American Chemical Society
Division of the History of Chemistry

Program and Abstracts

238th ACS National Meeting
Washington, DC
August 16-20, 2009

S. C. Rasmussen, Program Chair

HIST

DIVISION OF THE HISTORY OF CHEMISTRY

Final Program, 238th ACS National Meeting, Washington, DC, August 16-20, 2009

S. C. Rasmussen, *Program Chair*

SOCIAL EVENT:
Edelstein Award Dinner, 6:00 pm: Tue

SUNDAY MORNING

Washington Plaza -- Franklin Room

Classic Books in Chemistry VI: The Language of Chemistry
Cosponsored by Bolton Society and CINF
J. J. Bohning, *Organizer*
N. D. Heindel, *Organizer, Presiding*

9:00 — Introductory Remarks.
9:05 —1. Austin M. Patterson: *Words About Words* and his contributions to nomenclature. **J. B. Sharkey**
9:35 —2. Metaphorical matter: The language of alchemy. **A. Timmermann**
10:05 —3. *Méthode de Nomenclature Chimique* revisited. **C. J. Giunta**
10:35 — Intermission.
10:45 —4. Documenting the history of chemical nomenclature and symbolism. **W. B. Jensen**
11:30 —5. Systematizing chemical nomenclature: IUPAC's Red Book and Blue Book. **R. A. Egolf**

SUNDAY AFTERNOON

Washington Plaza -- Franklin Room

Classic Books in Chemistry VI: The Language of Chemistry
Cosponsored by Bolton Society and CINF
N. D. Heindel and J. J. Bohning, *Organizers*
R. S. Brashear, *Presiding*

2:00 —6. What's in a name? **N. Foster**
2:30 —7. mmCIF: A computer language for the representation of macromolecular structure. **J. B. Ealy**
3:00 — Intermission.
3:10 —8. Putting it on the line: The Wiswesser line-formula notation system (WLN). **J. J. Bohning**, N. Heindel
3:55 —9. CAS REGISTRY: Its history and principles. **R. J. Schenck**

The Best Practices of Starting a Chemical Business that were Valuable Years Ago and that Remain Valuable Today
Sponsored by SCHB, Cosponsored by HIST, PROF, and GLOBAL

MONDAY MORNING

Washington Plaza -- Franklin Room

The Heritage of Chemistry: A Symposium to Honor Arnold Thackray
J. I. Seeman, *Organizer, Presiding*

8:30 — Introductory Remarks.
8:40 —10. Alfred Nobel and James Dewar. **S. Mauskopf**
9:10 —11. Noninferiority: Antibiotics testing, regulation, and markets in historical perspective. **A. A. Daemmrich**
9:40 —12. Responsible conduct of research and the history of chemistry. **J. I. Seeman**
10:10 —13. Defining a proper history for science. **E. Mendelsohn**
10:40 — Intermission.
10:50 —14. Arnold Thackray: The antidote against my retirement decay. **O. T. Benfey**
11:20 —15. Can it have been two decades? Personal reflections. **M. E. Bowden**
11:50 —16. ACS, HIST, CHOC, UP, AT and JJB: The adventures of a nontraditional chemist. **J. J. Bohning**

Handbooks: Past, Present, and Future
Sponsored by CINF, Cosponsored by HIST

MONDAY AFTERNOON

Washington Plaza -- Franklin Room

The Heritage of Chemistry: A Symposium to Honor Arnold Thackray
J. I. Seeman, *Organizer, Presiding*

1:30 —17. Airports, air products, and AT: Arnold Thackray's influence on public history practice. **D. G. Douglas**
2:00 —18. A Brit and a Frenchman. **S. L. Thompson**
2:20 —19. Arnold Thackray, the Philadelphia history of science community and the creation of the Center for the History of Chemistry. **J. L. Sturchio**
2:50 — Intermission.
3:00 —20. Arnold Thackray: Matchmaker extraordinaire. **E. Garfield**
3:30 —21. Arnold Thackray and the emergence of the Chemical Heritage Foundation. **T. R. Tritton**
4:00 —22. The letters from history. **J. I. Seeman**, M. Perrin
4:15 —23. The chemistry of history. **A. W. Thackray**

MONDAY EVENING

Walter E. Washington Convention Center -- Hall D

Sci-Mix
S. C. Rasmussen, *Organizer*

8:00 - 10:00
3. See previous listings.
26, 30. See subsequent listings.

TUESDAY MORNING

Washington Plaza -- Franklin Room

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

8:00 —24. Finding eka-iodine: Discovery priority in modern times. **S. Burdette**, B. Thornton
8:25 —25. Women advisees of Alfred Werner: I. Chana Weizmann. **D. F. Martin**, B. B. Martin
8:50 —26. Sisters in chemistry: The seventeenth century medicinal chemistry of Alethea Howard, Countess of Arundel; Elizabeth Grey, Countess of Kent, and their associates. **A. L. Wilson**
9:15 —27. Simultaneous priority disputes: G.N. Lewis vs. Irving Langmuir, and Irving Langmuir vs. William Harkins. **P. Coffey**
9:40 — Intermission.
9:50 —28. The white knight chemist who performed a 1930's economic miracle. **D. G. Hicks**
10:15 —29. Using history in teaching chemistry: History on PowerPoint. **D. A. Katz**
10:40 —30. A comparison of early modern alchemical equipment and common kitchen utensils. **A. L. Wilson**
11:05 —31. *Haber*: A viewing and discussion of the new film about one of history's most famous and infamous chemists. **G. D. Fisher**, D. Ragussis

TUESDAY AFTERNOON

Washington Plaza -- Franklin Room

Edelstein Award Symposium Honoring Trevor Levere
M. Usselman, *Organizer*
S. Mauskopf, *Presiding*

1:30 — Introductory Remarks.
1:40 —32. From "chymistry" to physics: The influence of chemical analysis and synthesis on Isaac Newton's theory of light and colors. **W. R. Newman**
2:05 —33. Particles and solvents: Debating the nature of matter and chymical analysis at the early *Académie des Sciences*. **V. D. Boantza**
2:30 —34. Visual imagination in nineteenth-century chemistry. **A. J. Rocke**

2:55 — Intermission.
3:05 —35. Marketing chemistry in the early 19th century: The various ventures of William Hyde Wollaston. **M. Usselman**
3:30 —36. Sons of genius: Chemical manipulation and the image of chemistry from Joseph Black to Michael Faraday. **T. Levere**
3:55 — Concluding Remarks.

Abstracts

HIST 1: Austin M. Patterson: *Words About Words* and his contributions to nomenclature

***John B Sharkey**, jsharkey@pace.edu, Department of Chemistry and Physical Sciences, Pace University, Pace Plaza, New York, NY 10038, Fax: 212-346-1256*

Early in his long and distinguished career (1876-1956), Austin Patterson recognized the significant, ever-growing need for a better language of chemistry, and he went to work to help in providing such a language. He virtually devoted his life to the development of chemical nomenclature and to fostering good usage. He became widely recognized as the world's leading authority in this field. Perhaps the culmination of his life's work, undertaken during the last five years of his life, was the writing of a regular column in Chemical and Engineering News. This column, entitled “Words about Words” in the beginning and later just labeled “Nomenclature,” was widely read. In 1957, the ACS published e reproduction of his columns. According to E. J. Crane, who wrote the Preface, “This book is produced for use, but it is also offered for memory and for inspiration.” This paper will highlight Patterson's contributions to the field of nomenclature and review some of his more interesting columns.

HIST 2: Metaphorical matter: The language of alchemy

***Anke Timmermann**, Chemical Heritage Foundation, 315 Chestnut Street, Philadelphia, PA 19106*

Alchemists wrote down their experiments, theories and observations in their own way long before the concepts of atoms and molecules, chemical formulae and reactions were articulated in the images and formulae familiar to us today. The practice and theory of alchemy were rooted in ancient traditions which had come to the Western world from Egypt, ancient Greece and the Islamic countries. It was believed that the convoluted language of alchemical writings could only be deciphered by initiated alchemists. Altogether, the language of alchemy provides a rather intriguing combination of alchemical information and symbolic expression. How, then, was it possible for alchemists to communicate practical and theoretical knowledge? This talk will discuss alchemy and its symbols with the help of examples (word and image) from the rare book collections in the Othmer Library.

HIST 3: *Méthode de Nomenclature Chimique* revisited

***Carmen J. Giunta**, giunta@lemoyne.edu, Department of Chemistry and Physics, Le Moyne College, 1419 Salt Springs Rd, Syracuse, NY 13214-1399, Fax: 315-445-4540*

The *Méthode de Nomenclature Chimique*, published in 1787, provided the basis for the systematic nomenclature of binary inorganic compounds still in common use more than two centuries later. The presentation will examine the component parts of this publication, particularly Lavoisier's memoir that advocated reforming and perfecting chemical nomenclature, Guyton de Morveau's memoir on developing the principles of the proposed systematic nomenclature, and glossaries of chemical names old and new.

HIST 4: Documenting the history of chemical nomenclature and symbolism

***William B. Jensen**, jensenwb@email.uc.edu, Department of Chemistry, University of Cincinnati, ML 172, Cincinnati, OH 45221-0172*

The talk will review attempts by past chemical historians to document the history of chemical nomenclature and symbolism, ranging from coverage in standard histories of chemistry, such as those by Kopp and by Ihde, to specialized monographs, such as those by Caven and Cranston and by Crosland.

HIST 5: Systematizing chemical nomenclature: IUPAC's Red Book and Blue Book

***Roger A. Egolf**, rae4@psu.edu, Pennsylvania State University, Lehigh Valley Campus, 8380 Mohr Lane, Fogelsville, PA 18051-9999, Fax: 610 285-5220*

One of the original purposes of the International Union of Pure and Applied Chemistry at it foundation in 1919 was the unification of chemical nomenclature. Commissions of IUPAC published reports suggesting standardized nomenclature over many years, but it was not until 1955 that tentative rules for inorganic and organic nomenclature were published in Comptes Rendus. These rules were ratified at the 19th IUPAC Conference in 1957, then published as Nomenclature of Inorganic Chemistry – 1957, better known as the Red Book; and Nomenclature of Organic Chemistry – 1957, Section A Hydrocarbons, and Section B Fundamental Heterocyclic Systems, better known as the Blue Book. This paper will discuss the process by which these rules were agreed upon and published.

HIST 6: What's in a name?

***Natalie Foster**, nf00@lehigh.edu, Department of Chemistry, Lehigh University, 6 East Packer Ave, Bethlehem, PA 18015, Fax: 610-758-3536*

“Organic Chemistry: The Name Game” is a good-humored text that explores the origins of contemporary terms in organic chemistry. The forward to this little gem of a book reminds us that in science, just as in literature, “language does not serve mankind only for communication any more than food serves only for nourishment.” This paper presents a selection of the stories behind the trivial names that are part of the language of organic compounds and chemical concepts. This excursion through the origin of names coined with reference to animals (felicene), architectural elements (peristylane), musical instruments (fidecene), food (sandwich compounds), and even head-coverings (diademane) illuminates the human side of chemistry highlights the strong links between words and pictures (names and shapes) that describe how chemists view the world.

HIST 7: mmCIF: A computer language for the representation of macromolecular structure

***Julie B. Ealy**, jbe10@psu.edu, Department of Chemistry, Pennsylvania State University, 8380 Mohr Lane, Academic Building, Fogelsville, PA 18051*

The language of the macromolecular crystallographic information file will be described as presented in: Bourne, P. E., Berman, H. M., McMahon, B., Watenpaugh, K. D., Westbrook, J. D., and Fitzgerald, P. M. D. Methods in Enzymology, 1997, 277, 571-590. The language was developed to extend the Crystallographic Information File (CIF) data representation that is used to describe molecular structure. Visually, aspects of the Protein Data Bank will used to demonstrate various aspects of the language.

HIST 8: Putting it on the line: The Wiswesser line-formula notation system (WLN)

***James J. Bohning**, jjba@lehigh.edu, Department of Chemistry, Lehigh University, 6 E. Packer Ave, Bethlehem, PA 18015, and Ned Heindel,Department of Chemistry, Lehigh University, 6 East Packer Avenue, Bethlehem, PA 18015*

The effort to reduce chemical structures of any complexity to a single line of letters, numbers and symbols began in the eighteenth century, but did not receive serious attention until the early computer age when in 1949 the IUPAC Commission on Codification, Ciphering, and Punched Card Techniques invited designers to submit their proposals for an internationally suitable notation system. Although IUPAC selected a system developed by G. M. Dyson, it was the WLN that won the most users, primarily through the determined efforts of its founder, William J. Wiswesser, who outlined the principles of the WLN in his

1954 monograph "A Line-Formula Chemical Notation." As Wiswesser explained, the WLN never enjoyed any IUPAC recognition, and had no other official approval. It earned user support “simply because it solved various information-managing needs with less cost and confusion than other internationally recognized alternatives.”

HIST 9: CAS REGISTRY: Its history and principles

***Roger J. Schenck**, Chemical Abstracts Service, 2540 Olentangy River Road, Columbus, OH 43202, Fax: 614-461-7140*

The CAS REGISTRY[SM] is the master collection of disclosed chemical substance information, with more than 45 million organic and inorganic molecules. This talk will focus on the nature of the CAS REGISTRY® Number as a unique identifier, and the principles and criteria for substances being added to the CAS REGISTRY. Examples will be given illustrating the breadth and depth of the CAS REGISTRY.

HIST 10: Alfred Nobel and James Dewar

***Seymour Mauskopf**, shamus@duke.edu, Professor of History, Duke University, 325 Carr Building, Durham, NC 27708*

The only historical memory of the relationship between Alfred Nobel and James Dewar is an adversarial and hostile one involving the infringement of patent lawsuit of 1894 over the British smokeless propellant "cordite," co-invented by Dewar and Frederick Abel. However, in my investigations of the background to this, I have come upon a very different, much more positive and interactive relationship between the two men in the 1880s. In this decade, Dewar functioned as something of a paid consultant to the Nobel brothers and participated in joint research projects with Alfred, including an attempt at nitrogen fixation.

HIST 11: Noninferiority: Antibiotics testing, regulation, and markets in historical perspective

***Arthur A. Daemmrich**, adaemmrich@hbs.edu, Harvard Business School, Morgan Hall 293, Boston, MA 02163*

The invention and market introduction of new antibiotics slowed drastically after a remarkable sequence of discoveries produced over ten new antibiotic classes between 1942 and 1962. Explanations for this drop have included declining markets, shifts in industry research from contagious to chronic diseases, and excessive regulation. Based on a case study of oritavancin – a therapeutic with a complex history that spans ownership by four different companies, numerous clinical trials seeking to meet shifting definitions of safety and efficacy, and changing disease and patient profiles – the talk examines underlying dilemmas of contemporary antibiotic development. The oritavancin case also uncovers epistemological tensions between statisticians and physicians that underpin regulatory disputes and shape the pharmaceutical marketplace. The paper suggests that future antibiotic drug development relies on prompt resolution of these disputes and clear signaling to firms of the market potential for these life-saving compounds.

HIST 12: Responsible conduct of research and the history of chemistry

***Jeffrey I. Seeman**, Department of Chemistry, University of Richmond, Richmond, VA 23173*

An important and central aspect of responsible conduct of research (RCR) is the determination of authorship and other forms of credit in scientific publications. Who makes these decisions and on what basis? These issues were brought into sharp focus to the chemical community when, upon his receipt of the Priestley medal in 2004, E. J. Corey wrote, “On May 4, 1964, I suggested to my colleague R. B. Woodward a simple explanation . . . that provide the basis for the further development of these ideas into

what became known as the Woodward-Hoffmann rules." We have recently completed a survey of American academic chemists in Ph.D. granting institutions dealing with authorship and credit issues. The results of this survey along with our related study on the origins of the Woodward-Hoffmann rules will be presented. The responsible conduct of research in today's complex and fast moving environment requires more than informal and inconsistently applied "rules" to govern the behavior of scientists.

HIST 13: Defining a proper history for science

***Everett Mendelsohn**, emendels@fas.harvard.edu, Harvard University, Science Center 371, Cambridge, MA 02138*

Historians have struggled to identify what aspects of science properly "fit" the historians task and what contexts are necessary to locate science in historical time and space. Scientists who have over the years turned historian have often generated a very different account of the same science and the same time; concept and practice have dominated their understanding of the history of their enterprise. For both historians and scientists the heroic figure of the conquering scientist has generated biographical accounts which have had wide appeal and often defined science for the reading public.

HIST 14: Arnold Thackray: The antidote against my retirement decay

***Otto T. Benfey**, benfeyo@bellsouth.net, 925 New Garden Road, Apt. #521, Greensboro, NC 27410*

Arnold Thackray once told me he thought of himself as a non-profit entrepreneur. During the eight years I worked with him at CHF, I saw him play that role with consummate skill. In spite of considerable differences in outlook, our relationship was remarkably harmonious. Three factors may have helped: We both had a British education. There are advantages to a part-time position. Quakers played a role from Dalton to Penn to today's CHF.

Arnold expanded horizons. Together we metamorphosed a slim black-and-white newsletter into Chemical Heritage, a full-color news magazine. My awareness was broadened from intellectual history to real-world problems. I interacted with a vast range of people from neophytes in history to Nobel Laureates and industry CEOs. Arnold sent me to Hungary and Germany and for two unforgettable months to the Edelstein Center in Jerusalem I can think of little as rejuvenating as eight years spent with Arnold.

HIST 15: Can it have been two decades? Personal reflections

***Mary Ellen Bowden**, mebowden@chemheritage.org, Chemical Heritage Foundation, 315 Chestnut St, Philadelphia, PA 19106*

It was a fateful day when I read that the Beckman Center for the History of Chemistry was looking for a "Public Education Specialist," or some such mystery title. Having weathered a decade of positions in college administration, I was more than ready to return to my first love—doing history of science. Soon I found myself working harder than ever before and for one of the most visionary and entrepreneurial academics of all time: Arnold Thackray. He had expectations of me that I would never have dared to imagine on my own. Through the years, I was often stressed and even shed a few tears in private, but I was never bored. Thanks to Arnold, whole new worlds opened up before me, my colleagues, and our various audiences.

HIST 16: ACS, HIST, CHOC, UP, AT and JJB: The adventures of a nontraditional chemist.

***James J. Bohning**, jjba@lehigh.edu, Department of Chemistry, Lehigh University, 6 E. Packer Ave, Bethlehem, PA 18015*

This retrospective review of a non-linear career begins with endeavors to educate the unenlightened in their understanding of chemistry which were underscored with utilitarian uses of past proclivities. The unintended transformation of historical chemistry from classroom anecdotal accounts to a professional pursuit involved a peculiar path from University Heights to Brooklyn Heights and beyond, with many stops in-between, from the coal fields to the Elysian Fields. Crucial to this course was participation in a Philadelphia project in which permanent proof of practitioner's predilections were preserved for posterity.

HIST 17: Airports, air products, and AT: Arnold Thackray's influence on public history practice

***Deborah G Douglas**, ddouglas@mit.edu, MIT Museum, MIT Museum, 265 Massachusetts Ave., N51-209, Cambridge, MA 02139*

Arnold Thackray arrived in America in 1967; the history of chemistry--of science and technology—has not been the same since. With the founding of the Center

for the History of Chemistry (now the Chemical Heritage Foundation) in 1982, Thackray would become a transformative figure amongst public history practitioners. While he is best known within the chemical community, Thackray's influence and contributions extend well beyond this domain. Bearing the distinction of being Thackray's last doctoral student, Deborah Douglas, now the curator of science and technology at the MIT Museum, will offer a scholarly appreciation and review of AT's myriad and remarkable contributions to public history.

HIST 18: A Brit and a Frenchman

***Sheldon L. Thompson**, slkbthompson@comcast.net, 66 Clayton Pk. Dr, Glen Mills, PA 19342*

I first met Arnold Thackray on the day that the ACS officially recognized the achievement of Eugene Houdry and Sunoco in commercializing Catalytic Cracking. The history and significance of that achievement will be reviewed. A comparison of Eugene Houdry and Arnold Thackray will be made which will include the significant achievement of launching and building the Chemical Heritage Foundation.

HIST 19: Arnold Thackray, the Philadelphia history of science community and the creation of the Center for the History of Chemistry

***Jeffrey L. Sturchio**, jeffreysturchio@optonline.net, 55 Blazier Road, Martinsville, NJ 08836-2040*

The history of science community in Philadelphia thirty years ago was an exciting place to be, thanks in no small part to the vision and energy that Arnold Thackray brought to building the Department of History & Sociology of Science at the University of Pennsylvania. One of the major assets for history on the Penn campus was the Edgar Fahs Smith Memorial Collection in the History of Chemistry. When the idea of a history center for the American chemical community was raised in the early 1980s, Penn was a natural location. This talk provides insight into Arnold Thackray's role in the establishment and early years of the Center for the History of Chemistry (the institutional precursor of the Chemical Heritage Foundation), based on the perspective of a fellow participant in that history.

HIST 20: Arnold Thackray: Matchmaker extraordinaire

***Eugene Garfield**, garfield@codex.cis.upenn.edu, ThomsonReuters Scientific, 3501 Market Street, Philadelphia, PA 19104-3302*

Arnold Thackray has had an extraordinary career as an historian of science and chemistry in particular. But as his career has evolved as a gatekeeper journal editor, mover and shaker in the worlds of the history and

sociology of science and founder of the Chemical Heritage Foundation , he has demonstrated a rare talent at what is ordinarily called “development” in the world of philanthropy. Development is a euphemism for fund raising. While we abhor those unsolicited phone calls from the local Police pension fund or other local politicians, we forget how important is the role of the philanthropo-matchmaker-catalyzer—as best exemplified by Arnold Thackray. Using his persuasive talents he has brought together small and large philanthropists with projects that satisfy their desire to uplift society or their profession through suitable memorials in their own names or loved ones or mentors. I hope to demonstrate how he has helped catalyze my career and the appreciation of the history of science.

HIST 21: Arnold Thackray and the emergence of the Chemical Heritage Foundation

***Thomas R. Tritton**, ttritton@chemheritage.org, Chemical Heritage Foundation, 315 Chestnut Street, Philadelphia, PA 19106*

Over a quarter century ago Arnold Thackray and a small group of dedicated individuals conjured into existence the Chemical Heritage Foundation. It began with different nomenclature—the Center for the History of Chemistry—and was a collaborative venture between the University of Pennsylvania and the American Chemical Society. Today CHF is an operation of about 60 people, over 40 affiliated organizations, and comprises a museum, library and center for scholars. The work focuses on the history and impacts of the chemical and molecular sciences. In this presentation I will chart how Arnold Thackray's leadership caused CHF to grow from modest beginnings to a flourishing and influential scientific and cultural organization.

HIST 22: The letters from history

***Jeffrey I. Seeman**, Department of Chemistry, University of Richmond, Richmond, VA 23173, and Marthenia Perrin, martip@chemheritage.org, Chemical Heritage Foundation, 3141 Chestnut Street, Philadelphia, PA 19106*

A special tribute will be presented.

HIST 23: The chemistry of history

***Arnold W. Thackray**, athackray@chemheritage.org, Chemical Heritage Foundation, 315 Chestnut Street, Philadelphia, PA 19106-2702, Fax: 215-925-9377*

The historiography of the chemical sciences is a little-studied field. Scientists and entrepreneurs are future-oriented, while historians have preferentially focused to the physics-astronomy or biology-genetics complexes when they have deigned to notice the presence of science. The poverty of our self-awareness is one of several forces that hobble the chemical heritage. This paper offers a brief attempt to explore five frames within which the chemical sciences have been historically examined. The starting point is with the invention of the scientist in the early nineteenth century. However the primary focus will be the era since World War II. The analysis will draw heavily from my own experience. Some thoughts will be offered on the challenges and opportunities that lie ahead for those who believe in the significance of the chemical heritage.

HIST 24: Finding eka-iodine: Discovery priority in modern times

***Shawn Burdette**, shawn.burdette@uconn.edu, Department of Chemistry, University of Connecticut, 55 North Eagleville Road, Storrs, CT 06269, and Brett Thornton, brett.thornton@itm.su.se, Department of Applied Environmental Science (ITM), Stockholm University, Svante Arrhenius väg 8c, 106 91 Stockholm, Sweden*

From the 1920s into the 1950s, scientists tried a variety of techniques to locate element 85, the heaviest halogen, based on its presumed properties. The accepted proof of element 85's existence came in 1940 from the Berkeley, California group of Dale R. Corson, Kenneth R. MacKenzie, and Emilio Segrè, who synthesized the element by alpha particle bombardment of bismuth. The turmoil of World War II and the fundamental question of artificial versus natural elements, meant that discovery credit and the honor of naming the element was postponed until 1947. In the intervening years others developed their claims to the discovery. Horia Hulubei and Yvette Cauchois observed X-rays they attributed to 218At from beta decaying 218Po in the late 1930s. Berta Karlik and Traude Bernert observed the alpha particle emissions of 218At in 1942. 219At was chemically separated from a natural source in 1953 by E.K. Hyde and Albert Ghiorso. The vagaries of discovery priority are discussed and the notion that at various times in history any of these groups might have been regarded as the discoverers of element 85 (astatine) is considered.

HIST 25: Women advisees of Alfred Werner: I. Chana Weizmann

***Dean F. Martin**, dmartin@cas.usf.edu, Department of Chemistry, University of South Florida, 4202 E. Fowler Avenue, SCA 400, Tampa, FL 33620, Fax: 813-974-3203, and Barbara B. Martin, Department of Chemstry, University of South Florida, 4202 East Fowler Avenue, Tampa, FL 33620*

Professor Alfred Werner, University of Zurich, received the Nobel Prize in 1914 for his contributions to the development of Inorganic Chemistry, specifically the field called chemistry of coordination compounds. One of his lesser known contributions was his encouragement of students from many nations as well as his encouragement of his women advisees. Only one of his students followed in the field he developed, though they continued in chemistry. Dr. Chana Weizmann had a useful career in chemistry in Israel following her graduate work, and the presentation considers her development and Werner's exceptional nature.

HIST 26: Sisters in chemistry: The seventeenth century medicinal chemistry of Alethea Howard, Countess of Arundel; Elizabeth Grey, Countess of Kent, and their associates

***A. L. Wilson**, Oolong Informatics, 364 Patteson Drive Box 214, Morgantown, WV 26505*

Alethea Talbot Howard and Elizabeth Talbot Grey were friends of Henrietta Maria, Queen of England. Shortly after the death of each sister, a book of medical recipes was published under her name. *Natura Exenterata*, associated with Alethea Howard, named the sources of many recipes. Similar attributions were made in a book associated with Queen Henrietta Maria. Sir Kenelm Digby, Lord Ruthven and the physician Theodore de Mayerne were also associated with books of medicinal recipes. There appear to have been some class and gender differences in early modern participation in alchemy and chymistry. Men were more involved in metallurgical studies or more willing to admit to it. Women of all social classes were engaged in extractions, distillations, refluxing and other activities that are still taught in college organic chemistry labs Women with high social status sometimes collected recipes for ‘masculine' medicines involving heavy metals, urine or human body parts.

HIST 27: Simultaneous priority disputes: G.N. Lewis vs. Irving Langmuir, and Irving Langmuir vs. William Harkins

***Patrick Coffey**, patrick_coffey@berkeley.edu, Office for History of Science and Technology, University of California, Berkeley, 1628 Euclid Ave., Berkeley, CA 94709*

In 1916, in his paper "The Atom and the Molecule", Gilbert Lewis suggested that the shared electron pair was the essence of the chemical bond. Beginning two years later, Irving Langmuir published a series of

papers extending Lewis{s theory, and Lewis and Langmuir became embroiled in a well-known priority dispute.

Langmuir proposed his theory of the surface chemnistry of oil films on water in 1916-1917 and became involved in a messy priority dispute with William Harkins. Lewis at first supported Langmuir, calling his theory fundamental and Harkins's actions "scientific piracy." But after his quarrel with Langmuir, Lewis supported Harkins when he was in danger of being discharged from Chicago as a "scientific bounder." Lewis minimized the contributions of both Langmuir and Harkins to surface chemistry, saying the dispute was inconsequential as they both had been predated by the Europeans.

HIST 28: The white knight chemist who performed a 1930's economic miracle

***Donald G Hicks**, Atlanta, GA 30328*

Chemist and genuine “white knight” Charles Herty was driven, simply by the nobility of the cause, to create thousands of jobs in the 1930's through chemistry research. An almost forgotten genius (like Percy Julian), he was at retirement age when he used results of a simple chemical analysis of sticky resin in wood to create both the southern pulp & paper and pine tree-farming industries that catalyzed rapid industrialization of the USA's poorest region. It was clearly a “miracle” because EVERY expert in the field said it was impossible! No personal financial gain came from these efforts, and this unique scientist was an early master of 2009 ACS President Tom Lane's “seven C's of career success.” A simple way to increase diversity and attract America's brightest students into chemistry would be to include multiple history lessons like this, on the real world value of innovative chemists, at appropriate points in the chemistry education of both students and the public. The 75th Herty Medal (3rd oldest annual award in ACS) will be presented 9-17-09 to celebrate Dr. Herty's legacy that includes other major contributions to chemistry and society.

HIST 29: Using history in teaching chemistry: History on PowerPoint

***David A. Katz**, dkatz@pima.edu, Department of Chemistry, Pima Community College - West Campus, 2202 W. Anklam Rd, Tucson, AZ 85709, Fax: 520-206-6092*

As a long advocate of using history in the teaching of chemistry, this author has been producing PowerPoint presentations for classes that include the historical background for various introductory topics along with photos of notable scientists and quotes from their original papers. All the historical information, in PowerPoint format, will be available for download.

HIST 30: A comparison of early modern alchemical equipment and common kitchen utensils

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Early modern woodcut pictures of kitchen utensils and lab equipment show striking similarities. Jugs, basins, flat-topped stoves, frying pans, ladles and spoons were essential for the well-equipped chymistry lab. Alchemists used napkins and saucepans for chromatography. Gravy ladles were handy for pouring out melted lead. Pictures of water baths often featured a kitchen cauldron; written descriptions sometimes specified an iron kettle. Kitchen bellows were used to regulate the temperature of the fire. Wooden pickle barrels were used for condensers during distillation. Mortars and pestles were used in kitchens to ‘stamp' rose petals. Colanders, hair sieves, jelly bags and conical fabric filters for spiced wine were among many filtration devices essential for the best cookery. Funnels were needed to pour sauces or butter into the steam vents of baked pies. Most chymical equipment could have been borrowed from the kitchen.

HIST 31: *Haber*: A viewing and discussion of the new film about one of history's most famous and infamous chemists

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Renowned for his synthesis of ammonia, this general-This recent film brings to the general public an insight into the enigmatic and complex Fritz Haber, whom Einstein said was “the tragedy of the German Jew: the tragedy of unrequited love.” Already famous for synthesizing ammonia and saving millions of lives, this general-audience film portrays Haber during the early stages of World War I as he faces the dilemma whether to develop chemical weapons for use at the German Front. Equally compelling is the portrayal of Clara Immerwahr, his wife and also a PhD chemist, as she struggles with her decision to have sacrificed her career for Haber's. *Haber* won the “Best of the Fest” at the 2008 Los Angeles International Short Film Festival, was an official selection at the 2008 Telluride Film Festival, and has been featured in many publications including the NY Times, LA Times and C&E News (05 Jan 09). A discussion with the writer/director/producer will follow the screening of the film.

HIST 32: From "chymistry" to physics: The influence of chemical analysis and synthesis on Isaac Newton's theory of light and colors

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In 1672, Isaac Newton overthrew some 2,000 years of optical theory by showing that white light is not a homogeneous entity, but rather a mixture of heterogeneous rays that can be separated by means of a prism. The pièce de resistance in Newton's demonstration was his resynthesis of the divided spectrum to reproduce the white light that he began with. Recently, the manuscript in which Newton first describes his resynthesis of white light has been published in its entirety on the Chymistry of Isaac Newton website (www.chymistry.org). It is now possible to see that Newton's exposé is buried in a mass of chemical and alchemical material extending over some thirty years of experiment. In my paper I will argue that Newton adapted contemporary chymical demonstrations of analysis and synthesis in order to arrive at his optical resynthesis. Analysis and synthesis had long played a key role in alchemical theory and practice, but had acquired a new prominence in the years directly before Newton arrived at his epoch-making discovery. My paper will give a brief survey of this earlier material and describe its influence upon Newton.

HIST 33: Particles and solvents: Debating the nature of matter and chymical analysis at the early *Académie des Sciences*

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Samuel Cottereau Duclos (1598-1685) established the laboratory and the chymical research program at the newly inaugurated Parisian Academy of Sciences (est. 1666). In the years following his election, Duclos enjoyed an unmatched level of activity and influence among academicians. During the 1670s, however, Duclos' institutional status and intellectual influence had dwindled considerably: by the end of the decade fellow academicians designated him a (heretic) “Platonist” and refused to publish his chemical philosophy, which was ultimately published in Amsterdam in 1680. The origins of this decline are examined in light of Duclos' preference of solution chymistry over traditional distillation practices, highlighted by his research into Alkahest, a theme he discussed at length at the Academy during the late 1660s. The assessment reveals metaphysical contentions within the Academy concerning the nature of matter and the scope chymical analysis. One turning point in these disputes is signaled by Duclos' confrontation with the younger Denis

Dodart, avid defender of distillation practices, over the direction of the ambitious ‘Natural History of Plants' project. In broader epistemological and experimental contexts, the contrast between solution and distillation analyses illustrates the interplay between conflicting perceptions and practices employed in negotiating distinctions such as physical/chymical, organic/mechanic, material/spiritual, and sensible/occult. Such divergences, rarely rigid, were at the core of two rival scientific worldviews, set apart by the Scientific Revolution.

HIST 34: Visual imagination in nineteenth-century chemistry

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This paper examines historically the role of the visual imagination in the pursuit of chemistry during the nineteenth century. Chemists were the first to move beyond philosophical speculation regarding the unseen microworld into the kind of productive, empirically-founded, and heuristically powerful investigative programs that have since become routine. In the process, microphysical speculations were transformed into an epistemically robust methodology that could be employed to confidently explore many of the intriguing details of that invisible world. An habitual and recurrent (though nearly invisible) pillar of that methodology, I propose here, was the productive use of the visual imagination.

HIST 35: Marketing chemistry in the early 19th century: The various ventures of William Hyde Wollaston

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In 1800, William Hyde Wollaston abandoned his medical practice in London to pursue the “business” of chemistry. With seed funding from his older brother and a partnership agreement with Smithson Tennant, he began a research program intent on producing commercial goods. Using information drawn from his research and account notebooks, together with banking records and stock transactions, I will trace the trajectory of Wollaston's various initiatives in the production and marketing of malleable platinum, the new metals rhodium and palladium, organic chemicals derived from wine lees, and patents for the camera lucida and periscopic spectacles. Only the malleable platinum business generated substantial profits, due to a happy confluence of scientific, technological and economic factors.

HIST 36: Sons of genius: Chemical manipulation and the image of chemistry from Joseph Black to Michael Faraday

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Joseph Black, with crude apparatus, arrived at results which were accurate to around 0.5% for solids, and 5% for gases; Henry Cavendish, with a precision balance but the simplest possible tools for handling gases, was accurate to around 1% in his measurements of gases; Lavoisier, with hugely sophisticated apparatus, was in error by as much as 20% in his gasometry; Thomas Beddoes had erratic results, and his problems are instructive for us; Humphry Davy and Michael Faraday were meticulous experimenters. All these chemists except Cavendish performed chemical experiments their lectures. This paper looks at the range of error in relation to the practical skills involved, laboratory apparatus, and the responses their lectures and publications evoked in their audiences and among their their fellow chemists.