American Chemical Society
Division of the History of Chemistry

Program and Abstracts

232nd ACS National Meeting
San Francisco, CA
September 10-14, 2006

J. S. Jeffers, Program Chair

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DIVISION OF THE HISTORY OF CHEMISTRY

Final Program, 232nd ACS National Meeting, San Francisco, CA, September 10-14, 2006

J. S. Jeffers, *Program Chair*

SOCIAL EVENTS:
Edelstein Dinner, Far East Cafe, 7:00 pm, $35: Mon
Chemists Making Music, 2nd Annual Concert, 5:30-7:00: Tue

SUNDAY MORNING

Marriott – Pacific Room H, http://marriott.com/property/propertypage/SFODT

Health Materials and Techniques: Research and Development over the Past 25 Years: Investment in Basic Research Leading to Benefits for Society

Cosponsored with PRES, CHED, MEDI, PMSE, POLY, and PRES
M. V. Orna, *Organizer, Presiding*

9:00 — Introductory Remarks. **M. V. Orna**.
9:10 — Welcome from the President. **E. A. Nalley**.
9:20 —1. History of the *in vitro* diagnostic industry. **H. M. Free**, R. M. Savol
9:50 —2. Medical applications of stimuli-responsive polymers. **A. Gutowska**
10:20 — Intermission.
10:30 —3. Nanofiber technology for health: Challenges and opportunities. **B. Chu**, B. S. Hsiao
11:00 —4. Nanofibrous materials for biomedical and environmental applications. **B. S. Hsiao**, B. Chu
11:30 —5. Biofunctional biomaterials. **J. L. West**

SUNDAY AFTERNOON

Marriott – Pacific Room H, http://marriott.com/property/propertypage/SFODT

Classic Chemistry Books of the Twentieth Century: Organic Chemistry

Cosponsored with Bolton Society, and CHED
N. D. Heindel, *Organizer, Presiding*

1:25 — Introductory Remarks. **N. D. Heindel**.
1:30 —6. Genesis of Roberts *Nuclear Magnetic Resonance* . **J. D. Roberts**
1:55 —7. Genesis of a textbook, *Basic Principles of Organic Chemistry* . **M. C. Caserio**, J. D. Roberts
2:20 —8. Paul Karrer as patriarch of Zurich. **J. S. Siegel**
2:45 —9. Whitmore's *Organic Chemistry*: Book, man, and time. **R. A. Olofson**

3:10 — Intermission.
3:25 —10. Textbooks of Louis and Mary Fieser. **K. L. Williamson**
3:50 —11. *Les Atomes*: A landmark book in chemistry. **G. D. Patterson**
4:15 —12. Organic chemistry textbooks in Britain from 1950 to 1990. **P. J. T. Morris**

MONDAY MORNING

Marriott – Pacific Room H, http://marriott.com/property/propertypage/SFODT

Celebrating a Legacy: Fifty Years of the Dexter and Edelstein Awards

J. I. Seeman, *Organizer,* A. S. Travis, *Organizer, Presiding*

9:00 — Introductory Remarks. **J. I. Seeman**.
9:10 —13. Newton's alchemical work and the creation of economic value. **K. J. Knoespel**
9:40 —14. History of alcohol as a motor fuel. **J. K. Smith**
10:10 —15. History of the colloid- macromolecular/polymer debate in biochemistry during the first half of the 20th century. **U. Deichmann**
10:40 — Intermission.
10:55 —16. Purple: The dye of dyes. **Z. C. Koren**
11:25 —17. 150th Anniversary of the synthetic dye industry. **A. S. Travis**

San Francisco Hilton –Yosemite A, http://www.sanfranciscohiltonhotel.com/?cid=goo

Dr. Percy L. Julian - Scientist, Humanist, Educator, Entrepreneur, and Inspirational Trailblazer

Sponsored by CMA, Cosponsored with PRES, Committee on Public Relations and Communications, Committee on Patents and Related Matters, Committee on National Historic Chemical Landmarks, Board Task Force on Percy Julian, ANYL, CHED, HIST, COMSCI, CPS, CPT, WCC, YCC, SOCED, and MEDI

MONDAY AFTERNOON

Marriott – Pacific Room H, http://marriott.com/property/propertypage/SFODT

Celebrating a Legacy: Fifty Years of the Dexter and Edelstein Awards

J. I. Seeman, *Organizer;* A. S. Travis, *Organizer, Presiding*

1:30 —18. History of the chemical industry since 1956. **P. J. T. Morris**
2:00 —19. History of chemistry: A Dexter awardee's reminiscences on the 50th anniversary of the Dexter and Edelstein awards. **G. B. Kauffman** WITHDRAWN
2:30 —20. Imagining the molecular world. **A. J. Rocke**
3:00 — Intermission.
3:15 —21. Scientific biography and history of chemistry in the last 50 years. **M. J. Nye**
3:45 —22. Role of experts in scientific consensus: Woodward-Doering/Rabe-Kindler total synthesis of quinine. **J. I. Seeman**
4:15 — Panel Discussion: Future of the history of chemistry. **J. I. Seeman** C. Hunt, E.

Homburg, W. B. Jensen, S. Mauskopf, A. Thackray, A. S. Travis .
4:55 — Concluding Remarks. **A. S. Travis**.

San Francisco Hilton –Yosemite A, http://www.sanfranciscohiltonhotel.com/?cid=goo

Dr. Percy L. Julian - Scientist, Humanist, Educator, Entrepreneur, and Inspirational Trailblazer

Grand Hyatt-Union Square Room, http://grandsanfrancisco.hyatt.com/hyatt/hotels/index.jsp

Fifty Years of Electron Transfer and RRKM Theories: Ideas of Electron Transfer in Physical Chemistry
Sponsored by PHYS, Cosponsored with HIST

MONDAY EVENING

Far East Café, http://www.fareastcafesf.com/

Edelstein Dinner

J. I. Seeman, *Organizer; Presiding*

7:00— by ticket, $35

TUESDAY MORNING

Marriott – Pacific Room H, http://marriott.com/property/propertypage/SFODT

Edelstein Award Symposium Honoring Peter Morris

M. D. Saltzman, *Organizer, Presiding*

8:30 — Introductory Remarks. **E. Holmberg**.
8:35 —23. Dynamite vs. guncotton. **S. H. Mauskopf**
9:15 —24. Imagining the molecular world in the nineteenth century. **A. J. Rocke**
9:55 —25. Torviscosa: Mussolini's chemical city. **A. Molella**
10:35 — Intermission.
10:50 —26. Unintended technology transfer: I.G. Farben's dyes, photographic products and Reppe chemistry in the United States. **A. S. Travis**
11:30 —27. Writing the history of modern chemistry. **P. J. T. Morris**

Grand Hyatt-Union Square Room, http://grandsanfrancisco.hyatt.com/hyatt/hotels/index.jsp

Fifty Years of Electron Transfer and RRKM Theories: Interaction with Experiment: Biological Electron Transfer *Sponsored by PHYS, Cosponsored with HIST*

TUESDAY AFTERNOON

Marriott – Pacific Room H, http://marriott.com/property/propertypage/SFODT

History of the FDA in its Hundredth Year

Cosponsored with Chemical Society of Washington
K. Morehouse, *Organizer, Presiding*

1:30 — Introductory Remarks.
1:40 —28. Celebrating 100 years of food and drug regulation. **S. Junod**
2:05 —29. Munyon's home remedy company: A test case for the original version of the food and drugs act. **N. D. Heindel**
2:30 —30. Developments in cosmetics regulation: A historical overview. **B. R. Meyers**
2:55 —31. Science and regulation of biological products. **C. T. Middendorf**
3:20 —32. History of the drug approval process. **B. W. Poole**, M. E. Kremzner

Marriott – Pacific Room H, http://marriott.com/property/propertypage/SFODT

General Papers

J. S. Jeffers, *Organizer, Presiding*

4:10 —33. St. Elmo Brady (1884-1966): Pioneering black academic chemist. **D. F. Martin**, B. B. Martin
4:35 —34. Patriots, immigrants and chemical patentees in the National Inventors Hall of Fame. **H. M. Peters**, S. B. Peters

Grand Hyatt-Union Square Room, http://grandsanfrancisco.hyatt.com/hyatt/hotels/index.jsp

Fifty Years of Electron Transfer and RRKM Theories: RRKM Theory and Experiment
Sponsored by PHYS, Cosponsored with HIST

TUESDAY EVENING

Palace – Ralston Room, http://www.sfpalace.com/main/location.htm

5:30-7:00 — Chemists making Music, Victoria Bragin and Cal Tech Chamber Music Ensembles, 2nd Annual Concert, sponsored by HIST and Chemical Heritage Foundation
J. I. Seeman, V. M. Bragin, *Organizers, Presiding*

WEDNESDAY MORNING

Grand Hyatt-Union Square Room, http://grandsanfrancisco.hyatt.com/hyatt/hotels/index.jsp

Fifty Years of Electron Transfer and RRKM Theories: Applications and Extensions of Electron Transfer Theory *Sponsored by PHYS, Cosponsored with HIST*

San Francisco Marriott Courtyard–Soma 3, http://www.courtyardsanfrancisco.com/

Great Technicians in History Sponsored by TECH, Cosponsored with HIST

WEDNESDAY AFTERNOON

Grand Hyatt-Union Square Room, http://grandsanfrancisco.hyatt.com/hyatt/hotels/index.jsp

Fifty Years of Electron Transfer and RRKM Theories: Foundations of RRKM Theory
Sponsored by PHYS, Cosponsored with HIST

Marriott – Salon 11, http://marriott.com/property/propertypage/SFODT

Lives in Science as Illustrations of Scientific Practice
Sponsored by CHED, Cosponsored with HIST

THURSDAY MORNING

Grand Hyatt-Union Square Room, http://grandsanfrancisco.hyatt.com/hyatt/hotels/index.jsp

Fifty Years of Electron Transfer and RRKM Theories: Interaction with Experiment: Molecular Electronics/Nanoscience *Sponsored by PHYS, Cosponsored with HIST*

THURSDAY AFTERNOON

Grand Hyatt-Union Square Room, http://grandsanfrancisco.hyatt.com/hyatt/hotels/index.jsp

Fifty Years of Electron Transfer and RRKM Theories: Theory of Reaction Dynamics
Sponsored by PHYS, Cosponsored with HIST

Abstracts

HIST 1 History of the *in vitro* diagnostic industry
Helen M. Free, Diabetes Care Division, Bayer HealthCare, 1884 Miles Ave., Elkhart, IN 46514, hmfree23@aol.com, and Rosanne M. Savol, Rosebud Consulting

Clinical laboratory science evolved into an important part of the practice of medicine during the first part of the 20th century. General analytical methods to identify and quantify clinically significant components in blood, urine and spinal fluid were refined over the decades. By 1930, the medical laboratory, directed by professional clinical chemists or pathologists, was a recognized partner in the delivery of modern healthcare. The first successful commercially available, ready-to-use reagent was produced by Walter Ames Compton, M.D., and chemist Maurice Treneer at Miles Laboratories. About 1940, they created a self-heating effervescent copper sulfate tablet to perform the Benedict's test for urine sugar. Ten years later, Leonard Skeggs devised an instrument - the "autoanalyzer" - to automatically process and test serum specimens. The *in vitro* diagnostic (IVD) industry is now a multi-billion dollar global high technology industry offering testing products for home use, physician offices, hospitals and genetic testing laboratories.

HIST 2 Medical applications of stimuli-responsive polymers
Anna Gutowska, Advanced Imaging Technologies, 2400 Stevens Drive, Suite B, Richland, WA 99354, agutowski@charter.net

Response to stimulus is a basic process of living systems. Based on the lessons from nature, scientists have been designing polymeric materials that respond to external stimuli such as temperature, pH, light, electric field, chemicals, and ionic strength. Applications of these stimuli-responsive, or “smart”, polymers in delivery of therapeutics, tissue engineering, bio-separations, sensors/actuators were studied extensively, and numerous papers and patents are evidence of a rapid progress in this area. Understanding of the structure-property relationship is essential for rational design of new functional smart materials that in turn enable further development of new technologies. A specific sub-class of the stimuli-responsive polymers, i.e., thermally-reversible gels, will be discussed. Aqueous solutions of these polymers form gels at physiological conditions (body temperature, pH and ionic strength), but are free flowing solutions at room temperature. These interesting properties make the gels useful for delivery of therapeutics and tissue engineering.

HIST 3 Nanofiber technology for health: Challenges and opportunities
Benjamin Chu and Benjamin S. Hsiao, Department of Chemistry, Stony Brook University, Stony Brook, NY 11794-3400, Fax: 631-632-6518, bchu@notes.cc.sunysb.edu

In recent years, there has been an explosive growth of research activities to explore the development of electro-spinning technology and its applications. Over 600 scientific papers and 70 patents have been published. The majority of current electro-spinning related studies are concerned with the generation of new nano-structured materials and their applications, e.g., biological and clothing membranes, aerosol filters, optical and chemical sensors. Recently, advances in electro-spinning and related technologies have been made. The non-woven structure has unique features, including interconnected pores, very large surface-to-volume ratio, and ease of surface modifications, which enable such scaffolds to have many biomedical and industrial applications. In this lecture, we will provide an overview of the challenges and the opportunities of this unique technology, including one example in biomedical applications.

HIST 4 Nanofibrous materials for biomedical and environmental applications
Benjamin S. Hsiao and Benjamin Chu, Department of Chemistry, Stony Brook University, Stony Book, NY 11794-3400, Fax: 631-632-6518, bhsiao@notes.cc.sunysb.edu

The present lecture aims to provide two novel technologies based on nanofibrous materials. The first application involves the development of a unique class of electrospun non-woven nanofibrous membranes that can combine the advantages of controlled degradation profile, pre-designed drug loading capacity and tailored release rate, for clinical applications after abdominal, cardiac or thoracic surgery. The membrane can also be changed into protein-philic, suitable for cardiac tissue regeneration. The second application involves the development of novel high flux ultrafiltration (UF) media, consisting of a three-tier composite structure for oil/water emulsion separations. This unique type of nanofibrous UF media exhibited a high flux rate (over 10 times that of commercial UF media) and an excellent total organic solute rejection rate (99.8%) without appreciable fouling.

HIST 5 Biofunctional biomaterials
Jennifer L. West, Department of Bioengineering, Rice University, 6100 Main Street, Houston, TX 77005, jwest@rice.edu

Synthetic biomaterials are presently used in a wide variety of medical devices, but failures related to biocompatibility still plague many applications. Designing synthetic materials to be biomimetic or biofunctional may help to overcome some of these complications. This may enable development of functional devices such as small diameter vascular grafts that resist thrombosis and restenosis. Development of biofunctional biomaterials may also allow one to provide appropriate cues to guide tissue formation processes. Patterning technologies are also utilized to create complex architectures for presentation of bioactive signals.

HIST 6 Genesis of Roberts *Nuclear Magnetic Resonance*
John D. Roberts, Gates and Crellin Laboratories, California Institute of technology, 1201 East California Blvd., Pasadena, CA 91125

Concrete realization of NMR in condensed phases was achieved by physicists E. M. Purcell and F. Bloch, earning them a joint Nobel Prize in 1952. These events did not impinge much on the consciousness of many organic chemists, although my encounters with Francis Bitter and Richard Ogg did suggest that something I could not understand would revolutionize structural analysis of organic compounds. Still the idea remained fallow, while others recognized the significance of a NMR of ethanol disclosed by Arnold, Dharmati and Packard in 1951, with three chemical shifts in the 1:2:3 intensity ratio. Then, an exposure in 1954 to the pioneering NMR work of W. D. Phillips at DuPont CRD demonstrated that even with no understanding how NMR worked, it was obvious what it could do and I absolutely had to get involved. Hands-on operation of the temperamental Varian HR-40 instrument was a rewarding, but time-consuming experience. Early NMR users were occasionally asked by non-users what NMR was all about, preferably from someone not knowing enough to overwhelm with details. A scary, modestly successful first lecture at snowy Rochester in 1956 was followed by a primitive but nonetheless smash presentation at a Reaction Mechanisms Conference. Repeated some forty times around the country, this lecture morphed into *Nuclear Magnetic Resonance*.

HIST 7 Genesis of a textbook, *Basic Principles of Organic Chemistry*
Marjorie C. Caserio, Department of Chemistry & Biochemistry, University of California San Diego, 9500 Gilman Drive, La Jolla, CA 92093, Fax: 858-534-5383, mcaserio@chem.ucsd.edu, and John D. Roberts, Gates and Crellin Laboratories, California Institute of technology

An initial effort to write a different kind of textbook for beginning organic chemistry was generated by the triumvirate of Arthur C. Cope, John C. Sheehan and John D. Roberts at MIT about 1950. The effort collapsed after one chapter was written, primarily because it was not clear who was going to write what and how much emphasis on physical organic the text was going to have. The junior author had been inspired by the radical organic text published by Howard J. Lucas of Caltech about 1935 and, after transferring from MIT to a professorship at Caltech (as successor to Lucas) and developing an elementary course with a large physical organic component, this ideal became much more realizable. The effort began with encouragement by Caltech's Edward R. Buchman to prepare a syllabus and was strongly pushed by W.A. Benjamin, which was starting a publishing company and wanted an organic text to be its first major work in chemistry. How this subsequently panned out to give a published text will be revealed in some detail.

HIST 8 Paul Karrer as patriarch of Zurich
Jay S. Siegel, Organisch-chemisches Institut, Universität Zürich, Winterthurerstrasse 190, 8057 Zürich, Switzerland, Fax: +41 (0)44 635 6888, jss@oci.unizh.ch

Paul Karrer was Ordinarius Professor and Director of the Chemistry Institute at the University of Zurich from 1919 to his retirement in 1959. He wrote the first edition of his Organic textbook in 1927; a total of 13 editions appeared as well as translations in several languages. In addition, he produced a monograph on carotenoids, and over 1000 research publications. He was awarded the Nobel Prize in 1937. His numerous research and teaching accomplishments made him a patriarch over the Zurich school, which influenced the course of organic chemistry for four decades.

HIST 9 Whitmore's *Organic Chemistry*: Book, man, and time
Roy A. Olofson, Department of Chemistry, The Pennsylvania State University, 104 Chemistry, University Park, PA 16802, rao3@psu.edu

Heralded as the first advanced organic chemistry text written in English and characterized as a “one-volume ‘Beilstein',” Penn State Dean Frank C. Whitmore's 1937 *Organic Chemistry* was published to critical acclaim. At the time, Whitmore already ranked among America's most famous chemists. He had written the classic monograph on organomercurials and introduced the carbocation as a reaction intermediate to explain whole classes of rearrangements (“Whitmore 1,2-shifts”). As 1938 ACS President, he would address 72 of the 102 local sections (better than a book tour!). He became chemistry's *de facto* public spokesman and a leader in organizing and directing critical WWII war research. With the aid of original notes and documents from the Penn State collection, the eight-year process Whitmore followed in writing his opus is outlined. After ten reprintings, a second edition was completed and published in 1951 after Whitmore's death. The saga of this endeavor also is recounted.

HIST 10 Textbooks of Louis and Mary Fieser

Kenneth L. Williamson, Chemistry Department, Mount Holyoke College, South Hadley, MA 01075, Fax: 413 538 2327, kwilliam@mtholyoke.edu

Fieser and Fieser. Louis Frederick Fieser and Mary Fieser of Harvard University. Are there any two names more synonymous with organic chemistry textbooks and lab manuals during the 1940's and 1950's? Have there ever been two more prolific authors of valuable reference books, monographs, and instruction books in organic chemistry? *Experiments in Organic Chemistry* by Louis Fieser (Mary was never a coauthor of this text) was first published in 1935. In 1975 Ken Williamson became coauthor of the text, now with the title *Organic Experiments*. It is still in print almost three-quarters of a century and twelve editions later and includes at least one classic experiment from that first edition. The textbook, *Organic Chemistry*, by Louis and Mary Fieser was first published in 1944. This introduced the era of the gigantic undergraduate textbook that, at over 1000 pages, tries to cover the entire field. The 3rd edition of 1956 introduced stereochemistry but was devoid of mechanisms. Shortly thereafter Louis introduced the Fieser molecular models, made of plastic and aluminum tubes. To accompany these models, patterned after Dreiding molecular models, he published *Chemistry in Three Dimensions*. In addition to these textbooks the Fiesers published more than a score of other books, the most renowned of which is the series *Reagents for Organic Synthesis*.

HIST 11 *Les Atomes*: A landmark book in chemistry

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

Jean Perrin changed the terms of discussion in all physical chemistry texts with the publication of *Les Atomes* in 1913. Although Dalton had proposed the atomic hypothesis as the basis for a rational philosophy of chemistry, few physical chemists in the late 19th century actually believed in the physical reality of such microscopic entities. They were far too small to be imaged directly and were relegated to the realm of natural philosophy. Although atoms and molecules are small, colloidal particles give rise to light scattering and the ultramicroscope reveals points of light at the location of the optical inhomogeneities. The phenomenon of Brownian motion demonstrated that colloidal particles undergo highly irregular trajectories in solution. With the publications of Einstein on the microscopic basis of Brownian motion and the invention of the ultramicroscope, the stage was set for the Nobel Prize winning researches of Jean Perrin. He observed both the diffusion coefficient of colloidal particles in solution and the distribution of concentration of colloidal particles in a tall vessel. Both experimental results confirmed the predictions of Einstein. Perrin then produced a definitive treatise containing all the known evidence for the physical existence of atoms and molecules. The book produced immediate capitulation of virtually all resistance and most of the extant physical chemistry texts were modified accordingly. Even Ostwald, the father of physical chemistry and one of the chief opponents of the notion of physical atoms and molecules, rapidly changed his views and textbooks. A discussion of the contents of the English translation of the book by Perrin and a presentation of typical physical chemistry texts from that period will also be given.

HIST 12 Organic chemistry textbooks in Britain from 1950 to 1990

Peter J. T. Morris, Science Museum, London SW7 2DD, United Kingdom, peter.morris@nmsi.ac.uk

The main textbooks used for undergraduate organic chemistry courses in Britain in this period were American: Fieser & Fieser in the 1950s and 1960s, followed by March in the 1970s and 1980s, and by McMurry in the 1980s. The major home-grown competitor was by Ivor Finar, a chemist at North London Polytechnic. The first edition was published in 1951. Finar only made passing use of organic reaction mechanisms and no use of physical methods at all. Not until the publication of the sixth edition (1973) did physical methods appear in the text. This gap was filled by Peter Sykes's *A Guidebook to Mechanism in Organic Chemistry* (1961), and Peter Schwartz's *Physical Methods in Organic Chemistry* (1964). Despite its conversion to mechanistic chemistry, Finar's book was now on its last legs, although it was reprinted until at least 1986. However, it was not replaced by a British textbook. The only attempt in the UK to publish a mechanism-based textbook, *Basic Organic Chemistry: A Mechanistic Approach* (1966) by John Tedder and Anthony Nechvatal, was not a success. Who used Finar? Why did he largely ignore organic reaction mechanisms and physical methods? And why did Britain fail to produce a textbook to match its American counterparts?

HIST 13 Newton's alchemical work and the creation of economic value

Kenneth J. Knoespel, Georgia Institute of Technology, Atlanta, GA 30033-0165, Kenneth.knoespel@iac.gatech.edu

Newton's alchemical practice functions as a translation code for a new language of economics in which an investigation of material-spiritual value truly becomes transformed into a systematic structure of social value understood through economics. After noting the forms of material valorization in Keynes Newton manuscripts at Cambridge, this paper surveys the Yahuda Newton manuscripts in Jerusalem and shows that Newton's extensive work on universal history provides an essential setting for linking his work on alchemy and his work at the mint. Indeed, it is not at all farfetched to think of history as a kind of alchemical process that looks to the creation of value and wealth. Research on Newton's manuscripts dealing with universal history in the Yahuda collection at the Hebrew University emphasizes the importance of integrating Newton's unpublished manuscripts and provides an opportunity to celebrate the fundamental contributions of the Edelstein Center to Newton scholarship.

HIST 14 History of alcohol as a motor fuel
John Kenly Smith, Lehigh Univerity, Bethlehem, PA 18015, jks0@lehigh.edu

Alcohol has been used as a motor fuel or additive to motor fuel since the early part of the 20th century. My paper traces the history of the use of alcohol as a motor fuel and the controversies surrounding its use.

HIST 15 History of the colloid- macromolecular/polymer debate in biochemistry during the first half of the 20th century
Ute Deichmann, Institute of Genetics, University of Cologne, Zuelpicher Str. 47, 50674 Koeln, Germany, ute.deichmann@uni-koeln.de

This paper will review developments in colloid chemistry and macromolecular chemistry as related to biochemistry. It includes major controversies in Europe and the United States during the first half of the 20th century. Among them are polemics over the applicability of the ionic theory, postulated by Arrhenius, Ostwald, and van't Hoff, as an explanation for the behaviour of proteins, in particular enzymes, and the far-reaching claims of colloid chemists regarding the constitutions and properties of biologically relevant macromolecules. This paper will also focus on the important historical contributions of Dexter Award winner Joseph Fruton, a distinguished biochemist at Yale University, who also published widely on the history of biochemistry.

HIST 16 Purple: The dye of dyes
Zvi C. Koren, The Edelstein Center for the Analysis of Ancient Textiles and Related Artifacts, Shenkar College of Engineering and Design, Department of Chemical Technologies, 12 Anna Frank St., 52526 Ramat-Gan, Israel, zvi@shenkar.ac.il

Phoenician Purples and Biblical Blues were the most royal and sacred of textile dyeings, produced in one of the most complex of biochemical technologies practiced at least three and a half millennia ago. The purple and violet pigments used were produced from the hypobranchial glandular extracts of certain species of Levantine mollusks, such as Murex trunculus. Until recently, scientists were mystified as to how the amazing empirical biochemists of the hoary past were able to perform completely natural chemical dyeings with these water-insoluble pigments. This field of research was particularly close to the late Dr. Sidney Edelstein, who, nearly 20 years ago, sponsored the publication of Rabbi Dr. Isaac Halevy Herzog's 1913 doctoral dissertation on "Hebrew Porphyrology", which spurred tremendous interest in this area. This talk will include a number of recent archaeological and chemical discoveries made by the author regarding this purple pigment – truly The Dye of Dyes.

HIST 17 150th Anniversary of the synthetic dye industry
Anthony S. Travis, Edelstein Center for the History and Philosophy of Science, Technology and Medicine, The Hebrew University of Jerusalem, Levy Building, Edmond J. Safra Campus, Givat Ram, 91904 Jerusalem, Israel, travis@cc.huji.ac.il

The year 2006 marks the sesquicentennial of the discovery by teenaged chemical inventor William Henry Perkin of the first aniline dye, later known as mauve. The anilines and other aromatics revolutionized the study of chemistry, led to the inauguration of industrial research laboratories, and helped forge academic-industrial collaborations. The colorants, as agents of modernity, forced changes in patent law, fostered technology transfer, stimulated the emergence of the modern chemical industry, and decimated cultivation of dye-yielding plants. They contributed to the growth of Germany as a major economic power, and, after the dye industry was adopted by the United States, from 1915, its mode of applied research led to the discovery of synthetic polymers and new agrochemicals. Apart from the intrinsic chemical interest in the early story of the dye industry, these few facts make a compelling reason for a historical review of the first high-tech science based industry.

HIST 18 History of the chemical industry since 1956
Peter J. T. Morris, Science Museum, Exhibition Road, South Kensington, London SW7 2DD, United Kingdom, peter.morris@nmsi.ac.uk

There are several different ways of writing the history of the chemical industry, ranging from a focus on the chemical processes to an econometric analysis. Some of these methods, for instance looking at the development of the chemical industry from the environmental viewpoint, are of recent origin. What do these different approaches tell us about the history of the chemical industry and the historiography of the chemical industry? What new lines of analysis are needed?

HIST 19 History of chemistry: A Dexter awardee's reminiscences on the 50th anniversary of the Dexter and Edelstein awards

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WITHDRAWN

Since my first historical paper presented at the 124th National Meeting of the American Chemical Society, Chicago, IL, September 8, 1953, I have consistently devoted a large portion of my research endeavors to the history of chemistry, many with student coauthors and my wife, Laurie. I shall review these contributions to the literature and to the ACS Division of the History of Chemistry through the perspective of more than a half-century.

HIST 20 Imagining the molecular world

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The characteristic mental vision of chemists to the molecular world is so intuitive and so second-nature that it becomes instinctual. But how exactly were molecular representations used, and what was the historical process of developing these methods in the nineteenth century—especially in the crucial period of 1850-70? What mental processes and habits were developed side by side with what empirical evidence? What were the reactions of contemporaries to this ontological turn—i.e., when the actual reality of these tiny creatures began to be seriously considered and then even forthrightly asserted by at least a few centrally-situated chemists? This paper will address some of these questions.

HIST 21 Scientific biography and history of chemistry in the last 50 years

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Biography is one of the most popular categories of books, and scientific biographies are no exception. This paper examines approaches typical of different genres of scientific biography and the ways in which historians of chemistry have used biography as a means of writing about chemical practices and chemical theories in different historical periods and national settings. Antoine Lavoisier has been the most popular subject of biographical study for Dexter Award and Edelstein Award recipients, along with notable chemists of the nineteenth century such as Humphry Davy and Hermann Kolbe. Discussion of approaches to writing biographies of more contemporary chemists, such as Michael Polanyi and Linus Pauling, also is the subject of this paper.

HIST 22 Role of experts in scientific consensus: Woodward-Doering/Rabe-Kindler total synthesis of quinine

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In 1918, Paul Rabe and Karl Kindler reported the conversion of d-quinotoxine into quinine. In 1944, Robert B. Woodward and William Doering reported “The Total Synthesis of Quinine.” In fact, Woodward and Doering never synthesized any quinine. Rather, they prepared d-quinotoxine. As stated by Woodward and Doering, “In view of the established conversion of quinotoxine to quinine, with the synthesis of quinotoxine the total synthesis of quinine was complete.” In 2000 and 2001, Gilbert Stork opined that the Woodward and Doering assertion of a total synthesis was a “myth.” In 2001, Stork and co-workers published “The First Stereoselective Synthesis of Quinine” stating that “the basis of their [RBW and WD's] characterization of Rabe's claim as ‘established' is unclear.” I shall review the experimental data and demonstrate that Rabe and Kindler did, in fact, convert d-quinotoxine into quinine, and that Woodward and Doering did complete a formal total synthesis of quinine.

HIST 23 Dynamite vs. guncotton

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In the mid 1860s, Frederick Abel and Alfred Nobel succeeded in "taming" two hitherto highly dangerous organic explosives for use as blasting agents. They were guncotton (tamed as "patent safety guncotton") and nitroglycerin (tamed as dynamite).These products-and their progenitors-were soon locked in intense competition in Great Britain. Abel's advice as a government expert in explosives and munitions facilitated the passage of the Nitroglycerine Act of 1869, in which production and transportation of all nitroglycerine products (including dynamite) were severely constrained. For his part, Nobel personally remonstrated against the Act and may have been a guiding force behind an anti-guncotton, pro-dynamite "mineral interest", which mounted a campaign to repeal the Act in the press and in parliament, especially after a severe and lethal explosion in the factory that produced "patent safety guncotton" in 1871. In this paper, I shall use the narrative of the Abel-Nobel competition between 1868 and 1874 to explore a number of important issues regarding science and technology of explosives, the state and society. These include: the determination and management of risk and safety, the debate over the appropriateness of government scientists holding profitable patents and serving as expert advisors regarding products competitive to their own patents, and the activities of special interest lobbies.

HIST 24 Imagining the molecular world in the nineteenth century
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In 1996 Joachim Schummer pointed out that the characteristic mental vision of chemists to the molecular world is for them so intuitive and so second nature "that they are often no longer consciously aware of the category-leap between the perspective of substances on the one hand, and that [molecular] structures on the other, which is required for the molecular modeling of compounds." But how exactly were molecular representations used, and what was the historic process of developing these methods in the nineteenth century, especially in the crucial period of 1850-70? What mental process of developing and habits developed side by side with what empirical evidence? Was it psychologically necessary for an individual scientist to take an ontological turn before Schummer's "category-leap" from macroscopic substances to sub-microscopic modeling and images could be attempted? This paper will address these and other questions.

HIST 25 Torviscosa: Mussolini's chemical city
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During the 1930's, Mussolini was seeking economic and technological independence from a world that feared his rising power and threatened him with embargoes. One of his signature strategies was to develop autonomous industries in a dozen new towns, citta-nouve, scattered around Italy. Between Venice and Trieste arose the techno-city of Torviscosa, dedicated to the production of rayon from a newly introduced "sweet cane." Advertised as the "Italian Cellulose," Torviscoa not only produced synthetics for Italian industry but also served as a potent propaganda symbol for Il Duce's program to revive Italy, its industries, and its people.

HIST 26 Unintended technology transfer: I.G. Farben's dyes, photographic products and Reppe chemistry in the United States
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During the 1930s the German behemoth I. G. Farbenindustrie was a leading manufacturer and supplier of chemicals, particularly synthetic dyes, novel detergents, and photoproducts, in the United States. Knowledge of the most complex processes was generally in the hands of trusted employees sent over from Ludwigshafen and Leverkusen. At the end of the decade the corporation's U.S. patent portfolio included several examples of the then new acetylene, or Reppe, chemistry. In 1942, after the United States entered the war, the I.G.'s American factories, those of General Aniline and Film, and patents were sequestered by the government. The German employees, according to political affiliations or ethnic origins, were imprisoned, discharged, assigned to research posts distant from factories, or encouraged to develop new manufacturing processes based on I.G. patents. This had a significant impact on technologies adopted by General Aniline and Film and on the careers of German industrial chemists in the United States after 1945.

HIST 27 Writing the history of modern chemistry
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Modern chemistry is a vast and important enterprise. There are probably more chemists alive now than in the whole of preceding history. More chemistry-however it is defined-was done in the 20th century then ever before. Since 1900, chemistry has changed out of recognition and may even be on the brink of not being chemistry at all. Outside academia, the chemical industry and industrial chemists have had a profound influence on the development of our way of life. Yet there are very few professional historians of chemistry actively studying the period after 1900 and even fewer the post-1945 era. Why is this and what are the barriers to studying the history of modern chemistry? As one of the rare historians of modern chemistry, I will illustrate the attractions of studying this period and the resources needed to build up its history.

HIST 28 Celebrating 100 years of food and drug regulation
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The Centennial of the passage of the 1906 Pure Food and Drugs Act is being commemorated by FDA as well as other organizations during 2006. This federal law was never considered as important as banking regulation or railroad regulation at the time it was enacted, but today, even though the law has long been superseded by the 1938 Food, Drug, and Cosmetic Act and its amendments (which as still the foundation for federal food and drug regulation), this Act is recognized as a milestone in American history – a cornerstone of the Progressive movement in American history, and a tribute to regulation based upon and grounded in science. This presentation, using artifacts and articles from the 1906 era as well as from the collection of the FDA's History Office, reviews the major milestones in the first 100 years of federal food and drug regulation.

HIST 29 Munyon's home remedy company: A test case for the original version of the food and drugs act
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The Pure Food and Drugs Act of 1906 derived its legal power from its infamous “misbranding” clause. Unfortunately the misbranding section of the law did not specifically speak to the wild advertising claims by manufacturers promising spectacular cures for everything from migraines to malignancies. The mere threat of the law was enough to cause many manufacturers to tone down their claims, but a few, like Munyon's Home Remedy Company and Johnson's Cancerine, had to be hauled into court. In U.S. v. Munyon (Eastern District Court of Pennsylvania, 14 December 1910), after government chemists presented chemical analyses showing the “Special Blood Cure” was lactose, the company pled guilty. However, a parallel case for a guaranteed cancer cure was appealed all the way to the Supreme Court, where the justices unexpectedly ruled in the company's favor. This prompted a rapid Congressional rewriting of the law (the Sherley Amendment). The colorful history of the Munyon Company, modern analyses of its patent medicines, and the firm's role in triggering the first revision of the Pure Food and Drugs Act will be presented.

HIST 30 Developments in cosmetics regulation: A historical overview
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When the Federal Food, Drug, and Cosmetic Act of 1938 superseded the Food and Drugs Act of 1906, the new law's name announced a significant advance: For the first time, cosmetics became subject to Federal authority. How did we go from cosmetics being completely unregulated—and the use of makeup even morally suspect—to establishing legal requirements for their safety? The new law marked the culmination of years of consumer activism and shifting perceptions, as the use of cosmetics such as makeup and hair dyes became not only socially acceptable but commonplace. These developments paralleled other social changes, such as the entrance of women into the workplace, the growth of the entertainment industry with its attendant glamour, and the wider availability of commercially marketed products. Consumer injuries, most notoriously cases of blindness resulting from “Lash Lure” eyelash dye, also helped propel cosmetic safety requirements into the new law. Since 1938, FDA's regulatory responses have included requiring warning statements, prohibiting or restricting certain ingredients, and pursuing enforcement actions (e.g., warning letters, seizures, injunctions, and import refusals). The Fair Packaging and Labeling Act of 1966 authorized FDA to issue regulations requiring ingredient declarations for cosmetics sold at retail to consumers. In 1972, FDA established the Voluntary Cosmetic Registration Program. FDA's Cosmetics website became available in the 1990s and immediately became an important communications tool. Today FDA continues to monitor emerging cosmetics issues and to inform the public of our findings and conclusions on cosmetic safety.

HIST 31 Science and regulation of biological products
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The Food and Drug Administration's (FDA) Center for Biologics Evaluation and Research (CBER) is responsible for ensuring the safety, purity, potency, and efficacy of biological and related products (biologics) intended for use in the diagnosis, prevention, treatment, or cure of diseases in humans, and for ensuring the safety of the nation's supply of blood and blood products. Biologics are substances either derived from living organisms—including humans, animals, plants, and microorganisms—or produced by biotechnology. In addition, they can be combinations of these substances. Biologics include vaccines, blood and blood products, antitoxins, allergenic products such as patch tests and extracts, certain tissues and diagnostic devices for HIV and hepatitis. The number of biologics regulated by CBER is expanding rapidly because of the remarkable growth of research in biotechnology and scientific advances such as completion of the Human Genome Project.

HIST 32 History of the drug approval process
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Abstract text not available.

HIST 33 St. Elmo Brady (1884-1966): Pioneering black academic chemist

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St. Elmo Brady was the first African-American to earn a Ph.D. in chemistry in the United States, and he had a considerable influence on the development of chemistry at Fisk University and on the training of young African-American students at four historically black colleges or universities (HBCUs). The amount of information about him seems to be fairly diffuse, and he deserves much more attention – the degrees he earned, how he got to graduate school, the postdoctoral years, the retirement years, and his contributions.

HIST 34 Patriots, immigrants and chemical patentees in the National Inventors Hall of Fame

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The U.S. patent system is over 200 years old (www.uspto.gov). The National Inventors Hall of Fame (NIHF) in Akron, Ohio is over 30 years old (www.invent.org). Using available resources including immigration records, genealogy records, the Sons of the American Revolution (www.sar.org) and the Daughters of the American Revolution (www.dar.org), this paper continues an examination of the NIHF inductees for chemical innovation for their and/or their families' origins. Different NIHF inductees are examined for immigrant family or long-term US family history. Archival information in this series is found at the first author's web site (www.howardpeters.net).