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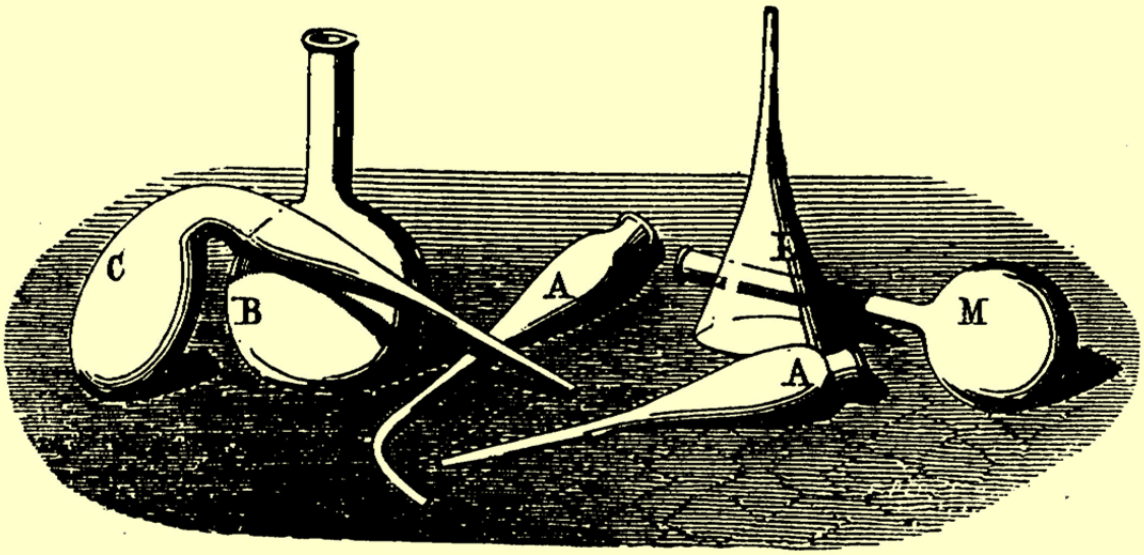
American Chemical Society

DIVISION OF THE HISTORY OF CHEMISTRY



NEWSLETTER, PROGRAM & ABSTRACTS

251st ACS National Meeting
San Diego, CA
March 13-17, 2016

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

2015 finished with a flourish at the Pacifichem Meeting in Hawaii. Many historians of chemistry from the Pacific Rim came and participated in our symposium on the history of chemistry in their countries. HIST is now viewed as a central member of the worldwide community of historians of chemistry. Korea has been added to the active list of countries that value this history.

HIST is a hotbed of outreach activities. HIST received a ChemLuminary Award, in this case for Jeff Seeman's *Citation for Chemical Breakthrough* program. Congratulations for an important and very well-received activity in the worldwide community of chemists. [If we are fortunate, we may have a winner of the HIST Award to announce.]

The ACS National Meeting in San Diego promises to be very busy and exciting. HIST Symposium programming includes "Preceptors in Chemistry" and "The Posthumous Nobel Prize". In addition, HIST is the primary sponsor for an MPPG symposium on "The History of Computers in Chemistry".

It is a good time to think about the ACS Meeting in Philadelphia in August. HIST has another full schedule, including a symposium on "Chemistry in America Before 1876". There are still open places for a few talks on this subject. In addition to the regular programming, HIST is sponsoring a workshop for High School teachers on the use of the history of chemistry in High School chemistry teaching on Saturday, August 20, 2016. If you wish to assist in this effort, please contact me (gp9a@andrew.cmu.edu).

HIST and Springer continue to be "the place" to publish "Briefs" on the History of Chemistry. Seth Rasmussen has created an important route to rapid and visible publication. Please continue to talk to Seth about your manuscripts.

I look forward to meeting and greeting many of you in San Diego and Philadelphia.

Gary Patterson, HIST Chair

Report of Councilors, Division of the History of Chemistry
250th ACS National Meeting – Boston, MA, August 19, 2015

Election Results

By electronic ballot, the Council elected **Christopher J. Bannochie (265)**, **Michelle V. Buchanan (199)**, **Alan B. Cooper (268)**, **Donna G. Friedman (176)**, and **Carolyn Ribes (260)** for a 2016-2018 term, and **Jetty Duffy-Matzner (164)** for a two-year term, 2016-2017, on the Committee on Committees.

By electronic ballot, the Council elected **Frank D. Blum (259)**, **Mary K. Carroll (305)**, **Lisa Houston (178)**, and **Lee H. Latimer (285)** for a 2016-2018 term on the Council Policy Committee.

By electronic ballot, the Council elected **Mary K. (Moore) Engelman (227)**, **Roland F. Hirsch (203)**, **C. Marvin Lang (191)**, **Les W. McQuire (302)**, and **Donivan R. Porterfield (220)** for a 2016-2018 term on the Committee on Nominations and Elections.

Petitions to Amend Bylaws

The Council **VOTED** to approve the ***Petition on Preferential Voting***, contingent upon confirmation by the ACS Board of Directors (Procedures for election of President-Elect, District Directors, and Directors-at-Large).

The Council **VOTED** to approve the ***Petition on Member Expulsion***, contingent upon confirmation by the ACS Board of Directors, as well as the procedures thereof.

International Chemical Sciences Chapters

On the recommendation of the Committee on International Activities, Council **VOTED** to approve the establishment of the Australia, Brazil, Nigeria, Peru, and United Arab Emirates International Chemical Sciences Chapters, subject to confirmation by the Board of Directors.

Reports of Committees (Highlights)

Nominations and Elections (N&E)

Nominations & Elections announced the candidates for the fall 2015 ACS national election:

Candidates for President-Elect, 2016

- **G. Bryan Balazs**, Associate Program Leader, Lawrence Livermore National Laboratory, Livermore, CA
- **Allison A. Campbell**, Associate Laboratory Director, Pacific Northwest National Laboratory, Richland, WA

Candidates for Directors-at-Large, 2016-2018

- **Lee H. Latimer**, Head of Chemistry, NeurOp, Inc., Oakland, CA
- **Willem R. Leenstra**, Associate Professor, University of Vermont, Burlington, VT
- **Ingrid Montes**, Professor, University of Puerto Rico - Rio Piedras Campus, San Juan, PR
- **Mary Jo Ondrechen**, Professor of Chemistry and Chemical Biology, Northeastern University, Boston, MA
- **Thomas W. Smith**, Professor, Chemistry & Microsystems Engineering, School of Chemistry and Materials Science, Rochester Institute of Technology, Rochester, NY

Candidates for District I Director, 2016-2018

- **Thomas R. Gilbert**, Professor, Northeastern University, Boston, MA
- **Laura E. Pence**, Professor of Chemistry, University of Hartford, West Hartford, CT

Candidates for District V Director, 2016-2018

- **John E. Adams**, Curators' Teaching Professor, University of Missouri-Columbia, Columbia, MO
- **Kenneth P. Fivizzani**, Retired, Nalco Company, Naperville, IL.

Council Policy (CPC)

The CPC Long-Range Planning Subcommittee was asked to review the way Local Sections and Divisions are currently represented on Council. The Task Force is examining issues that affect the Divisor formulae set out in the Bylaws; for example, how sacrosanct is the rule that twenty percent of elected Councilors shall be elected by Divisions, and eighty percent shall be elected by Local Sections? What would Council look like if the ratio were changed, for example to 70/30? Should there be more Division representation on Council and what would be the impact? Would this result in more resources for Divisions? Should

a cap be placed on the number of Councilors per Local Section and Divisions to ensure more balance? What does representation look like for international members of Local sections and Divisions? Comments on these questions can be submitted to President@acs.org.

Budget and Finance (B&F)

B&F reviewed the Society's 2015 probable year-end financial projection which expects a Net Contribution from Operations of $15.5 million, or $2.1 million higher than the Approved Budget. Total revenues are projected at $512.1 million, which at $481,000 favorable is essentially on Budget. Total expenses are projected at $496.6 million, which is $1.6 million or 0.3% favorable to the Approved. This variance is the result of lower-than-budgeted expenses across almost all major expense categories.

Education (SOCED)

SOCED voted to approve revisions to the ACS Guidelines for Chemistry in Two-Year Colleges. The committee voted to make the pilot program of ACS International Student Chapters a permanent feature of the student chapters program. ACS has chartered 15 International Student Chapters since the pilot launched last year.

Science (ComSci)

ComSci voted to recommend approval of the draft ACS policy statement on energy, a notably improved statement on this critical economic and environmental issue. At this meeting, the committee sponsored a roundtable discussion with leaders of Divisions, journals, and outside experts on moving advanced materials from discovery to application.

Committee on Divisional Activities (DAC)

DAC recently completed a review of a white paper to help Divisions identify, evaluate, and pursue international engagement opportunities; received an update on several changes to the Meeting Abstracts Programming System (MAPS); was briefed on a recently-created task force that seeks to enhance the content and functionality of the acs.org web pages that help Division and Local Section volunteers execute their volunteer duties; and voted to fund 14 Innovative Project Grants (IPG) totaling $77,050.

The Multidisciplinary Program Planning Group is proposing the following 2018 national meeting themes to the Divisions for their consideration: Nexus of Food, Energy and Water (Spring/New Orleans), and Nanotechnology (Fall/Boston).

Local Section Activities (LSAC)

LSAC will award 20 Innovative Project Grant (IPG) grants totaling $39,886. This brings the total for 2015 to 34 IPG awards totaling over $75,000. Since the inception of the program, a total of 166 Local Sections have received at least one award. The committee voted to keep the current Local Section allotment formula in place for the next three years, and developed a new process for managing the annexation of unassigned territories by multiple sections.

Membership Affairs (MAC)

MAC reported that as of July 31, the ACS membership was 156,561; 2,055 fewer than on the same date in 2014. The number of new members who have joined this year is 14,457; 147 fewer than this time last year. The Society's overall retention rate is 84%. The number of international members has increased to 25,989; 1,014 higher than in July, 2014. The international retention rate is 85%. The committee intends to submit a petition for consideration in San Diego to permanently extend the Unemployed Member Dues Waiver Benefit period from two years to three years.

Economic and Professional Affairs (CEPA)

The committee reported that ACS ChemCensus data showed that Domestic Unemployment among ACS member chemists edged slightly upwards in the last year from 2.9% to 3.1%. Still, the current unemployment rate is lower than it was from 2009 to 2013. The ChemCensus also showed a modest salary increase year-over-year. For the first year since 2004, the percentage of ACS members working in manufacturing increased. These trends are mirrored by a slight decline in the percentage of members in academia. Other workforce categories remained relatively flat.

Meetings and Expositions (M&E)

M&E accepted 9,271 papers for the Boston meeting. As of the Council meeting, total attendance for the meeting was **13,888**. The Exposition had 475 booths with 325 exhibiting companies. There were nearly 5500 downloads of the Boston Mobile App. The committee established a new Operations Subcommittee, responsible for monitoring the financial

success of the national meetings, monitoring compliance with the National Meeting Long Range Financial Plan and the recommendations of the 2015 Task Force on Implementing National Meeting Financial Targets.

Ethics (ETHX)

ETHX requests that the committee be kept informed of any ethics-related activity sponsored by ACS entities such as committees, Local Sections and Divisions. ETHX will provide this information (with proper credit) to national meeting attendees. Please contact the committee staff liaison at E_slater@acs.org.

International Activities (IAC)

IAC welcomed dignitaries from our sister societies in Canada, Cuba, India, Germany, Taiwan, the UK, as well as leadership of the Organization for the Prohibition of Chemical Weapons (OPCW), the US National Academies of Science, the Iraqi Chemical Society, ACS International Chapters, and ACS International Student Chapters. The committee approved the ACS Global Innovation Initiatives (Gii) Singapore White Paper and chose South America and Mexico for the 2017 joint ACS-Pittcon program to foster exchange and research collaboration in analytical chemistry.

Minority Affairs (CMA)

CMA focused its activities at this meeting on the 20th anniversary celebration of the ACS Scholars Program. The program has awarded more than $17 million in scholarship assistance since 1995 to enable 2,500 talented minority students to pursue their dreams of a degree in the chemical sciences. The new Scholars Endowment Fund now has commitments of more than $2 million. Nominations are being sought for the Stanley C. Israel Award. Instructions for nominations can be found at www.acs.org/stan-israel-award.

Patents and Related Matters (CPRM)

CPRM continues to monitor legislative and regulatory developments influencing intellectual property in ways that impact the chemical enterprise. The committee website is updated frequently and contains a wealth of helpful information about intellectual property matters relevant to those in the chemical enterprise.

Project SEED (SEED)

SEED announced another successful SEED program with the participation of 411 high school students. These students are currently placed in over 100 laboratories across the nation, under the supervision of over 400 volunteer scientists and coordinators in 39 states, the District of Columbia, and Puerto Rico. The committee awarded 32 first year non-renewable College Scholarships to SEED alumni in 17 states and Puerto Rico.

Public Relations and Communications (CPRC)

CPRC co-sponsored a number of events in Boston to showcase ways to increase public appreciation for chemistry: the PBS preview of "Mystery of Matter: Search for the Elements"; a symposium on the public perception of chemistry co-sponsored with Chemical & Engineering News, and the ACS Office of Public Affairs; ChemChamps; and Wikipedia Edit-a-thon, co-sponsored with the Division of Chemical Information.

Senior Chemists (SCC)

This meeting marked the third anniversary of the formation of the SCC at the Philadelphia National Meeting. SCC has been able to establish a number of initiatives thru its provision of mini-grants to Local Sections to sponsor senior-related activities, several of which were recognized by the initial ChemLuminary awards at Boston. A committee retreat is being planned for this fall to identify priorities that will serve the SCC constituency as well as meeting the strategic goals of the committee.

Technician Affairs (CTA)

CTA is now accepting nominations for the 2016 National Chemical Technician Award. This annual award is presented in recognition of outstanding technical and communication skills, reliability, leadership, teamwork, publications, and presentations. For more information about the award, please visit the committee website at www.acs.org/cta.

Younger Chemists (YCC)

The Program in a Box effort continues to grow rapidly with a 43% increase in the number of disseminated boxes between the fall 2014 and February 2015, when 181 boxes were delivered to local sections and international chapters. At this meeting YCC participated in the 5th Younger

Chemists Crossing Borders, an exchange which brings younger chemists from parts of Europe to the meeting. YCC is currently in discussions with N&E, ACS Webinars, ACS Office of Public Affairs, and the presidential candidates about holding a roundtable webinar, "Catalyze the Vote", where the candidates can speak to the younger constituency about their vision for the Society in the future.

ADDITIONAL INFORMATION

In addition to links within committee reports and elsewhere, the following is a list of URLs and email addresses presented elsewhere at the Council meeting:

Diane Grob Schmidt	d.schmidt@acs.org; president@acs.org
Donna J. Nelson	djnelson@ou.edu
C&B Bylaws / Bulletin V	bylaws@acs.org; www.acs.org/bulletin5
Career Navigator	www.acs.org/careernavigator
Ethics	www.acs.org/ethics; e_slater@acs.org
Nominations and Elections	nomelect@acs.org
Scholars Program	www.donate.acs.org
Get Involved Stay Involved (Local Sections)	www.acs.org/getinvolved
Minority Affairs – Speakers	cma@acs.org
Stan Israel Regional Award Nominations	www.acs.org/stan-israel-award
Public Relations and Communications	www.pbs.com; www.rsc.org; www.acs.org/chemistryambassadors
Nanotechnology-Inspired Grand Challenges	http://www.acs.org/content/acs/en/acs-webinars/grand-challenge.html

Activities of HIST Councilors

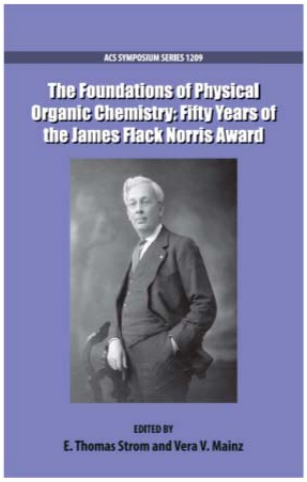
Roger Egolf – continuing as a member of the Divisional Activities Committee (DAC). He co-chairs the new Governance and Annual Reports subcommittee of DAC. He also serves as the liaison from DAC to the Constitution and Bylaws Committee (C&B), to HIST, and to the Computers in Chemistry Division (COMP).
Mary Virginia Orna – completing her first year as a full Member of the Local Sections Activities Committee (LSAC). She is also a member of the Technology, Tools, and Operations Subcommittee until the end of 2015. She will then assume the Chair of the new subcommittee on Communications.
Mary Virginia Orna, Roger A. Egolf, Councilors

News

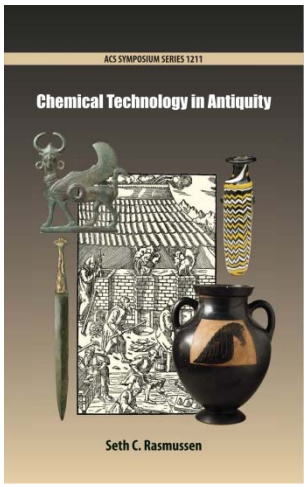
New HIST-sponsored Volumes of ACS Symposium Series Published

Two new HIST-sponsored volumes of the ACS Symposium Series have been recently released in ebook form, with hardcover editions due to be released via Oxford University Press sometime in the next few months. The first of these is volume 1209, *The Foundations of Physical Organic Chemistry: Fifty Years of the James Flack Norris Award*, edited by E. Thomas Strom and Vera V. Mainz. The book is based on a HIST symposium from the Spring 2014 ACS meeting in Dallas organized by Strom and Jeffrey Seeman.

The book contains a chapter on James Flack Norris by Arthur Greenberg and seven chapters by past Norris Award winners Kenneth Wiberg, Edward Arnett, Ronald Breslow, Andrew Streitwieser, Paul Schleyer, Keith Ingold, and Weston Borden, as well as chapters on deceased Norris Award winners Paul Schleyer, Glen A.



Russell, and William Doering. The chapter on Glen Russell was written by Strom and Kathleen Trahanovsky; the chapter on Doering by Ronald Magid and Maitland Jones. Because of the death of Paul Schleyer while the book was in progress, his Dallas presentation on "Norbornyl Cation Isomers Still Fascinate" was edited by Mainz and Strom, while his autobiographical memoir "From the Ivy League to the Honey Pot" was edited by Andrew Streitwieser. A full list of the available chapters and the corresponding details can be found at http://pubs.acs.org/isbn/9780841230712.



The second of these is volume 1211, *Chemical Technology in Antquity*, which is edited by Seth C. Rasmussen. The book is based on the popular HIST symposium from the Spring 2015 ACS meeting in Denver and covers the early production and use of mineral pigments, pottery, metals, fermented drinks, leather, organic dyes, perfumes, soap, and glass. An initial chapter on the role of chemical technology in early civilizations is also included to set the stage for the rather long time spans covered by the various contributing authors, as well as highlighting the importance of these early chemical applications. A full list of the available chapters and the corresponding details can be found at http://pubs.acs.org/isbn/9780841231122.

Both of these volumes should be of wide interest to the chemical community and illustrate the broad interdisciplinary interest that HIST symposia engender across division lines.

HIST-sponsored PACIFICHEM 2015 Symposium to Generate New Book

The HIST-sponsored symposium for the 2015 International Chemical Congress of Pacific Basin Societies (Pacifichem 2015) entitled *Historical Evolution of the Chemical Community in the Countries of the Pacific Rim* was a success and caught the attention of World Scientific Publishing, who are eager to develop a general interest book based on the symposium. Originally covering the development of chemistry in the US, Australia, Japan, Canada, Korea, and China, additional authors have now been recruited to cover New Zealand and Taiwan, with the hope to add one of two more chapters yet. The planned book will be entitled *Igniting the Chemical Ring of Fire. Historical Evolution of the Chemical Communities in the Countries of the Pacific Rim* and will be edited by Seth C. Rasmussen.

The Reach of HIST Continues to Grow via Facebook

The international community following the HIST Facebook page has continued to expand; now exceeding **1600 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 inherent interest in the history of our science throughout the chemical community.

Division	Followers	Division	Followers
PHYS	2306	**HIST**	**1603**
INOR	2099	ORGN	1459
ANYL	2031	CHED	1311
POLY	1811	PMSE	523

As in the past, the majority of those reached via Facebook are still younger people (74% are aged 18-35, with 42% aged 18-24). The majority of our followers (~63%) reside in Egypt, India, and the US. All in all, 86% of our followers are from various international communities (45 different countries!), without traditional access to HIST.

The HIST Facebook page can be found at https://www.facebook.com/pages/ACS-Division-of-the-History-of-Chemistry-HIST/152326921497559 or by searching 'HIST' in the Facebook search bar. If you are a Facebook user, please stop by and check out these efforts to share our passion of the subject with the world. Then 'Like' the page to join us and post comments to share the history of chemistry with our growing audience!

Efforts of HIST Past Presidents Project Continue

HIST Past Presidents Project continues to present symposium and prepare information on Past Presidents of the ACS.

Charles C. Price, 1965 ACS President, is the subject of the seventh HIST Past Presidents Symposium during the Fall 2016 National meeting in Philadelphia. The focus of this symposium is to share stories of Dr. Prices' legacy both in organic chemistry and other science and community activities. Primary organizer Roger Egolf has identified some participants to speak on Price's contributions to research, science organizations, and academic and research organizations. Those participating include Arnold Thackray on Price and CHF and Madeline Joulie as his colleague. We would like to invite participation by any others who would like to share their experiences working with, for and over him. Volunteer to share your experiences with Dr. Price or his scientific contributions by contacting Roger Egolf, rae4@psu.edu, or Jan Hayes, jmhayesacs@gmail.com, for further information.

Future symposia are planned as follows: Spring 2017, San Francisco, Glenn Seaborg, 1976 President; Fall 2017, Washington DC, Daryl Busch, 2000 President. In each case, we invite participation of individuals or suggestions as speakers and organizers for each of these programs.

We also invite HIST members, and others, to suggest subjects for future meetings. The plan has been to pick former presidents that are identified with the geographic location of the meeting. Those with information or suggestions, or volunteers for any program to contact Jan Hayes, HIST Past Presidents Program organizer, at jmhayesacs@gmail.com.

News from the Chemical Heritage Foundation

The Chemical Heritage Foundation (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.

CHF and LSF Finalize Merger

On December 1, 2015, the Chemical Heritage Foundation and the Life Sciences Foundation finalized their historic merger.

On October 9, 2015, the board of directors of the Chemical Heritage Foundation approved a merger with the Life Sciences Foundation. On October 11, the Life Sciences Foundation board approved the same plan. The new organization will cover the history of the life sciences and biotechnology together with the history of the chemical sciences and engineering—two of the largest and most significant branches of modern science and technology.

Meetings between the two groups revealed plans and ambitions on both sides that were remarkably similar and led to an interest in working together more closely. Rather than build capacity in two separate institutions, leadership on both sides decided to bring the two organizations together.

The new organization will continue to explore the interaction of engineering, technology, and industry with science. The goal remains to reveal science and technology's evolution, their cultural role, and their crucial importance for our future. The combined organization aspires to make the history of science as valued and familiar as the histories of nations and empires, literature and art.

Carsten Reinhardt Elected to the German National Academy of Sciences

Chemical Heritage Foundation (CHF) president and CEO Carsten Reinhardt was elected as a member of the German National Academy of Sciences, the Leopoldina.

The German Academy of Sciences Leopoldina is one of the world's oldest academies in the natural sciences. It was founded in 1652 and was appointed Germany's National Academy of Sciences in July 2008. Scientists who have distinguished themselves

by demonstrating academic excellence are elected as members of the society. Its central task is to provide independent science-based advice to policy makers and the society at large in order to tackle and overcome urgent social and increasingly global challenges. Its expertise is based on the excellence of its more than 1,500 members worldwide.

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.

Ambix Special Issue

Publication of the fourth issue of volume 62 of Ambix is imminent, following an unavoidable delay caused by widespread flooding around Chennai where, like many academic journals, it is composited. It is a special issue on the theme of 'Chemical Knowledge in Transit,' guest edited by Ana Maria Alfonso-Goldfarb, Hasok Chang, Marcia H. M. Ferraz, and Silvia Waisse. This project began with the international conference Crossing Oceans: Exchange of Products, Instruments, and Procedures in the History of Chemistry and Related Sciences, held in São Paulo, Brazil, 24-28 August 2014, jointly organised by the Society for the History of Alchemy and Chemistry (SHAC), the Centre Simão Mathias (CESIMA), Pontifical Catholic University of São Paulo (PUC-SP), and the Centre for Logic, Epistemology and History of Science (CLE), State University of Campinas (UNICAMP). Besides celebrating the twentieth anniversary of CESIMA, a leading centre for the history of science (including numerous projects related to the history of alchemy and chemistry), this was the first time that SHAC sponsored a major event outside Europe or North America. The special issue represents a further stage in our transatlantic collaboration, incorporating four essays by Brazilian and British scholars, and guest-edited by representatives of both CESIMA and SHAC.

Morris Award

SHAC is pleased to announce that it was the unanimous decision of the committee to select as the recipient of the Morris Award, Dr. Anthony S. (Tony) Travis. Dr. Travis was nominated as a candidate for his contributions to the history of the chemical industry (history of the dye industry and Heinrich Caro) and the history of modern chemistry (history of chemical instrumentation and the history of groundwater pollution).

The award was presented at the SHAC Spring Meeting, on 11 February, 2016, at the Dana Research Centre and Library, 165 Queens Gate, London SW7 5HD. The meeting theme was 'High Pressure in the Interwar Period' with Dr. Travis presenting the Morris Award Lecture. The subject of his paper was 'Nitrogen Capture: The Emergence of a Global Industry, 1920-1935'.

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.

Nathan Reingold Prize Awarded to Evan Hepler-Smith

The 2015 Reingold Prize is awarded to Evan Hepler-Smith, of Princeton University, for his essay "'A way of thinking backwards': Chemists, computers, and a once and future method." The essay skillfully recounts the history of a critical method in organic chemistry—retrosynthetic analysis— while proposing a new way of understanding the role of computers in the history of science. Evan Hepler-Smith's insightful paper follows organic chemist E.J. Corey's development of a computer program (LHASA) aimed at both "emulating" and aiding human chemists in the task of organic synthesis. Hepler-Smith finds that the program played a number of crucial roles for Corey in the 1960s and 1970s, functioning as a means of both refining existing methods and developing new methods.

Through the construction of LHASA, retrosynthetic analysis itself emerged, "at once a well- established and transformative way of thinking about synthetic design," a method that was "neither discovered nor constructed but unfurled." Contrasting Corey with fellow Harvard organic chemist R.B. Woodward, Hepler-Smith describes how Corey systematized Woodward's conception of organic synthesis as art, taking Woodward's "imaginative leaps" as "objects of study in themselves." Hepler-Smith adeptly illustrates how the construction of LHASA enabled Corey to organize the previously inarticulable and intuitive process of organic synthesis into an "orderly set of strategies." Through this history, Hepler-Smith provocatively suggests that computer programs may be regarded as simultaneously embodying and transmuting existing human scientific methods; and, in homage to its alchemical roots, chemistry may still be practiced as both an art and a science.

HIST Programming

Message from the HIST Program Chair

With a new year comes yet another HIST Newsletter from your humble Program Chair. This last December, HIST participated for the first time in programming for the Pacifichem conference, which is held every five years in Hawaii. The most important aspect of this was that the HIST-led international symposium consisted of cooperation between organizers from the US, Canada, Japan, and Australia, which represents just one of several recent efforts to strengthen ties between HIST and the rest of the world.

Closer to home, the HIST program for San Diego is relatively strong, with two focused symposia and two General Papers sessions. Likewise, our upcoming programming for Philadelphia also looks to be strong, with four focused symposia currently scheduled. Of course, things could always be even better. A disturbing trend which contributes to limitations in HIST programming is the growing resistance to organize symposia for days other than Sunday or Monday. While some have expressed concerns of low attendance for later days in the ACS National Meeting schedule, this has never been a problem for Tuesdays and even Wednesday does not see a dramatic drop off in attendance for HIST sessions. As such, I hope that we can work together to rebuild our programming in order to allow full schedules for at least Sunday through Wednesday morning (thus giving a minimum of three and half days of programming). As I have said in the past, the success of our programming is always dependent on the efforts of our various symposium organizers, so if you have ideas for potential symposia and would like to get more involved in the division, just let me know and I can team you up with more experienced members that can help make your symposium happen.

As always, if you have programming ideas or would like to provide suggestions or feedback, please don't hesitate to let me know (seth.rasmussen@ndsu.edu).

Seth C. Rasmussen, HIST Program Chair

HIST SYMPOSIA, 250th ACS Meeting in Boston, MA, August 16-20, 2015

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

Preceptors of Chemistry

Cosponsored by CHED

In the history of chemistry there have been people who chose to organize their thoughts and practices in such a way that they could be taught to others: the Preceptors of Chemistry. In this symposium, many of these people will be featured. It starts with an early true teacher: Libavius (Bruce Moran); followed by the featured talk on Herman Boerhaave (John Powers). In the 18th century the French dominated pedagogical chemistry (Bernadette Bensaude-Vincent). From the 19th century Mendeleev is a good example (Vera Mainz). From the 20th century the teachers are Basolo (Jay Labinger), Bartlett (Weininger) and Pauling (Gary Patterson). Come and learn how chemistry was taught effectively throughout the last 500 years. The symposium will be held **Sunday afternoon**, March 13, at the Hilton San Diego Bayfront - Aqua 311 A/B.

G. D. Patterson, Organizer

The Posthumous Nobel Prize in Chemistry. Correcting the Errors and Oversights of the Nobel Prize Committee

This full day symposium will center on the idea of a Posthumous Nobel Prize and will highlight those overlooked during the history of the award. The opening talk on "The Nobel Prize: A Brief Overview" is by William Jensen and E. Thomas Strom. The remaining presentations cover overlooked chemists Dmitri

Mendeleev, Henry Moseley, Herman Mark, Wallace Carothers, Edward Teller, Y. K. Zavoiskii, Michael Dewar, Louis Hammett, R. B. Woodward, Neil Bartlett, and Howard Simmons. We all know that Woodward won a Nobel Prize, but perhaps he deserved two. The presenters, respectively, are Carmen Giunta, Virginia Trimble, Gary Patterson, Tom Strom, Burtron Davis, David Lewis, Eamonn Healy, Charles Perrin, Jeffrey Seeman, Joel Liebman, and Pierre Laszlo. The symposium will be held **Monday Morning** and **Monday Afternoon**, March 14, at the Hilton San Diego Bayfront - Aqua 311 A/B.
E. T. Strom, Organizer

UPCOMING MEETINGS AND HIST DEADLINES

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

252nd ACS Meeting, Philadelphia, PA, August 21-25, 2016

Submit your abstract via the new online Meeting Abstracts Programming System (MAPS) by **March 28th, 2016**. 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

Chemistry in America: 1676-1876. (Invited and Seeking contributors) Gary D. Patterson, Department of Chemistry, Carnegie Mellon University, 4400 Fifth Avenue, Pittsburgh, PA 15213, Phone: 412-268-3324, email: gp9a@andrew.cmu.edu

Charles C Price, 1965 ACS President: Exploring his legacy after 50 years. (Invited and Seeking contributors) Roger Egolf, Pennsylvania State University - Lehigh Valley Campus, 2809 Saucon Valley Road Center Valley, PA 18034, Phone: (610) 285-5110, email: rae4@psu.edu; Jan Hayes, Hayes, 6829 Barbara Lee Circle, Sacramento, CA 95842, Phone: (916) 331-6886, email: janan.hayes@yahoo.com

A Salute to Ted Benfey at 90: Science, History, Culture, and a Commitment to Humanism. (Invited) Jeffrey I. Seeman, Department of Chemistry, University of Richmond, Westhampton Drive, Richmond, VA 23173, Phone: (804) 794-1218, email: jiseeman@yahoo.com

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

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

The Science and Legacy of Glenn Seaborg. (Invited and Seeking contributors) Jan Hayes, Hayes, 6829 Barbara Lee Circle, Sacramento, CA 95842, Phone: (916) 331-6886, email: janan.hayes@yahoo.com

Chemistry Through the Eyes of Non-chemists: Evolution of the Public Perception of Chemistry. (Invited and Seeking contributors) Daniel Rabinovich, Department of Chemistry, University of North Carolina at Charlotte, 9201 University City Blvd., Charlotte, NC 28223, Phone: 704-687-5105, email: drabinov@uncc.edu; Nicolay V. Tsarevsky, Department of Chemistry, Southern Methodist University, 3215 Daniel Avenue, Dallas, TX 75275, Phone: 214-768-3259, email: nvt@smu.edu

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

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

Hilton San Diego Bayfront - Aqua 311 A/B

General Papers

S. C. Rasmussen, *Organizer*, *Presiding*

8:30 HIST 1: Intersection of art and science in the discovery of molecular chirality by Louis Pasteur (1822-1895) in 1848. **J. Gal**

9:00 HIST 2: The Royal Society of Chemistry: History now online. **S. Dabb**

9:30 HIST 3: Butlerov Museum of the Kazan School of Chemistry. **A. R. Davis, E. T. Walsh**, D. E. Lewis

10:00 Intermission

10:15 HIST 4: Philatelic history of vitamin C. **D. Rabinovich**

10:45 HIST 5: Astatine – The Elusive One. **K. Kostecka**

11:15 HIST 6: Robert Boyle and Urban Hjarne: At the Crossroads. **S. Mitra**, S. B. Mitra

SUNDAY AFTERNOON

Section A

Hilton San Diego Bayfront - Aqua 311 A/B

Preceptors of Chemistry

Cosponsored by: CHED

G. D. Patterson, *Organizer, Presiding*

1:00 Introductory Remarks

1:05 7. Ghost of Libau and problems with teaching “chemistry”. **B.T. Moran**

1:35 8. Herman Boerhaave and the use of demonstration-experiments in chemistry Courses. **J.C. Powers**

2:05 9. Teaching chemistry in eighteenth-century France. **B. Bensaude-Vincent**

2:35 HIST 10. Withdrawn

3:05 Intermission

3:15 11. Mendeleev and the Chemistry Textbook in Russia. **V. V. Mainz**

3:45 12. Fred Basolo and the (re)naissance of American inorganic chemistry. **J. A. Labinger, H. B. Gray**

4:10 13. Paul Doughty Bartlett: Evangelist for mechanistic organic chemistry. **S.J. Weininger**

4:35 14. Linus Pauling: the right to be wrong. **G. D. Patterson**

SUNDAY EVENING

Hilton San Diego Bayfront - Aqua 303

5:00 - 8:00 HIST Executive Committee Meeting

MONDAY MORNING

Section A

Hilton San Diego Bayfront - Aqua 311 A/B

The Posthumous Nobel Prize in Chemistry. Correcting the Errors & Oversights of the Nobel Prize Committee

T. Strom, *Organizer*, *Presiding*

8:40 Introductory Remarks

8:45 HIST 15. The Nobel Prize: A brief overview. W. Jensen, **T. Strom**

9:15 HIST 16. Dmitri Mendeleev's Nobel-prize-losing research. **C. J. Giunta**

9:45 HIST 17. Who got Moseley's prize? **V. L. Trimble**

10:15 Intermission

10:30 HIST 18. Herman Mark's claim to fame. **G. D. Patterson**

11:00 HIST 19. Wallace Carothers and polymer chemistry: A partnership ended far too soon. **E. T. Strom**

11:30 HIST 20. BET equation: Nominated but not selected. **B. H. Davis**

MONDAY AFTERNOON

Section A

Hilton San Diego Bayfront - Aqua 311 A/B

The Posthumous Nobel Prize in Chemistry. Correcting the Errors & Oversights of the Nobel Prize Committee

T. Strom, *Organizer*, *Presiding*

1:30 HIST 21. Yevgenii Konstantinovich Zavoiskii (1907-1976): Overlooked pioneer in magnetic resonance. **D. E. Lewis**

2:00 HIST 22. Between two stools: Pauling, Mulliken and Michael J. S. Dewar. **E. Healy**

2:30 HIST 23. Hammett deserved a Nobel Prize. **C. Perrin**

3:00 Intermission

3:15 HIST 24. R. B. Woodward: One was just not enough. **J. Seeman**

3:45 HIST 25. Neil Bartlett: No Nobel for noble gases: Some guesses why. **J .F. Liebman**

4:15 HIST 26. Proposing Howard E. Simmons, Jr. **P. Laszlo**

MONDAY EVENING

Section A

San Diego Convention Center - Halls D/E

Sci-Mix

S. C. Rasmussen, *Organizer*

8:00 - 10:00

HIST 1, HIST 11, HIST 16. See previous listings.

HIST 27. Translation of Markivcnikov's Magistr Khimii dissertation: A progress report. **A. R. Davis, E. T. Walsh**, D.E. Lewis

TUESDAY MORNING

Section A

Hilton San Diego Bayfront - Aqua 311 A/B

General Papers

S. C. Rasmussen, *Organizer*
N. V. Tsarevsky, *Presiding*

9:00 HIST 28. Oldest planetary astrochemical mystery, Jupiter's great (but shrinking) red spot. **R. L. Hudson**

9:30 HIST 29. Eponym's curse. **V. L. Trimble**

10:00 Intermission

10:15 HIST 30. Gilbert Lewis and the conceptual evolution of the chemical bond. **S. Mitra**

10:45 HIST 31. R. J. P. Williams and the chemical sequence of natural history. **B. J. McFarland**

Memorial Symposium Honoring Karen J. Brewer

Sponsored by INOR, Cosponsored by HIST

TUESDAY AFTERNOON

Memorial Symposium Honoring Karen J. Brewer

Sponsored by INOR, Cosponsored by HIST

WEDNESDAY MORNING

History of Chemistry and Computing

Sponsored by MPPG, Cosponsored by COMP and HIST

Memorial Symposium Honoring Karen J. Brewer

Sponsored by INOR, Cosponsored by HIST

WEDNESDAY AFTERNOON

Memorial Symposium Honoring Karen J. Brewer

Sponsored by INOR, Cosponsored by HIST

HIST 1 - Intersection of art and science in the discovery of molecular chirality by Louis Pasteur (1822-1895) in 1848

Joseph Gal*[2,1]*, joe.gal@ucdenver.edu. (1) Clinical Laboratory, University of Colorado Hospital, Aurora, Colorado, United States (2) Departments of Medicine and Pathology, University of Colorado School of Medicine, Aurora, Colorado, United States

Pasteur's discovery of molecular chirality was a fundamental advance in chemistry. His key findings were that the crystals of (+)-tartaric acid and its salts were hemihedral and chiral, and sodium ammonium (±)-tartrate produced two crystal forms that he recognized as non-superposable-mirror-image counterparts (enantiomorphs). Before Pasteur, prominent scientists Jean-Baptiste Biot (1774-1862), Eilhard Mitscherlich (1794-1863), Frédéric-Hervé de la Provostaye (1812-1863), and Wilhelm Gottlieb Hankel (1814-1899) had studied tartrate crystals but failed to notice their chirality. What allowed Pasteur to recognize crystal chirality missed by his predecessors? Some argue that Pasteur's poor eyesight forced him to observe meticulously; others credit his scientific intelligence. However, Pasteur's eminent predecessors too had powers of observation and scientific acumen. Is there another explanation? Pasteur was a talented artist who from age 13 to 19 executed ca. 40 portraits of friends, relatives, dignitaries, etc., in pastel, charcoal, pencil, or lithography. Pasteur's artistic talents, acclaimed by artists, e.g., renowned Finnish painter Albert Edelfelt (1854-1905), likely aided his recognition of crystal chirality. Specifically, in lithography the final image is the mirror reflection of the initial drawing, and in 1841 Pasteur expressed concern with lithographic mirror reversal. Conclusion: art sensitized Pasteur to non-superposable mirror reflection, thereby presumably facilitating his discovery of molecular chirality.

HIST 2 - The Royal Society of Chemistry: History now online

***Serin Dabb**, dabbs@rsc.org. The Royal Society of Chemistry, Cambridge, United Kingdom*

The Royal Society of Chemistry recently launched its Historical Collection. This collection covers the development and evolution of the chemical sciences from the 16th century to the 20th century, as well as the publications of learned chemical societies. There is an extensive range of historical items including books, journals, letters, lecture notes, pamphlets, monographs, minutes and magazines, which were previously unavailable online. The collection is segregated into two parts; society publications and minutes, and the historical books and papers from our library. We will discuss how we converted our collection to an online resource, and the eclectic and remarkable pieces you can find.

HIST 3 - Butlerov Museum of the Kazan School of Chemistry

***Alexander R. Davis**, davisar@uwec.edu, **Eugene T. Walsh**, walshet@uwec.edu, David E. Lewis. Chemistry Department, UW-Eau Claire, Eau Claire, Wisconsin, United States*

During June, 2015, we had the ooportunity to work in the Butlerov Museum of the Kazan School of Chemistry, and to record several important manuscripts, including Markovnikov's *Magistr Khimii* and *Doktor Khimii* dissertations. The Kazan School of Chemistry produced such luminaries as Karl Karlovich Klaus (the discoverer of ruthenium), Nikolai Nikolaevich Zinin (discoverer of the reduction of nitrobenzene to aniline), Aleksandr Mikhailovich Butlerov (the structural theory of organic chemistry, and the first organozinc synthesis), Aleksandr Mikhailovich Zaitsev (Zaitsev's Rule), Vladimir Vasil'evich Markovnikov (Markovnikov's Rule), Yegor Yegorovich Vagner (Wagner; oxidation of alkenes with potassium permanganate), Sergei Nikolaevich Reformatskii (the Reformatskii reaction), and Aleksandr Yerminimgel'dovich Arbuzov (the Arbuzov rearrangement). The museum contains such historical artifacts as Klaus' first samples of ruthenium metal and ruthenium dioxide, and Zinin's first sample of aniline, as well as samples of phenol used by Arbuzov at the Krestovnikov Brothers plant for the manufacture of aspirin during World War I and the Russian revolution. The Butlerov Museum will be described, along with other museums of the university (e.g. the Zavoiskii office-laboratory museum).

HIST 4 - Philatelic history of vitamin C

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

Vitamin C (L-ascorbic acid) is an essential nutrient for humans and a well-known antioxidant against oxidative stress. This simple molecule has played a fascinating role in history ever since James Lind, a physician in the British Royal Navy, established in the mid-18th century the relationship between the consumption of citrus fruits and fresh vegetables rich in vitamin C and the prevention of scurvy. In this regard, Jay Burreson and Penny Le Couteur argue in their provocative book "Napoleon's Buttons" that vitamin C may well be responsible for extending the trade routes to the Americas and the Far East during the 17th and 18th centuries. The history of vitamin C, including its isolation, structural elucidation, and synthesis in the 20th century, will be outlined in this presentation and illustrated with postage stamps and other philatelic materials.

HIST 5 - Astatine: The elusive one

***Keith Kostecka**, kkostecka@colum.edu. Science and Mathematics, Columbia College - Chicago, River Forest, Illinois, United States*

Astatine, the last member of the halogens and the rarest naturally occuring element, was first isolated by Corson, Mackenzie and Segre in 1940 [though this isolation had been attempted by many during the 1930s]. This elemenent has an intereresting set of physical and chemical properties and, in addition, a fairly rich chemistry. It exists in a large number of isotopes where astatine-210 is the most stable and is generally produced by bombardment of bismuth-209 with energetic alpha particles. Astatine, after its formation, must only be separated from the target and any possible contaminants. The element may also have use in ongoing research work in nuclear medicine; it also requires precautions in its useage.

HIST 6 - Robert Boyle and Urban Hjarne: At the crossroads

***Smarajit Mitra**[1], smarajitmitra@hotmail.com, Sumita B. Mitra[2]. (1) Mitra Chemical Consulting LLC, Saint Paul, Minnesota, United States (2) Mitra Chemical Consulting LLC, St. Pete Beach, Florida, United States*

Through the major part of the second half of the seventeenth century, Urban Hjarne in Sweden and Robert Boyle in England were, amongst others, towering figures in the
intellectual communities in Europe. They influenced not only the field of chemistry but many areas of physical sciences, natural philosophy and even literature. While Boyle immersed himself in the properties of air, Hjarne branched out into geology and mineralogy. In this talk, their concurrent lives will be compared, sometimes running parallel and at others crossing each other's path. Their different worldviews finally culminated in the opposing positions they took on the fundamental nature of matter.

HIST 7 - Ghost of Libau and problems with teaching "chemistry"

***Bruce T. Moran**, moran@unr.edu. History, University of Nevada, Reno, Reno, Nevada, United States*

In July 2015 a new plaque was installed in the German city of Marburg by the Society of German Chemists honoring Johannes Hartmann (1568-1631) as the first professor of chemical pharmacy and his *laboratorium chymicum publicum* as the "earliest university laboratory for the instruction of chemistry." However, when Hartmann started teaching "chemistry" the battle over what the discipline of chemistry was, was still being fought. From some points of view what formed the basis for what Hartmann taught at Marburg was something altogether despicable, and qualified as neither an "art" nor a "science." One person to object vociferously to Hartmann's teaching was Andreas Libau (also called Libavius), a physician, schoolmaster, and alchemist living for the most part in the German city of Coburg. When Libau learned that a public chemical laboratory was to be erected at Marburg, he must have been delighted. When he learned that Hartmann was to teach "chemistry" there, it was probably one of the worst days of his life. If the ghost of Andreas Libau had been in the crowd at Marburg last July, how would it have reacted? And why would Libau's ghost have perhaps chilled those

assembled by roaring out that, although correct in drawing attention to the teaching of techniques and practices, the Marburg plaque, in other respects, had really missed the mark?

HIST 8 - Herman Boerhaave and the use of demonstration-experiments in chemistry courses

***John C. Powers**, jcpowers@vcu.edu. Dept. of History, Virginia Commonwealth University, Richmond, Virginia, United States*

Herman Boerhaave (1668-1738) was one of the most prolific teachers of chemistry and medicine in the earthly Eighteenth Century; his student Albrecht von Haller called him the "*communis Europae praeceptor.*" One of Boerhaave's pedagogical innovations in his chemistry course was his use of demonstration-experiments to build theoretical claims. His use of these experiments moved beyond the traditional demonstrations of how to make medicaments and other chemical products that had been a staple of chemistry textbooks for more than a century. Rather, he intended his demonstrations to reveal latent characteristics and relationships between substances, about which he could theorize to his students. To do this, he worked out his demonstrations ahead of time, often incorporating novel instruments, such as thermometers, air pumps, and other custom apparatus, previously little used in chemistry. This paper examines a handful of Boerhaave's demonstrations in detail, by discussing their origins, how he worked them out, and how they persisted in the chemical literature of the 18th century, even as the theoretical interpretations of the experiments were altered or dismissed by later chemists.

HIST 9 - Teaching chemistry in eighteenth-century France

***Bernadette Bensaude-Vincent**, Bernadette.bensaude-vincent@univ-paris1.fr. History, Universite Paris1, Paris, France*

During the eighteenth-century chemistry became an autonomous science taught in many parts of Europe. This promotion was the result of efforts made by public lecturers and professors who taught chemistry in a variety of sites (apothecaries, schools of mines, botanical gardens, private laboratories…).This paper will focus on three famous French public demonstrators – Guillaume-François Rouelle, Gabriel Venel and Pierre-Joseph Macquer – who contributed to the prestige and dissemination of chemistry as well as to the training of Lavoisier.

HIST 10 - Withdrawn

HIST 11 - Mendeleev and the chemistry textbook in Russia

***Vera V. Mainz**, mainz@illinois.edu. School of Chemical Sciences, University of Illinois at Urbana-Champaign, Urbana, Illinois, United States*

Dmitrii Ivanovich Mendeleev (1834-1907) is known for his discovery in 1869 of the periodic law of the chemical elements, leading to the concept of the periodic table. Many, including Mendeleev, ascribe this discovery to his work in writing a general chemistry textbook for the Russian student, *Osnovy khimii* or *The Principles of Chemistry*. The Principles was one of many textbooks written in Russian for a Russian audience by Mendeleev — he could be said to have brought the modern chemistry textbook written in the Russian language to Russia. He wrote an organic chemistry textbook (1861) and translated and enlarged the analytical chemistry textbook of Gerhardt and Chancel (1864-1866), prior to the publication of the Principles. This talk will present an overview of the influence of Mendeleev's textbooks on chemistry teaching in Russia.

HIST 12 - Fred Basolo and the (re)naissance of American inorganic chemistry

***Jay A. Labinger**, jal@its.caltech.edu, **Harry B. Gray**, hbgray@caltech.edu. California Institute of Technology, Pasadena, California, United States*

It was an Australian/British chemist, Sir Ronald Nyholm, who first spoke of a "renaissance" of inorganic chemistry; but its emergence as a newly dynamic subfield, beginning in the 1950s, can be seen even more clearly in the US. While John Bailar is often credited as the "Father of American Inorganic Chemistry," it is arguable that Fred Basolo, Bailar's student at Illinois, has had the most lasting impact on the dramatic growth of the field in American academia. Our justification for that assertion will include comments and reminiscences from the students (one of them first-person!) he trained, as well as an examination of his seminal contributions

in the form of both original research and textbooks, particularly the groundbreaking 1958 work “Mechanisms of Inorganic Reactions,” written with his Northwestern colleague Ralph Pearson, which played a central role in raising the intellectual stature of inorganic chemistry by bringing the study of mechanism to the forefront.

HIST 13 - Paul Doughty Bartlett: Evangelist for mechanistic organic chemistry

***Stephen J. Weininger**, stevejw@wpi.edu. Chemistry, Worcester Polytechnic Institute, Brookline, Massachusetts, United States*

Unlike the other preceptors in this Symposium, Paul Bartlett of Harvard and Texas Christian Universities never succeeded in writing a textbook. He eventually consigned his incomplete efforts to a file entitled “Life’s Too Short.” Nonetheless, he deserves the designation Preceptor for having released a burgeoning new field, mechanistic organic chemistry, from the confines of the academic laboratory into industrial laboratories and production lines. He also promoted its establishment and growth beyond the Anglophone chemical community. The acknowledged “father” of mechanistic, or physical, organic chemistry, C. K. Ingold of University College London, was uninterested in its possible applications. Bartlett, by contrast, worked out mechanisms for several reactions vital to the World War II military effort. One of these involved free radical chemistry, an area neglected by the Ingold group. Furthermore, during the postwar era Bartlett taught courses on organic mechanisms for several industrial firms. His laboratories hosted numerous foreign students, especially from Germany and Japan. Speaking in German, Bartlett lectured at several German universities in 1954 on contemporary developments in organic mechanistic studies. Although there had been several isolated German chemists doing notable mechanistic investigations, the formation of a German physical organic research community was galvanized by Bartlett’s visit.

HIST 14 - Linus Pauling: The right to be wrong

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

Linus Pauling was one of the most important preceptors in the history of Chemistry. He was exceptionally well educated and displayed ability in teaching even in undergraduate school. He received the Nobel Prize in Chemistry in 1954 largely for his Baker Lecture monograph: “The Nature of the Chemical Bond (1939).” But, this document is more of a teaching tool than a book for experts. He produced the most influential text for general chemistry in 1947. It was subtitled “An introduction to descriptive chemistry and modern chemical theory.” It does indeed contain an enormous amount of descriptive chemistry. But, what kind of theory is presented? Pauling chose to create conceptual schemes that could be used by any chemist, rather than empirically adequate theories that were as rigorous as could be produced at the time. He invented arbitrary quantities like electronegativity; a semi-quantitative tool rather than a measurable property. He used the conceptual scheme of G. N. Lewis to describe molecules, rather than a more modern molecular orbital approach. This allowed all chemists to reason about molecular structure, even those who could not solve the Schrodinger equation. He left the rigor for the physicists and the chemical experts.

HIST 15 - The Nobel prize: A brief overview

*William Jensen[1], **Tom Strom[2]**, tomstrom@juno.com. (1) Department of Chemistry, University of Cincinnati, Cincinnati, Ohio, United States (2) Department of Chemistry and Biochemistry, University of Texas, Arlington, Arlington, Texas, United States*

This introductory lecture will provide background for the symposium which follows by offering a brief overview of the Nobel Prize, including its history, nomination and evaluation procedures, restrictions on possible recipients, summary statistics relative to previous prizes in chemistry, and mention of various controversies over the nature of some of the earlier awards.

HIST 16 - Dmitri Mendeleev's Nobel-prize-losing research

***Carmen J. Giunta**, giunta@lemoyne.edu. Le Moyne Coll, Syracuse, New York, United States*

Dmitri Mendeleev (1834-1907), the scientist most closely associated with the establishment of the periodic law and that icon of chemistry, the periodic table, never received the Nobel prize. Why not? He was still alive when

the first six chemistry prizes were awarded, but he was not even nominated until the last three years of his life. Rules about recognizing recent work probably prevented his nomination for the first few years of the prize. Researchers into the Nobel archives point to the influence of Svante Arrhenius as the principal obstacle preventing Mendeleev from receiving the prize in 1906. The fate of Mendeleev's nominations will be described and discussed. Near the end of his life, Mendeleev was skeptical of such important scientific developments as the divisibility and transformability of atoms, and his prediction of the existence of elements lighter than hydrogen proved to be elusive. The work that arguably lost Mendeleev the Nobel prize, however, was most likely his hydration theory of solution and, more to the point, his criticism of the ionic dissociation theory in the 1880s.

HIST 17 - Who got Moseley's prize?

***Virginia L. Trimble**, vtrimble@astro.umd.edu. Dept of Physics & Astronomy, University of California Irvine, Irvine, California, United States*

Henry Moseley presumably thought of himself as a physicist, but the impact of his 1913-1914 papers on chemistry was profound, clarifying the order of the elements in the periodic table. This presentation will focus on what Moseley did (the samples were much smaller than I would have guessed), and the context in which his work was performed and then abandoned for voluntary active duty.

HIST 18 - Herman Mark's claim to fame

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

Herman Mark was one of the greatest scientists of the 20th century, but he did not win a Nobel Prize. He was Austrian in a century when leaving was the best career path. He was educated in Germany and worked for Bayer, but his Jewish background made that country unwelcoming. He made his home in America and founded the Polymer Research Institute at the Polytechnic Institute of Brooklyn, but he was a physicist and the chemistry community had other heroes to promote. He was affectionately known as the *Geheimrat* of polymer science, and he made everyone he knew better. But, there is no one accomplishment that caught the fancy of the type of people in America who nominate Nobel Prize winners in chemistry or physics. His major accomplishments will be surveyed, and they will be placed in historical context, but it is not that surprising that he was denied world recognition in Sweden. The Germans would have vetoed any such award!.

HIST 19 - Wallace Carothers and polymer chemistry: A partnership ended far too soon

***E T. Strom**, tomstrom@juno.com. Chemistry and Biochemistry, University of Texas at Arlington, Dallas, Texas, United States*

The nine year career of Wallace H. Carothers at DuPont was incredibly productive for both DuPont and for polymer chemistry. The Carothers group produced two landmark products, Nylon and Neoprene rubber, while polymer chemistry became credible within the chemical discipline and was put on a firm basis. As an example of Carothers' impact on the science, the beginning polymer student now learns the Carothers equation as a way of calculating the degree of polymerization in condensation polymerization and the Carothers gelation equation as a way of determining the gel point of a polymerization. Carothers would be a "slam dunk" as a recipient of a posthumous Nobel Prize, but the presenter will make the case that Carothers would have been a viable candidate for the Nobel Prize in 1936, provided a suitable, prestigious nominator could have been found.

HIST 20 - BET equation: Nominated, but not selected

***Burtron H. Davis**, burtron.davis@uky.edu. Univ of Kentucky, Lexington, Kentucky, United States*

The experimental and theoretical development of the Brunauer-Emmett-Teller method to measure the surface area of porous materials will be described. It was nominated for the award but was not selected. Over the years, the citations for the method have been steadily increasing and is one of the most cited publications. Brunauer and his wife were prominently involved in the McCarthy attacks on communism in the US Government. Teller certainly merited consideration for his contributions to this equation but also many others as well. The impact of his involvement in politics, especially his testimony against J. Robert Oppenheimer and his promotion of the H-bomb, will be considered.

HIST 21 - Yevgenii Konstantinovich Zavoiskii (1907-1976): Overlooked pioneer in magnetic resonance

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The Nobel Prize has been awarded five times since 1944 for developments in nuclear magnetic resonance: the Physics prize was awarded in 1944 and 1951, the Chemistry prize in 1991 and 2002, and the prize in Physiology or Medicine in 2003. Zavoiskii was Professor of Physics at Kazan University, and while there he began working on magnetic phenomena. It is possible that he observed the first NMR signal, but the homogeneity of his magnetic field was not stable enough to permit the reproducible detection of the signal. The advent of World War 2 led to the cessation of this line of research, and after a short period of time doing manual work for the Soviet army, he returned to the research laboratory. Here he worked on electron paramagnetic resonance, and he built the first functioning EPR spectrometer. Zavoiskii's life and career will be discussed, and possible reasons why his pioneering research he failed to garner the Nobel Prize will be proposed.

HIST 22 - Between two stools: Pauling, Mulliken, and Michael J. S. Dewar

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In a wonderful review of Michael's autobiography, *A Semiempirical Life*, the reviewer correctly notes that Michael "…contributed as much or more to the development of practical Molecular Orbital theory than anyone else. His methods and computer programs for semiempirical MO calculations are now used by chemists everywhere. He was at the same time brilliant and insufferable, but above all a delightful human being. His interests were broad ranging; his imagination boundless." The reviewer finishes by stating that "…there can be no doubt whatsoever that had Michael J. S. Dewar been more tactful in speaking his mind, he would have been awarded the Nobel Prize in Chemistry". With the benefit of hindsight this presentation seeks to probe the truth, or otherwise, of this last claim.

HIST 23 - Hammett deserved a Nobel prize

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Louis Hammett deserved a Nobel Prize in Chemistry for making quantitative the relation between rate constants and acidity constants of benzoic acids. His equation established organic chemistry as a science with regularities, rather than only a collection of observations and preparations. His 1940 monograph, Physical Organic Chemistry, was instrumental in giving a name to this field and establishing its credibility. The resulting predictability of reactivity represents a benefit to humanity.

HIST 24 - R. B. Woodward: One was just not enough

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Robert Burns Woodward (April 10, 1917 - July 8, 1979) was one of the greatest chemists of all time. He received his Nobel Prize in 1965 for ""for his outstanding achievements in the art of organic synthesis." Perhaps this great scientist, who loved and pursued the limelight and was universally acclaimed in both his lifetime and even today, nearly 40 years after his death, deserved even more.

HIST 25 - Neil Bartlett: No Nobel for noble gases: Some guesses why

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In 1962, Bartlett published a one page note describing the synthesis and energetics of the first xenon-containing compound: Xenon hexafluoroplatinate(V), *Proc. Chem. Soc. London*, 1962, 216. This resulted in a flurry of activity by experimentalists and theorists, seasoned scientists and students, alike. Other comparably brief studies reported the synthesis of the binary, and therefore simpler, species XeF_4 and then XeF_2. An edited volume on noble gas chemistry followed the next year as well as the synthesis of KrF_2. In the same year, a college Chem 1 lecture stimulated the author of this talk in his later choice of doctoral studies. Inert gases were not inert, the octet rule was shattered, the understanding of chemistry was irrevocably altered. With such a seminal scientific seismic shift, why then did Bartlett never win the Nobel Prize for his discovery? Some

possible reasons follow: Others had predicted before, and many others experimented and explained soon afterwards, the existence of noble gas compounds. Xenon-containing species were “in the air”. Such species were “too normal”, conventional, sensible; Noble gas chemistry was too novel. The simply described experiments still involved the too exotic reagents, such as PtF6 and elemental fluorine; The octet rule was long violated by such commonplace species as PCl_5 and H_2SO_4; Noble gas chemistry was the science of essentially only one element, Xe; Bartlett was “too optimistic”, if not, “egotistical” -- his compound was not Xe^+ $[PtF_6]^-$ but rather ill-defined; Bartlett was too humble to advertise himself and the specialness of his accomplishment – he never was a member of the *nobility*.

HIST 26 - Proposing Howard E. Simmons, Jr.

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The Nobel Prize rewards the author of a major discovery. However, there are other avenues to the advancement of knowledge. Its dissemination occurs not only from publications in peer-reviewed scholarly journals, also through the patent literature. Industrial laboratories prepare novel materials and devise technical applications for them. Sometimes — Bell Laboratories is a prime example — they engage in pure science as well. While expertise in a field may bring eminence with it, the complementary role of polymaths is equally essential. Leadership in exploration entails judgment in surrounding oneself with lieutenants, wisely chosen for their potential. Because Howard Ensign Simmons, Jr. (1929-1996) who directed the Experimental Station at DuPont, in Wilmington, Delaware, excelled in all these other characteristics, he is, I submit, a prime candidate for one of the honorary Nobel Prizes in chemistry.

HIST 27 - Translation of Markivcnikov's Magistr Khimii dissertation: A progress report

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During June, 2015, we were able to obtain digital copies of the *Magistr Khimii* and *Doktor Khimii* dissertations of Vladimir Vasil'evich Markovnikov. The translation of these documents into English consists of two distinct phases. First, the pre-Soviet Russian of the original document needed to be translated (transliterated) into modern Russian—after the Russian revolution, four letters were eliminated from the Cyrillic alphabet entirely, and the spelling of many words was simplified. For example, only one vowel for 'i' now appears in modern Russian, and there are two, not three representations of 'e'; the hard sign, which was widely used in early Russian at the end of words is now used rarely, and then only in the middle of words. Following the modernization of the Russian, the translation into English is now being carried out. Herein, we will report our progress in the translation of the *Magistr Khimii* dissertation.

HIST 28 - Oldest planetary, astrochemical mystery: Jupiter's great (but shrinking) red spot

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Jupiter's Great Red Spot (GRS) is arguably one of the more recognizable extraterrestrial features in the Solar System, ranking near Saturn's rings and the polar caps of Mars. Although many proposals have been made to explain the GRS's color, no consensus has been reached as to the most likely chromophore. This presentation will review the history of some of these suggestions, including materials that can be traced to Robert Boyle in the 17th century and the Polaroid Corporation in the 20th. Both astronomical challenges and chemical obstacles will be addressed. The recent discovery that the GRS is shrinking has added urgency to the solution of this astrochemical mystery.

HIST 29 - Eponym's curse

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Yes, that's an Erlenmeyer flask, but which is the Plucker tube, the Pitot tube, and the Buchner funnel? Gimbattista Riccioli, and Italian Jesuit, probably started it all by blanketing his 1651 lunar map with the names of dozens of

Greek, Roman, early Christian, medieval, and Renaissance scholars. The 21st century version has been the naming of mountains, craters, plains, and everything else on planets and other moons according to complex rules devised by the International Astronomical Union (which also names comets and asteroids, with exoplanets coming next). But it was the International Union of Pure and Applied Chemistry that gave 12 of the 19 most recent elements to people, rather than places, properties, or characteristic reactions. The Heck process you probably remember (he just died in October) and perhaps Ostwald, Pasteur, and Haber. But Birkeland-Hyde, Bucher, Caro & Franke, Coslett, Fischer-Tropsch, Mercer, Parker, Schoop, and Serpek? Hall has both a process and a current (not the same Hall). Centigrade has become Celcius, and the atomic mass unit (amu) is fading into the Dalton. Nearly all the units of electromagnetism, from Ampere to Tesla, are eponyms, with very little correlation between what folks did and what is named for them. Where's the harm if the scientific community wishes to honor its own in this fashion (or even, as less generous commentators have said, things get named for the first person who fails to credit his predecessors)? First is the loss of information, as per Celcius, Dalton, and the threatened renaming of the Cepheid period-luminosity relation as Leavitt's law. An ideal gas law tells you what it is good for far better than Boyle's and Charles'. Second is the simplified, even erroneous, history encapsulated (Hubble's law, so called because it was discovered by Lundmark is a classic astronomical example, but I would not want to have to defend Biot-Savarin, Clausius- Clapeyron, Dulong-Petit, or Guy-Lussac either). Third, what happens when either the persona or the concept is declared non-grata? A few years ago, Debye had a posthumous narrow escape from losing his institute and perhaps even his degree. Luckily his length was not endangered before the fuss had died down. Meanwhile, anyone for Blanc's rule or Mattauch's law? The presentation will include a long list, but focus on a few cases the presenter regards as interesting.

HIST 30 - Gilbert Lewis and the conceptual evolution of the chemical bond

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This marks a landmark year in the development of the concept of a chemical bond as it relates to participation of electrons of the atoms involved. The ideas of valence and the possible stereo-chemical orientations of such valences were already generally accepted through the work of notable chemists in the second half of the nineteenth century. As a better understanding of how atoms connected in a molecule began to take shape, Gilbert N. Lewis, in 1916, wrote a seminal publication with a clear picture of the covalent bond structure between two atoms, based on “shared” electrons. The simple illustration of electrons around an atom by “dot” structures provided an easy to understand means to such bonding when the “octet” rule was taken into account. The distribution of such bonding electrons was subsequently modified by more sophisticated probability theories. On the centennial of this publication, this paper will describe the life of G.N. Lewis and the evolution of the concepts of bonding up to his time.

HIST 31 - R.J.P. Williams and the chemical sequence of natural history

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The inorganic chemist R.J.P. Williams (1926-2015) is known best for identifying the Irving-Williams series with Harry Irving in 1953, but Williams is also well known for many contributions to biochemistry. In the final decades of his life, Williams published several books and articles applying the principles of inorganic chemistry (including the Irving-Williams series) to natural history. In these publications, he wrote as a historian telling a narrative of chemical evolution. After the turn of the century, genetic evidence supported many aspects of his synthesis of geochemistry, biochemistry, and inorganic chemistry, culminating in a chemical sequence for the evolution of life on Earth. I have adapted Williams’ historical narrative for a general audience and contrasted it with Stephen Jay Gould’s “Tape of Life” narrative in the new book A World From Dust: How the Periodic Table Shaped Life. Williams developed his narrative by applying his experience as an inorganic chemist and biochemist to four billion years of natural history. Williams’ chemical thinking led to his hypotheses of specific ways in which chemistry constrained the historical possibilities open to biology through chemical availabilities, reactivities, and solubilities. These chemical constraints shaped the trajectory of evolution into a story that can be told to a general audience as an engaging, interdisciplinary narrative of "big history." This narrative shows how the regular organization of the periodic table led to regularities in the chemical sequence of the development of Earth and life, ultimately highlighting the historical explanatory power of the discipline of chemistry.