Our investigation focuses on the use of such materials to provide mechanical compression and cooling properties on apparel design for women with lymphedema. Due to removal or damage of lymph nodes, it is recommended to “[apply] pressure to area so, the lymph moves in the correct direction” by selectively varying textile properties throughout the garment using fabric structures, fiber chemistry and finishing processes, a functional compression system can deliver targeted pressure to the body. This can provide relief and aid in the lymph drainage process while preventing range of motion restrictions often seen in high compression garments. The additional need for cooling during recovery causes many women to place ice packs in the underarm near the incision area. Moisture wicking qualities either inherent to the fiber or through chemical finishes can provide relief while maximizing comfort, due to reduced bulk and weight. With a client-centered design approach, a functional and adaptive garment is created for our user in this case study.

HIST 31 - Second skin: The science and cultural impact of stretch

Christina Schneider, *cschneider@chemheritage.org*. *Chemical Heritage Foundation, Philadelphia, Pennsylvania, United States*

How do you get the body you want or need? You can clothe it in a second skin. This presentation focuses on Second Skin: The Science of Stretch, a current exhibition at the Chemical Heritage Foundation in Philadelphia that features garments and textile devices that stretch and compress to fulfill our aspirations and needs, and shift our sense of self. A second skin can reveal, cover, or allow the body to move in new ways. When an Olympic swimmer glides to victory in a fast, compressive suit, they are clothed in the innovative but often unseen work of chemists, chemical engineers, fashion designers, and garment workers. The science, technology, and history of stretchy second skins have changed how we move through the world. Once, stretch was primarily produced by knitting—a thousand-year-old technology. Today, high-tech micro-knit spandex surrounds us at the gym, and conductive threads and digital knitting machines lead us into a future of wearable technologies. *Second Skin: The Science of Stretch* was developed with a variety of partnerships and object loans from corporate and university sources including Bolt Threads, INVISTA, the University of Delaware Historic Costume and Textile Collection, Hagley Museum and Library, the Shima Seiki Haute Technology Laboratory at Drexel University, and University of Delaware Move to Learn Innovation Lab. This range of partners allows an exploration of the past, present, and future of stretch materials on the body. Exhibition programming has included a presentation on the history of swimsuits, a gender and science panel led by students at a local charter school, a DIY wearables workshop, and Knit-Ins with local crafting groups. This ACS presentation will discuss the science and cultural content of the

exhibition, and related strategies for interpretation and audience engagement. And, after viewing the dazzling image of a purple Jazzercise suit featured in the exhibition, you might want to try some new aerobics stretches.

HIST 32 - Ease: Using seam bonding technology to create durable shirts for a girl with autism

Christina Glover², *christina.mglover@yahoo.com*, **Elizabeth Riley**⁴, *elizabetherinriley@gmail.com*, **Uma Desai**³, *uma.desai@students.olin.edu*, **Grace Jun**¹. (1) Parsons School of Design, New York, New York, United States (2) Savannah College of Art and Design, Savannah, Georgia, United States (3) Olin College of Engineering, Needham, Massachusetts, United States (4) Bay Path University, Longmeadow, Massachusetts, United States

Ease is a line of durable, seamless, and stylish t-shirts created during MIT's Open Style Lab 2016 summer program. The Open Style Lab exists to raise awareness for universal design and adaptive fashion. Teams of designers, engineers, and occupational therapists create functional yet stylish wearable solutions with and for individuals with specific clothing challenges. Ease was developed for Eliza, an 11-year-old girl with Autism Spectrum Disorder (ASD) and Obsessive-Compulsive Disorder (OCD). She perseverates on the seams of her clothes, and enjoys picking at threads until her clothes are completely torn apart. Therefore, she needed a clothing solution that would be durable enough to stand up to her ripping. In addition, Eliza has sensory preferences that favor proprioceptive input, necessitating that the garment fit tightly to her body. Since Eliza's shirts have the shortest lifespan of all her garments due to their proximity to her hands and the nature of t-shirts to be flimsily made, a durable, compressive shirt was found to be the best solution for Eliza in this preliminary study. The shirts were made using bonded seam technology – a process where chemically engineered adhesives bond with the fibers of the fabrics through the application of high levels of heat - and a variety of comfortable, synthetic stretch fabrics in



Lineup of Ease shirts



Applying bonded adhesive film

activewear-inspired shapes that accommodate for Eliza's activity level. In addition, a custom pattern was designed from Eliza's artwork and digitally printed onto fabric to personalize the shirts. The style is ideal for the everyday athleisure aesthetic and lifestyle, making Ease the ideal garment for effortless modern style and optimal performance.

HIST 33 - Trading innovation across chemistry and design: A content analysis of synthetic fiber advertisements

Stephanie Vasko, *stephanie.vasko@gmail.com*. *AgBioResearch & Philosophy, Michigan State University, East Lansing, Michigan, United States*

This talk will cover my current scholarship on the intertwined histories of innovation in the chemistry and design, focusing on fashion as a space that represents multiple representative intersections including industry/innovation and the American chemical/design industries. While the industries related to fashion are myriad, and include dyes, fibers, finishes, patterns, and finished garments, this talk will focus on fibers as a case study. Specifically, I investigate the manufacture and marketing of synthetic fibers by DuPont in the post-World War II using a combination of grounded theory, content analysis, and discourse analysis. The content for this investigation comes from trade journal advertisements, specifically in a trade journal targeted to the chemical, design, and fashion industries. I also touch upon the histories of innovation in chemistry and design, the history of DuPont, additional marketing documents, and previous scholarship on fashion intermediaries (specifically Dorothy Liebes). I will highlight the importance of archival work to the history of chemistry and innovation and underscore archival opportunities available to interdisciplinary researchers.

HIST 34 - Was Markovnikov's Rule an inspired guess? ...No!

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Although most organic chemistry students do not know much about Vladimir Vasil'evich Markovnikov (1838-1904), every one of them has been exposed to his Rule for addition, that when a hydrogen halide adds to an unsymmetrical alkene, the hydrogen atom is added to the carbon atom possessing the greater number of hydrogens already. Over the century and a half since its proposal by Markovnikov in his *Doktor Khimii* dissertation, the basis for the rule has been clarified based on the relative stabilities of the intermediate carbocations. Markovnikov's original paper (under the name, Morkovnikov) appeared in the first issue of the new *Zhurnal Russkago Fiziko-Khimicheskago Obshchestva*, in 1969. In it, Markovnikov published the results of his investigations of addition reactions with 1-butene and isobutylene, which gave rise to his Rule. When the work was published in German, this part was relegated to a short section at the end of the paper, but in Russian, it was the first part of his dissertation to be published. Based on its less-than-prominent position in the German paper, it has been suggested that Markovnikov's Rule was an inspired guess. A re-evaluation based on the Russian-language originals suggests that this is, in fact, not the case.

HIST 35 - Paul Dirac: A man at the intersection of science and philosophy

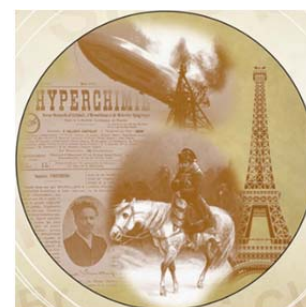
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Paul Dirac was one of the most influential minds of the twentieth century on the fields of both chemistry and physics. The combination of his genius, his unusual personality, and his unusual family life caused him to be one of the most interesting scientists of all time, both scientifically and philosophically. In this presentation, we explore the effects of science, world events, family life and religion on who Paul Dirac was, and the effects of his work and who he was on contemporary thought in science, philosophy and religion.

HIST 36 - Periodic footprints in history, literature and cinema

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This is not the story of the elements, nor of their discoverers or of the amazing properties of the 118 basic building blocks of our world that make up the Periodic Table as of November 2016. These are stories of people crossing paths with an element, and the resulting impact giving lasting effects on their lives and sometimes impact on history. So, I will not tell you about the wonderful colours you get from uranium tinted glass, but about a couple in love and a British government public relations nightmare of the 1950's. We will venture into biochemistry meeting the dreaded petermen and going out on the high seas with a future president and also learn how an elemental deficiency affecting 800 million people is related to a famous comic book hero. On the more serious side we may learn of some biologically related chemistry of elements as diverse as potassium and rhodium, and even discuss science communication. Perhaps you will even learn the truth about Napoleon losing his trousers in Moscow.



HIST 37 - Drug repurposing: A bibliometric analysis by text-mining PubMed

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There are many thousands of diseases that do not have a treatment, including many rare and neglected diseases. Streamlining ways to find a potential treatment for such diseases could dramatically change the patient outlook for millions of people. Finding new uses for existing drugs is called drug reprofiling, repositioning, redirecting, or repurposing and it is increasingly recognized as a way to find new disease treatments at lower cost. We provide a bibliometric overview of the practice of repurposing by analyzing drug-disease relationships text-mined from PubMed. Our analysis extends back to drug treatments from the 1940's and provides a historical overview up to the

present day. While the attention to repurposing may be new, we find that the practice is certainly not. Most drugs have indeed been tested as treatments against more than one disease and some compounds have been tried in hundreds of diseases. Three of these highly reprofiled drugs – the antipsychotic chlorpromazine, the antimalarial chloroquine, and the antiulcer medicine cimetidine were examined in depth by looking at their repurposing activity over time, starting with the first annotation of the drug in the literature up through recent publications. We characterized the diseases and therapeutic areas these drugs were directed at and what evidence motivated researchers to redirect the drugs. While in the majority of cases these drugs were tried on diseases in therapeutic areas close to their original use, there are striking, and perhaps instructive repurposing attempts where drugs have been tried in unexpectedly novel therapeutic areas. Findings of this study provide instructional inspiration for continuing to apply human intuition and reasoning to identify new treatments of disease by the means of drug repurposing.

HIST 38 - History of water chemistry monitoring and education on the Yukon River Watershed

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Is the salmon population decline on the Yukon and Tanana Rivers due to (1) climate change (water temperature, sedimentation, and water discharge); (2) effects of urban pollution or mining on spawning habitat (3) infection by *Ichthyophonus*; and (4) overharvest in the ocean (commercial harvest and bycatch) or specific parts of the river system? What field and laboratory techniques were used to evaluate the chemistry of the Yukon River and enumerate the numbers and types of salmon species on the river and its tributaries 60 years ago and how has this changed? The first western science research conducted on the Yukon River watershed did not incorporate local knowledge due to language and cultural perspective barriers. This is a collection of the traditional local knowledge from before western contact to the present, along with the earliest western scientific water chemistry data and salmon population numbers compiled. What is the variability and accuracy of the earliest scientific water chemistry data collected and how has this changed over time? What parameters are most useful in this dataset for understanding salmon habitat health and potential impacts due to anthropogenic pollution and climate change? What are the challenges associated with performing regression and other statistical analysis with historical water chemistry data compiled with current data sets? How has local traditional knowledge and western science converged over the years and what is the continued suggested work to continue this process? How have the Athabaskan tribe's view and capabilities to perform western science and understand chemistry changed?