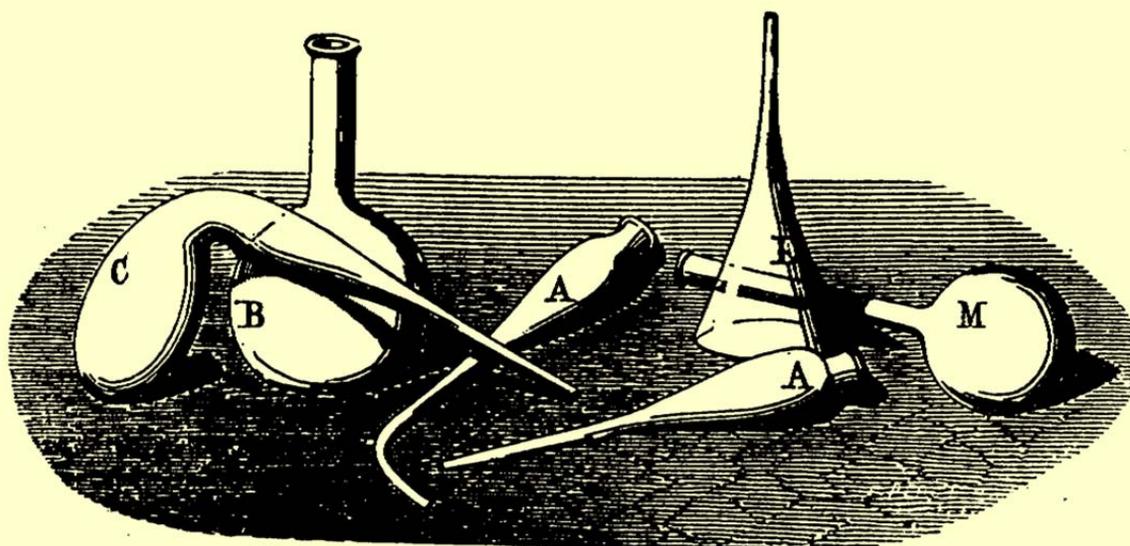




American Chemical Society
**DIVISION OF THE
HISTORY OF CHEMISTRY**



**NEWSLETTER, PROGRAM AND
ABSTRACTS**

246th ACS National Meeting
Indianapolis, IN
September 8-12, 2013

S. C. Rasmussen, Program Chair

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Mission Statement

The Division of the History of Chemistry (<http://www.scs.illinois.edu/~mainzv/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.

Message from Ned Heindel, HIST Division Chair

We've always been a lively, little Division within ACS and these days we're even livelier! Rich symposia, HIST tutorials, and extensive general programming at Indianapolis, Dallas, and San Francisco testify to the enthusiasm of our members and the diligence of our Divisional Program Chair, Seth Rasmussen. The symposium series on legacies of former ACS presidents continues with Helen Free being featured at Indianapolis and Attila Pavlath at San Francisco. We've always done milestones well and the Moseley centennial (Indianapolis) and the James Flack Norris Award's 50th (Dallas) continue that tradition. The History of Mass Spec (at Indianapolis) and of Organic Chemistry (San Francisco) will have broad cross-disciplinary sponsorships. A symposium at San Francisco, "Found and Lost: Incredible Tales of Spurious, Erroneous and Rehabilitated Elements," will celebrate the publication of a book of similar title by Marco Fontani, Mariagrazia Costa and Mary Virginia Orna.



Perhaps HIST's greatest event is our award for outstanding career contributions to the history of chemistry which we've given since 1956 through three name changes, Dexter, Edelstein, and HIST Award. Thirty-two ACS divisions, 4 secretariates, and an estimated 48 local sections all grant awards but of those given for individual professional contributions, showcased by a symposium, perhaps only the Goodyear Medal (Rubber - 1948) and the Hudson Award (Carbohydrates - 1946) predate ours. This year's HIST Awardee, William R. Newman, will be honored in Indianapolis with the award, a symposium, and a banquet.

Several of our Division members, including our Chair and Chair-Elect, will represent us and present papers at the November 9th meeting in London of the Society for the History of Alchemy and Chemistry. The meeting's theme will be *Books in Chemistry*. Teresa Celestino represented HIST at the award ceremony for the *Citation for Chemical Breakthrough Award* that honored the 1811 paper of Avogadro, in Vercelli, Italy. HIST greatly appreciates the efforts of Jeff Seeman in creating and sustaining the Breakthrough Awards program. Jay Labinger will represent HIST and will present a paper at the *Centenary of the Alfred Werner Nobel Prize*, 22 November in Zurich.

We hope to see you at as many of these events as you're able to attend.

Ned D. Heindel, HIST Chair

Report of Councilors, Division of the History of Chemistry ACS National Meeting, New Orleans, LA; April 7-11, 2013

Election Results

- The Committee on Nominations and Elections presented to the Council the following nominees for selection as candidates for President-Elect, 2014: G. Bryan Balazs, Charles E. Kolb, Jr., Carolyn Ribes, and Diane Grob Schmidt. By electronic ballot, the Council selected G. Bryan Balazs and Charles E. Kolb, Jr. as candidates for 2014 President-Elect. These two candidates, along with any candidates selected via petitions, will stand for election in the Fall National Election.
- The Committee on Nominations and Elections announced the results of the election to select candidates from the list of nominees to serve as Directors from District II and District IV on the Board of Directors for the term 2014-2016. Nominees for District II included George M. Bodner, Jed F. Fisher, Alan A. Hazari, and Robert A. Pribush. Nominees for District IV included John P. Fackler, Jr., Rigoberto Hernandez, Larry K. Krannich, and John A. Whittle. By mail ballot, the Councilors from these districts selected George M. Bodner and Alan A. Hazari as District II candidates; and Rigoberto Hernandez and Larry K. Krannich as District IV candidates. Ballots will be mailed on or before October 10 to all ACS members in District II and District IV for election of a Director from each District.

Candidates for Directors-at-Large

- The Committee on Nominations and Elections announced the selection of the following candidates for Directors-at-Large for a 2014-2016 term: Susan B. Butts, Thom H. Dunning, Jr., Dorothy J. Phillips, and Kathleen M. Schulz. The election of two Directors-at-Large from among those candidates and any selected via petition will be conducted in the fall. Ballots will be mailed to the Council on or before October 10.

Committee Election

- Two vacancies on the Committee on Committees were created by the election of Ingrid Montes to the ACS Board of Directors and the appointment of H.N. Cheng as chair of the Committee on International Activities. Prior to the New Orleans meeting, the Committee on Nominations and Elections presented to the Council the following slate of candidates for membership on the Committee on Committees beginning 2013: Christopher J. Bannochie, Arindam Bose, David Lohse and Jason Ritchie. Christopher J. Bannochie and Jason Ritchie were selected to fill three-year and one-year terms, respectively.

Committee Review

- As part of a regular performance review, the Council VOTED unanimously to continue the Committees on Chemical Abstracts Service, Environmental Improvement, and Younger Chemists. Continuation of these three committees requires Board concurrence.

Re-alignment of Electoral Districts

- At the 2012 fall meeting, Councilors called for a broader and long-lasting solution to requirements that Board electoral districts have parity in member populations. At this meeting, the Committee on Nominations and Elections reported on their discussions of a revised redistricting proposal which brings all six election districts within 400-1,000 members of the mid-point of the permissible range. This proposed action is designed to eliminate the need for frequent small changes for some time to come. The proposal will be up for vote at the fall Council meeting in Indianapolis.

Society Finances

- Despite the sluggish economy, ACS generated favorable operating results in 2012. Total revenue was \$490.7 million, which was \$6.1 million or 1.3% greater than the approved budget, and 3.9% higher than 2011. The Net from Operations was \$20.2 million, or \$4.3 million favorable to budget. This was

largely attributable to better-than-expected performance by ACS Publications and CAS, and represents the Society's 9th consecutive year of positive operating results. While operating performance was favorable, Unrestricted Net Assets declined \$1.4 million to \$100.6 million. Finally, ACS ended the year in compliance with four of the five Board-established financial guidelines.

2014 Member Dues

- The Council VOTED to set the member dues for 2014 at the fully escalated rate of \$154. This rate is established pursuant to an inflation-adjustment formula in the ACS Constitution and Bylaws.

Petition to Amend the Constitution and Bylaws

- For Action: After discussion, a vote to approve the Petition to Amend National Election Procedures FAILED (85% against, 15% in favor). The petition sought to shorten the campaign period for candidates for President-Elect and to charge the Committee on Nominations and Elections (N&E) with proposing two candidates for President-Elect. Currently, N&E proposes four nominees from which Council selects two candidates. Under the petition, Council would no longer vote on a list of nominees. In collaboration with the Committee on Nominations and Elections, the Council Policy Committee authorized a joint task force on election timelines and procedures. This task force will examine the entire election system.

Member Statistics

- Society membership at the end of 2012 was 163,322 - 893 lower than the total for year-end 2011 despite recruiting 24,943 new members. The net loss occurred primarily in the Regular, full member category. There was continued growth in both the Student Member undergraduate and international categories, which helped mitigate the overall decline in membership. The Membership Affairs Committee approved five pilot market data tests to increase membership.

Attendance Report

- As of April 11, 2013, the ACS spring national meeting had attracted 15,596 registrants, including 8,105 regular attendees and 5,793 students. The meeting had 11,232 papers presented.

Academic Professional Guidelines

- The Council VOTED to approve the Academic Professional Guidelines as submitted by the Committee on Economic and Professional Affairs. These guidelines apply to those members of the academic community whose job function impacts directly or indirectly on scientists practicing the profession of chemistry.

Local Section Allotment Formula

- The Council VOTED to approve a new formula for the distribution of allocations to individual Local Sections beginning in 2014. The new allocation will be divided as follows: base allotment (49%); per member allotment (43%), and LSAC program funds (8%).

Divisional Activities Name Change Request

- The Divisional Activities Committee (DAC) received a request from the Division of Colloid and Surface Chemistry to change its name to the Division of Colloids, Surfaces and Nanomaterials. Six divisions have registered opposition to the proposed name, largely due to the use of the term 'nanomaterials'. DAC will ask Council to vote on the new name in Indianapolis, with a recommendation to approve.

Revision to Charter Bylaws for the International Chemical Sciences Chapters

- The Council VOTED to approve changes to the Charter Bylaws for New International Chemical Sciences Chapters. These changes will guide the Committee on Constitution and Bylaws in reviewing bylaw changes before proposed changes are approved by the membership of the new chapter.

New International Chemical Sciences Chapter

- The Council VOTED, in concurrence with the Board of Directors, to approve the petition to charter the Romanian International Chemical Sciences Chapter, consisting of the Territory of Romania.

Special Discussion Item

- A special discussion item was put on the Council agenda for this meeting. ACS President Marinda Li Wu presented and moderated a discussion on “What else should ACS do to help members to thrive in the global chemistry enterprise?” ACS has established a strategic goal to “Empower an inclusive community of members with networks, opportunities, resources, and skills to thrive in the global economy.” In support of this goal, President Wu commissioned a task force entitled, “Vision 2025: Helping ACS Members Thrive in the Global Chemistry Enterprise,” to identify globalization opportunities and engage members in advocacy for improving the business and job climate. Following the presentation, 29 Councilors engaged in a robust discussion on what the Society currently offers or could offer to help members thrive in the global chemistry community.

The Executive Director/CEO Report

- The Executive Director/CEO and her direct reports updated the Board on the following: highlights of accomplishments from 2012; the major challenges and projects facing the Society in 2013; and the activities of CAS (Chemical Abstracts Service), the ACS Publications Division, and the Society’s General Counsel. As part of the Publications report, the Board VOTED to approve journal editor re-appointments and an appointment to the ACS Governing Board for Publishing.

Activities of HIST Councilors

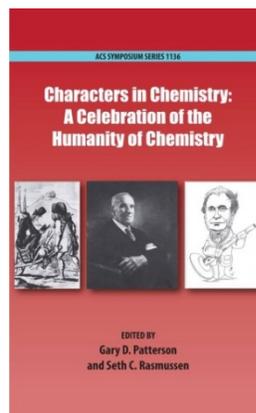
Mary Virginia Orna – continues in the third year of her second three-year term as a member of the Council Policy Committee (CPC). She is also a member of CPC’s Long-Range Planning Subcommittee and CPC’s Subcommittee on Constitution and Bylaws. She has also participated in the planning and implementation of the New Councilor Mentor Program and the 2013 New Councilor Orientation Program which took place at this meeting. This year marks the completion of her 18th year as a member of one of the three elected committees of the Council; she is ineligible for re-election to CPC.

Roger Egolf – continues as a member of the Divisional Activities Committee (DAC). He has recently moved from the Annual Reports subcommittee to the Constitution and Bylaws subcommittee of DAC. He also continues to serve as the liaison from DAC to the Membership Affairs Committee and to HIST. Roger also serves the division as its representative to the Heritage Council of the Chemical Heritage Foundation.

Mary Virginia Orna, Roger A. Egolf, Councilors

New HIST-Sponsored ACS Symposium Book: *Characters in Chemistry*

The ACS Symposium Series Volume 1136, *Characters in Chemistry: A Celebration of the Humanity of Chemistry*, is now available as an ebook, with the hardback version available in the coming months. The volume is based on the HIST Symposium of the same name held on August 21, 2012 at the Philadelphia ACS Meeting. Characters as old as Lucretia Borgia and as recent as Robert Woodward are discussed. Robert Anderson presents the latest research on Joseph Black, Allan Rocke introduces John Dalton as a Quaker rustic, and Seth Rasmussen celebrates the gaseous state in the life of Humphry Davy. Chemical physics provided two of the most remarkable characters of all time: Robert Bunsen and William Crookes. No collection of characters would be complete without a dead Russian: Egor Vagner. Contemporary characters are also well represented: Georg Rosenkranz, Paul Flory and the remarkable collection of



Hungarian scientists known as “The Martians.” Even purely fictional characters are discussed. The volume is guaranteed to provide hours of enjoyable chemistry amidst the chemists.

Gary Patterson and Seth C. Rasmussen, Volume Editors

Facebook Pages Share the History of Chemistry with the World

Since Spring 2011, HIST has maintained a Facebook page to help promote its activities and all things relating to the history of chemistry. This effort joins that of the *Society for the History of Alchemy and Chemistry* (SHAC), who established their own Facebook page in 2010. To date, the community following the HIST Facebook page has grown to 127 official followers (i.e. 'likes'), up by 35% from the last update in the previous HIST Newsletter, but still only about half of that of the SHAC Facebook page. The majority of those reached via the HIST Facebook are younger people in their 20s and 30s, most of which are not HIST or even ACS members. In addition, approximately 3/4 of the official 'likes' are coming from various international communities (30 different countries) without traditional access to activities of the division. The HIST Facebook page can be found at <http://www.facebook.com/#!/pages/ACS-Division-of-the-History-of-Chemistry-HIST/152326921497559> or by searching 'HIST' in the Facebook search bar. The SHAC Facebook page can be found at <https://www.facebook.com/pages/Society-for-the-History-of-Alchemy-and-Chemistry/105879199433508>. If you are a Facebook user, please stop by and check out these efforts to share our passion of the subject. Then 'Like' the page to join us and post comments to share the history of chemistry with the world!

Seth C. Rasmussen, HIST Facebook Page Administrator



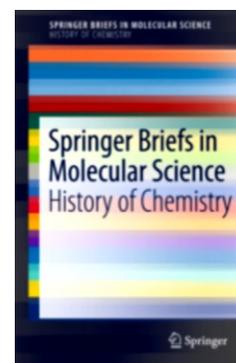
HIST Past Presidents Symposium Series

The HIST Past Presidents Symposium series is designed to explore the professional and scientific legacy of some of our former ACS Presidents. Symposia are planned for National ACS meetings in the geographical area associated with the President to be honored. Past symposia have honored Henry Eyring (Salt Lake City, Spring 2009), Anna Jane Harrison (Boston, Fall 2011), and Mary Good (New Orleans, Spring 2013). In addition to the upcoming Helen Free symposium in Indianapolis, future symposia are under development for Attila Pavalth (San Francisco, Fall 2014) and Henry Hill (Boston, Fall 2015). If you would like to be a part of any of these future symposia, please contact Jan Hayes at janan.hayes@yahoo.com for more information on plans and participation.

Springer Briefs in Molecular Science: History of Chemistry Seeks New Authors

The first five volumes are currently available in softcover or ebook formats and details on the next two volumes are now posted, with their availability coming shortly. In addition, three additional volumes are currently being written and edited, with the hope to add even more before the end of the year. As such, new authors are being sought for potential new volumes. Volumes are 50-125 pages in length, presenting concise summaries of historical topics covering all aspects of chemistry, alchemy, and chemical technology. Authors interested in discussing potential topics for future volumes should feel free to contact the Series Editor, Seth Rasmussen (seth.rasmussen@ndsu.edu). For more detailed information on available volumes and guidelines for submitting volume proposals, please visit the series website at <http://www.springer.com/series/10127>.

Seth C. Rasmussen, Series Editor



Message from the HIST Program Chair

Hello again. This newsletter's message will be brief as there is not much new to share. As a member of the Abstract System Replacement Advisory, we are currently evaluating potential replacement systems, but the process is still ongoing. The new system is supposed to be in place for the Denver (Spring 2015) call for papers. In terms of HIST programming, our symposia for Indianapolis will provide two and a half days of strong offerings, including a symposium honoring William R. Newman, the recipient of the first HIST Award, the successor of the previous Dexter Award and Sydney M. Edelstein Award. I am also happy that Carmen Giunta will be giving the HIST tutorial for Indianapolis, entitled *HIST Tutorial: Molecules in motion - the kind we call heat*. As a reminder, these tutorials aim to provide an educational review on a historical topic of general interest, which is aligned with the ACS thematic programming if possible. As the theme for Indianapolis is 'Chemistry in Motion', Carmen's topic nicely connects to the overall meeting theme while providing an interesting topic for some great history. As I have mentioned previously, we have struggled to maintain the *HIST Tutorial Series* due to a lack of willing speakers and I am still looking for Tutorial speakers for Dallas (*Chemistry & Materials for Energy*), San Francisco (*Chemistry & Global Stewardship*), and Denver (*Chemical Resources: Extraction, Refining, and Conservation*). If you are willing to give a tutorial related to one of these topics or if there is a topic you would like to see added to the series, please don't hesitate to let me know (seth.rasmussen@ndsu.edu).



Seth C. Rasmussen, HIST Program Chair

HIST SYMPOSIA, 246th ACS Meeting in Indianapolis, IN, September 8-12, 2013

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

HIST Award Symposium Honoring William R. Newman

This half-day symposium will honor Professor William R. Newman (Indiana University), the recipient of the 2013 HIST Award of the Division of the History of Chemistry. Speakers will include Lawrence M. Principe (The Johns Hopkins University), John C. Powers (Virginia Commonwealth University), Jole Shackelford (University of Minnesota), and Joel A. Klein (Indiana University, The Chemical Heritage Foundation), followed by an award address by Prof. Newman. The symposium will be **Sunday afternoon**, September 8, at the Indianapolis Marriott Downtown – Michigan.

S. Mauskopf and S. Rasmussen, Organizers

What's Your Number: A Centennial Remembrance of Henry Moseley

One of the most important chemical events of the 20th century was the measurement and explanation of the x-ray spectrum of the elements by H.G.J. Moseley in 1913. This work vindicated the periodic description of the elements and assisted with the discovery of many more elements. The life of Moseley will be remembered by his most famous modern biographer, J.L. Heilbron. Carmen Giunta will present a reflection on atomic number and Paul Karol will review x-ray spectroscopy. Gary Patterson will present a bibliography of the work by and about Moseley. And Virginia Trimble will bring the perspective of the astronomy community to the understanding and appreciation of the work of Moseley. A concluding panel discussion will allow for extensive interaction on all the topics raised in the presentations. The symposium will be **Monday morning**, September 9, at the Indianapolis Marriott Downtown – Michigan.

G. Patterson, Organizer

Historical Origins of Mass Spectrometry

Cosponsored by Bolton Society and American Society for Mass Spectrometry

This year marks the 100th anniversary of J.J. Thomson's publication of the monograph "Rays of Positive Electricity and Their Applications to Chemical Analysis." It is only fitting that the HIST Division of the

American Chemical Society should hold a symposium entitled "One Hundred Years of Mass Spectrometry: Then and Now." Speakers include both historical artifacts themselves and major figures in the history of mass spectrometry. Gary Patterson will present "A Natural History of Positive Electricity." O. David Sparkman will laud one of the most prized books in his collection: ROPE. Michael Grayson will discuss the discovery and study of isotopes by MS. Cathy Costello will chronicle biological applications. Fred McLafferty will discuss "McLafferty." Graham Cooks will discuss the history of MS instrumentation. And Ken Standing will feature the history of TOF/MS. The symposium will be **Monday afternoon**, September 9, at the Indianapolis Marriott Downtown – Michigan.

M. Grayson and G. Patterson, Organizers

Helen Free: Science and Legacy of a unique Past ACS President.

Helen Free: Science and Legacy of a Unique Past ACS President is the latest in a series of symposia honoring past ACS Presidents. Helen's contributions will be shared by laboratory colleagues, society co-workers, and other friends and family. Be prepared to laugh a little, maybe cry a little, and be amazed at all the contributions of this magnificent chemist, humanitarian and mother. The symposium will be **Tuesday afternoon**, September 10, at the Indianapolis Marriott Downtown – Michigan.

J. Hayes, Organizer

UPCOMING NATIONAL MEETINGS AND HIST DEADLINES

Offerings are subject to change. Check the [HIST website](#) for updates.

Dallas, March 16-20, 2014

Submit your abstract via the online ACS Program and Abstract Creation System (PACS) by **October 14, 2013**. 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

History of Chemistry in North Texas (Invited and **Seeking contributors**) 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

Fifty Years of the James Flack Norris Award. The Foundations of Physical Organic Chemistry (Invited and **Seeking contributors**) 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; Jeffrey I. Seeman, Department of Chemistry, University of Richmond, Westhampton Drive, Richmond, VA 23173, Phone: (804) 794-1218, Email: jiseeman@yahoo.com

Bringing Chemistry To the Public: A Historical Look at the Popularization of Chemistry (Invited and **Seeking contributors**) Nicolay Tsarevsky, Department of Chemistry, Southern Methodist University, PO Box 750314, Dallas, TX 75275-0314, Phone: (214) 768-3259, Email: nvt@smu.edu

San Francisco, August 10-14, 2014

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

Found and Lost: Incredible Tales of Spurious, Erroneous and Rehabilitated Elements (Invited and **Seeking contributors**) Mary Virginia Orna, Department of Chemistry, College of New Rochelle, New

Rochelle, NY 10805, Phone: (914) 654-5302, Email: maryvirginiaorna@gmail.com; Marco Fontani, Email: marco.fontani@unifi.it

Science and Legacy of Attila Pavlath (Invited and **Seeking contributors**) Jan Hayes, Hayes, 6829 Barbara Lee Circle, Sacramento, CA 95842, Phone: (916) 331-6886, Email: janan.hayes@yahoo.com

Recent Studies in the History of Modern Organic Chemistry (Invited and **Seeking contributors**) Jeffrey I. Seeman, Department of Chemistry, University of Richmond, Westhampton Drive, Richmond, VA 23173, Phone: (804) 794-1218, Email: jiseeman@yahoo.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 Names Carsten Reinhardt President and CEO

Carsten Reinhardt, professor of the history of science at Bielefeld University, Germany, will become president and CEO of the Chemical Heritage Foundation (CHF), effective August 1, 2013. He will succeed Thomas R. Tritton, who is retiring. Reinhardt was selected following a worldwide search for a leader with a great depth of experience in the history of science who could guide CHF to reach new audiences locally, nationally, and around the world. He has extensively researched and published on the impact of chemistry on society through topics including the history of industrial research, the emergence of instrumentation, and chemistry's links to physics, biology, medicine, and technology.

"Carsten comes to CHF with an illustrious career in the history of science," said Laurie Landeau, chair of CHF's board of directors. "In addition to his academic connections, he has connections across the chemical enterprise. He has worked with leaders in the chemical industry as well as in government. Under Carsten's leadership CHF will reach out to the entire world from Philadelphia, while maintaining and expanding both our local and national programs in the history of chemistry and early science."

Carsten Reinhardt joined the faculty of Bielefeld University in 2007. In 2006–2007 he held a fellowship at the Max Planck Institute for the History of Science, Berlin. Before that, he spent a decade as a professor at the University of Regensburg. The author of three books, Reinhardt has contributed to five edited volumes and published nearly forty academic articles. He has made more than thirty major presentations on topics in the history of science in a dozen countries in Europe and North America. In addition he has received many awards and fellowships, including being named a fellow at the Max Planck Institute and a visiting professor (professeur invité) in the Department of Philosophy, École Normale Supérieure, Paris. Reinhardt was an Edelstein Fellow at CHF in 1998–99. He was also an Edelstein Fellow at Hebrew University in Jerusalem in 1994.

Chemical Heritage Foundation Project Page in Wikipedia

The Chemical Heritage Foundation Project Page was created to document the collaboration of the Chemical Heritage Foundation with Wikipedia. As part of WikiProject GLAM and the Wikipedian in Residence initiative, staff of the Chemical Heritage Foundation worked with Wikipedian Mary Mark Ockerbloom. This project seeks to coordinate the sharing of resources between the Chemical Heritage Foundation and the Wikimedia community in a way that is beneficial to both. Activity focused around three specific events during May–June 2013: a "What Is Wikipedia?" brown bag lunch, a "Wikipedia 101" workshop, and a "Wikipedia Edit-a-thon".

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.

Sources of Alchemy and Chemistry

SHAC is proud to announce the launch of a new series of monograph-length volumes: Sources of Alchemy and Chemistry. This series will provide critical editions and English translations of some of the foundational texts in the history of alchemy and early chemistry: sources that have previously been inaccessible to all but a handful of scholars owing to a lack of modern editions. The series will be overseen by an international editorial board, under the general editorship of Professor Lawrence Principe (Baltimore) and Dr Jennifer Rampling (Cambridge).

The series begins this year with one of the earliest known chemical texts: the Four Books of Pseudo-Democritus, edited by Dr Matteo Martelli (Berlin). Although the original work, dating from the first century, has not survived in its entirety, the Four Books can be reconstructed from later Greek and Syriac compilations – allowing important insights into some of the earliest recorded practices in western chemistry. This volume will be followed in 2014 by The Book of Alums and Salts, pseudonymously attributed to the Persian polymath Al-Razi. Dr Gabriele Ferrario (Cambridge) will present Arabic and Hebrew editions of this practical treatise, which exerted strong influence on the western alchemical tradition.

The series includes editions of works in Greek, Syriac, Arabic, Hebrew and Latin, all with English translation and commentary. Each volume will showcase the best and most up-to-date scholarship on early chemical writings, offering new insight into the origins of alchemy, chemistry and chemical technology. This exciting development has been made possible through the generosity of a private donor, which allows us not only to commission the best available scholarship, but also to provide these issues of Sources free of charge to members of the Society and Ambix subscribers.

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.

H. Floris Cohen Becomes the Tenth Editor of *Isis*

In February 2012, H. Floris Cohen submitted a preliminary proposal to the History of Science Society (HSS) to become the Society's new Editor. After many months of discussion, a site visit from the search committee, and a person-to-person conversation with our current editor, Bernie Lightman, Dr. Cohen and his colleagues in Utrecht submitted a final proposal. In June 2013 the HSS Council accepted the recommendation from HSS's Committee on Publications and elected Dr. Cohen to a 5-year term as Society Editor beginning July 1, 2014. Dr. Cohen is professor of comparative history of science and chairman of the Descartes Centre for the History and Philosophy of the Sciences and the Humanities at Utrecht University in the Netherlands.

Final Program

HIST

DIVISION OF THE HISTORY OF CHEMISTRY

S. C. Rasmussen, *Program Chair*

SUNDAY MORNING

Section A

Indianapolis Marriott Downtown - Michigan

HIST Tutorial and General Papers

S. C. Rasmussen, *Organizer*

J. Jeffers, *Presiding*

8:30 1. HIST Tutorial: Molecules in motion - the kind we call heat. **C. Giunta**

9:10 2. Disability, despotism, and deoxygenation—outlaw to Academy Member. Nikolai Matveevich Kizhner (1867-1935). **D. E. Lewis**

9:40 Intermission.

9:55 3. Hidden gold: The nature of Purple of Cassius in the Dictionnaire de chymie. **T. P. Hanusa**

10:25 4. Samuel C. Lind: Father of US radiation chemistry. **R. L. Hudson**

10:55 5. Path to Conducting Polyacetylene. **S. C. Rasmussen**

SUNDAY AFTERNOON

Section A

Indianapolis Marriott Downtown – Michigan

HIST Award Symposium Honoring William R. Newman

S. Mauskopf, S. C. Rasmussen, *Organizers*

J. Heilbron, *Presiding*

1:00 Introductory Remarks.

1:15 6. Seeking true principles: The evolution of Wilhelm Homberg's *Essais de chimie*. **L. M. Principe**

1:55 7. Corpuscles, elements, and principles: The limits of fire analysis in Herman Boerhaave's chemistry. **J. C. Powers**

2:35 8. Working in time: The inner craftsman as teleological agent in Paracelsian biology. **J. Shackelford**

3:15 Intermission.

3:30 9. Corpuscular chymical tradition in Germany and the question of the metaphysical principles. **J. A. Klein**

4:10 10. Mercury and sulfur among some medieval European alchemists. **W. R. Newman**

SUNDAY EVENING

Indianapolis Marriott Downtown – Michigan

5:00 - 5:30 HIST Business Meeting

MONDAY MORNING

Section A

Indianapolis Marriott Downtown – Michigan

What's Your Number: A Centennial Remembrance of Henry Moseley

G. Patterson, *Organizer, Presiding*

8:00 Introductory Remarks.

8:05 11. Henry Gwyn Jeffries Moseley: A remembrance. **G. D. Patterson**

8:35 12. Ordering the elements: van den Broek and Moseley. **C. J. Giunta**

9:05 13. Bringing Law and Order to the Table. **P. J. Karol**

9:35 14. Bohr and Moseley. **J. L. Heilbron**

10:05 Intermission.

10:20 15. Blurring the boundaries among chemistry, physics, and astronomy: The Moseley Centenary. **V. Trimble**

10:50 16. Bibliography of H.G.J. Moseley. **G. D. Patterson**

11:20 Panel Discussion.

MONDAY AFTERNOON

Section A

Indianapolis Marriott Downtown – Michigan

Historical Origins of Mass Spectrometry

Cosponsored by Bolton Soc

Financially supported by American Society for Mass Spectrometry

M. Grayson, *Organizer*

G. Patterson, *Organizer, Presiding*

1:00 Introductory Remarks.

1:05 17. Natural history of positive electricity. **G. D. Patterson**

1:35 18. True origin of the first mass spectrometer. **O. D. Sparkman**

2:05 19. Isotopes: The era of the physicist. **M. A. Grayson**

2:35 20. MS/MS: From Thomson's day to ours. **R. G. Cooks**

3:05 Intermission.

3:20 21. Molecular mass spectra: the chemistry of gaseous organic ions. **F. W. McLafferty**

3:50 22. Time-of-flight mass spectrometry: from niche to mainstream. **K. G. Standing**

4:20 23. Ever-widening horizons of biological mass spectrometry. **C. E. Costello**

MONDAY EVENING

Indianapolis Marriott Downtown - Atlanta

5:00 - 8:00 HIST Executive Committee Meeting

MONDAY EVENING

Section A

Indiana Convention Center - Halls F&G

Sci-Mix

S. C. Rasmussen, *Organizer*

8:00 - 10:00

1, 2, 5, 12, 19, 23. See previous listings.

TUESDAY AFTERNOON

Section A

Indianapolis Marriott Downtown – Michigan

Helen Free: Science and Legacy of a unique Past ACS President

J. Hayes, *Organizer, Presiding*

2:00 Introductory Remarks.

2:05 24. The Early Years at Miles Laboratories. **R. Savol**, M. Sproull, C. Ringuette

2:20 25. The Scientific Legacy of Helen M. Free, 1993 ACS President. **D. V. Brown**

2:40 26. The woman who launched at least a thousand chemistry outreach programs. **D. Creech**

3:00 27. Helen Free and the National Inventors Hall of Fame. **R. Paiva**

3:20 Intermission.

3:40 28. The Helen M. Free Award for Public Outreach. **J. Butler**

4:00 29. Science-2-Go Bus. **P. Bohler**

4:20 30. Helen Free: The Family's Perspective. **E. Free**

4:40 31. Thanks and Serendipity. **H. M. Free.**

HIST 1 - HIST Tutorial: Molecules in motion - the kind we call heat

Carmen Giunta, giunta@lemoyne.edu. Department of Chemistry, Le Moyne College, Syracuse, NY 13214, United States

The random motion of atoms, ions, and molecules has long been recognized as the microscopic explanation of heat. An overview will be given of how natural philosophers, chemists, and physicists understood and explained heat from the 17th through the 19th centuries. Mechanical corpuscular theories of the 17th century included an understanding of heat as motion. Because heat was obviously related to fire it could be understood in terms of the phlogiston theory while that theory held sway. Even while challenging the existence of phlogiston, Lavoisier explained heat in terms of another imponderable material, caloric. At the very end of the 18th century, experiments by Rumford and Davy supported the interpretation of heat as motion. During the 19th century the idea of heat as motion was developed into a quantitative dynamical theory of heat through the work of Carnot, Joule, Mayer, Clausius, Thomson, Maxwell, and Boltzmann among others.

HIST 2 - Disability, despotism, and deoxygenation—outlaw to Academy Member. Nikolai Matveevich Kizhner (1867-1935)

David E. Lewis, lewisd@uwec.edu. Chemistry. University of Wisconsin-Eau Claire, Department of Chemistry, University of Wisconsin-Eau Claire, Eau Claire, WI 54702, United States

Nikolai Matveevich Kizhner (Николай Матвеевич Кижнер, 1867-1935) is immortalized in the name of the reaction he discovered, and that was discovered almost simultaneously by Ludwig Wolff (1857-1919). The Wolff-Kishner reduction, which is now just over a century old, is taught in practically every introductory organic chemistry course. Kizhner's career details are readily available, but they are also symptomatic of the fact that a famous chemist frequently becomes the captive of his fame, and this has certainly been the case with Kizhner. There are relatively few details about his non-professional life, but, fortunately, there is biographical material available about him during his first academic appointment, as the founding Director of the Chemistry Laboratory at the Imperial Tomsk Technological Institute, in Tomsk, Siberia. Here, during the first decade of his professional career, he passed through a remarkable series of events: he suffered the amputation of not one, but both legs below the knee, he organized teacher/student strikes against the government of Tsar Nicholas II, he was exiled from Tomsk for a year on the orders of the Governor-General of Western Siberia, and he discovered the reduction of ketones and aldehydes by base decomposition of their hydrazones. The early years of the career of this remarkable chemist will be discussed.

HIST 3 - Hidden gold: The nature of Purple of Cassius in the *Dictionnaire de chimie*

Timothy P. Hanusa, t.hanusa@vanderbilt.edu. Department of Chemistry, Vanderbilt University, Nashville, Tennessee 37235, United States.

The problem of reproducing the synthesis of metal nanoparticles is well known among practitioners of modern nanoscience, even if it is not often mentioned in the literature (see, e.g., Moshofsky and Mokari, *Chem. Mater.*, 2013). The poster child for such difficulties should probably be the gold-based pigment, Purple of Cassius. Known since the 17th century, Purple of Cassius' identity as a nanoparticulate gold hydrosol supported on tin oxide was not universally accepted until the work of Richard Zsigmondy in the 1890s. Zsigmondy, in turn, recognized that his results basically reaffirmed the conclusions of Michael Faraday, who with the aid of light-scattering experiments had deduced the same in 1857. Remarkably, eighty years before Faraday's work, Pierre Joseph Macquer wrote in the *Dictionnaire de chimie* (Paris, 1778) that the color of Purple of Cassius was due to gold that was finely divided (*"extrêmement divisé"*). Up until the time of Zsigmondy, however, many chemists, including J. J. Berzelius, held an alternate view: Purple of Cassius was considered to be a compound, probably derived from a gold oxide with tin oxide. The latter interpretation was not unreasonable, as the pigment failed classical chemical tests for gold (e.g., the gold was not extracted with mercury). The fact that the exact conditions under which the pigment was formed led to variations in its color made the replication of experimental results difficult, further complicating its study. In this presentation, we examine the arguments put forth in the *Dictionnaire de chimie* in defense of the presence of metallic gold in Purple of Cassius, which given

the nature of the material and the limitations of 18th century chemical theory, was a remarkably perceptive interpretation of the available data.

HIST 4 - Samuel C. Lind: Father of US radiation chemistry

Reggie L. Hudson, reggie.hudson@nasa.gov. *Astrochemistry Laboratory, NASA Goddard Space Flight Center, Greenbelt, Maryland 20771, United States.*

Samuel Colville Lind was an important figure in early-to-mid-20th century chemistry in the United States, serving as an ACS president, Priestley medalist, editor of the *Journal of Physical Chemistry*, president of the American Electrochemical Society, and member of the National Academy of Sciences. This presentation will review Lind's life, work, and legacy, focusing on his pioneering contributions to the then new field of radiation chemistry, particularly Lind's books on the subject.

HIST 5 - Path to Conducting Polyacetylene

Seth C. Rasmussen, seth.rasmussen@ndsu.edu. *Department of Chemistry and Biochemistry, North Dakota State University, Fargo, ND 58103, United States.*

The discovery that the conductivity of conjugated organic polymers can be controlled through oxidation or reduction led to materials combining the electronic properties of metals with the weight and density of plastics. For this reason, such materials have been studied extensively and their importance recognized with the awarding of the 2000 Nobel Prize in chemistry to Alan Heeger, Alan MacDiarmid, and Hideki Shirakawa. The award stemmed from their work on conducting polyacetylene via doping with oxidants which they carried out in the late 1970s. Prior to this, however, Berets and Smith reported conductive polyacetylene doped with BF_3 and BCl_3 in 1968, work which has been almost totally overlooked in the history of conjugated polymers. The work of Berets and Smith will be presented and then compared and contrasted with the later work of Heeger, MacDiarmid, and Shirakawa to try to give a more complete picture of the history of conductive organic polymers.

HIST 6 - Seeking true principles: The evolution of Wilhelm Homberg's *Essais de chimie*

Lawrence M. Principe, lmfjp@jhu.edu. *The Charles Singleton Center for the Study of Pre-Modern Europe, The Johns Hopkins University, Baltimore, MD 21218, United States.*

Wilhelm Homberg (1653-1715) was one of the most prominent and ambitious chymists of the late seventeenth century. Once admitted to the Parisian Académie Royale des Sciences in 1691, he labored for the rest of his life to establish a sound foundation for chemistry, at once more practical and experimental than the airy speculations of the physicists and more theoretically rigorous than the recipe-based compilations of contemporaneous chemical textbook writers like Nicolas Lemery. His system was to be summarized in a comprehensive textbook of his own. While selected chapters were published serially from 1702 until 1709, the complete work was never published. Following extensive archival explorations, I have collected four versions of the text dating over a twenty-year period. This paper will examine the changes in Homberg's ideas about the constitutive principles of mixed bodies, the difficulties he faced in isolating them, and his remarkable experimental programs that forced him frequently to revise his conclusions as new observational results emerged from his laboratory.

HIST 7 - Corpuscles, elements, and principles: The limits of fire analysis in Herman Boerhaave's chemistry

John C. Powers, jcpowers@vcu.edu. *STS Program & Department of History, Virginia Commonwealth University, Richmond, VA 23284-2001, United States.*

In the 18th century, chemists saw fire as the traditional, central tool for conducting chemical operations and analysis. Yet, building on the critiques of Joan Baptista van Helmont and Robert Boyle, academic chemists placed analysis by fire as a technique for breaking chemical bodies into their constituent elements or principles under serious scrutiny. One such chemist was Herman Boerhaave (1668-1738), who claimed, following Boyle, that many examples of analyses were, in fact, not reductions into a body's elements, but rather the

rearrangement of particles by the fire. As a result, Boerhaave undertook an examination to determine the true effects of chemical operations in matter, focusing primarily on the nature and effects of fire. This paper will discuss some of Boerhaave's experiments and conclusions from this examination, which relate to his definition of a chemical element, his notion of the *pabulum ignis* as principle of inflammability, and his operational definition of chemical species. In addition, I show that these aspects of Boerhaave's work have ramifications for later developments in chemistry, especially those of Lavoisier and his compatriots during the Chemical Revolution.

HIST 8 - Working in time: The inner craftsman as teleological agent in Paracelsian biology

Jole Shackelford, shack001@umn.edu. *Medical School, University of Minnesota, Minneapolis, MN 55455, United States.*

The importance of the *archaeus* for Paracelsus' understanding of physiology is well known, as is the longevity and various permutations of the concept in Helmontian medicine. Recently historians have reconsidered the *archaeus* as a craftsman, that is, as a mechanic, and pondered how this affects the traditional distinction drawn in the history of science between Paracelsian vitalism and what became known as the "Cartesian" mechanical philosophy. I will explore this concept by considering time – duration and timing – as an essential characteristic of Paracelsian bodies, much as color, saltiness, hardness, and other characteristics traditionally associated with Aristotelian form, and offer some ideas about why this inner temporality accounts for the continued usefulness of the *archaeus*, often anonymously, into the nineteenth century.

HIST 9 - Corpuscular chymical tradition in Germany and the question of the metaphysical principles

Joel A. Klein, kleinja@indiana.edu. *Indiana University, United States, The Chemical Heritage Foundation, United States.*

William Newman's research has demonstrated the importance of medieval alchemy and early-modern chymistry to the development of modern science, and in particular, his recent work has shown the importance of experimental chymical atomism in the development of corpuscular theories in the seventeenth century. Conversely, following the work of Betty Jo Teeter Dobbs and Robert Siegfried, a group of historians of chemistry have demarcated the eighteenth-century understanding of elements and principles from earlier chymistry and alchemy, wherein, they argued, the principles were viewed as metaphysical and intangible. I have maintained elsewhere that early-modern chymistry was an art defined by the analysis and synthesis of materials to discover internal, sensible principles, and that this emphasis on tangible principles allowed chymists to defend the exceptionality of their discipline against competitors from the sixteenth through the eighteenth century. In this paper I further explore the sensible nature of the chymical principles and question their alleged metaphysical status and the purported discontinuity between the seventeenth and eighteenth centuries. The current understanding of metaphysical principles was based almost exclusively on the French textbook tradition, neglecting multiple other groups. I thus focus on several German chymists who developed an influential view of the chymical principles that grew from the adoption of corpuscular chymistry into academic medicine and natural philosophy. These chymists promoted an experimental and corpuscular understanding of nature that furthered the conceptual understanding of composition, the purity of substances, and affinity. Some chymists even argued directly against the notion that the chymical principles were metaphysical.

HIST 10 - Mercury and sulfur among some medieval European alchemists

William R. Newman, wnewman@indiana.edu. *Department of History & Philosophy of Science, Indiana University, Bloomington, IN 47401, United States.*

The influential 1968 paper "Composition: A Neglected Aspect of the Chemical Revolution," by Betty Jo Dobbs and Robert Siegfried, had as one its core features the belief that the traditional alchemical components of metals, mercury and sulfur, were somehow idealized principles representing states or types of matter rather than the common materials corresponding to their names. Although that may have been true in some instances, there is considerable evidence to challenge this view among the founding documents of European alchemy, particularly in the case of those composed in the High and Late Middle Ages. Since many of these treatises

were still being widely read and analyzed in the early modern period, their significance to the debate should not be underrated. My talk will therefore focus on several alchemical treatises from the thirteenth and fourteenth centuries in order to complement the other papers in the session (particularly Joel Klein's paper) that deal with later chymical authors.

HIST 11 - Henry Gwyn Jeffries Moseley: A remembrance

Gary D Patterson, gp9a@andrew.cmu.edu. Department of Chemistry, Carnegie Mellon University, Pittsburgh, PA 15213, United States.

One of the greatest scientists of the 20th century died an early death under tragic circumstances of war. But, during his short lifetime Henry Gwyn Jeffries Moseley lived a remarkable and active life. This introductory talk will detail his aristocratic birth, remarkable childhood, education, and his final fatal military service. The focus will be on his character and his drive. The details of his research will be reserved for many other speakers.

HIST 12 - Ordering the elements: van den Broek and Moseley

Carmen J Giunta, giunta@lemoyne.edu. Department of Chemistry and Physics, Le Moyne College, Syracuse, NY 13214, United States.

The atomic number, the number of protons in the atomic nucleus, has been recognized as the proper ordering principle of the periodic table for nearly a century. But the notion of assigning ordinal numbers to the elements is as old as the periodic table, and a proposal linking that ordering number to nuclear charge is about as old as the nuclear model of the atom. This presentation will trace the origins of the atomic number concept, focusing primarily on the contributions of Antonius van den Broek and Henry Moseley.

HIST 13 - Bringing Law and Order to the Table

Paul J Karol, pk03@andrew.cmu.edu. Department of Chemistry, Carnegie Mellon University, Pittsburgh, PA 15213, United States.

Ernest Rutherford's students included Niels Bohr, Benram Boltwood, James Chadwick, John Cockcroft, Kazimierz Fajans, Hans Geiger, Otto Hahn, Douglas Hartree, Pyotr Kapitsa, and Frederick Soddy. Yet he esteemed Henry Moseley as the best of the young people he had ever had. Moseley spent only a few years with Rutherford, first working on radioactive decays and then jumping to his own interest in exploring an intriguing craze, the nature and application of X-rays, overcoming the initial resistance of Rutherford to this risky venture. A confluence of instrumental and theoretical advances enabled the ingenious and insightful Moseley to demonstrate his eponymous Law, taking advantage the new field of X-ray spectrometry and rapidly bringing order to the Periodic Table one century ago.



HIST 14 - Bohr and Moseley

John L. Heilbron, john@heilbron.eclipse.co.uk. Department of History of Science and Technology, University of California, Berkeley, CA 94720, United States.

Early in 1913, Niels Bohr returned briefly to Ernest Rutherford's physics department at the University of Manchester, where he had spent a few months during the academic year 1911/12. His purpose was to convince Rutherford, who had agreed to submit his revolutionary paper on the spectrum of hydrogen and helium for publication, of the importance of every single word in it. Rutherford's prize student Henry Moseley was then just beginning the researches that would make him famous. Very likely he was aware of the lively debate over the length and content of the revolutionary paper and took the opportunity to discuss his research plans with the stubborn Danish visitor who could do battle with Rutherford. In a subsequent exchange of correspondence, Moseley and Bohr tried with indifferent success to relate the details of Moseley's findings about x-ray spectra to Bohr's quantum atom. Soon after Moseley's death in 1915, some of his last, unpublished results came into Bohr's hands. These may have included the contents of a notebook, now lost, which Moseley's mother had entrusted to Rutherford. Moseley placed a very high value on this notebook. A speculation about its contents will be hazarded.

HIST 15 - Blurring the boundaries among chemistry, physics, and astronomy: The Moseley Centenary

Virginia Trimble, vtrimble@astro.umd.edu. Department of Physics and Astronomy, University of California at Irvine, Irvine, CA 92697, United States.

Scientists, like other human beings, are territorial creatures, not just about our parking spaces and seats in the colloquium room, but also about our scientific territories, from the narrowest thesis topic to the whole of chemistry or physics or astronomy. Many 19th century astronomers resented spectroscopes invading their observatories; chemists objected to Moseley's use of X-rays outgaming their retorts and test tubes in 1913; and chemists and physicists typically disbelieve astronomers suggesting new science on the basis of astronomical data (Mendeleev did not welcome Lockyer's helium, and physicists were reluctant to admit that the apparent deficit of neutrinos coming from the sun arose from incomplete physics rather than scruffy astrophysics). The talk will explore some of these transgressions, both some spectacular successes and rather more awkward failures. Moseley's own contributions included sorting out the rare earths, putting paid to nebulium and coronium as elements between H and He, many years before improved understanding of atomic structure led to correct identifications of the ionization states and transitions actually responsible for the lines credited to them, and putting Prout's hypothesis on a firm foundation, ready for the structure Cameron and B2FD would eventually erect there. Back in 1935, Gamow asked whether the new discipline should be called nuclear chemistry or nuclear physics. Both now exist, within ACS and APS respectively, but with rather different meanings. Decades later, chemist L.S. Trimble was still complaining that the physicists had grabbed away the territories of atomic and nuclear composition, which should have been part of chemistry!

HIST 16 - Bibliography of H.G.J. Moseley

Gary D Patterson, gp9a@andrew.cmu.edu. Department of Chemistry, Carnegie Mellon University, Pittsburgh, PA 15213, United States

While Henry Gwyn Jeffries Moseley (1887-1915) published only a few papers himself, he spawned a vast number of papers and books on the x-ray spectroscopy of the elements. In this paper a bibliography of works by and about both Moseley as a person and about his contributions to x-ray spectroscopy will be presented. The talk will conclude with a look at the monumental work on "Chemical Analysis by X-Rays and its Applications" (1932) by Georg von Hevesy (1885-1966, Nobel 1943).

HIST 17 - Natural history of positive electricity

Gary D Patterson, gp9a@andrew.cmu.edu. Department of Chemistry, Carnegie Mellon University, Pittsburgh, PA 15213, United States

Since antiquity it was known that some objects attracted one another and other objects repelled one another. Benjamin Franklin was able to unify the 18th century understanding of electrical phenomena by invoking two kinds of electricity. Joseph Priestley ended the century with further explanations and unifications. Michael Faraday was able to study electric current inside vacuum tubes and the electromagnetic theory of Maxwell stimulated a search for the fundamental sources of negative and positive current. Jean Perrin studied the behavior of Crooke's tubes and determined that the current was carried by negative particles. J.J. Thomson subjected these particles to magnetic fields and the "electron" was born. But, if electrons were going in one direction, what was going in the other direction to equalize the charge? Sure enough, there were cations in Crooke's tubes as well: rays of positive electricity!

HIST 18 - True origin of the first mass spectrometer

O David Sparkman, ods@compuserve.com. Department of Chemistry, University of the Pacific, Stockton, California 95211, United States

Was J.J. Thomson's 1913 book *Rays of Positive Electricity* the first monograph to report what has become known as "the mass spectrometer"? Francis William Aston was awarded the 1922 Nobel Prize in Chemistry in part for the development of a mass spectrograph. Thomson first observed that neon produced two separate signals in his rays of positive electricity apparatus, but he was not able to say what they were. Aston recognized

what the singles represented and capitalized on this. This presentation will attempt to answer those questions that come up in every course on mass spectrometry of who and when was the mass spectrometer developed. One hundred years after what is considered to be the first mass spectrometry book was published, the question is still a question, until now; maybe.

HIST 19 - Isotopes: The era of the physicist

Michael A Grayson, mikeagrayson@gmail.com. *American Society for Mass Spectrometry, St. Charles, MO 63303, United States*

The story of isotopes and mass spectrometry begins with J. J. Thomson who observed a line at mass 22 in the positive ray analysis of neon in 1912. Interestingly, while Thomson accepted the existence of isotopes among the radionuclides, he held firmly to the belief that stable elements were monoisotopic. In truth, we should credit Aston with the discovery of isotopes of the stable elements – as he was when awarded the Nobel Prize in Chemistry in 1922. Aston chose the exploration of isotopes of the elements as his primary research enterprise; and began by creating a new and improved positive ray analyzer. His competitor and colleague in this enterprise was A. J. Dempster, an expatriate Canadian at the University of Chicago, who – developing his own mass analyzer – was the first to report the isotopes of several elements, mainly because he did not feel the need to use gas discharge as the only method of sample ionization. As the importance of Einstein's classic equation relating energy and mass became more widely understood, the physics community was intent on determining the exact masses and relative abundance of the isotopes for all of the elements. This was a strong motivator for the design and construction of mass analyzers capable of ever more precise mass determinations as well as accurate abundance measurements. Nier joined this group of physicists in 1935 when he reported a previously unknown isotope of potassium. Both Dempster, Bainbridge and Nier made important contributions to the understanding of nuclear fission in uranium. While physicists dominated this endeavor, we can credit a petroleum chemist, Meyerson, for prompting the physics community to revisit and correct the relative abundance of chlorine isotopes in 1961.

HIST 20 - MS/MS: From Thomson's day to ours

R Graham Cooks, cooks@purdue.edu. *Department of Chemistry, Purdue University, West Lafayette, Indiana 47907, United States*

Collision-induced dissociation has been known almost as long as mass spectrometry. This presentation covers the history of this subject, from early adventitious observations through systematic studies of the kinematics and dynamics of inelastic ion/molecule in/surface collisions over a range of collision energies, through the development of collision-induced dissociation as a method of characterization of ions to the examination of individual constituents of complex mixtures using tandem mass spectrometry. The later development of alternatives to collision-induced dissociation is also mentioned. The talk can be summarized by the acronyms related to the methodology: m^* , MIKES, MS/MS, MRM, SID, etc. and alternatively by the people mostly responsible for these developments –White, Jennings, McLafferty, Futrell, etc.

HIST 21 - Molecular mass spectra: the chemistry of gaseous organic ions

Fred W McLafferty, fwm5@cornell.edu. *Department of Chemistry and Chemical Biology, Cornell University, Ithaca, New York 14850, United States*

When I joined the Mass Spectrometry Section of the Dow Chemical Company in 1950, MS was a successful method for the quantitative analysis of small hydrocarbons. "Electron ionization (EI)" excited gaseous molecules, with those sufficiently excited undergoing unimolecular decomposition into product ions. This "gaseous ion" chemistry was poorly understood. The early "Quasiequilibrium Theory" of Rosenstock, Wallenstein, Wahrhaftig, and Eyring provided a theoretical foundation for understanding the EI mass spectrum of propane. Better understanding of gaseous ion chemistry began with specific studies of common chemical classes. A major breakthrough came through the extensive collection of non-hydrocarbon reference EI spectra. Crazy reactions that change the atomic order of the molecule, "rearrangements", were suddenly not only understandable, but highly valuable for structure elucidation. Although new methods such as electrospray ionization only yield "evenelectron" ions which do not exhibit this chemistry, it can now be applied to far larger molecules with "Electron Capture Dissociation".

HIST 22 - Time-of-flight mass spectrometry: from niche to mainstream

Ken G Standing, standing@cc.umanitoba.ca. Department of Physics, University of Manitoba, Winnipeg, Manitoba, Canada

World War II electronic advances suggested the use of time-of-flight for mass measurements (Stephens), and subsequently to the development of commercial TOF instruments by Bendix and by Bioion (TOF/PDMS/MacFarlane), as well as to the use of TOF/SIMS (Standing). Although the latter TOF methods were the only ones capable of measuring the masses of really large biomolecules, most mass spectrometrists were still wedded to sector/quadrupole instruments for high/low-end mass measurements. The coup-de-grâce for TOF (as generally believed) was the discovery (Barber1981) of a suitable matrix (glycerol), which enabled the use of sector/quadrupole instruments for measurements of large biomolecules ("fabulous FAB"). Ironically, it was the discovery of suitable matrices for laser excitation (MALDI/Hillenkamp/Karas) that revived TOF, aided by the additional accuracy provided by the reflecting geometry (Mamyrin), and the subsequent development of orthogonal injection (Dodonov). Thus TOFMS/MALDI, along with electrospray, are the prime methods now used for the mass spectrometry of biomolecules.

HIST 23 - Ever-widening horizons of biological mass spectrometry

Catherine E Costello, cecmsms@bu.edu. Department of Biochemistry, Biophysics and Chemistry, Boston University School of Medicine, Boston, Massachusetts 02188, United States

Physicists and physical chemists started the field of mass spectrometry (MS) and the petroleum industry promoted development of commercial instrumentation, but it is mass spectrometry's relevance to biology and medicine that has propelled much of its growth and public attention. MS defines biochemical pathways, taking particular advantage of stable isotope-labeled tracers. Early work that focused on drug metabolism and toxicology has led to critical roles in sports competitions and forensics. MS enabled amino acid sequencing of peptides and precise structural determinations of steroids, glycans, oligonucleotides, toxins and perfumes; today it is the fundamental approach for proteomics, glycomics, lipidomics, metabolomics and dynamic imaging. The needs of biological MS have motivated increases in mass range, scan speed, sensitivity, resolution and mass accuracy; today's amazing instruments are capable of analyzing vanishingly small amounts of materials that are components of extremely complex mixtures, well beyond the imagination and dreams of early practitioners.

HIST 24 - The Early Years at Miles Laboratories

Rosanne Savol¹, rsavros@aol.com. Mary Sproul², Celeste Ringuette². (1) Rosebud Consulting, Granger, IN 46530, United States (2) Unaffiliated, United States

Helen Free began her career at Miles Laboratories in Elkhart, IN. In this presentation we will share stories of her early adventures in chemistry.

HIST 25 - The Scientific Legacy of Helen M. Free, 1993 ACS President

Daniel V. Brown, daniel.brown@bayer.com. Bayer Diabetes Care, Mishawaka, IN 46544, United States

Helen Mae Murray Free maintained a profound interest in raising public awareness to the many beneficial contributions of chemistry to society, but to some members, her own part in those contributions might not be well understood. Helen began her career in chemistry at Miles Laboratories in Elkhart, Indiana. After a short stint in the Quality Control department, she joined her future husband's research team. Al and Helen, who married in 1947, became lifelong research partners. Initially the Frees and their research team focused on improving tablet-based clinical chemistry tests for glucose and ketones, but eventually turned their attention to inventing dipstick-type methodologies that are common today.

Key technical challenges that the researchers overcame included enhancing assay specificity for glucose over other sugars, and impregnating filter paper-based strips to effect a stable, convenient, cost-effective reagent. The Frees became recognized experts in the field of urinalysis, publishing numerous texts and monographs. Urine strip testing is a standard practice for patients seen in physicians' offices, medical clinics and hospitals as an initial indicator of metabolic or kidney disorders.

HIST 26 - The woman who launched at least a thousand chemistry outreach programs

Denise Creech, D.Creech@acs.org. American Chemical Society, United States

Helen Free was a critical element of the launch of many of ACS's public outreach programs including National Chemistry Day/Week having served as its Task Force chair and shepherding the program from a day to a biannual weekly celebration to an annual celebration in 1993. She led the first International Chemistry Celebration in 1999 and was active with the ACS Kids-n-Chemistry program. In 1995, the Helen M. Free Award in Public Outreach was inaugurated and Helen Free was its first recipient. This talk will describe Helen's contributions to the ACS's commitment to educating the public about the contributions that chemists make to improve people's lives.

HIST 27 - Helen Free and the National Inventors Hall of Fame

Rini Paiva, rpaiva@invent.org. National Inventors Hall of Fame, United States

This presentation will introduce the National Inventor's Hall of Fame and the National Medal of Technology and Innovation. The major example will be how Helen and Al Free's work resulted in Helen receiving both of these honors.

HIST 28 - The Helen M. Free Award for Public Outreach

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Awards Subcommittee Chair, ACS Committee on Public Relations and Communications, United States

The Helen M. Free Award for Public Outreach recognizes outstanding achievements in the field of public outreach by a member of the ACS who improves public recognition and appreciation for the contributions of chemistry. This award was established in 1995 by the American Chemical Society Committee on Public Relations and Communications to honor Dr. Free. As the 1993 president of ACS she pledged to initiate and support activities that would improve the public's awareness of chemistry's contributions to the quality of daily life. There have been 18 winners of this award all committed to public outreach by chemists and chemical engineers. For the purposes of this award, public outreach activities are defined as those that reach lay audiences, as opposed to science professionals.

HIST 29 - Science-2-Go Bus

Patsy Boehler, patsy@ethos.org. ETHOS, Goshen, IN 46528, United States

Science-2-Go Bus is an outreach activity of the Ethos Center of Elkhart, IN. Helen Free and the Al and Helen Free Foundation have provided both funding and encouragement and support for this unique program to encourage technology and hands on science. As Executive Director, the speaker will both describe the program and Helen's support for Ethos Center.

HIST 30 - Helen Free: The Family's Perspective

Eric Free, efree49@yahoo.com. Unaffiliated, Cape Coral, FL 33914, United States

As Helen's oldest son, the speaker will reflect on the personal, domestic, and recreational side of this outstanding lady.

HIST 31 - Thanks and Serendipity

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Helen's opportunity to respond.