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THE NUCLEUS

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James Flack Norris

James Flack Norris was born in Baltimore, MD in 1871 as one of nine children of Reverend and Mrs. Richard Norris. He went to school in the Washington, D.C. area, then enrolled in Johns Hopkins University in 1889, obtaining the doctorate in chemistry in 1895. He had a Fellowship during his last year and also taught at the University of Maryland and coached classes in mathematics and science. He joined the faculty at MIT as an Instructor, giving a course in organic preparations, later, history of chemistry, and organic chemistry. He taught a laboratory course in organic reactions and preparations with A.A. Noyes. In 1900 he became Assistant Professor of Organic Chemistry.

In 1902 he married Anne Bent Chamberlin, a student at the Museum of Fine Arts in Boston.

He published his thesis work with his mentor, Ira Remsen, on "*The Action of Halogens on the Methylamines*" . During his career he published some seventy publications, also four books: *Principles of Organic Chemistry* (1912), *Experimental Organic Chemistry* (1915), *Inorganic Chemistry for Colleges* (1921), *Laboratory Exercises in Inorganic chemistry* (1922), coauthored with Prof. Kenneth Mark of Simmons College. In 1904 he was appointed Professor of Chemistry at Simmons College, where he stayed for 11 years. In 1910 he took a sabbatical leave in Karlsruhe, Germany to study with Prof. Fritz Haber. There he acquired the physical-chemical point of view, giving him new insights into organic chemistry.

During this time, he and Mrs. Norris and, for the summer three of Norris' sisters, toured Europe with sojourns in Paris, Holland, England, and Scotland.

In 1915 Norris was offered the professorship of chemistry in Vanderbilt University in Nashville, Tenn., but in 1916 he was asked to return to MIT

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The Northeastern Section of the American Chemical Society, Inc.

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James Flack

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to become Professor of General Chemistry. In 1917, on a leave of absence from M.I.T., he engaged in war work at the Bureau of Mines, and in 1918 he was appointed Lt. Colonel in the Chemical Warfare Service of the U.S. Army, headquartered in London. After the war he returned to M.I.T., where he continued his productive career umtil his death in 1940.

He had many graduate students from all over the world. His happy disposition gave him the nickname "Sunny Jim."

He also was very active in the American Chemical Society: He chaired the Northeastern Section in 1904, in 1925 he was elected President of the ACS and was a Director until 1934. He also served as Vice President of the International Union of Pure and Applied Chemistry, 1925-1928, and in 1924 he became chairman of the Section on Chemistry and Technology of the National Research Council in Washington, D.C.

He was a special lecturer in organic chemistry at Harvard, 1912-1913, where Louis P. Hammet, later known as the founder of physical organic chemistry in America was one of his students. Norris also lectured at Clark University and at Bowdoin College, Maine.

He loved to spend summers in a summer home he had built in western Maine where he found the leisure to study and write his books in the morning.

Dr. and Mrs. Norris had an active interest in art.

He received many honors and awards both for his teaching and for research.

In the summer of 1940 he encountered multiple health problems which resulted in his death on August 3. He is buried in Mt. Auburn cemetery.

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

In 1948 the Northeastern Section was a beneficiary of the estate of Anne C. Norris, the widow of James Flack Norris, with an outright gift of $10,000 and the sharing of the residue of her estate in equal parts with M.I.T. "*…to perpetuate the memory of my said husband James F. Norris.*"

A committee was set up to explore how best to use the money, with Gustavus J. Esselen as one of the prime movers. The decision was announced in January, 1950 that the James Flack Norris Award shall be made for outstanding achievement in the teaching of chemistry, particularly when demonstrated at college or secondary school levels rather than shown in research. This approach to memorialize Norris recognized the emphasis he placed on teaching, and the Committee's feeling that another award for outstanding research would be lost in the crowd.

The early recipients were chosen by a secret committee. In 1954 the Norris Award Committee was established as one of the elected committees of the Section.

The first presentation was made in May, 1951 at the Harvard Club to George Shannon Forbes, an old friend of Norris, an outstanding teacher at both Harvard and, in retirement, at Northeastern University. Since then the award has been made annually to outstanding teachers at all levels.

Since then the income from the bequest has increased sufficiently to sponsor a second award, the *James Flack Norris Award for Physical Organic Chemistry*, which is administered by the American Chemical Society and also is given annually.

The above has been abstracted from accounts written by the late Avery A. Ashdown and by Myron Simon, Archivist. ◇

Directions

Holiday Inn, Newton

399 Grove Street

A. **From I-95/128 Southbound**
Take Exit 21B/22 keeping sharp right ("MBTA") into Grove St. After crossing over Rte. 95/128, The Holiday Inn is the first building on the left.
Enter and go around the building to the rear for parking. An elevator to the lobby serves all levels.

B. **From I-95/128 Northbound**
Take Exit 22 to Grove St. The Holiday Inn is immediately on the left. Proceed as in A

C. **From the Mass. Turnpike**
Exit to Rte. I-95/128 Southbound. Proceed as in A.

D. **By MBTA**
Take the Riverside Green Line ("D") to the end. Exit the station and parking lot to Grove Street (on your left). Turn right into Grove St. and walk to the Holiday Inn, immediately adjacent to the MBTA parking lot. (total 900-1000 feet). ◇

Monthly Meeting

James Flack Norris Award Meeting

The 828th Meeting of the Northeastern Section of the American Chemical Society

Thursday, November 8, 2001

Holiday Inn, 399 Grove St., Newton, MA Riverside Room

5:30 pm Social Hour; a table of Career Services Literature and Aids will be available

6:30 pm Dinner

7:45 pm Award Meeting, Dr. T. Frigo, Chair, presiding
James Flack Norris, Edward R. Atkinson
Introduction of the Awardee, Dr. John M. Hayes, Oceanographic Institute, Woods Hole, Mass.
Presentation of the Award to
Dr. Dennis G. Peters, Indiana University, Bloomington, IN
Award Address: *Toward Better Teaching*

Dinner reservations should be made no later than noon, November 1. Please call or fax Marilou Cashman at (800) 872-2054 or e-mail at MCash0953@aol.com. Specify chicken, fish, or vegetarian meal. Reservations not cancelled at least 24 hours in advance must be paid. Members, $28.00; Non-members, $32.00; Retirees, $18.00; Students, $ 10.00.

THE PUBLIC IS INVITED.

Anyone who needs special services or transportation, please call Marilou Cashman a few days in advance so that suitable arrangements can be made.

Free Parking at the Inn. Proceed to the back for parking. Take elevator to the lobby.

Next Meeting: *December 13, 2001. Joint meeting with the Medicinal Chemistry Group at the MIT Faculty Club, 50 Memorial Drive, Cambridge, MA. Symposium on Approaches to the Treatment of Lyosomal Storage Diseases. 3:30 Afternoon symposium, 6:00 Social mixer and dinner; 8:00 Evening Meeting*

Abstract

Receiving the James Flack Norris Award provides a wonderful opportunity to reflect on lessons learned over the last 40 years from mentors, colleagues, and students about how to be a more effective teacher in the classroom and laboratory. This talk will focus, with the aid of anecdotes and personal observations, on a number of issues related to teaching:

Why are the first lectures of a semester so important?

Can one actually relate to several hundred students in a big classroom?

What can a teacher do to encourage students to be more active in their own education?

Why is preparing a lecture, even one about familiar and simple material, so crucial?

How can a teacher effectively combine pedagogy and showmanship?

What are the roles of computers and lecture demonstrations in teaching?

How can a teacher's own experiences be shared with others to improve the educational enterprise? ◇

Biography

Dennis G. Peters is Herman T. Briscoe Professor of Chemistry at Indiana University, where he has been on the faculty since 1962. He is a native of Los Angeles and earned a bachelor's degree from the California Institute of Technology in 1958 and the Ph. D. from Harvard University in 1962. An analytical chemist, whose research focuses on electrochemistry, he has received numerous awards for excellent teaching, both graduate and undergraduate, from Indiana University, the CMA National Catalyst Award in 1988 and the ACS Analytical Chemistry Division award for excellent teaching in 1990.

Professor Peters' research area is organic electrochemistry, especially electroorganic synthesis. He works with graduate, undergraduate, and high school students. He is a strong advocate for research by undergraduates: half of his undergraduate research students have gone on to graduate school, and many are co-authors of his group's publications. Half of his doctoral students have followed him into college or university teaching.

He is described as an authentic scientist-professor, in complete command of his subject.

Year after year, his courses in introductory and analytical chemistry are sought after and crowded. He is responsible for developing and directing the undergraduate chemistry majors program at Indiana, which has become one of the top three producers of chemistry majors in the nation. He designed his department's cooperative college-industry program for undergraduates. Throughout his teaching career he has developed curricula in analytical chemistry and introductory courses for both majors and non-majors.

He is the author of five widely-used textbooks of analytical chemistry. He has supported high school education in chemistry and continues to do so: by mentoring high school research students, by advising students in the MAT program, and by co-founding the Indiana Alliance of Chemistry Teachers.

His service to the chemical community includes ACS activities: Chairman and Treasurer of the Southern

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Call For Applications

YCC/NESACS–JCF/GDCh Initiative to Germany

March 10–16, 2002

The Younger Chemists Committee (YCC) of the Northeastern Section and the NESACS Education Committee invite applications from undergraduate and graduate students of chemistry, biochemistry, and chemical engineering at colleges and universities within the Section to spend a week in Germany as the guests of the Jungchemikerforum (JCF) of the Gesellschaft Deutscher Chemiker (GDCh).

The group will consist of 10–12 students and 3–4 faculty and industrial representatives.

The visit, which will take place March 10–16, 2002, at Cologne and Aachen, will consist of a student research conference, symposia on careers, education, and study abroad, visits to industrial sites and research centers, and the opportunity to engage in extensive networking with the German students. Each U.S. student representative is expected to make a poster presentation at the student research conference. Travel expenses will be provided by NESACS; expenses in Germany by GDCh.

Application forms will be available from department chairs and on the YCC <http://people.bu.edu/ nsycc/> and NESACS <http://www.nesacs.org> Web sites, must include the abstract of the poster presentation, and a letter of recommendation from the student's research supervisor approving the week's absence. A working knowledge of German, while useful, will not be required.

For more information, contact Dr. Michael Strem: mstrem@strem.com

Deadline: December 3, 2001 ◇

Puzzle Column

The Mensa Mind Challenge: Part II

This puzzle appeared in *American Way*, the American Airlines in-flight magazine. *Reprinted with permission of American Mensa Limited, 1229 Corporate Drive West, Arlington, TX 76006; www.us.mensa.org.*
Source: Abbie F. Salny, Ed. D., Mensa's supervisory psychologist

1. Jerry went out to the hardware store to buy some needed supplies. He spent half of what he had plus $2 in the first store; half of what he had left plus $1 in the second store; half of what he had left plus $1 in the third store; and in the last store, half of all he had. Three dollars were left over. How much money did he start with?

2. Find a nine-letter word below by reading either clockwise or counterclockwise.

A	L	A
C		T
S		O
	E	R

3. In a footrace, Frances was not last and beat Georgia. Jill beat Ida and Harriet. Georgia beat Jill. Harriet was not first. Ida was neither first nor last and beat Harriet.
   What was the order in which the runners finished?

4. The names of three U. S. cities have been interlaced below. Can you find them?

DEFOSATRRTCROIWAAMTYNENETO

5. Going from POOR to RICH used to take a generation. Here, do it in six steps changing one letter at a time to form the interim words.

(Answers next month.)
Answer to October Puzzle on p.21 ◇

Biography

Continued from page 5

Indiana section, committee memberships in the Divisions of Chemical Education and Analytical Chemistry. He is active in the Electrochemical Society, where he currently serves on the executive committee of the Division of Organic and Biological Electrochemistry. ◇

National Chemistry Week

Tenth Annual ACS Northeast Regional Undergraduate Day

Saturday, November 3, 2001

Hosted by the Department of Chemistry, Boston University, and Chemia. Sponsored by NESACS

9:00 ***Registration*** (Metcalf Science Center, 590 Commonwealth Avenue, Boston)

9:30 ***Welcoming Remarks:*** **Professor John Snyder**, Assoc. Chair, Chemistry Dept., Boston University
Dr. Timothy Frigo, Chair, Northeastern Section
Cassie Mapolski, President, Chemia (ACS Student Affiliates Chapter at B.U.)

9:45 ***Keynote Address:*** **Professor Bassam Shakhashiri**, University of Wisconsin: *The Joy of Learning*

10:30 ***Coffee break***

10:45 ***Technical Talk and Seminar*** (choose one)
Professor Anne Gershenson, Brandeis University: *Beyond the Average: Watching Single Biomolecules*
Dr. Patricia Hamm, The EdY Group: *Planning for a Career in Industry*

11:30 ***Workshop and Seminar*** (choose one)
Professor James Golen, University of Massachusetts– Dartmouth: *Hands-on Chemistry with Children Workshop*
Professor Warren Giering, Boston University: *Choosing a Graduate School*

12:00 ***Résumé Review, Graduate School/Industry Fair***
Dr. Frank Wagner, Strem Chemicals: *Preparing Your Résumé*
Graduate School /Industry Fair (12–1:30 pm)

12:30 ***Lunch***

1:30 ***Technical Talk and Seminar*** (choose one)
Professor Scott Schaus, Boston University: *Chemical Genetics: An Approach to Studying Gene Product Function*
Dr. Greg Roth, Boehringer–Ingelheim: *What to Expect When Interviewing in the Pharmaceutical Industry*

2:15 ***Student Affiliates Workshop***
Professor Morton Hoffman, Boston University: *Reviving a Shallow– Breathing Student Affiliates Chapter*

3:00 ***Adjournment***

There will be a $5 registration fee to partially cover the cost of lunch and workshop materials.

For information, or if your school or company would like to send a representative to the Graduate School and Industry Fair, please contact Kevin Burgoyne at (617)353–2503; fax: (617)353–6466; internet: burgoyne@chem.bu.edu). ◇

Celebrating Chemistry and Art

Sunday, Nov. 4, 2001

10 am-5 pm Museum of Science *Numerous demonstrations, presentations, and displays on chemistry and art*

11:00am Prof. Bassam Shakhashiri, University of Wisconsin: Phyllis A. Brauner Memorial Lecture: *Picasso, daVinci, Shakhashiri! Artistry and Chemistry*

3:00 pm Repeat of 11:00 am lecture by Prof. Shakhashiri also live on WWW.mos.org "What's Happening"

4:30 pm Reception for family and friends of Phyllis A. Brauner in the Skyline Room. If you plan to attend, R.S.V.P. by calling 1-800-872-2054
Paid parking at the Museum

Tuesday, Nov. 6, 2001

Half-day symposium on ***Chemistry and Art*** from 4 to 9 pm at the **Forsyth Institut**e, 140 The Fenway (next to the Boston Museum of Fine Arts). Parking adjacent to the Institute.

4:00 pm *Welcome and Introduction by* Dr. Dominick DePaola, President, Forsyth Institute and Prof. Michael Henchman, Brandeis University

4:10 pm Dr. Orrie Friedman, Brandeis University *Reflections of an Artist/Chemist*

4:30 pm Prof. Michael Henchman, Brandeis University *The Science Behind Art*

5:00 pm Prof. Richard Laursen, Boston University *Application of Gas Chromatography-Mass Spectrometry to the Analysis of Paint Media*

5:30 pm Dr. Janet Schrenk, MIT *The Royal Art of Benin Kingdom: What Science Can Tell Us*

6:00 pm Refreshments and Ask the Speakers

6:20 pm Dr. Shelby Kashket, Forsyth Institute *Introduction*

6:30 pm Prof. Margaret Merritt, Wellesley College *Blue Eyes of Africa: Identification of Blue Pigments in Painted Yoruba Wood Sculptures*

7:00 pm Michael Douma of Michael Douma Productions *How a Scientist Investigates if a Painting is Authentic*

7:30 pm Dr. Francesca Bewer, Straus Center for Conservation at Harvard University: *Technical Research and the Care of Works of Art at the Fogg Museum (1900-1950)*

8:00 pm Dr. Richard Newman, Boston Museum of Fine Arts: *The Real and Unreal: Science as an Aid to Authenticating Three-Dimensional Works of Art*

8:30 pm Ask the Speaker.
The Forsyth Institute, is an ideal location for this symposium.

For information: NESACS Website: www.nesacs.org

The Public is Invited ◇

Book Review

Instruments and Experimentation in the History of Chemistry.

Edited by Frederic L. Holmes and Trevor H. Levere. xxii + 415 pp. The MIT Press, 2000. $50.

Reviewed by Arthur Greenberg, College of Engineering and Physical Sciences, University of New Hampshire, Durham.

Reprinted by permission from *American Scientist*, **2001,** *89*(July-August), 372-74

Humphrey Davy held the early "world's record" for discovering chemical elements – six. In *Elements of Chemical Philosophy*, he modestly attributed his success to the voltaic pile-a new instrument in the chemist's armamentarium – rather than to his own acumen, stating that "The active intellectual powers of man in different times are not so much the cause of the different successes of their labours, as the peculiar nature of the means and artificial resources in their possessions."

Histories of chemistry usually trace the evolution of great ideas or the interplay between great scientists. The essays in this collection examine the evolution of the field through its apparatus. This presents an interesting challenge since, unlike the attractive and robust microscopes, telescopes and astrolabes of earlier centuries, chemical apparatus was more modest, even homely, and especially more fragile and, therefore, highly disposable and disposed of. Its more valuable parts (such as metal rings) were stripped and recycled. Thus, little ancient alchemical glassware exists today; for example, the number of true pelicans (glassware for recycling distillation) that have survived is quite small. We rely on ancient manuscripts containing highly stylized figures and on the texts of the 16th and 17th centuries, which were often stylized versions of these stylized pictures, in some cases probably describing apparatus fabricated only in the mind of the author.

Following a helpful introduction by the editors are 14 contributed chapters organized chronologically into three sections: The Practice of Alchemy; From Hales to the Chemical Revolution; and The Nineteenth and Early Twentieth Centuries. The editors also introduce each section with a brief explanatory essay. The chapters, 20 to 40 pages in length, are uniformly well written and well edited, and most are well illustrated. They are written both for chemical historians and for a more general readership, since unfamiliar terms are defined, and often the workings of unfamiliar apparatus are explained. Each chapter ends with an extremely useful summary.

The first chapter ("The Archaeology of Chemistry"), by Robert G.W. Anderson, summarizes the discoveries of fragments of ancient chemical glassware from Egypt, Arab lands, India, early Europe and Renaissance Europe. Four important early books are scrutinized for details of Renaissance chemical practices. It is both humbling and reassuring to note the relative "stability" of chemical glassware and "continuity" of change through the ages. However, Anderson cautions us not to take these texts at face value, noting that much more may eventually be learned from careful study of the archaeological fragments.

In "Alchemy, Assaying, and Experiment," William R. Newman makes a case for the very early use of the blowpipe for chemical investigations – well before its employment by Johann Kunckel in the 17th century. Quantitative accuracy in alchemical investigation, commonly unanticipated, is implied by the famous glass-cased balance in Elias Ashmole's 1652 *Theatrum Chemicum Britannicum* (the plate is a virtual copy of the illumination from Norton's 15th-century manuscript *Ordinal of Alchemy*) [*The color illustration could not be reproduced, ed.]*. The glassware in the figure suggests alchemy, not simply the assaying or weighing of gemstones. Thus the quantitative analytical work of alchemists may have been more sophisticated than is generally assumed.

Lawrence M. Principe (in "Apparatus and Reproducibility in Alchemy"), arguing against Jungians who attribute alchemical imagery to psychic states, makes a case for precise chemical apparatus as an indicator of the reproducibility desired by chrysopoeians (alchemists devoted to making gold). Evidence includes a discussion of the symbols in the keys of Basil Valentine, presumably readily decipherable by any true adept. One very interesting feature of this chapter is Principe's experimental recreation of a "Philosopher's tree" inside a glass flask.

In "Slippery Substances," Maurice Crosland neatly explains how and why chemists were so unconcerned with gases until the work of Stephen Hales and thoroughly depicts the evolution of studies of gases through the 18th century.

Trevor H. Levere (in "Measuring Gases and Measuring Goodness") treats the long-forgotten eudiometer, initially developed by Joseph Priestley as a volumetric instrument for measuring the purity of "dephlogisticated air" as well as the "goodness of air" through reaction with nitric oxide. This instrument quickly evolved to include sparking wires and in other ways to make it suitable for testing other gaseous reactions. The illustrations of gasometers, which fed measured amounts of gases into reactions, include the elaborate apparatus of Antoine Laurent Lavoisier.

Lavoisier's wealth and precision afforded him a laboratory of unrivaled apparatus. Frederic L. Holmes ("The Evolution of Lavoisier's Chemical Apparatus") quotes Jan Golinski's observation that "To Priestley and his followers, expenditure on this scale was not only undesirable but reprehensible, because it foreclosed the possibility of Lavoisier's experiments being replicated by others who lacked his wealth." A key insight offered to the reader is that most of Lavoisier's great works were actually accomplished using relatively simple apparatus, often

adapted or "jerry-rigged" from earlier pieces.

Bernadette Bensaude-Vincent ("The Chemist's Balance For Fluids") treats hydrometers and their cousins areometers. Thought initially to have great potential as scientific instruments, hydrometers were useful for measuring the "goodness" of wine, among other commercial liquids.

Jan Golinski ("Fit Instruments") reminds us of the important role Herman Boerhaave played in transforming the thermometer from an instrument used to quantify our senses (a "cool" breeze has the same temperature as motionless air) into a scientific instrument both used on its own and incorporated into more complex apparatus.

In "Platinum and Ground Glass," William A. Smeaton describes Louis Bernard Guyton de Morveau's exploitation of these innovations in his portable laboratory. The agronomist Arthur Young visited Guyton in Dijon in 1789 and found "such a variety and extent of apparatus, as I have seen nowhere else." This apparatus was the standard for other such chemistry "kits" on both sides of the Channel and across the Atlantic during the early 19th century.

The final section begins with an insightful essay by Melvyn C. Usselman ("Multiple Combining Proportions") that analyzes the experimental work associated with the law of multiple proportions. John Dalton, whose experiments verified his theory, did not provide experimental support as strong as that of William Hyde Wollaston, who had no theoretical bias. The strongest experimental evidence was contributed by Jacques Étienne Bérard, who received the least recognition, because the theory was already generally accepted.

In "Organic Analysis in Comparative Perspective," Alan J. Rocke provides an excellent description of Justus Liebig's development of the Kaliapparat, which permitted the gravimetric measurement of carbon dioxide from large quantities of organic compounds, thus revolutionizing the accuracy of carbon, hydrogen and oxygen analysis. His accounts of Liebig's interactions with Jacob Berzelius, Friedrich Wöhler and Jean Baptiste Dumas are informative and entertaining. Liebig was skeptical of Dumas's "French chemistry," but Dumas ultimately perfected the difficult analysis of nitrogen.

"Chemical Techniques in a Pre-electronic Age," by Colin A. Russell, treats the ingenious chemical apparatus designed by Edward Frankland in the latter half of the 19th century. Trying to trap the radical "ethyl," Frankland made pyrophoric diethylzinc instead and ushered in the era of organometallic chemistry.

The theme of Seymour H. Mauskopf's "Bridging Chemistry and Physics in the Experimental Study of Gunpowder" is the use of physics to determine the ballistic force of gunpowder.

The final chapter, "Laboratory Practice and the Physical Chemistry' of Michael Polanyi," by Mary Jo Nye, provides a wonderfully focused description of the Hungarian Jew who left the continent in the stormy and dangerous aftermath of World War I to make seminal contributions to x-ray crystallography in Manchester in the 1920s. His polymathic interests led him eventually to exchange the title of professor of physical chemistry for a chair of "social studies" at Manchester.

This book is a must for all institutional libraries and for anyone even mildly interested in the history of chemistry. ◇

Meeting Report

Post-Bologna Chemical Education in Europe

By Terence N. Mitchell
Fachbereich Chemie, Universität Dortmund, Dortmund, Germany

From the address at the May 3, 2001 YCC-JCF symposium on chemical education in the United States and Germany, held at Boston University.

The text below has been reprinted with permission from "Nachrichten aus der Chemie" **2001,** *49* (Sept.), 1048-1051, with minor editorial changes.

Europe has an open job market, so that obstacles to the free movement of employees within the European Union need to be removed. One potential obstacle is the plethora of educational qualifications, with their many titles. Educational systems in the European nations have grown up historically with, in many cases, no regard to the systems in neighboring countries. In fact there are a series of "mini-blocks" within Europe, often linked to language.

Thus, when European chemists look towards the USA they see a university educational system which they think they can easily understand, marked by the degrees of BS, MS and PhD.

However, when Europeans look at academic degrees in Europe, they have, with few exceptions, previously only found these well-known qualifications in the form of BSc, MSc and PhD in the UK and Ireland. In other European countries the titles awarded for first degrees include Licenciatura, Laurea, Doctorandus, Ptychio, Candidatus, Licencié, Mâitre, Meester and (in Germany) Diplom.

Doctoral programs can be either structured, with a coursework component, or completely unstructured (i.e. there is only the research component).

So why "post-Bologna"? Certainly not because of spaghetti Bolognese! Europe has a number of very ancient universities, the oldest being the Sorbonne (in Paris) and Bologna. As a result of a declaration signed by a small number of European ministers of education on the occasion of the 800th anniversary of the foundation of the Sorbonne, there was a historic meeting of ministers from 29 European countries in Bologna in June 1999, which resulted in the so-called "Bologna Declaration". In this paper the ministers affirmed their will to set up a European Education Area, thus adding education to agriculture and partially finance, in the form of the Euro, areas in which there is a common European policy.

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Meeting Report

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In other words, the will is there to harmonize the educational structures in Europe, a process which will be slow and certainly laborious, but very necessary. In May 2001 the ministers will meet again in Prague, the city with the first German-language university in Europe, to review their progress.

The Declaration, being a political paper, contains a lot of hot air. But the actual action areas are well worth looking at and commenting on, as they demonstrate some of the fundamental differences from the US system.

- *Adoption of a system of easily readable and comparable degree. Also through the implementation of the Diploma Supplement, in order to promote European citizens' employability and the international competitiveness of the European higher education system.*

The meaning of this is clear when we consider the plethora of degrees listed above. The Diploma Supplement is a transcript of record which includes information on how the degree concerned fits into the national system of the country awarding it.

- *Adoption of a system essentially based on two main cycles, undergraduate and graduate. Access to the second cycle shall require successful completion of first cycle studies, lasting a minimum of three years. The degree awarded after the first cycle shall also be relevant to the European labor market as an appropriate level of qualification. The second cycle should lead to the master and/or doctorate degree as in many European countries.*

The concepts "undergraduate" and "graduate" are foreign to some European university systems, and PhD candidates may not even be considered as students or have a legal status within the university! Since many European countries have five-year first degrees, they will have to modify their system considerably to fit in with the Bologna ideas.

- *Establishment of a system of credits – such as in the European Course Credit Transfer System (ECTS) – as proper means of promoting the most widespread student mobility. Credits could also be acquired in non-higher education contexts, including lifelong learning, provided they are recognized by receiving Universities concerned.*

By no means all European countries use credits, and those that do have their own national systems. ECTS is a "common currency", including a grading system, which was devised to facilitate student mobility and which is now slowly being incorporated Europe-wide alongside national systems. It is also used in Latin America, and there is much interest in it throughout the world.

The problem of credits in lifelong learning (a pet topic of the European Commission) will be very hard to solve.

- *Promotion of mobility by overcoming obstacles to the effective exercise of free movement with particular attention to: for students: Access to study and training opportunities and related services for teachers, researchers and administrative staff: Recognition and valorisation of periods spent in a European context researching, teaching and training, without prejudicing their statutory rights.*

Mobility is an important topic in Europe, and there are many problems associated with it, though those for the students have in general been solved.

- *Promotion of European cooperation in quality assurance with a view to develop comparable criteria and methodologies.*

At present there are either national quality systems in place or in some countries none yet established (in Germany the process is just beginning). Naturally, there is a need for a uniform basis for quality control.

- *Promotion of the necessary European dimension in higher education, particularly with regard to curricular development, inter-institutional cooperation, mobility schemes and integrated programs of study, training and research.*

This last goal is a general political one, probably aimed at the European Commission, who can use it to make

Meeting Report

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proposals on any aspects they deem useful.

So this is the general framework of the discussion which is taking place within these 29 European countries right now, and several other countries have made it clear that they also want to act in a pro-Bologna manner, whatever that turns out to mean.

Now we have to look at where chemistry fits into all this. In very many countries in Europe, as in the US, we have a "numbers problem", as our young people no longer want to study our subject. There are, however, exceptions, such as Poland and Spain. Thus we are spurred into reform discussions not only by—in some cases intense—political pressure, but also because we are looking for models which will hopefully lure more students into chemistry.

But which way are these reform discussions going? In the UK there is a strong tendency at present to try to replace the 3-year BSc (4 in Scotland) as a standard first degree by the MChem or MSci, degrees which require 4 (or 5) years of study. At the same time mainland Europe, which is characterized by first degrees which generally take 5 years, though in some cases only 4, is clearly moving towards a "3/5/8" structure with the introduction of Bachelor degrees after 3 years, Master's degrees after a further 2, and defining the PhD as a 3-year course of study. In this ongoing discussion chemistry is not going to be an exception.

But we are so far missing the "European dimension" in these discussions, as we are still arguing on the basis of our historically built-up national systems. We can ask ourselves the question as to which organisations represent university chemical education in Europe. There are three answers to this question:

a) The national Chemical Societies

b) FECS (the Federation of European Chemical Societies)

c) ECTN (the European Chemistry Thematic Network)

While the first two are self-explanatory, what is ECTN? A series of Thematic Networks was set up and funded in 1996 by the European Commission as part of the SOCRATES/ERASMUS program of exchange activities. The Chemistry Network is a group of over 100 chemistry departments (as representatives of their universities) from all the member states of the European Union, and also Norway, Iceland, Bulgaria, Poland, Romania, Hungary, Cyprus, Lithuania, Latvia, the Czech Republic and Slovenia. ECTN is now in the process of turning itself into an Association and can be reached via the Internet under www.cpe.fr/ectn.

During its first 3 years of existence, ECTN surveyed "Core Chemistry", i.e. the content of a chemistry first degree course which can be expected to be covered by all chemistry students independent of their degree of later specialization.

On the basis of this survey computer-based tests were devised to determine whether students were actually coming up to the standard expected of them. These tests are available in many European languages and will hopefully be made available as a testing tool throughout Europe in the near future.

Since the European educational systems are so diverse, the American observer may well wonder whether there are fundamental differences in the way chemistry is taught in European countries. Studies carried out by ECTN have shown that there are perhaps not "fundamental" differences but certainly considerable differences.

Thus the proportion of study hours spent on practical work will vary greatly throughout Europe, with Germany and Austria probably at the top of the list.

Curricula may be very detailed (for example in Italy, where compulsory courses were previously defined by national laws) or very brief; such as a statement made by a German colleague:

- *"The written curriculum is relatively brief: the German professors are free in designing their lectures and courses so that every lecture is an individual "work of art"."*

Certainly, standards of chemistry education in Europe are not lower than those in the United States, and it would be good to see a flow of students from the US to Europe comparable with the flow towards the US which we all know. What features of chemical education in Europe could be particularly interesting:

- in many countries there are no admission or tuition fees
- there are structured doctoral programs which only require 3 years of study
- many well-equipped laboratories with state-of-the-art instrumentation can be found

There are many new initiatives designed to attract students from outside Europe and to increase intra-European mobility still further. Here we will only mention three which are presently getting under way in Germany:

- Max Planck International Research Schools in cooperation with universities
- Doctoral Programs (PHD) supported by the German Academic Exchange Service, DAAD, and the German Research Council, DFG
- Interdisciplinary Graduate Schools set up and financed by Federal States

In other European countries there will be comparable initiatives.

Thus the conclusion of this brief survey must be that

- European chemistry education is getting its act together for the 21st century

All we need to do now, is motivate our young people to study our subject! ◇

CHICKENS AND EGGS

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Pharmaceutical Industry in India

Promise and Potential of the Pharmaceutical Sector in India: Opportunities and Challenges for Strategic Collaboration

By Mukund S. Chorghade, Veena M. Chorghade, Natick, MA 01760-4205
and Mukund K. Gurjar, Pune-411008, India

Background:
The home of one of the world's oldest civilizations and several of the greatest religions, India arouses a mixture of amazement, awe and fascination among many foreigners. It occupies the seventh largest land mass in the world; nearly a billion people living in its boundaries make it the second most populous country. India is a melting pot of a myriad of races, languages and religions; has the most striking disparities in wealth and poverty; and operates with primitive as well as sophisticated technologies. These dichotomies in the world's largest democracy have lent an exotic flavor to India.

The country was ruled for nearly a millennium by a disparate succession of local and colonial rulers; the economy was largely feudal and agrarian. The growth of science and technology in India in the post-independence (1947-) era has been impressive. The country now possesses a well- developed Western style legal/administrative structure, a proficient and competent civil service bureaucracy and considerable support and enthusiasm among the populace for betterment of life through science. The academic and publicly funded institutions have provided a steady stream of multi-lingual, mainly English speaking, educated manpower. The scientific manpower pool is the second largest in the world; many of the country's technocrats, scientists, and engineers have been trained in the finest laboratories of Europe and the USA. Several researchers have won international awards and have published and lectured abroad. Chemical research has increased in breadth, sophistication, and finesse. Modern instrumentation is readily available; numerous laboratories, pilot plants, and manufacturing facilities conforming to stringent specifications of GLP and cGMP have been established. These facilities have received regulatory approvals from

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international bodies such as the U.S. FDA, MCA-UK, TGA-Australia, MCC-South Africa and the WHO. Total Quality Management programs are in place in the leading professionally managed institutions, with noteworthy improvements in product quality and reliability. The industrial base is therefore strong and technologically sophisticated. Infrastructure problems in roadways, transport and communications are being targeted for solution and increased foreign investment.

The Indian Government's economic liberalization program, announced by the then Prime Minister Narasimha Rao has resulted in abandonment of the stifling protectionism of "Faubian and Nehruvian socialism." Trade barriers have been lowered, taxes cut, and bottlenecks for foreign investment have been removed. The Government of India has announced a relaxation of drug price controls and the provision of fiscal incentives to promote collaboration with the Western World. New and comprehensive industrial policies have been formulated; foreign equity participation of 51% and above is now permissible. US investment in India is in the billions by 2000, up from less than $ 20 million in 1990. These facts allied with tremendous market opportunities in a vibrant, growing middle class dominated consumer economy are expected to interest Western, Indian and Oriental companies.

The Pharmaceutical Sector in India:

India is emerging as one of the largest and cheapest producers of therapeutics in the world, accounting in volume for nearly 8.5% of the world's drug requirements. The Indian pharmaceutical sector has achieved global recognition as a low cost producer of bulk chemicals and formulation products. Leading Indian pharmaceutical companies have significant international marketing presence in nearly sixty countries in Asia, the Middle-East, Eastern Europe, Africa, and South America; exports to the United States and Europe are continually on the rise.

In the initial years of independence, the industry was monopolized by a few multinationals. A decade later, the industry showed signs of doing away with multinational dominance with the emergence of Indian companies with capacity for production of formulations based on imported bulk drugs. The seventies saw the emergence of bulk drugs manufacturing based on imported as well as indigenous technologies. In the eighties, the Indian R&D contributions became significant and imports of bulk drug technologies reduced drastically. The industry today is manufacturing practically the entire range of therapeutic groups; is nearly self-sufficient in raw materials for production from basic stage of a wide range of bulk drugs and formulations, and its level of operation is on par with international standards in production, technology and quality. India now produces 80% of the bulk drugs and nearly 100% of formulations available worldwide.

New Drugs Developed Entirely In India: CSIR plays a lead role

The Indian pharmaceutical industry is in its infancy regarding the development of internationally patentable New Chemical Entities. However, this area is receiving increased attention at the highest levels of the government and industry. With the new IPR regime being implemented in 2005, all major pharmaceutical companies in India are experiencing a paradigm shift and are consolidating their efforts directed at creating new molecules and processes to retain competitiveness in the marketplace. Direct foreign investments worth 7-8 billion dollars have been forecast for the next three years due to the perception of investor friendliness. Indian pharmaceutical industries are presently investing 3-4 % of their turnover a small percentage in comparison to the current world average of 18-20 %.

Numerous discovery research activities have begun. Dr. Reddy's Laboratories and Ranbaxy are leading the pack, have filed international patents and may become the first to

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discover new drug molecules with global potential. Other renowned companies such as Cadila Healthcare, Glenmark, Lupin, Nicholas Piramal Healthcare, Wockhardt, Zydus Cadila have announced ambitious plans to be in the forefront of research; building of facilities and recruitment of personnel has been initiated. Indian companies have started soliciting strategic partnerships with Western companies to accelerate the introduction of new molecules for emerging markets, as well as selected global niche positions. To cite a few examples: Ranbaxy has filed INDs for benign prostatic hyperplasia and anti-inflammation. Dr Reddy's Research Laboratories successfully out- licensed two anti-diabetic compounds to the Danish multinational company Novo Nordisk. These compounds are currently under clinical evaluation. The laboratory also aims to develop robust compounds for cancer and COX 2 inhibition; additionally, anti cancer compounds are undergoing clinical studies in Europe. Torrent Pharmaceuticals have a compound in cardiovascular therapies. The biotech companies are also emerging as formidable players. Shantha Biotech 's DNA hepatitis B vaccine has captured 46 % of the global market of approximately US $ 3 billion; co-marketing rights have been negotiated with Pfizer by Shantha Biotech has also developed a monoclonal antibody for lung cancer; clinical trials will be initiated in the near future.

The Council of Scientific and Industrial Research is an umbrella organization for a network of forty laboratories around the country. This organization is gifted with 10,000 highly trained scientists and has rendered yeoman service to the cause of scientific research and training in India. The titular head is the Prime Minister of India. Administratively Dr. Raghunath A. Mashelkar, F. R. S., Director General (CSIR) and Secretary to the Ministry of Science and Technology heads the organization. Dr. Mashelkar enunciated a new vision for the CSIR and formulated plans for what the organization should be in the year 2001. These include goals for providing a global R & D platform providing competitive R & D and high quality science based technical services; developing competitive technologies in pharmaceuticals, agricultural products, catalysis and high polymers etc. Some of the most prestigious national laboratories, viz. National Chemical Laboratory in Pune, Indian Institute of Chemical Technology in Hyderabad, Indian Institute of Chemical Biology, Calcutta, Central Drug and Toxicology Institutes in Lucknow, will be upgraded to international standards and be made fully compliant with cGMP/GLP/GCP regulations; they will also be ISO 9000 certified.

The R&D thrust, in the chemical / pharmaceutical sector is focused on development of new drugs, innovative/ indigenous processes for known drugs (with special emphasis on drugs for tropical and other diseases endemic to the country) and development of plant based drugs through investigation of leads from the traditional systems of ayurvedic medicine. Technologies developed invariably involve indigenous substitutes for expensive imported raw materials, innovative modifications to optimization of conventional process routes and application of novel techniques for product quality/purity.

CSIR's R&D strengths encompass world class expertise for organic synthesis and facilities for isolation and structure elucidation, biological screening, toxicological testing and pharmacokinetics supplemented by the expertise for development of agrotechnology for cultivation of medicinal plants for programs on bioactive molecules from natural product leads. The essential complement of expertise of clinical medicine/pharmacology and infrastructure facilities for clinical/field trials is through the strong institutional linkages built up with various medical institutes/hospitals, while industry participation in the development ensures successful upscaling and implementation of technology.

The Department of Science and Technology (DST), Government of India, in collaboration with CSIR has launched a new program and strategic initiatives to encourage Indian Industries into undertaking new drug development in the country and establishing state of art infrastructure for clinical and toxicology testing and screening. Recently the Govt. has sanctioned a multi-million dollar fund for this purpose; the amount is likely to increase every year and will also be supplemented by funds from the private sector.

Process Research and Manufacturing at Indian Companies

Stiff competition posed by the emergence of large numbers of manufacturers with process development skills led to the development of efficient technology and the nurturing of a highly skilled but low cost work force. Research personnel costs are much lower in India. For research contracts, it is possible to secure the services of a Ph.D. chemist for $ 50-60000 per year. Pilot plant time is usually accrued at $ 40,000 per week, less than one-third the US cost. Collaboration is also available for clinical trials, analog design and synthesis, process justification and validation. Several successful collaborations have been established in recent years; these are summarized below:

The avenues of cooperation that have been exploited by various companies are listed as illustrative examples of the enormous benefits that could accrue worldwide.

1) Synthesis of analogs for broad spectrum and high throughput screening
2) Lead optimization and analog design
3) Combinatorial chemistry and development of synthetic methodologies
4) Route selection, Process Chemistry: preparation of 1-5 Kg. of drug candidates for pre-clinical and Phase I evaluation
5) Contract manufacturing of sunset molecules at the end of the patent production period: Several such technologies can be transferred to

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high quality Indian manufacturers to free capacity constraints at a Western company. The FDA approved manufacturers can be used for Phase II and Phase III API manufacture; specific contracts can be entertained for marketing in regional markets

6) Strategic in-licensing of compounds discovered in India: Several academic groups in India have advanced programs in the areas of anti-infectives, anti-histamine, CNS drugs, cardiovascular natural product based drug discovery etc. Some of the compounds are available for further exploration and joint development. Several of the compound libraries available from India can be used in high throughput screening programs.

India and International Patent Law:

Two laws with far reaching implications were enacted in 1970 to allow Indian companies to compete globally despite their limited resources. The Indian Patent Act eliminated product patent protection and retained only process patents, and the Foreign Exchange Regulation Act (FERA) put a ceiling of 40% ownership of Indian businesses by foreign entities. The patent act allowed process patents for 7 years for all inventions related to health and food. The act was designed to break the monopolies of the multinationals. Former Prime Minister Mrs. Indira Gandhi stated, " There should be no patenting of Life and Death". The act led to self- sufficiency and self-reliance in basic drug manufacture and formulations.

In 1995, India became a GATT signatory and made a commitment to the WTO accords. The treaty is awaiting ratification by the Indian parliament. Beginning on January 1, 2005, India will enforce all international product patent laws, including pharmaceuticals, according to the GATT agreement. Indian predominance in branded generics will gradually change to a healthy combination of newly discovered and generic products much like US by 2015.

India, along with 127 other countries, is also a signatory to the World Trade Organization (WTO) and is obliged to comply with the recommendations of the Trade Related Intellectual Property Right (TRIPS) Agreement and modify the existing Patents Act 1970 by the year 2005. A new Patents (Amendment) Bill 1999 has been tabled in the parliament to widen the scope of patentability, say of New Chemical Entities, capable of being used as a drug, medicine or food that had so far been excluded from the 1970 Act.

The GATT regime implications for the Indian pharmaceutical industry are:

1) Any patent obtained prior to July 1, 1995 in any World Trade Organization (WTO) country will not be valid in India; only process patents will be honored. Existing Indian Patent Laws for manufacturing and marketing will cover the patents.

2) Drug Patents filed after July 1, 1995 will not be available to Indian companies to manufacture or sell without license from the inventor, even if they are imported. There will be, thus, little or no protection for indigenous industry.

3) A molecule patented after July 1, 1995 if approved for marketing prior to January, 2005 in any WTO country, a five year market exclusivity period (or until an Indian patent is granted or denied, whichever is shorter) will be granted to the marketing company in India. The product will still have to be approved for its safety and efficacy by the Drug Controller of India.

A close look at the amendments proposed in the new bill on sections 2,3,4 and 5 of the 1970 Act on patentable inventions would reveal the following:

A. Non-Patentable Inventions

an invention, which is frivolous and claims anything contrary to well-established natural laws or whose use is contrary to law or morality of the country and causes serious prejudice to human, animal or plant life or to health and environment.

- mere discovery of a scientific principle, formulation of an abstract of a scientific principle, formulation of an abstract theory or discovery of any living or non-living substance occurring in nature.
- mere discovery of any new property or new use of a known substance or of mere use of a known process machine or apparatus unless such known process results in a new product or employs at least one new reactant.
- a substance obtained by mere admixture resulting in only a aggregation of the properties of the compounds thereof or a process for producing such substances.
- plants and animals other than microorganisms in whole or any part thereof including seeds, varieties and species and essentially biological processes for productions or propagation of plants and animals.
- a mathematical or business method or a computer program or algorithms.
- inventions related to atomic energy.

B. Patentable Inventions

- Patent coverage in India is valid for a period of 20 years from the date of filing as it is for WTO / GATT members.
- The term "inventions" in section 2 of the Principal Act has been redefined to mean a new product or process involving an inventive step and capable of industrial application.
- The scope of section 5 of the 1970 Act has been widened to embrace biochemical, biotechnological and microbial processes in addition to chemical process for manufacture of a product.
- Pharmaceutical products arising out of the above processes would also be patentable after January 01, 2005.
- Microorganisms per se have been excluded from the list of non-

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patentable inventions as per section 3 sub clause(j).

If the company applies for a PCT status and chooses India as one of the countries to be covered, there will be automatic patent coverage. India became a member of PCT on 12.98 and any application to PCT after this date which mentions India as a designated country will be honored in India. All patent applications either direct or through the PCT route go into a 'Mail Box'. Process claims can be granted immediately but product claim will be granted only in 2005.

Indian violations of product patents have habitually led to denunciations of "intellectual piracy " by the developed nations. Care must however be exercised in levying such charges as they could lead to retaliatory charges of "biopiracy" against Western pharmaceutical companies. Indian sensitivities have been aroused to the continued patenting of traditional Indian herbal remedies, natural products obtained from indigenous flora and fauna and even the culinary delights of India by Western companies.

Changes in Patents Act would have a significant impact on the research activity carried out in the country. A new paradigm is envisaged which would force the industry to reorient its research culture. This should lead to the advancement of science and technology and betterment of the nation.

Selected Key Institutions (Academic And Industrial) For Discovery And Process Research:

- AVRA Laboratories, Hyderabad:
- Department of Chemical Technology, University of Bombay:
- Indian Institute of Chemical Technology, Hyderabad:
- National Chemical Laboratory, Pune:
- University of Delhi:
- University of Pune:

Industrial Organizations:

- Cipla, Mumbai: Technological expertise spans the full spectrum of product development, from new molecules to modern drug delivery systems.
- Lupin Laboratories, Mumbai: This company, headquartered in Mumbai, has superb facilities in Bhopal, Ankleshwar, and in Thailand. They are FDA and EPA approved for the manufacture of corticosteroids, anti-infectives, anti-tuberculosis drugs
- Ranbaxy Laboratories, New Delhi: Ranbaxy is considered to be a great success story and is the top pharmaceutical company in India; it has strengths in new molecule discovery, process development, and bulk drug manufacture. It has a major presence in the international generic drug market
- Dr. Reddy's Group (DRG) has grown into a fully integrated company with significant expertise in the

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development and manufacture of organic intermediates, bulk actives and finished dosage forms.

- RPG Life Sciences, Mumbai: The company has progressed from being a small pharmaceutical unit to a multi-product, multi-location diversified company with plants in Thane and Ankleshwar.
- Syngene International Pvt. Ltd is a contract research organization and export- oriented unit.
- Wockhardt, Mumbai: One of the fastest growing pharmaceutical companies in India, is on the global map for its product quality and production processes.

Additional Players

Other key players in the pharmaceutical sector are Cadila Healthcare, Zydus Cadila, Divi's Laboratories, Herdillia, Kopran, Kores (India), Medicorp Technologies, Morepen Laboratories, Torrent Pharmaceuticals and Unichem; research emanating out of CSIR labs such as the Center for Biotechnology (New Delhi), Central Drug Research Institute (Lucknow), the Indian Toxicology Research Center (Lucknow), the Indian Institute of Cell Biology (Calcutta) and the Regional Research Laboratory (Jammu) can also be rewarding. ◇

Board of Directors

Notes of Meeting of May 10, 2001

NOTE: Board Meetings are held on the monthly meeting day at 4:30 p.m. Section members are invited to attend.

Officers' Reports:

Chair: The Esselen Award Meeting was very successful and the Esselen Family was very pleased with the arrangements. The Medicinal Chemistry Group has planned a joint Meeting with the Section for December 6. T. Frigo congratulated the YCC and the Education Committee for a very successful event held jointly with the Gesellschaft Deutscher Chemiker (GDCh).

Chair-Elect: M. Hoffmann reported that the September Meeting will be held jointly with the Rhode Island Section at Bristol Community College with Dr. Stratt of Brown U. as speaker..

Treasurer: J. Piper presented the April 2001 report which was ACCEPTED.

Trustees: M. Strem stated that the Trustees will have a meeting with the financial advisor later in May.

Standing Committees:

Bd. Of Publications: P. Gordon reported that revenue is ahead of the budget. A reader survey is being planned for the NUCLEUS for October. Board member volunteers are requested to assist with the telephone survey. The Web Page updates are overdue. There was a discussion about oversight of the webpage, which is under the aegis of the Board of Publications.

Chemistry Education: The Northeast Student Research program was held April 28, with 66 poster presentations. The joint program between YCC and the GDCh was very successful. A reciprocal visit of a delegation of YCC to Germany is under discussion. M. Strem commented on the important role played by the YCC. M. Hoffman stated that a report of the meeting is being prepared for the *J.Chem.Ed.*

M. Simon MOVED that the Bd. of

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Board of Directors

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Directors express its thanks to the organizing Committee of the joint YCC-GDCh event for making the week of activities such a success.
The motion was PASSED. The Brauner Book Award is to be presented starting with 2002.

Constitution and Bylaws: C. Costello reported that the Board received a draft text of amendments to the Constitution and Bylaws of the Section to establish a Phyllis A. Brauner Memorial Book Fund and Award. Action by the Board is requested for the fall.

Other Committees:

Continuing Education: A. Viola stated that the ACS Short Course on Dispersions, Emulsions and Foams so far has received only 7 registrations, but since the course is being given by a local chemist it will be given. (Actually, additional registrants appeared when the course was given). Sigma RBIA has requested the Short Course *Pharmacology for Chemists,* guaranteeing five registrants. Since the National ACS Meeting will be held in Boston in 2002 any additional Short Courses for the Section will not be advisable.

Summerthing: Only 35 tickets are left for the Red Sox event.

NERM 2001: T. Frigo commented that the NERM event at the UNH will be largest in terms of technical papers: 312 papers have been scheduled.

Old Business: None

New Business: D. Lewis presented a proposal for a Salute to Excellence Commemoration to recognize Carl Selavka who has been an important force in the movement both for individual certification for forensic scientists and for laboratory certification of forensic laboratories. He is currently the President of the American Board of Criminalists and their representative to the ASTM. After two years as the Director of Forensic Services with the New York Division of Criminal Justice Services, where he helped the state's 25 forensic laboratories to receive accreditation, hw became Director of the Massachusetts State Police Crime Laboratory in Sudbury and is responsible for the full-service Crime Lab System and the DNA Databank for the Commonwealth. He has received a Ph.D. in Forensic Chemistry from Northeastern University and has repeatedly presented talks for NESACS. ◇

ACS News

From The Capital Connection, August, 2001

Daryle H. Busch
President-Elect, 1999
President, 2000
Immediate Past President, 2001

July 31, 2001

Dear Colleague:

I am writing to you on behalf of the Committee on Public Affairs and Public Relations to alert you to the enclosed policy statement, adopted by the Board of Directors at its June meeting. It is a product of the board's deep concern about the U.S. government's role in providing Internet access to scientific research.

To a university professor like me, the, government's promise of "free" information sounded good when I first heard about it. But as I learned more, I came to recognize that this approach threatens the survival of the American Chemical Society as we know it, as well as the dissemination of scientific knowledge and our freedom of inquiry as scientists - the very goals it purports to further.

Let's start with "free" information. In actuality, it wouldn't be free: it would be funded by American tax dollars — and therein lies the rub. As scientists, we know how important it is to preserve knowledge in perpetuity. We also know that the government appropriations process is notoriously fickle. If the surplus vanishes, Congressional budget-balancers might propose cutting corners on scientific databases. Should politicians make such decisions? Or scientists?

Beyond that, scientific findings have a history of becoming enmeshed in partisan politics. In the news media, Congress and state houses across the nation, value judgments permeate discussion of scientific findings on evolution, human cloning, embryonic stem cell research, global warming, and more. Dare we risk empowering politicians to decide whether to include the full range of research on contentious issues?

The private sector is already doing what the government proposes to do. ACS, for example, maintains the world's largest, most comprehensive chemical databases and publishes 30 journals — activities that provide a substantial portion of the income used by ACS to fund activities that benefit members and advance the chemical sciences. Is it right for competition from our government to place these activities at risk?

The enclosed statement articulates principles of utmost importance to each of us as members of ACS, as members of the scientific community, and as individual scientists. I encourage you to share and discuss it with colleagues and other ACS members.

Sincerely,
(signed)
Daryle H. Busch
Immediate Past President
Chair, Public Affairs and Public Relations Committee

Scientific Knowledge into Perpetuity?

As scientists and engineers, we value and understand the need for scientific knowledge to be accessible for all time. A core mission of nonprofit scientific organizations, such as ACS, is to advance science and technology. One way to accomplish this goal is to disseminate information by providing scientists, engineers and other interested users a wide range of options to search journals, abstracts, citations, and patents in their specific disciplines. Scientific organizations have led the effort to ensure that technical information is broadly available and that state-

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ACS News

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of-the-art technology revolutionizes the communication of science. Unfortunately, these services may now be at risk because of efforts like the Department of Energy's (DOE) PubSCIENCE program.

In the past, DOE maintained specialized databases in specific scientific areas. The intended scope of PubSCIENCE is significantly different. PubSCIENCE is a searchable database that provides hyperlinks to abstracts and the full text of peer-reviewed scientific journal articles that go beyond DOE's R&D portfolio. It duplicates pre-existing private and non-profit sector services. This duplication threatens the existence of private and nonprofit sector services and the ability of scientists to access current and previous information at a moment's notice.

At first glance, the notion of PubSCIENCE sounds great-it promises the ability to access "free" information. However, in reality taxpayers are funding it. Consequently, its funding is at the mercy of the annual appropriations process. Departments funded by appropriations rarely receive consistent budgets, and when times are lean, programs are cut unilaterally. Moreover, government sponsorship of such a database could give lawmakers carte blanche to determine which scientific findings get published. In addition, the large volume of information generated each day presents a daunting management challenge for any single provider. Delays associated with loading data on a single-source Web site using outdated technology would slow progress in science and technology.

DOE has other Internet-based initiatives, including the DOE Information Bridge, that help the public access information on DOE-supported R&D. By eliminating programs that compete unnecessarily with existing services, DOE could concentrate its resources on these valuable initiatives as well as its traditional efforts at building databases in specialized areas of energy science.

At its recent meeting, the ACS Board of Directors took a stance against the expanding governmental efforts to disseminate scientific information. While I do not often highlight individual statements, this one is worth bringing to your attention. I also have taken the liberty of including a letter from Dr. Daryle Busch, Immediate Past President of ACS, articulating why the ACS board took such a position. I encourage you to read the position statement at http://www.chemistry.org/government/policy/ps2001.html and Dr. Busch's letter

(signed) David L. Schutt, Ph.D. Director ◇

Historical Notes

Prepared by Edward R. Atkinson, Amherst, MA

In recent years the majority of these Notes have been obituaries of chemists and chemical engineers. While we plan to continue this practice, we again remind our readers that contributions to this column are welcome. Send 500-1000 words of a story of general historical interest to me at 163 Gray St. , Amherst MA 01002. 1 am the sole referee of such and don't expect to receive contributions that might qualify for publication in the elite historical journals.

E. Robert Coburn, 85, died on June 3, 2001. He was a native of Suncook, NH who attended Exeter Academy and then received the S.B. (1938), M.S. (1940), and Ph.D. (1941) from Harvard University where his research director was Louis Fieser. He joined the faculty of Bennington College in Vermont and was for many years the only chemistry instructor. Some of his students went on to advanced study in science and careers in medicine. While at Bennington he served as a consultant to the Sprague Electric Co. in North Adams, MA and was co-author of publications derived from his work. He was a 50-year ACS member and a member of the Northeastern Section since retiring in 1980 and moving to Meredith, NH. There he was active in a local civic organization and enjoyed renovating his home that he had shared with his wife of 42 years (Jean Flagg). He was a member of several professional organizations including Omicron of Alpha Chi Sigma. He was survived by two daughters and two grandchildren.

Harvey Mason Cole, 79, died on April 28, 2000. A native of Weymouth, MA he received the B.S. in Chemical Engineering from Northeastern University then served as an officer in the Army Air Corps during World War II. He was employed until his retirement in 1984 by the Cabot Corporation in Billerica, MA. He was the author of several research papers and about 11 patents, all in the field of carbon black and other Cabot products. He and his wife of 54 years (Evelyn Rowlett) were parents of three sons and a daughter.

Lester E. Coleman, Jr., 69, died on October 21, 2000 of lung cancer. He was a native of Akron, OH who received the B.S. in chemistry. from the University of Akron (1952) and the M.S. (1953) and Ph.D. (1955) from the University of Illinois. In his last year of retirement in New Hampshire he also acquired the M. S. in liberal studies from Dartmouth College.

After two years service in the Army Air Corps he joined the research staff of the Lubrizol Corporation in 1955 at its home base in Wickliffe, OH and remained with the company until retirement in 1996. He became president of the company in 1976, chief executive officer in 1978, and chairman in 1982. He led the company to become an international supplier of lubricants, fuel chemicals, and diversified specialty chemicals. He was the named inventor of 34 U.S. patents and 85 foreign patents and the author of over 100 articles on chemistry, scientific research, and corporate management. In retirement in Grantham, NH

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Historical Notes

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he remained a member of the boards of Lubrizol and other corporations.

During his professional life Coleman received honors from several academic institutions and technical societies. The Northeast Ohio Section of ACS honored him for outstanding contributions to chemistry. The Boy Scouts of America gave him the highest national awards for long service at the local, regional, and national levels. He was a member of Omicron Delta Kappa, Phi Lambda Upsilon, and Beta Lambda of Alpha Chi Sigma. Surviving were his wife Kathleen A. (Deak), two sons and four grandchildren.

Lewis Winfield Davis, 86, died on February 4, 2001. A native of Auburn, ME he received the B.S. in chemistry and physics from Bates College. After employment by General Electric Co. he moved to Beverly, MA and helped Peter Alexander develop the Alexander-Davis procedure for the preparation of high purity uranium metal. The role of Metal Hydrides Co. in the development of the uranium atom bomb is well-known.

Davis became president of the company. On retirement he moved to Standish, ME, and became active in community affairs and a trustee of Bates and Endicott colleges.

Philip H. Dewey, 91, died on September 6, 2000 in Yarmouthport, MA after a brief illness. He received the B.S. in chemistry from Union College in 1931 and the M.S. from Cornell University in 1932 where he did research on adsorption under the direction of the legendary Wilder D. Bancroft. At the Coal Research Laboratory of the Carnegie Institute of Technology in Pittsburgh he studied heats of combustion of cokes and graphite. For the Pittsburgh Plate Glass Co. his research included the production of foamed glass for use as an insulator. During World War II he was employed on the Manhattan Project at the Western Electric Co. in Kearny, NJ.

After the war Dewey joined RBH Dispersions Co. in Bound Brook, NJ for research on pigments and printing inks. He became a research manager at a laboratory in New York City when RBH was purchased by the Interchemical Corp. He supervised the move of the laboratory to Clifton, NJ in the 1960's and did pioneering work on color matching by use of a computer. After retirement to Cape Cod in 1973 he continued to read every issue of *Chemical and Engineering News* while enjoying the building of reproductions of antique furniture. He was an enthusiastic supporter of ACS and its programs. During his professional life he also supported Boy Scouts, Meals-on-Wheels, and other community programs. He was survived by his wife of 65 years, a son, a daughter, three grandchildren, and one great-grandchild.

Austin W. Fisher, 85, died on February 27, 2001. He was a native of Newton, MA who received the B.S. from what is now the University of Massachusetts, Amherst (1937) and the Sc.D. in chemical engineering from MIT in 1941. During World War II he oversaw the development of synthetic niacin at the Allied Chemical and Dye Corp. in Philadelphia. In 1946 "Bud" (as he was known to his associates) joined the technical staff of Arthur D. Little, Inc. as manager of process engineering and later as manager of the firm's New England office and a senior member of its research and development division. During this time he managed a highly-publicized project on the cultivation of algae as a source of food and fuel. The algae farm was located on the roof of the Little building on Memorial Drive, Cambridge.

In 1959 Bud became vice president of research and development and of the paper and plastics division at the Ludlow Corporation in Needham, MA. In 1965 he joined the Northeastern University faculty to teach industrial engineering and to coordinate the graduate programs in engineering management. Prior to his retirement in 1979 his family made its home in Lexington, MA where Bud was prominent in town affairs.

Bud and his wife then became residents of his 31-ft. sailboat, "Endelig" and cruised the waters of the Atlantic from the coast of Maine to the far reaches of the Caribbean. They came ashore at St. Croix where Bud taught a labor relations course at the University of the Virgin Islands. As luck would have it, hurricane Hugo destroyed the Fisher house on land but spared the boat. The Fishers then moved to Stoneham, MA where Bud was a vice commander in the U.S. Coast Guard Auxiliary and taught courses in navigation.

Thayer Carlton French, 66, died at his home in Belmont, MA of heart failure on April 11, 2001. He was a native of the Pittsburgh, PA area. He received the S.B. in biology from MIT in 1957 and subsequently the Ph.D. in biochemistry. Until 1985 he was a member of the MIT faculty and had an active consulting business. He then joined the Center for Biochemical and Biophysical Science and Medicine at the Harvard Medical School. At the time of his death he was director of the laboratories at the Center.

Yuli Moiseevich Glazman, 89, died on February 16, 2001. He was a native of Kiev, Russia and earned the doctorates at the State University (1939) and at the Kiev Institute of Light Industry (1959). He taught colloid chemistry at both schools until 1974 and was an author of more than 100 publications. An outspoken opponent of communism and Soviet anti-semitism he brought his family to the U.S.A. in 1975 and joined the Jewish community in Brookline, MA. He then was a member of the Tufts University faculty until retirement in 1989.

Alvin Olsen Ramsley, 81, died on February 9, 2001. A native of North Bergen, NJ, he received the B.S. in chemistry from Houghton College in Houghton, NY, and the M.S. in inorganic chemistry from Columbia University. After service in the U. S. Army during World War II he was employed by the Army and at the time of his retirement was a physical chemist at the U.S. Soldier Systems Command at the Natick laboratories. Among a number of awards received during his service was a 1982 "Technical Directors

Historical Notes

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Gold Pin Award for Research" made for his development of the Army's temperate battle dress (camouflage) uniform. He made his home in Sherborn, MA where he participated in many church and community activities. He was a 50-year member of ACS and a member of other professional associations.

P. Langdon Richards, 85, died on March 29, 2001 after a short illness. A native of Northampton, MA. In 1937 he received the B.S. in chemistry and physics from what is now the University of Massachusetts, Amherst. For 10 years he was employed in the research department of the precursor of the ExxonMobil Corporation. In 1948 he joined the technical marketing division of the Exxon Chemical Co. and traveled extensively in Europe and Latin America. In 1965 he became vice president and director of Esso Chemical U.S.A. After retirement in 1971 he served as a consultant to the petrochemical industry.

Richards was a member of ACS and other professional societies for over 50 years. At his home in Westport, CT he was active in community affairs and continued this activity after moving to Cummaquid on Cape Cod. By his first wife Helen (Codet) who died in 1994 he had three sons. A second wife Edith (Larnica) survives him.

Giacomo J. Ristagno, 88, died on June 23, 2001 in a Brockton, MA nursing home after a long illness. He came to the U.S.A. with his family from Sicily in 1914. He was a graduate of Lincoln Technical College and received the B.S. from Northeastern University. From 1942 until 1980 he was employed by the Polaroid Corporation as a chemist, department manager, and staff assistant. In Brockton he was active in community affairs and was a substitute teacher in the local schools. He spent considerable time helping mentally challenged adults find jobs. His hobbies included several participatory sports and membership in the Boston Mycological Club. He was survived by a daughter, a son, five grandchildren, and seven great-grandchildren.

Seymour Rothchild, 80, died on April 11, 2001 of lung cancer. He was a Bronx, NY native and a graduate of Brooklyn College. After serving as a captain in the Army Air Corps during World War II he obtained the Ph.D. at the University of Rochester and secured employment at the Tracerlab Co. in Boston. In the early 1950's he founded the New England Nuclear Corporation and served as its president for 15 years during which the company was involved in work for the International Atomic Energy Agency. Later he became vice president of the Clinical Assays Co. which produced medical testing supplies.

In 1980 Rothchild founded the Boston Philharmonic Orchestra and served as its president for 15 years. He played violin for it and several other amateur orchestras. As president of the New England Israel Chamber of Commerce he promoted the establishment of high-tech companies in Israel. He was active in Harvard Hillel and was a well-known tennis player at the Wellbridge Center in Newton. He was survived by his wife Sylvia (Rosner), three daughters, two sons, and four grandchildren.

Samuel Vigo, 92, died on June 22, 2001 at a retirement home on Cape Cod. He received the B.S. in chemistry from Brown University in 1930 and was then employed as an analytical and research chemist at the U.S. Army's Watertown Arsenal where he helped standardize the use of spectroscopy in the analysis of iron alloys. After World War II he was chairman of a national committee to standardize the analysis of titanium alloys. He was a member of ACS, ASTM, and other professional societies and a representative to a NATO division on aeronautical research. On retirement to Cape Cod he became very active in religious, artistic, musical, and other liberal, political and social organizations. He was survived by two daughters, two grandsons, and four great-grandchildren. ◇

Calendar

Continued from page 24

November 26 continued

Prof. Arthur Palmer (Columbia Univ.)
Biochemistry Seminar, "NMR studies of Protein Motions and Folding"
MIT, Room 6-120, 4 pm

November 27

Prof. James P. Morken (Univ. North Carolina)
"Development of Stereoselective Reactions with Arrayed Catalyst Evaluation"
Boston College, Merkert Chemistry Center, Room 127, 2609 Beacon St.4:00 pm

Prof. David Jonas (Univ. of Colorado)
"Exploring Local Solvent Environments and Degenerate Electronic Motion with Electronic Analogs of 2D NMR"
MIT, Room 2-105, 4 pm

November 28

Prof. John Groves (Princeton Univ.)
Harvard/MIT Inorganic Chemistry Seminar
Harvard Univ.,12 Oxford St., Cambridge

November 29

Prof. Robert Gordon (Univ. of Illinois, Chicago)
MIT Physical Chemistry Seminar
MIT, Rm. 2-105, 4 pm

Prof. David Glueck (Dartmouth College)
"Metal-catalyzed Formation of Phosphorus-carbon Bonds" Northeastern Univ., 129 Hurtig Hall, 4:00 pm

Notices for the Nucleus Calendar should be sent to:

Dr. Donald O. Rickter, 88 Hemlock St., Arlington, MA 02474-2157
e-mail: 72133.3015@compuserve.com

Puzzle Solution

Answers to the October 2001 Puzzle

1. Clear, hail
2. Transposing the first, second or third digits of the two numbers that are added together yields five other combinations whose sum is 729, e.g., 183+546=729.
3. BOSTON, TROY, ITHACA
4. STAR, TRUE, AURA, REAR
5. 14

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Check NESACS Homepage for late additions: http://www.NESACS.org

Note also the MIT Chemistry Department Webpage calendar:
http://web.mit.edu/chemistry/www/temp/seminars/pchemseminars.html
and the Harvard Chemistry web site for updates:
http://www-chem.harvard.edu/events/Physical_Seminars.html
(which includes the Harvard/MIT joint seminars).

November 1

Prof. Scott J. Miller (Boston College)
"Minimal Peptide-Based Catalysts: Biomimetic Discovery and Biomimetic Synthesis"
Boston College, Merkert Chemistry Center, Room 127, 2609 Beacon St. 4:00 pm

Prof. Marisa Kozlowski (Univ. of Pennsylvania)
"Identification of Novel Ligands for Asymmetric Synthesis"
Dartmouth College, Room 101 Fairchild, 10:30 am

Prof. Watt Webb (Cornell Univ., Dept. Applied and Engineering Physics)
Harvard/MIT Physical Chemistry Seminar
Harvard Univ., Room MB23, 12 Oxford St., 5 pm

Prof. J. Santalucia, Jr. (Wayne State Univ.)
"DNA Folding Thermodynamics, Bioinformatics, and Hybridization Design"
Northeastern Univ., 129 Hurtig Hall, 4:00 pm

Prof.Rebecca R. Conry (Colby College)
Title TBA
Univ. New Hampshire, Iddles Auditorium Room L103, 11:10 am

Dr. Charles W. Martin (WL Gore)
"Fuel cell membranes: The key to the revolution."
Worcester Polytechnic Institute, Dept. of Chemical Engineering,
Goddard Hall, Room 227, 4:00 pm

November 5

Prof. Takeshi Nakai (Tokyo Institute of Technology)
"Recent Progress in Asymmetric Catalysis and Catalytic Stereocontrol"
Boston Univ., Science Center Auditorium, SCI 107, 4:00 pm

Prof. Paul R. Selvin (Univ. of Illinois)
"Conformational Changes in Actomyosin and Ion Channels Measured by Fluorescence"
[Joint Physical Chemistry / Biological Chemistry]
MIT, Room 6-120, 4 pm

November 6

Prof. David Nesbitt (Univ. of Colorado)
Radicals, Single Collisions and Single Molecules
Tufts Univ., Pearson Chem. Building, 62 Talbot Ave., Medford,
Room 106, 4:30 pm

Ms. Maryjo Bent (Univ. Mass. Boston)
"Triple Hydrogen Bonding in Uracil Derivatives" (Thesis Defense)
Univ. Mass. Boston, Science Building, Room 089, 4:30 pm

Dr. Mary Beth Carter (Biogen)
"Integrin alpha-4-beta-1 (VLA4) Inhibitors"
Univ. New Hampshire, Iddles Auditorium Room L103, 11:10 am

November 7

Prof. Joseph. J. BelBruno (Dartmouth College)
"Computational Studies of the Applications of Fullerenes to Material Science"
UMass Dartmouth, Science & Engineering Building (Group II), Room 115, 4:00 pm

November 8

Prof. Ken Dill (Univ. of California, San Francisco)
"A Statistical Mechanical Model of Water, the Hydrophobic Effect,
and Ion Solvation" (Harvard/MIT Seminar)
MIT, Room 2-105, 5 pm

Prof. Kevin G. Owens (Drexel Univ.)
"Quantitative Analysis by MALDI TOFMS: Fact or Fantasy?"
Univ. New Hampshire, Iddles Auditorium Room L103, 11:10 am

November 12

Prof. Geoff Coates (Cornell Univ.)
"Synthetic Polymers from Nature: New Catalysts for the Synthesis of Biodegradable Polymers from Renewable Resources"
Boston Univ., Science Center Auditorium, SCI 107, 4:00 pm

November 13

Prof. Robert Dunn (Univ. of Kansas)
"Single-Molecule Probes of Lipid Membrane Structure and Dynamics"
MIT, Room 2-105, 4 pm

Dr. Berkeley W. Cue (Vice-President, Pfizer Inc.)
"The Road to Drug Discovery & Development"
Univ. Mass. Boston, Science Building, Room 089, 4:30 pm

November 14

Prof. Dennis A. Dougherty (Calif. Inst. of Technology)
George Buchi Lectures in Organic Chemistry
MIT, 6-120, 4 pm

Prof. Dwight Sweigart (Brown Univ.)
"Organometallic Chemistry Applied to Carbon-Sulfur Bond Activation and Quinoid Polymer Formation"
UMass Dartmouth, Science & Engineering Building (Group II),
Room 115, 4:00 pm

November 15

Dr. Mary Lou Ganzer (President, AACC)
"Cystatin C"
American Association for Clinical Chemistry and Clinical Ligand Assay Society
Doubletree Guest Suites Hotel, Waltham at 128
Social 6 pm; Dinner 7 pm;Lecture 8 pm

Prof. Gregory L. Verdine (Harvard Univ.)
"The Secret Life of the Genome"
Boston College, Merkert Chemistry Center, Room 127, 2609 Beacon St. 4:00 pm

Prof. Chris Chidsey (Stanford Univ.)
Harvard Physical and HU/MIT Combined Physical Chemistry Seminar
Harvard Univ., Room MB23 Pfizer Lecture Hall,12 Oxford St., Cambridge, 5 pm

Prof. Dennis A. Dougherty (Calif. Inst. of Technology)
George Buchi Lectures in Organic Chemistry
MIT, 6-120, 4 pm

November 19

Prof. Matthew Sigman (Univ. of Utah)
"Palladium-Catalyzed Aerobic Oxidation of Alcohols"
Boston Univ., Science Center Auditorium, SCI 107, 4:00 pm

The Pfizer Symposium:
Prof. David Bartel (MIT-Whitehead Institute) at 1:30 pm;

Prof. Ronald Breaker (Yale Univ.), "The Pursuit of Catalytic Perfection with
Ribozymes and Deoxyribozymes" at 3 pm;

Prof. Gerald Joyce (The Scripps Institute), "Three Paradigms for theRNA-catalyzed Replication of RNA" at 4:30 pm
Harvard Univ., MB-23 Pfizer Lecture Hall

November 20

Prof. Philip Keehn (Brandeis Univ.)
"Intramolecular Non-bonded Interactions"
Univ. Mass. Boston, Science Building, Room 089, 4:30 pm

November 26

Prof. James Morken (Univ. North Carolina)
Organic Seminar
Harvard Univ., MB-23 Pfizer Lecture Hall, 4:15 pm

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