

THE NUCLEUS

December 2008

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Monthly Meeting

*Medicinal Chemistry Symposium
New Technologies for Drug Discovery*

Heyn Book Prize

Awarded to Vivian Walworth

Report from Mauritius

By Morton Z. Hoffman

Book Review

*Science for Sale. The Perils, Rewards and Delusions
of Campus Capitalism. Reviewed by Dennis Sardella*

REPORT FROM MAURITIUS

20th International Conference on Chemical Education (ICCE 2008)

by Morton Z. Hoffman, Boston University <hoffman@bu.edu>

U.S. National Representative to the IUPAC Committee on Chemistry Education (CCE); CCE Conference Coordinator; CHED and SOCED Liaison to IUPAC; Member, International Advisory Committee of ICCE 2008



The island of Mauritius (*Île Maurice, en français*), a tiny dot in the Indian Ocean at 20° S latitude and 57° E longitude, is located about 1,000 km east of Madagascar off the southeastern coast of Africa. Home to about 1.2 million people and the University of Mauritius, it was the site of ICCE 2008, which was held on August 3-8 at Le Méridien Hotel in Pointe aux Piments. Attracting about 200 attendees from 40 countries, the conference, which had *Chemistry in the Information and Communications Technology (ICT) Age* as its theme, offered 170 oral presentations and 58 posters. It was organized by a local committee headed by Conference President Henri Li Kam Wah and Conference Chairman Ponnadurai Ramasami of the Department of Chemistry of the University. Welcoming remarks were made by Peter Mahaffy (Canada), chair of the IUPAC Committee on Chemistry Education (CCE); Dharambeer Gokhool, Mauritius Minister of Education and Human Resources; I. Fagoonee, Vice-Chancellor of the University of Mauritius; Ambassador Kalimi Mugambi Mworja (Kenya), Director of the International Cooperation and Assistance Division of the Organisation for the Prohibition of Chemical Weapons (OPCW), which was a financial sponsor of the conference.

Plenary lectures were given by nine distinguished chemists and educators: Roald Hoffmann (U.S.A.), *Chemistry's Essential Tensions: Different*

Ways of Looking at a Science; Peter Mahaffy (Canada), *Communicating the Chemistry of Climate Change with ICT and Paraffin*; Loretta Jones (U.S.A.), *How Technology can Help Students to Visualize the Molecular World without Inducing Misconceptions about Chemistry*; Henry Schaefer III (U.S.A.), *Lesions in DNA Subunits: Foundational Studies of Molecular Structures and Energetics*; Arthur Olson (U.S.A.), *Back to the Future: Grasping Molecular Biology with Tangible Interfaces*; Peter Atkins (U.K.), *The Future of the Book*; Vandana Hunma (Mauritius), *Chemistry Education for Socially Responsible and Sustainable Development: What are the Challenges for a Developing Country?*; John Bradley (South Africa), *Substances, Molecules and Symbols in the ICT Age*; Shalini Baxi (India), *Community Based Collaborative ICT Strategies for Science Education*.

The parallel oral sessions centered around the following themes: teaching chemistry at the secondary and tertiary levels, chemistry education research, the use of modern technologies, green chemistry, involvement of the arts, public understanding of chemistry, chemistry teacher education. In addition, symposia were held on best practices in professional development, Process Oriented Guided Inquiry Learning (POGIL), increasing the popularity and relevance of school chemistry, structural models and chemical understanding, and the systemic

approach to teaching and learning chemistry (SATL). Workshops were offered on the teaching of advanced chemistry courses, electrochemical model experiments, air and water environment, and strategies to assist students to learn chemistry.

The organization of the program gave participants ample time to interact and develop connections. In addition to morning and afternoon coffee/tea breaks and daily group lunches, evening events included a welcoming reception, an entertainment evening with local singers and dancers, the conference banquet at a Chinese restaurant in Port Louis, the Mauritian capital city, and participants night with national songs and performances. The day-long conference tour in the middle of the week to sites of interest on the island provided a delightful break.

For three weeks prior to the ICCE, an on-line virtual conference was held in which 45 papers were presented and 371 participants from 44 countries participated in the discussions. Immediately prior to the main conference, a Young Ambassadors of Chemistry (YAC) workshop was held in Mauritius; 30 local chemistry teachers attended and performed chemical demonstrations to students and the public. In addition, a drama on the history of chemistry presented at the conference was very well appreciated by the audience.

ICCE 2008 also featured a post-conference satellite meeting at the University of Nairobi that was sponsored by the Kenya Chemical Society. Sixty delegates, mainly from Kenya with representatives from Uganda and Tanzania, attended, including university staff, students, and secondary school teachers of chemistry.

Details of all the conference pro-

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Cover: (L-R) Dr. Michael Singer, 2008 recipient of the Henry Hill Award for Outstanding Service to the Northeastern Section of the ACS; his wife, Mrs. Anna Singer, and Dr. Joseph Billo, NESACS Chair-Elect at the October Meeting. (Photo by Morton Z. Hoffman)

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YCC Event

NSYCC Announces December Tour of the Broad Institute in Cambridge, MA

Date and Time: TBD

The Northeastern Section Younger Chemists Committee (www.nsycc.org) would like to inform younger chemists in the section of our plans to arrange a tour of the Broad Institute. The Broad has many research efforts that push the envelope in the fields of drug, genomics, and proteomic discovery, data compilation, data visualization, as well as many other areas.

Sign-up information and full details are available on our website (www.nsycc.org). If you have specific questions, please contact Lee Johnson, [leland.johnson\(at\)nsycc.org](mailto:leland.johnson(at)nsycc.org). ◇

Vivian Walworth Receives Heyn Book Prize

By Myron S. Simon and Michael Filosa

The Arno Heyn Memorial Book Prize Committee is pleased to announce that the Heyn prize for 2008 has been awarded to Vivian Walworth for her outstanding work on the Board of Publications. Vivian was presented with the award at the November Meeting. Past recipients of this prize for exemplary contributions to the publications of the Northeastern Section of the ACS have been Mark Spitler (2005), Sam Kounaves (2005), Vince Gale (2006) and Myron Simon (2007).

Vivian has been a critical contributor to the *Nucleus* and the website as a member of the Board of Publications. Arno Heyn recruited Vivian in 2004

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Notable New England Chemists

by Myron S. Simon

Here we continue mining the golden ore of the Memorial Booklet of the 1928 ACS Meeting in Boston and Swampscott. That was an infamous meeting, because after the banquet a large number of the participants came down with what was called informally and indelicately, "food poisoning," but was announced by the chairman to be "flu."

The biographies were written by Lyman C. Newell (B.U.) and Tenney L. Davis (MIT). We are following these biographies in the order in which they were published.

Lyman Spalding 1775-1821

Lyman Spalding was born in Cornish, NH. He graduated from Harvard with the degree of M.B. in 1797. At Harvard Spalding studied chemistry under Aaron Dexter. One of Dexter's earliest students was Nathan Smith, who graduated in 1790—the third man to graduate from the Medical School. Realizing the meager opportunities for studying medicine and surgery in America, Smith established a Medical School in connection with Dartmouth College in 1798 and called to his aid Lyman Spalding. Spalding collected and constructed the chemical apparatus and delivered the first course of lectures in chemistry at Dartmouth. Although a practicing physician all his life, Spalding laid two foundation stones in the early days of chemistry in New England. First, in 1799, while teaching chemistry at Dartmouth, he published a translation of the book on nomenclature recently issued by Lavoisier and his associates—the third American and the first New England chemist to perform this service. Second, he suggested the idea of a United States Pharmacopeia, which should have the authority of all the medical societies and medical schools

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in the country. A few states had pharmacopeias, e.g. Massachusetts issued one in 1808 through the Massachusetts Medical Society, Aaron Dexter being chairman of the committee. Spalding's plan for a national pharmacopeia was set forth in a paper read January 6, 1817. He was made a member of the publication committee and worked diligently on the book. Largely through his efforts, the first edition of the Pharmacopeia of the United States was published in Boston, December 15, 1820. Spalding continued to teach chemistry at Dartmouth until about 1817, when he was succeeded by James Freeman Dana.

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Monthly Meeting

The 892nd Meeting of the Northeastern Section of the American Chemical Society

Joint Meeting: Northeastern Section ACS and Medicinal Chemistry Group

Symposium

New Technologies for Drug Discovery

Wednesday, December 10, 2008

Holiday Inn, 15 Middlesex Canal Park Road, Woburn, MA

3:00 pm Refreshments

3:15 pm Welcome
Raj (SB) Rajur, Program Chair, CreaGen Biosciences, Woburn, MA

3:20 pm Introductory Remarks
Norton Peet, International R&D Consultant, North Andover, MA

3:30 pm TBD

4:15 pm **New Approaches for Discovery of Chemical Reactions and Chemotypes**
John A. Porco, Jr., Professor and Director, Boston University Chemical Methodology and Library Development Center, Boston, MA

5:00 pm **Selective Deuterium Chemistry in Drug Discovery: Improved New Chemical Entities from Clinically Validated Therapeutics**
Scott L. Harbeson, Vice President, Research, Concert Pharmaceuticals, Inc., Lexington, MA 02421

5:45 pm Social Hour

6:30 pm Dinner

7:45 pm **Drug Discovery in the 21st Century-the Collaborative Paradigm**
Christopher G. Newton, Senior Vice President, BioFocus DPI, Chesterford Research Park, Saffron Walden, Essex, CB10 1XL, UK

Dinner reservations should be made no later than noon, Wednesday, December 3rd, 2008. Please contact Marilou Cashman at (800) 872-2054 or (508) 653-6329 or e-mail at [MCash0953\(at\)aol.com](mailto:MCash0953(at)aol.com). Reservations not cancelled at least 24 hours in advance must be paid. Members, \$28.00; Non-members, \$30; Retirees, \$18; Students, \$10.

Directions to the Holiday Inn:

A. From Boston-Cambridge-Points North: Take Route I-93 to Route 95/128 West. After one mile, take Exit 35 South to Route 38 (Main Street). After about 500 feet at the traffic light, turn right on to Middlesex Canal Street to the Hotel Entrance.

B. From Points West: Take Route 95/128 North to Exit 35 South (Route 38 - Main Street). See above for the remaining directions to the hotel.

THE PUBLIC IS INVITED. ◇

Abstracts and Biographies

Christopher G. Newton

Drug Discovery in the 21st Century - The Collaborative Paradigm

The 20th century's paradigms of drug discovery will be dissected based on the author's experiences, and a paradigm for the next phase of the discovery of medicines will be discussed.

Christopher Newton is currently a senior vice-president at BioFocus DPI. Between 2000 and 2005 he was a founding scientist, CSO, and Board member at Argenta Discovery, Ltd. From 1979 to 2000, he held a variety of senior management positions in both research and development within the Rhone-Poulenc group of companies (now Sanofi-Aventis), working on a variety of projects, many of which reached clinical trials, and one of which (temozolomide, Temodal®) is now on the market with Schering-Plough. He holds a degree in Natural Sciences from the University of Cambridge (UK) and is an Emeleús Chemistry Prize holder of that university. He earned his Ph.D. at the University of Sheffield (UK) in 1979, for which he was awarded the Turner Prize. During his industrial career he has held visiting academic fellowships and professorships at the University of Warwick (UK) (1994-1998) and the University of Essex (UK) (1995-1999). Dr. Newton has been a member of the ACS for about 15 years.

John A. Porco, Jr.

New Approaches for Discovery of Chemical Reactions and Chemotypes

Professor Porco's research is focused in two major areas: the development of new synthetic methodologies for efficient chemical synthesis of complex molecules and synthesis of complex chemical libraries. Synthetic methodologies developed in his laboratory

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Call for Nominations

James Flack Norris Award for Outstanding Achievement in the Teaching of Chemistry

Nominations are invited for the 2009 James Flack Norris Award for Outstanding Achievement in the Teaching of Chemistry. The Norris Award is one of the oldest awards given by a Section of the American Chemical Society. This award is presented annually by the Northeastern section. The Award consists of a certificate and an honorarium of \$3,000.

Nominees must have served with special distinction as teachers of chemistry at any level: secondary school, college, and/or graduate school. Since 1951, awardees have included eminent and less widely-known but equally effective teachers at all levels.

The awardees for 2008 were Professors David K. Gosser, Jr., City College of New York; Jack A. Kampmeier, University of Rochester; and Pratibha Varma-Nelson, Indiana University-Purdue University.

Nominations should focus on the candidate's contributions to and effectiveness in teaching chemistry. The nominee's curriculum vitae should be included. Seconding letters are also an important part of a nominating packet. These may show the impact of the nominee's teaching in inspiring colleagues and students toward an active life in chemistry and/or related sciences, or may attest to the influence of the nominee's other activities in chemical education, such as textbooks, journal articles, or other professional activity at the local or national level. The committee looks for impact of the candidate's activities at the national and international levels.

The nomination materials should consist of a primary nomination letter, supporting letters, the candidates curriculum vitae. Reprints or other publications should NOT be included. The material should not exceed thirty pages.

Call for Nominations

Philip L. Levins Memorial Prize

Nominations for the Philip L. Levins Memorial Prize for outstanding performance by a graduate student on the way to a career in chemical science should be sent to the Administrative Secretary of NESACS, 23 Cottage St., Natick, MA 01760 by **March 1, 2009**.

The graduate student's research should be in the area of organic analytical chemistry and may include other areas of organic analytical chemistry such as environmental analysis, biochemical analysis, or polymer analysis.

Nominations may be made by a faculty member, or the student may submit an application. A biographical sketch, transcripts of graduate and undergraduate grades, a description of present research activity, and three references must be included. The nomination should be specific concerning the contribution the student has made to the research and publications (if any) with multiple authors.

The award will be presented at the May 2009 Section Meeting. ◇

Please direct questions about the content of a nomination to the Chairperson of the Norris Award Committee. For 2009 the Committee Chairperson is Professor Morton Z. Hoffman, Department of Chemistry, Boston University, email: hoffman(at)bu.edu.

Send nomination packets electronically in Adobe PDF format to Ms. Marilou Cashman, Administrative Secretary of NESACS. email: mcash0953(at)aol.com.

The deadline for nominations is **April 15, 2009**. ◇

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WWW.NESACS.ORG/CAREERS

Abstracts & Bios

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include: copper (I)-mediated formation of enamides, *oxa*-electrocyclization/dimerization of dienals en route to complex epoxyquinoid frameworks; enantioselective oxidative dearomatization using chiral copper complexes and molecular oxygen; photocycloaddition using oxidopyryliums enroute to the rocaglamides and related natural products, and catalytic ester-amide exchange using group(IV) metal alkoxide-activator complexes. In the past six years, his research group has synthesized more than twenty-five complex natural product targets, including nine epoxyquinoid natural products, four salicylate enamide macrolides, the rocaglamides, silvestrol, and kinamycin C.

At the NIH-funded Center for Chemical Methodology and Library Development at Boston University (<http://cml.d.bu.edu>), Professor Porco and coworkers have recently focused on approaches to identify transformations leading to complex chemotypes. Reaction development has historically been guided by problems in total synthesis or interest in developing chemical transformations of broad scope and utility. Chemical methodology development has increasingly relied on systematic evaluation of catalysts and other variables, including solvent, temperature, and supporting ligands. Screening approaches have increased the efficiency of reaction development with regard to discovery of active catalysts or conditions but have generally been focused on specific transformations of interest.

An emerging but underdeveloped method for chemical reaction discovery involves high-throughput screening. A few examples have been reported in which new reactions were discovered through screening of either multicomponent systems or reaction partners and catalysts. As a part of our overall interest in the synthesis of new chemotypes and structural frameworks, we have initiated a program to identify novel chemical transformations using both "*multidimensional screening*" and

Abstracts & Bios

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“*reaction discovery*” approaches. In this approach, substrates may be reacted with various catalysts and reaction partners in an array format and analyzed for unique reaction processes. In this lecture, we will report our recent studies on this mode of reaction screening and the identification and exploration of several new transformations discovered during initial screening efforts.

Professor John A. Porco Jr. obtained his B.A. degree in 1985 from the College of the Holy Cross. He then moved to Yale (1986-1989) and Harvard University (1989-1992), where he earned his Ph.D. under the direction of Professor Stuart L. Schreiber and worked on syntheses of the enediyne antibiotics. Professor Porco was an NSF postdoctoral fellow with Professor Chi Huey Wong at the Scripps Research Institute (1992-1994), where he studied carbohydrate chemistry. After his postdoctoral studies, John went on to work in venture capital (Avalon Ventures, La Jolla, CA) and in industry as Director of Chemistry at Argonaut Technologies, which he co-founded in 1995. John joined the Department of Chemistry at Boston University in 1999 as Assistant Professor and was promoted to Professor of Chemistry in September 2004. In 2002, he successfully led an effort to establish the Center for Chemical Methodology and Library Development at Boston University (CMLD-BU, <http://cml.d.bu.edu>). Funded by the National Institutes of Health (NIH) as a *Center of Excellence*, the focus of the CMLD-BU is the discovery of new methodologies to produce novel chemotypes and derived chemical libraries of unprecedented complexity for biological screening. As Director, Professor Porco combines his scientific expertise in chemical synthesis with his extensive business experience. In addition to multiple grants from the NIH, in 2001 Professor Porco received the American Cancer Society Research Scholar Award for “Studies Towards the Synthesis of Torreyanic Acid and

Related Epoxyquinoids;” and, in 2003, the Bristol-Myers Squibb Unrestricted Grant in Synthetic Organic Chemistry. In 2009, Professor Porco will receive the Arthur C. Cope Scholar Award from the American Chemical Society. At Boston University, he has mentored 25 Ph.D. graduate students, 2 Masters students, 25 undergraduates, and 14 postdoctoral fellows. Since beginning his research program at Boston University in 1999, he and his colleagues have published over seventy manuscripts in peer-reviewed journals and presented over 95 invited seminars at universities, pharmaceutical companies, and conferences

Scott Harbeson

Selective Deuterium Chemistry in Drug Discovery: Improved New Chemical Entities from Clinically Validated Therapeutics

Concert Pharmaceuticals, Inc. is creating new medicines through a novel scientific approach utilizing deuterium, a naturally-occurring element. Deuterium-containing compounds retain their molecular shape and thus have comparable potency and selectivity with respect to their hydrogen analogs. However, since deuterium is heavier than hydrogen, it forms significantly stronger bonds with carbon. Concert is using selective deuterium replacements to improve important drug properties such as bioavailability and metabolism, enabling increased efficacy and tolerability. Since deuterium substitution fully retains potency and selectivity, these agents have greatly increased odds of successful development. Several examples of deuterium-substituted compounds with improved drug properties will be presented.

Dr. Scott Harbeson joined Concert Pharmaceuticals, Inc. in July 2006 and currently serves as Vice President, Research. He has more than 20 years experience in medicinal chemistry in both venture-backed start-up and major pharmaceutical companies, including Ensemble Discovery, Vertex Pharmaceuticals, Inc., Alkermes, Inc., Marion Merrell Dow and Abbott Laboratories.

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8th Tripathy Symposium

The University of Massachusetts Lowell will hold its eighth anniversary symposium on **December 5, 2008**, to honor the memory of the late Prof. Sukant Tripathy, renowned researcher and former Director of the Center for Advanced Materials, University Provost and Vice Chancellor. The program includes talks by invited speakers and poster presentations.

Date, Time, Location

December 5, 2008

8:15 a.m. - 4:30 p.m.

University of Massachusetts Lowell, MIL Conference Room, Wannalancit Mills, 600 Suffolk St., Lowell, MA 01854. Directions at www.uml.edu/maps/directions

Speakers:

Peggy Cebe, Tufts University

Paul Calvert, University of Massachusetts Dartmouth

Mrinal Thakur, Auburn University

Thomas Jozefiak, Genzyme Corporation

Wen-Bin Lin, University of North Carolina

Venkat Raman, University of Massachusetts Amherst

Jeong Ok Lim, Kyungpook National University School of Medicine, South Korea

Russell Gaudiana, Konarka Technologies

Registration

Pre-registration (free) is required by November 24, 2008 to Michele_Vercellin@uml.edu. Lunch and refreshments will be provided.

Accommodations

Double Tree Hotel, Warren St., Lowell, MA. For reservations, please call 978-452-1200 & request UMA Lowell rate.

Details and Changes

All updates including speaker topics and program schedule will be posted on the website www.uml.edu/tripathysymposium/ or you may contact Michele_Vercellin@uml.edu or 978-934-3695. ◇

Book Review

Science For Sale. The Perils, Rewards, and Delusions of Campus Capitalism, Daniel S. Greenberg (University of Chicago Press, 2007, 2005) 200 pp., ISBN 978-0-226-30625-4; \$25.00 hard cover)

Reviewed by Dennis J. Sardella, Department of Chemistry, Merkert Chemistry Center
Boston College, Chestnut Hill, MA 02467

“Be careful what you pray for,” the old adage goes, “you may get it.” This applies particularly well to the case of scientific research. The explosive post-World War II growth of American universities, a steadily increasing emphasis on their research mission, and technological advances that have made available (and essential) to researchers a panoply of ever-more sophisticated (and expensive!) instrumentation have also increased budgetary pressures on academic scientists and their institutions. While the great majority of this need continues to be met by funding from federal agencies such as NIH, NSF, and DOE, recent decades have seen universities turning more and more to collaborative agreements with corporations, and to commercialization of discoveries made in their laboratories, to support their

research enterprise. More than a few observers have raised questions about the wisdom and appropriateness of such arrangements between institutions with such divergent goals (knowledge versus profit) and attitudes toward information dissemination (“open-source” versus proprietary), and are wondering whether the collaboration will be ultimately salutary or corrosive. Daniel S. Greenberg’s *Science For Sale. The Perils, Rewards and Delusions of Campus Capitalism* is a well-researched, nicely balanced, and accessibly written examination of this question and an interesting companion piece to his earlier *Science, Money and Politics. Political Triumph and Ethical Erosion* (University of Chicago, 2001).

The book is divided into three parts, the first laying out the history of growing university-industry collabora-

tions and chronicling the problems that have resulted and attempts to manage them, the second taking a more personal look through extended conversations with several university faculty deeply enmeshed in collaborative work with industry, and final part offering Greenberg’s prescriptions for corrective action. Chapter 1 sets the stage by pointing out scientists’ familiar refrain that science is chronically short of money, because the increasing cost of equipment and supplies, and the “arms race” among American universities, have created a constantly-increasing appetite for research money. The result has been an ever-decreasing fraction of fundable proposals, an increasing concentration of money in the hands of older investigators, and a corresponding pressure on young scientists, and their institutions to find alternative sources of support, such as private industry.

In his second chapter, entitled “How Extensive and Influential Is Industrial Funding of Academic Research?” Greenberg makes the argument that industry support for academic research is only a small fraction of total funding and is dwarfed by federal dollars. While true, it seems to gloss over the fact that a relatively small amount of resources, judiciously leveraged, can have an effect on the way in which research is pursued that is out of proportion to its actual amount.

Chapter 3 deals with the Bayh-Dole act, passed in 1980 to facilitate the transfer of technology from university laboratories to the market. By mandating universities to look for patentable discoveries made by their researchers and allowing both universities and researchers to share in licensing royalties, it fundamentally shifted the landscape and created tensions by opposing the historic notion of openness through publication of research

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Book Review

Continued from page 8

results and the secrecy stemming from the requirement that patentable inventions be novel (i.e., previously undisclosed). While Bayh-Dole opened the floodgates, Greenberg points out that industry-academic collaborations had already been going on sporadically for some time. Interestingly, Greenberg's examples of early agreements do not include the early-seventies arrangement between Monsanto and the laboratories of Bert Vallee and Judah Folkman at Harvard Medical School, which provoked much consternation in the academic community at the time, as it seemed to many to strike at the very ideals of the academic research enterprise. Looking back three decades later (in 2002), Vallee wrote that

"The Monsanto agreement, organized around the theme of angiogenesis as a window on biology for the Monsanto Company, was a landmark. Its consummation brought, in some quarters, dire predictions that it represented the slippery slope to academic perdition. Its execution demonstrated just the opposite, viz., that industry and the academy, under the proper circumstances, could be of enormous help to each other. The Harvard-Monsanto agreement included a construction element, which paid for siting of the Laboratory in the Seeley Mudd Building, where it was located for over 20 years. It also endowed three new professorships in perpetuity. The Harvard-Hoechst agreement and subsequent interactions with Peptech and Promega followed the Harvard-Monsanto agreement. Each of these has brought major resources to the Laboratory and to the School." (<http://www.hms.harvard.edu/bbsm/history.htm>)

Coming as it did at the beginning of a nearly three-decade long period of conservative dominance in national politics, Bayh-Dole has led to a fundamental shift in attitudes on the part of universities and their science faculty toward entrepreneurship that Greenberg chronicles next. The most notable casualty was the reputation of the National Institutes of Health, which

was tarnished when several senior officers were found to have been serving as consultants for pharmaceutical companies over whose products they had oversight responsibility, an egregious violation that led to the resignation of several of the offenders and, in overreaction, to the imposition of restrictive rules governing conflicts of interest.

Greenberg makes the case in subsequent chapters that local structures, such as university-based Institutional Review Boards (IRB's) created to vet proposals, and national ones, like the Office for the Protection from Research Risks (ORPP), have generally proven to be relatively ineffective at solving the problem.

The second part of *Science For Sale*, which I found most fascinating, recounts Greenberg's in-depth conversations with several academics involved in industrial collaborations at different levels of complexity and satisfaction. They put a human face on the issues, and clearly illustrate the uneasy tug of war between the siren song of financial gain, whether for research support or personal enrichment (though almost without exception

individuals focus heavily on the former and tend to downplay the latter), and the ideals of independence and the openness that draw scientists to academe in the first place. For instance, Robert Holton, whose NIH-funded synthesis of the anticancer drug taxol and numerous analogs have led to personal wealth, huge profits for Bristol-Myers Squibb and over \$200 million of licensing income to Florida State University, is nonetheless generally negative in his opinion of university-industry collaborations. In stark contrast is the interview with Robert Dickson, of the School of Chemistry and Biochemistry at Georgia Tech, where tech transfer is strongly encouraged. Dickson, whose laboratory's development of methods for 3-dimensional imaging of cells and of single molecule orientation have led to significant financial support from NIH, NSF and the private sector, as well as a licensing arrangement with a major biotech firm, is generally positive in his attitude toward such arrangements, seeing no hindrance to the freedom to communicate or share research results,

continued on page 11

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Mauritius

Continued from page 2

grams are available on the ICCE 2008 website: <<http://www.uom.ac.mu/icce/index.asp>>.

The ICCE was also the occasion of the annual meeting of the IUPAC Committee on Chemistry Education (CCE), which consists of titular members, divisional representatives, and national representatives. The Committee approved the minutes of its last meeting in Torino in August 2007 at the time of the IUPAC General Assembly and Congress, received the minutes of the CCE strategy meeting at the Chemical Heritage Foundation in Philadelphia earlier in 2008, and heard reports from subcommittees.

The Subcommittee on Chemistry for Development reported on the two-day conference on "Improving Chemical Education in the Philippines" that was held at the University of Santo Tomas in Manila, April 17-18, 2008, as a project of the "Flying Chemists Program," in which IUPAC chemical education experts collaborate with academic institutions and governmental officials of a country toward the betterment of its educational system. More than 320 tertiary-level chemistry teachers heard lectures by Peter Atkins (U.K.), Peter Mahaffy (Canada), Jorge Ibañez (México), Mei-Hung Chiu (Taiwan), and Fortunato Sevilla (Philippines), attended workshops, and participated in discussions. For more details, see *Chemistry International*, Vol. 30, No. 4 (2008). The activities of the Network for Inter-Asian Chemistry Educators (NICE) were also described; its third symposium for the exchange of teaching strategies and materials among teachers and faculty in Korea, Japan, and Taiwan will be held July 29-30, 2009, at Tokyo Gakugei University <nice2009@u-gakugei.ac.jp>.

The central current effort of the Subcommittee on the Public Understanding of Chemistry is to work with IUPAC and its National Adhering Organizations toward the proclamation of 2011 as the International Year of Chemistry by UNESCO and the UN. Through the incredibly hard work of



The Two Hoffman(n)s: Roald (at left) and Mort
Photographs (by M.Z. Hoffman)

Ethiopia and the support of Algeria, Benin, China, Côte d'Ivoire, Cuba, Democratic Republic of the Congo, Egypt, France, India, Japan, Kuwait, Madagascar, Malaysia, Morocco, Niger, Nigeria, Republic of Korea, Russian Federation, Senegal, South Africa, Togo, Uganda, the United Republic of Tanzania, and Zambia, the Executive Board of UNESCO approved the resolution and passed it on to the next meeting of the UNESCO General Conference; if approved there, the resolution would move to the UN General Assembly. The devoted efforts of Lida Schoen (Netherlands) toward the implementation of the programs of YAC and the evaluation of their success were recognized. CCE discussed ways in which this outstanding project could be sustained.

The next meeting of CCE will take place at the 42nd IUPAC Congress, August 2-7, 2009, in Glasgow, Scotland. The 21st ICCE (*Chemistry Education and Sustainability in the Global Age*) will be held in Taipei, Taiwan, August 8-13, 2010.

[Reprinted from *Chemistry International*, Vol. 31, No. 1 (2009), by permission.] ◇



Notable NE Chemists

Continued from page 4

Benjamin Silliman 1779-1864

Benjamin Silliman, was born in North Stratford, CT, and died in New Haven. He graduated from Yale in 1796, began to study law in 1798, and was admitted to the bar in 1802. He did not practice law, for in 1802 he was appointed Professor of Chemistry and Natural History in Yale University with the understanding that he be given time to qualify for the position. He had never studied chemistry. He obtained a list of books in chemistry from John Maclean of Princeton, but his private reading was not fruitful. So he went to Philadelphia to listen to the lectures of James Woodhouse, but he learned more from joint study with Robert Hare. In 1804 he gave a short course in chemistry at Yale, and a full course in 1805, though the latter was condensed so that he could go to Europe to buy books and apparatus. In London he took private lessons from Friedrich Accum, and in Edinburgh he studied with Professor Thomas Hope, the successor of Joseph Black. Returning to Yale, he continued to teach chemistry until 1853, and geology until 1855. He was a brilliant lecturer. In 1808 he began his popular lectures and continued to lecture to the public through his long career. Several courses were given in Boston. He edited three editions of Henry's "Elements of Chemistry" (1808-1814) and three editions of Bakewell's "Introduction to Geology" (1829-1839). In 1830-1831 he published "Elements of Chemistry" (2 vols.). His best known publication, however, is the **Journal** he started in 1818 — the **American Journal of Science**, long known as **Silliman's Journal**. In it, in its early days, were published many articles on chemistry and allied sciences. One feature of the **Journal** made it indispensable to early American chemists, viz. abstracts and notices of discoveries in chemistry. ◇

What goes on at NESACS' Board meetings?
www.nesacs.org/reports

Book Review

Continued from page 9

or dangers to intellectual property. The extended interviews in this section make for fascinating reading.

Greenberg concludes with a summary look at what he characterizes as this “troubled but durable relationship”, looking ahead to prospects for difficulties beyond the horizon that stem from the consumerization of higher education and the intellectual arms race it has engendered, and pointing to possible approaches to solving, or at least ameliorating, the problems.

It is probably safe to predict that, no matter what structural changes are proposed in an attempt to fix things, the problem will never go away. It seems of little use to bewail the temptations posed by the prospect of large amounts of research support or royalties or other sources of income. In an entrepreneurial culture like the American university system, money is what makes scientists’ work possible. In his conversation with Greenberg, Timothy Mulcahy, then “a senior administrator at the intersection of science and commerce” at University of Wisconsin, Madison, argued that, “it would be a horrendous waste if, at the expense to the public, the research we did did not yield benefits to them in the long run. But, in that transition, I think we always have to be attentive to what are the social costs, what are the ethical costs, and as long as we can ... say ... we’re doing the best to balance that tension. ... it’s when we evolve the culture where that’s no longer recognized as a potential contrast in culture that we run a problem. And I’m not sure about the new people coming in ... who may not be aware that some of these new issues might raise concerns about some of our core principles in universities.” NIH-mandated instruction in the responsible conduct of research should, in principle, help raise awareness of these and similar issues. What might perhaps help even more, though, is for colleges and universities to begin introducing science students to ethical and professional issues from the earliest stages of their undergradu-

Vivian Walworth

Continued from page 4

when he became ill and had to relinquish the editorship of the *Nucleus* after 14 exemplary years. At Arno’s request Vivian worked with Interim Editor Mukund Chorghade, recruited Editor Mark Spitler, then Editor Mike Filosa and worked closely with the advertising manager, Vince Gale, to build a support staff of associate editors and volunteers. Vivian has continued to serve on the Board of Publications and has also helped to manage the improvements in the NESACS website. Vivian also contributes to the *Nucleus* by submitting articles and as an extraordinary proofreader.

Vivian has been a member of ACS since 1942 and a member of NESACS since 1944. Vivian graduated from the University of Michigan in 1942 with a B.S. in Chemistry. She worked for a short time at Defender Photo Supply in Rochester, NY and then for a short time in a biochemistry lab at the University of Pennsylvania. In 1944 she joined Polaroid as a chemist in the Vectograph Research Department, where she worked on military applications of Vectograph technology, high efficiency polarizers, dichroic dyes, color Vectograph, color motion picture processes, sensitizing dyes, photographic emulsions and novel photosensitive materials. For several years she managed the Emulsion Research and Research Microscopy Laboratories. She retired from Polaroid in 1985 as a Senior Research Manager, Photosensitive Materials. Her Polaroid publica-

ate careers as an essential element of their education, rather than waiting until they are graduate students or postdoctoral fellows.

Greenberg’s treatment in *Science For Sale* is (at least in my opinion) even-handed and fairly sympathetic, and one could almost argue that the book might more accurately have been entitled *Science For Sale?* In any case, it made for thought-provoking reading, and would make a welcome addition to any scientist’s book list. ◇

Bios & Abstracts

Continued from page 7

While at Vertex, Dr. Harbeson was the head of medicinal chemistry and manager of medicinal chemistry outsourcing. Dr. Harbeson is an author or co-author of more than 20 peer-reviewed publications and an inventor on dozens of patents and patent applications. He received his Ph.D. in Medicinal Chemistry at the University of Wisconsin-Madison from Professor Daniel H. Rich and was an NIH NRSA postdoctoral fellow with Professor Richard B. Silverman at Northwestern University. ◇

tions include 28 U.S. Patents. From 1994-2002 Vivian worked as a consultant in the development of a stereoscopic inkjet printing process (StereoJet) at the Rowland Institute for Science, Cambridge, MA.

Vivian served as president of the Society for Imaging Science and Technology (IS&T) from 1981-1985. She edited the IS&T’s *Journal of Imaging Science* from 1986-87 and its successor, *Journal of Imaging Science and Technology*, from 1987-1994. She also edited the IS&T Reporter, a bimonthly newsletter, 1986-2008.

She co-authored with Edwin H. Land and Howard G. Rogers the chapter “One-Step Photography” in *Neblette’s Handbook of Photography and Reprography*, 7th edition (1977); wrote the sections “Color Photography, Instant,” in the *Kirk-Othmer Encyclopedia of Chemical Technology*, 3rd Edition (1979) and the 4th Edition (1993); co-authored with Stanley H. Mervis the chapter “Instant Photography and Related Reprographic Processes” in *Imaging Processes and Materials*, Neblette’s 8th Edition (1989); “Instant Photography and Related Imaging Systems” in the *Handbook of Photographic Science and Engineering*, editor Noel Proudfoot, IS&T (1997); “Instant Photography” in the *Kirk-Othmer Encyclopedia of Chemical Technology*, 5th Edition (2001) and “Instant Photography” in the *Wiley Encyclopedia of Imaging Science and Technology* (2001). ◇

October Meeting



Joseph Billo (NESACS Chair-elect), at left, with October Speaker Dr. Peter Meltzer (Organix, Inc.)

Connections to Chemistry 2008



(l-r) Thomas H. Lane (Dow Corning Co.), ACS President-elect; Ruth Tanner (University of Massachusetts Lowell), Steve Lantos (Brookline (MA) High School).



Thomas H. Lane and the Connections audience.



Thomas H. Lane during his evening address, "And Now for Something Completely Different."

December Historical Events In Chemistry

by Leopold May, The Catholic University of America, Washington, DC

December 2, 1942

First atomic pile produced the first self-sustained nuclear chain reaction under Stagg Field at the University of Chicago.

December 3, 1933

Seventy-five years ago, Paul Crutzen, a researcher in chemistry of the atmosphere, was born. In 1996, he shared the Nobel Prize in Chemistry with Mario Molina and F. Sherwood Rowland for their work in atmospheric chemistry, particularly concerning the formation and decomposition of ozone.

December 4, 1908

One hundred years ago Alfred D. Hershey was born on this date. In 1969, he shared the Nobel Prize in Physiology or Medicine with Max Delbrück and Salvador E. L. Luria for their discoveries concerning the replication mechanism and the genetic structure of viruses

December 6, 1835

One hundred and twenty-five years ago in 1883, Rudolf Fittig synthesized coumarone. He also synthesized lactones with B. C. G. Tollens, toluene, and discovered biphenyl and phenanthrene in 1872. He was born on this date.

December 9, 1868

Fritz Haber, who was born on this date, synthesized ammonia from hydrogen & nitrogen under high pressure (Haber Process). In 1918, he received the Nobel Prize for the synthesis of ammonia from its elements.

December 12, 1775

William Henry, who was born on this day, discovered that the amount of gas absorbed by a liquid is proportional to the gas pressure.

December 14, 1909

Fifty years ago, Edward L. Tatum shared the Nobel Prize in Physiology or Medicine with George W.

Beadle for their discovery that genes act by regulating definite chemical events and Joshua Lederberg for his discoveries concerning genetic recombination, and the organization of the genetic material of bacteria, and genes that regulate certain chemical processes. He was born on this date.

December 17, 1908

One hundred years ago, Willard F. Libby was born. He developed carbon dating and received the Nobel Prize in Chemistry in 1960, for his method of using carbon 14 for age determination in archaeology, geology, geophysics, and other branches of science.

December 17, 1778

Two hundred years ago, Humphrey Davy discovered barium and strontium. In 1807 he also discovered potassium and sodium. He born on this date and invented the Davy mine safety lamp.

December 18, 1890

Mary L. Caldwell, who isolated enzymes for individual analyses, was born on this date.

December 23, 1912

Twenty-five years ago, Anna J. Harrison served as president of the American Association for the Advancement of Science. She was the first woman to be the president of the ACS in 1978 and was born on this date.

December 29, 1879

Ellen Gledirsch, who was born on this date, made accurate measurements of the half-life of radium.

Additional historical events can be found at Dr. May's website, at <http://faculty.cua.edu/may/ChemistryCalendar.htm> or the "This Week in Chemical History" at the ACS website: <http://www.acs.org/whatischemistry>. ◇

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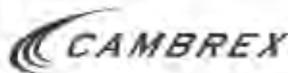
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Calendar

Check the **NESACS** Homepage for late additions:
<http://www.NESACS.org>

Note also the Chemistry Department web pages for travel directions and updates.

These include:

<http://chemserv.bc.edu/seminar.html>
<http://www.bu.edu/chemistry/events/>
<http://www.chem.brandeis.edu/colloquium.shtml>
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Dec 1

Frank H. Westheimer Prize and Prize Lecture
Alanna Schepartz (Yale)
TBA
Harvard, Pfizer Lecture Hall
4:00 PM

Professor C. Robert Matthews, University of Massachusetts Medical School
Title: The Hydrophobic effect and protein folding: Clusters of ILV Residues form cores of stability in TIM barrel proteins
Brandeis University, Gerstenzang 122
3:45 PM.

Dec 3

Dr. Ann Valentine (Yale)
"Bioinorganic Chemistry of Titanium in Medicine and the Environment"
Northeastern Univ, 129 Hurtig Hall
12:00 NOON

Dec 5

Tripathy Symposium.
University of Massachusetts Lowell, MIL Conference Room,
Wannalancit Mills, 600 Suffolk St., Lowell, MA 01854
Directions at www.uml.edu/maps/directions
8:15 AM. - 4:30 PM

Dec 8

Prof. Naohiko Yoshikai (Univ. Tokyo, Japan)
"Activation of Unreactive Carbon-Halogen and Carbon-Hydrogen Bonds by Transition Metal Catalysis of Nucleophilic Organometallics"
Boston College, Merkert 130
4:00 PM

Boehringer-Ingelheim Symposium
M. Christina White (Univ. Illinois at Urbana Champaign)
TBA
Harvard, Pfizer Lecture Hall
4:00 PM

Dec 9

Prof. Melanie S. Sanford (Univ. Michigan)
"Pd(II/IV)-Catalyzed Reactions in Organic Synthesis"
Organic Chemistry Seminar
Boston College, Merkert 130
4:00 PM

Prof. Daniel J. O'Leary (Bowdoin College)
"Deuterium and Tritium NMR Equilibrium Isotope Effects Involving OH/OH and CH/N Hydrogen Bonds: Stereochemical Applications"
Univ. New Hampshire, Iddles L103
11:10 AM

Dec 10

Daniel Gamelin (Univ. Washington, Seattle)
TBA
Harvard, Pfizer Lecture Hall
4:00 PM

Notices for The Nucleus Calendar of Seminars should be sent to:

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