American Chemical Society
Division of the History of Chemistry

Program and Abstracts

237th ACS National Meeting
Salt Lake City, UT
March 22-26, 2009

S. C. Rasmussen, Program Chair

HIST

DIVISION OF THE HISTORY OF CHEMISTRY

Final Program, 237th ACS National Meeting, Salt Lake City, UT, March 22-26, 2009

S. C. Rasmussen, *Program Chair*

BUSINESS MEETING:
HIST Business Meeting, 1:00 pm: Mon

MONDAY MORNING

Marriott Downtown -- Solitude

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

10:00 —1. Protein wars: Controversies in the early history of protein structure and function. **J. S. Jeffers**
10:30 —2. Neil Bartlett: A lifetime of accomplishment. **K. Kostecka**
11:00 —3. History of microencapsulation. **C. Thies**

MONDAY AFTERNOON

Marriott Downtown -- Solitude

Science History Study Tours: Global Perspectives
M. V. Orna, *Organizer*, *Presiding*

2:30 —4. Chemistry is everywhere. **M. V. Orna**
2:50 —5. "You can't miss it": A pictorial revisit of the John Wotiz tour of 1985. **L. Westmoreland**
3:15 —6. In the footsteps of the great: Exploring cathedrals of science. **Y. Twomey**
3:40 —7. Tycho Brahe, the island of Hven, and the Rundetaarn. **D. A. Katz**
4:00 — Intermission.
4:10 —8. The German nuclear reactor at Haigerloch. **D. A. Katz**
4:30 —9. A virtual chemical history tour of ancient Israel. **Z. C. Koren**
4:55 —10. Flights of fancy: Study tours off the beaten path. **C. J. Giunta**

TUESDAY MORNING

Marriott Downtown -- Salon C

Henry Eyring, His Science and His Legacy
J. M. Hayes, *Organizer, Presiding*

8:00 — Introductory Remarks.
8:10 —11. Henry Eyring: A model life. **S. M. Kuznicki**
8:45 —12. Henry Eyring's role in U. S. theoretical chemistry. **J. Simons**
9:20 —13. Henry Eyring and "Quantum Chemistry". **G. D. Patterson**
9:55 — Intermission.
10:10 —14. Henry Eyring: Mentor, models of research and emerging protein. **D. W. Urry**
10:45 —15. Henry Eyring: A mentor and a colleague. **J. Michl**
11:20 —16. Henry Eyring: Statistical mechanics and dynamics, significant structure theory. **D. J. Henderson**
11:55 —17. Henry Eyring: A model for young chemists. **J. M. Hayes**

TUESDAY AFTERNOON

ACS Award for Encouraging Women into Careers in the Chemical Sciences: Symposium in Honor of Mary F. Singleton

Sponsored by WCC, Cosponsored by HIST‡, PROF, and CEPA

Abstracts

HIST 1: Protein wars: Controversies in the early history of protein structure and function

Joe S. Jeffers, jeffers@obu.edu, Department of Chemistry, Ouachita Baptist University, 410 Ouachita Street, Box 3786, Arkadelphia, AR 71998-0001, Fax: 870-245-5241, Phone: 870 245 5216

Several controversial exchanges will be presented -- for example, the nineteenth-century dispute between Justus Liebig and Gerrit Mulder on protein structure; the debate between Hermann Staudinger (Nobel Prize 1953) and the colloidal chemists on whether or not proteins are macromolecules; and the dispute between James Sumner (Nobel Prize 1946) and Richard Willstätter (Nobel Prize 1916) on whether or not enzymes are proteins.

HIST 2: Neil Bartlett: A lifetime of accomplishment

Keith Kostecka, kkostecka@colum.edu, Science and Mathematics Department, Columbia College - Chicago, 600 S. Michigan Avenue, Chicago, IL 60605, Fax: 312-369-8075, Phone: 312-369-7182

Neil Bartlett (1932-2008) was an individual who, though well known for his significant discovery of the first noble gas compound, also did significant research in the general field of fluorine chemistry. He became “hooked” on chemistry at an early age, studied at King's College at the University of Durham, held a lecturer-ship at the University of British Columbia and later worked at Princeton University and the University of California at Berkeley. Bartlett also held a special interest in the stabilization of unusually high oxidation states of elements and in applying this work to the advancement of chemistry. In addition, he also contributed to understanding thermodynamic, structural and bonding considerations of chemical reactions. Furthermore, novel synthetic approaches were developed by Bartlett to give unstable binary fluorides. He also discovered many new metallic graphite compounds, including some that hold promise as powerful battery materials.

HIST 3: History of microencapsulation

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Since carbonless copy paper was commercialized in the 1950's, microencapsulation has evolved into a coating technology used globally by many industries. In this lecture, the author will use his 44 years of experience to trace microencapsulation technology from its beginnings at NCR to its current state of development. This presentation will discuss how many current encapsulation processes are refinements of processes developed prior to 1975, but refinements made over the years have had a major effect on their successful use. It will also be noted that microencapsulation has long been viewed as more of an art than a science. However, advances in characterization techniques plus studies by a diverse range of technical personal around the globe are developing a scientific foundation on which future encapsulation advances will be based. This is why the author believes the future of microencapsulation technology is much greater than its past.

HIST 4: Chemistry is everywhere

Mary Virginia Orna, mvorna@cnr.edu, Department of Chemistry, College of New Rochelle, 29 Castle Place, New Rochelle, NY 10805, Fax: 914-654-5387, Phone: 914-310-0351

Learning chemistry through travel to sites where the chemistry actually happened is a privilege available only since the latter part of the past century. This paper will describe how such travel can interface with the professional goals of chemists in academe, industry, and other areas of endeavor.

HIST 5: "You can't miss it": A pictorial revisit of the John Wotiz tour of 1985

Larry Westmoreland, bachscanyon@sbcglobal.net, 1320 Central Court, Edmond, OK 73034-4356, Phone: (405) 570-2851

For several years, Dr. John Wotiz of the University of Southern Illinois organized tours to sites of historical importance to Chemistry in Europe. The tour of 1985 was typical, and included visits to numerous museums, universities, monuments and mining districts in 11 countries over a period of 8 weeks. There were 21 participants who traveled in 5 new Peugeots, purchased in Paris, and returned to Paris at the end of the tour. Visits to sites often included private tours, guest lectures and wonderful hosted lunches or dinners. Travel between sites was at the discretion of each car driver, which allowed for a great deal of flexibility and independent exploration. (And the opportunity to get lost numerous times!) Individuals who have traveled to Europe recently, will be amazed to know that the cost of the 1985 tour was $3450, and at the conclusion of the tour there was a $409 rebate! John was an exceptional organizer, and was very much appreciated by all who were able to take part in one of his tours.

HIST 6: In the footsteps of the great: Exploring cathedrals of science

Yvonne Twomey, ytwomey@fnal.gov, P.O. Box 4707, Naperville, IL 60540, Fax: 630-961-1610, Phone: 630-961-9811

This symposium aims to show that visits to places important in the history of science provide teachers with interesting experiences to use in broadening their science curricula. In this presentation, I hope to give those interested in such ‘scientific travel' an insight into the way I research visits for study tours that I organize for teachers and others. I will mention some features of tours exploring14 European countries that I have planned for our non-profit group Science History Tours over the past 12 years, but will refer primarily to the 15-day visit to France made in June 2008. While the theme that emerged for the 2008 study tour was "19th century chemistry" visits relating to other branches of science were included to enable science teachers of all stripes to find something useful. Constructing such a tour lasts more than a year; it involves extensive research, first in the literature and through personal contacts, then making visits to check the proposed route, visit prospective sites, hold discussions with hosts or lecturers and inspect hotels and restaurants. Advance trips by the organizer are essential to make tours run smoothly; they also produce a wealth of useful local information gathered along the way.

HIST 7: Tycho Brahe, the island of Hven, and the Rundetaarn

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The Science History Tour of 2007, through northern Germany, Denmark, and Sweden followed the theme of astronomy, astronomical clocks, and the Swedish naturalist Carl Linnaeus. The Tycho Brahe museum on the island of Hven and the Rundetaarn (the round tower) gave insight to the life and times of this astronomer and his measurements of astrological phenomena.

HIST 8: The German nuclear reactor at Haigerloch

David A. Katz, david.katz@pima.edu, Department of Chemistry, Pima Community College - West Campus, 2202 W. Anklam Rd, Tucson, AZ 85709, Fax: 520-206-6092, Phone: 520-206-6044

The Science History Tour of 2004 visited the Atomkeller museum, site of the German nuclear reactor experiment, known as the "B8 Experiment", carried out at the end of March and the beginning of April, 1945. A subsequent trip to Norway, by this author, following the Science History Tour of 2007, included a visit to the Resistance Museum in Oslo and former site of the heavy water plant at Telemark to complete the story of the German nuclear reactor.

HIST 9: A virtual chemical history tour of ancient Israel

Zvi C. Koren, zvi@shenkar.ac.il, Edelstein Center for the Analysis of Ancient Artifacts, Department of Chemical Engineering, Shenkar College of Engineering and Design, 12 Anna Frank Street, 52526 Ramat-Gan, Israel, Phone: 011-972-54-8050066

The talk will take the audience through a scientific time warp spanning thousands of years of pre- and post-biblical history in an ancient land that has shaped modern western civilization. The scientific study of past societies, especially through chemical investigations, opens a historical window to understanding the technological developments of ancient cultures, the materials it used, the extent of international commerce in goods and crafts, and the way of life of ancient peoples. For example, the Dead Sea scrolls of Qumran and related Judean Desert sites have undergone carbon-14 dating, the nature of the ink used was studied, and conservation methods were developed to preserve them for future generations. Chemical studies have also been conducted on the finds from other Judean sites such as King Herod's Masada fortress palace and Bar Kokhba's Cave of Letters. Archaeometric investigations and provenance studies were performed on metal tools and weapons, ceramics, and clay objects excavated from underwater archaeological sites of the Mediterranean Levantine coast, from Zippori (Sepphoris) in the Galilee north, and from the ancient city of Beersheba in the south. Chromatographic analyses of dyes and pigments from various eras have shed light on the fashionable colors adorning the textiles of past societies.

HIST 10: Flights of fancy: Study tours off the beaten path

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, Phone: 315-445-4128

This presentation examines some of the challenges and opportunities of designing a history of chemistry study tour to destinations outside Europe and North America. Which sites in Asia, Africa, or South America might such a tour visit? What are the logistical resources and obstacles? Potential itineraries will be presented, assuming that the tour takers have limited time and funds.

HIST 11: Henry Eyring: A model life

Steven M Kuznicki, steve.kuznicki@ualberta.ca, Department of Chemical and Materials Engineering, University of Alberta, ECERF W7-002, Edmonton, AB T6G 2V4, Canada, Phone: 780-492-8819

Dr. Henry Eyring saw the world in simple terms, and modeled all that went on around him. His elegantly simple models, as crystallized in the Absolute Rate Theory, fundamentally changed the way

that we look at chemical reactions. It was in simplifying that Henry found great truth. The lesson of Dr. Eyring's life is that simple people, people just like you and me, can change the world. You do it every day, without recognizing it. And you have the potential to change the world much more if only you can understand and use the gifts you have been given.

HIST 12: Henry Eyring's role in U. S. theoretical chemistry

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The role of theoretical chemistry in U. S. chemistry research and education will be discussed with a special emphasis on the central role that the late Professor Henry Eyring played in its development, advancement, and applications to important chemical problems.

HIST 13: Henry Eyring and "Quantum Chemistry"

Gary D. Patterson, gp9a@andrew.cmu.edu, Department of Chemistry, Carnegie Mellon University, 4400 Fifth Avenue, Pittsburgh, PA 15213, Fax: 412-268-6897, Phone: 412-268-3324

The first generation of American physical chemists went to Germany to learn in the laboratories of men like Ostwald and Bunsen. The development of quantum mechanics in the 1920's led to another wave of intrepid Americans visiting Germany. Henry Eyring used his National Research Foundation Fellowship to study at the Kaiser Wilhelm Institute in Berlin with Michael Polanyi. Upon his return and appointment at Princeton University in 1931, he taught a graduate course in chemical applications of quantum mechanics. John Wiley was quick to suggest that he turn his lecture notes into an actual text in Quantum Chemistry. The project proceeded slowly and eventually coauthors(John Walter and George Kimball) were recruited to help finish the task. The book finally appeared in 1944. It has been a commercial success and remained in print and actively used in chemistry departments into the 70's. The book presents rigorous treatments of the mathematics of quantum mechanics, but the emphasis is on actual applications to chemistry. Both stationary state and dynamic issues are treated. Spectroscopy is thoroughly presented. The book all points to the chapter on the quantum mechanical theory of reaction rates. Henry Eyring won almost every prize in chemistry but the Nobel Prize. His chief book reflected his passion for explaining the chemistry observed in the laboratory in terms that could be grounded in rigorous theory, but which were simple enough to serve as a guide for every chemist.

HIST 14: Henry Eyring: Mentor, models of research and emerging protein

Dan W. Urry, School of Medicine, University of Alabama at Birmingham, 510 20th Street South, FOT 1203, Birmingham, AL 35294-3412, Phone: 205-979-4293

Henry Eyring was both a mentor and a teacher. I will give some anecdotes about his lecturing style and its relevance to his approach to research; his kindness and charity toward students, his elementary formulation of statistical mechanics and its relevance to chain entropy and to the Eyring significant structure theory of liquids. I will also discuss how the insights arising from the latter two lead to an understanding of the role of elastic deformation and of hydration structures in protein structure and function.

HIST 15: Henry Eyring: A mentor and a colleague

Josef Michl, michl@eefus.colorado.edu, Department of Chemistry and Biochemistry, University of Colorado, Boulder, CO 80309-0215, Fax: 303-492-0799, Phone: 303-492-6519

I will provide a brief personal account of what I owe to Henry Eyring from my first dozen years as a beginning faculty member.

HIST 16: Henry Eyring: Statistical mechanics and dynamics, significant structure theory

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The book "Statistical Mechanics and Dynamics" was one of Henry Eyring's last scientific contributions. The second edition appeared just after he passed away. The book exemplified his 'inductive-deductive' approach to science. The first chapter presents an interesting approach. For example, Bose-Einstein and Fermi-Dirac statistics are derived from rate theory. This is followed by chapters in which the same material is repeated but obtained rigorously. In this book he prsented his thoughts concerning the properties of liquids, namely significant structure theory. This theory was criticized at the time and is no longer pursed. However, by focusing on the volume rather than the temperature, as the significant variable, it anticipated later developments.

HIST 17: Henry Eyring: A model for young chemists

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As a conclusion to this symposium on Henry Eyring, I will summarize the qualities and experiences of Henry Eyring which make him a model for all scientists in their pursuit of knowledge. Eyring is model for younger (new to the profession) chemists, but he is also a model to all scientists.