

THE NUCLEUS

November 1993

Of the Northeastern Section of the American Chemical Society

Vol. LXXII, No. 3

Monthly Meeting

*Norris Award to
Arthur C. Breyer*

Environmental Chemistry Column

Bioremediation

Chemistry at Northeastern

A historical account

Chemistry Week

*Events scheduled for November
7-13 (more or less)*



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National Chemistry Week November 7-13, 1993

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Cover: Dr. Arthur C. Breyer, James Flack Norris Awardee
Photo by D. Bennett

Deadlines: January 1994 issue: November 18, 1993.

THE NUCLEUS



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James Flack Norris

In March, 1993 Keith U. Ingold received the ACS James Flack Norris Award in Physical Organic Chemistry. This came 27 years after his father, Sir Christopher K. Ingold received the first James Flack Norris Award for Excellence in Physical Organic Chemistry, sponsored by the Northeastern Section, from the American Chemical Society.

Keith Ingold was present at that meeting and remembers that Henry Hill of the Northeastern Section, later President of the ACS, picked up Sir Ingold at Kennedy Airport to drive him to Atlantic City, site of the 1965 Fall meeting.

The August 1965 *NUCLEUS* published a biographical sketch of James Flack Norris with several photographs. These photos show the joyful nature of J.F. Norris. He inscribed a picture of

himself at his desk in 1924: *Win with optimism, imagination and perseverance.* The pictures "Dr. Norris considering a problem – and seeing a possible solution" are reproduced from the August 1965 *NUCLEUS*, hence the rather poor quality since originals are not on hand. The group picture shows an informal dinner group following the symposium in September 1965. The second one from the left is Keith Ingold, on his left Henry Hill, across the table (second from the left) is Sir Christopher K. Ingold, recipient of the first Norris award, and on his right Mrs. Keith Ingold. The others on the picture are not identified, although they look familiar to this editor who had been at ACS meetings on and off during those years. ◇



Dr. Norris considering a problem.
Photos by Paul Arthur, Ph.D. MIT 1938.



Dr. Norris seeing a possible solution.



Informal dinner at the occasion of the first James Flack Norris Award in Physical Organic Chemistry to Sir Christopher Ingold. Atlantic City, Sept. 1965.

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Preliminary Announcement: December 9, 1993

Jointly with the Medicinal Chemistry Group

During the afternoon symposium, starting at 3:30 (Coffee at 3:00), Dr. J. Anthony Ware of Beth Israel Hospital will speak on *Protein Kinase C Iso-types as Drug Targets*, followed by Dr. Peter Blumberg of the National Cancer Institute, speaking on the design of selective therapeutic agents. Following the Social Hour at 5:30 and Dinner at 6:15, Dr. Steven E. Hall (Sphinx Pharmaceutical Corp. will speak on *Development of Selective Protein Kinase C Inhibitors*. All activities will be in the Shea Room, Conte Forum, Boston College. For further information, call James Quick, Procyon Pharmaceuticals, Inc. (617) 935-8700. FAX: 938-5420. ◇

Monthly Meeting

The 756th Meeting of the Northeastern Section, ACS

Presentation of the 42nd James Flack Norris Award for Outstanding Achievement in the Teaching of Chemistry to Dr. Arthur C. Breyer

Thursday, November 11, 1993, Boston College, Chestnut Hill, MA

5:30 Social Hour, Shea Room, Conte Forum

6:30 Dinner

8:00 Evening Meeting, Rm. 127, Chemistry Building

Dr. Dorothy Phillips, Chair, Northeastern Section, presiding

Introduction of Awardee by Dr. Henry A. Heikkinen, U. of Northern Colorado

Presentation of the Award by Dr. Marco H. Sheer, Chair, Norris Award

Committee

The Norris Award Address: *Chemistry and Teaching – Twin Arts*

Dr. Arthur C. Breyer, Beaver College, Glenside, PA

Reception in honor of Dr. Breyer

Dinner reservations should be made no later than November 5. Please call Marilou Cashman at (800) 872-2054. Reservations not cancelled at least 24 hours in advance must be paid. Members, \$21.00; Non-members, \$23.00; Retirees, \$12.50; Students, \$8.00. **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 is available in the garage. Enter from Beacon St.

Next meeting: December 9, 1993, jointly with the Medicinal Chemistry Group. For meeting details see the announcement on the facing page.

Biography

Arthur Breyer was born in Brooklyn, New York in 1925. After completing the technical chemistry course at Brooklyn Technical High School, he served in the U.S. Army in three European theater areas until his capture in December 1944 in the Battle of the Bulge. By the time he was liberated by the Russian army he had lost 70 lbs. Following discharge from the army in 1945 he completed an undergraduate program in chemistry and mathematics at New York University in 1948. Columbia University awarded him an M.A. in Physical Chemistry in 1950. He received his Ph.D. from Rutgers University in 1958.

He has taught at Columbia University (1948-9), Upsala College (1949-59), Ohio Wesleyan University (1959-63), Harvey Mudd College (1963-4), and Beaver College (1964-92), where he served as chairman of the Department of Chemistry and Physics from

1964-1985. He has also taught several other universities.

From 1962 to 1975 over 700 high school chemistry teachers from 37 nations and all 50 states were trained in Breyer-directed NSF-funded Summer Institutes focused on mastery of both the Chemical Bond Approach (CBA) and Chemical Education Materials Study (CHEM Study) curricula, as well as an extensive audio-visual workshop program. This influential series of teacher institutes remains unique in terms of its scope, longevity, and impact on secondary school curriculum reform in the 1960s and 1970s.

Dr. Breyer served as co-director and program chairman of CEC78, the first CHEM ED Conference held in the US. He served as director of the 1985 Woodrow Wilson-Dreyfus Master Chemistry Teacher Institute at Princeton University. More recently he served as one of thirteen group leaders of writing teams of modules for SourceBook, a four-volume handbook for inexperienced

Abstract

Teaching, like research, is an art that demands persistence, enthusiasm, initiative, and creativity. While the research scientist gains satisfaction from his efforts to accurately understand the transformation of chemical substances at the macroscopic and microscopic levels, the chemistry teacher's satisfaction is derived from seeing his communication of chemical wisdom multiply the productive potential of his one life through the productive professional lives of the thousands of students it is his privilege to teach. The words of Jim Elliot are my motto for teaching: "He is no fool who gives what he cannot keep, to gain what he cannot lose." Knowledge, wisdom, and laboratory skills have little value when not passed on to others.

As a teacher I attempt, by seemingly endless means, to inculcate in each of my students a working mastering of the fundamental concepts which

continued on page 6

enced chemistry teachers, a component of the ChemSource Project.

He has authored nearly 30 publications in chemical education, ion exchange, paper, thin-layer, and high-pressure liquid chromatography. He has presented 68 papers at professional meetings and given over 100 lectures and workshops throughout the U.S. He has served in a wide variety of capacities for the Philadelphia Section of ACS, including Section Chairman and national Councillor.

He has received numerous previous awards from foundations and ACS bodies.

He is a gardener, stamp collector, and devotee of classical and sacred music. He is a tenor soloist and member of two church singing groups. Dr. Breyer and his wife Louise have three children: Richard, a sales executive, Carol, a senior systems analyst, and Adrienne, a computer user engineer.

Dr. Breyer has submitted the abstract of his talk. ◇

Abstract

continued from page 5

underlie chemical and physical phenomena, and assist them in their development of the ability to solve real scientific problems systematically and quantitatively using structural models, mechanisms and the integrated application of physicochemical principles and laboratory skills. I want my students to perceive the beauty and design of the world in which they live and to see science as a creative art which seeks to discover the mechanisms of all components of the universe, so as to help to maximize the enjoyment of, appreciation for, and understanding of life.

My goal is to send forth students with scientific literacy, scientific competence, and a continuing interest in and enthusiasm for science as a major component of those areas we term culture and civilization. I seek to transmit to my students the best I know — the best intellectually, the best aesthetically, and the best spiritually. As is commonplace in the arena of labora-

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If you have not received your 1994 dues bill, or if you have questions about your bill, call the ACS at (800) 333-9511. Those whose dues remain unpaid after February 1, 1994 will be struck from the subscription lists for C&EN and journals, effective February 28.

To pay by credit card, please call (800) 333-9511, credit card in hand. ◇

tory research, outstanding teaching should be encouraged, recognized and rewarded, for creative teaching is an important area of research.

Chemistry is an intriguing human endeavor, investigated through experimental design and techniques, captured by our senses and explored by our minds.

In this lecture, selected topical areas of chemistry will be explored with the use of demonstrations, models, transparencies and dialogue to illustrate the twin arts of chemistry and teaching. ◇

Consulting Chemists' Meeting

Thursday, November 18, 1993
Sheraton Tara Lexington Hotel

Marrett Rd., Rte. 2A
(¼ Mi. west of 128)
Exit 30B, Rte. 128

Dinner at 5:30 p.m.
preceding the meeting

Paul J. Cook, Esq. (Manchester, MA) will speak on *Technical Entrepreneurs and the Written Word: Keeping Notes, Notebooks, and Other Documents to Protect Your Business, Your Ideas, and Your Clients*. Mr. Cook is an experienced patent attorney who will offer serious and factual information on this important topic.

Call Debra Saez at (508) 521-1327 by
November 16, 1993

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Chemistry Week 1993, November 7-13

NESACS Events

This year the Section is planning to reach young people not typically included in Section activities.

November 3, November 16

Chemistry of the Brain Two one-day symposia for chemistry teachers and their students at the Boston Museum of Science. If you have not received registration material, call Dr. Phyllis Brauner, (617) 235-7849

November 6

Second Annual Northeastern Regional Undergraduate Chemistry Day at Boston University. See adjacent column.

November 8, 6-8 p.m.

Special ACS TV Satellite Program - Up With Chemistry at the University of Massachusetts Dartmouth and Lowell. A special two-hour ACS satellite TV program designed for high school and college instructors interested in chemical instruction. The focus is on teaching introductory chemistry. For more information and registration, call Dr. James A. Golen at (508) 999-8245 (Dartmouth) and Dr. Ruth Tanner (508) 934-3662 (Lowell). See page 13.

November 11

James Flack Norris Award For Outstanding Contributions To Chemistry Education. See page 5.

November 11, 12 or 13

The First Annual M.I.T. Forum for Young Scientists to be held at M.I.T., featuring chemistry demonstrations and discussions, capped by a tour of the Chemistry Department. Selected schools are being invited.

For exact time and date or other information on any of these events, call Bert Paul, (508) 429-4079. ◇

The Second Annual ACS Northeast Regional Undergraduate Day

November 6, 1993

Sponsored by the Northeastern Section of the American Chemical Society
In Celebration of National Chemistry Week

- 9:00** Registration
- 9:30** Welcoming Remarks
Prof. Standish Hartman, Chairman, Chemistry Department, Boston University
Matthew Russell, President, Chemia (ACS Student Affiliates Chapter at B.U.)
Dr. Dorothy Phillips, Millipore Corp., Chairman, NESACS
- 9:45** Keynote Address
Prof. James Kaufman, Curry College, Chairman-Elect, NESACS
- 10:30** Workshop I: Making a Career in Chemistry
Dr. Esther A.H. Hopkins, Massachusetts Department of Environmental Protection
- 11:00** Coffee Break
- 11:15** Workshop II: Choosing a Graduate School
Prof. Lawrence Ziegler, Boston University
- 11:45** Workshop III: Interviewing Skills
Dr. Debra Saez, Technically
- 12:15** Lunch
- 12:45** Graduate School and Industry Fair
- 2:00** Workshops and Tours
Resumé Consultation: Bring your resumé and have it reviewed by a professional.
Mock Interviews: Develop interviewing skills through practice.
Tours of the Chemistry Department research facilities (2:00, 2:30, and 3:00 pm).

There will be a \$5 registration fee to cover lunch and workshop materials.

If you would like more information or if your school or company is interested in sending a representative to the Graduate School and Industry Fair, please contact Stephen Doherty at 617-353-2503 (fax: 617-353-6466; internet: doherty@chem.bu.edu)

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Abstract

continued from page 5

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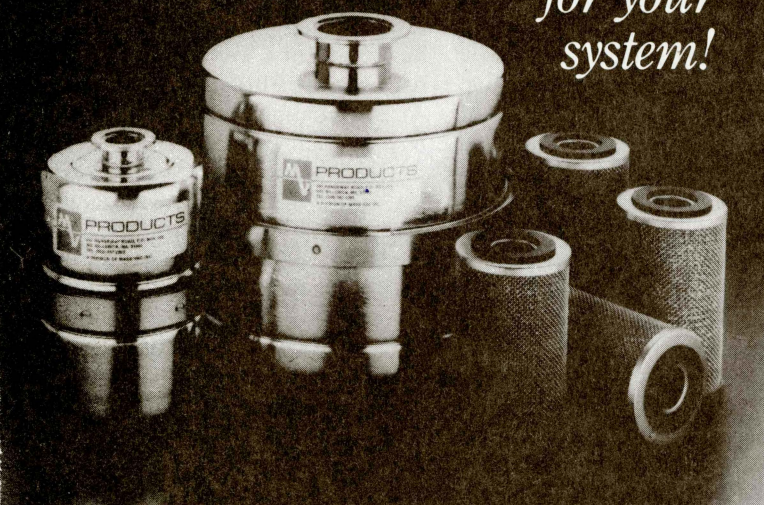
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Environmental Chemistry Column

Mother Nature's Micro Waste Treatment Reactors

By David Ham (Envirochem, Inc.) and Kathleen C. Swallow (Merrimack College)

Clean-up of contaminated water and soil to meet existing regulations provides scientific challenges and potentially lucrative business opportunities. In the last two Environmental Chemistry Columns we have summarized two emerging clean-up technologies, photochemical purification processes for treating waste water and supercritical processes for treating waste water and contaminated soil. Bioremediation offers another developmental approach that can be used to treat contaminated soils or ground water *in situ* or in reactors on site. The chemistry in these processes is promoted by enzymes in bacteria, Mother Nature's micro reactors. Besides the huge economic advantage of removing the contaminants without removing the soil or water, these techniques can offer the additional benefit of oxidizing contaminants all the way to H₂O and CO₂ in favorable cases. The main competition for *in situ* clean-up, air purge, removes the pollutants from the ground but deposits them into the air without destroying them.

Bioremediation refers to the destruction of contaminants below allowed concentrations using biological materials introduced to the site. The term *biodegradation* usually refers to processes that occur due to microorganisms occurring naturally at a site and thus well adapted to the particular environment. Biodegradation is the conventional engineering technique used for waste water treatment. The first uses of bioremediation occurred during the 1970's to treat oil spills at U.S. tank farms.

Naturally occurring organisms have evolved to produce enzymes that catalyze destruction of high molecular weight compounds occurring naturally throughout the biosphere. Compounds, such as organohalogenes that rarely occur naturally, persist in our environment largely because few or no organisms have evolved to degrade them. Some of the most widespread hazardous contaminants, including polychlorinated

biphenyls, trichloroethylene (TCE), tetrachloroethylene (PCE for perchloroethylene), and carbon tetrachloride (CT), are especially hazardous because they survive and build up for long times in the environment. Compared to these, petroleum hydrocarbons are rapidly destroyed naturally.

Serendipitous science led to the bioremediation processes now being developed to treat chlorinated hydrocarbons. In the early nineteen eighties analytical chemists studying a site in Florida encountered a confusing mystery. The site was contaminated by a known spill of TCE and some PCE, but they kept detecting large amounts of dichloroethylene (DCE). No DCE had been used in the area. After repeating their measurements and considering possible sources of error and other contaminants, they came to believe their results. This led them to controlled laboratory tests of the soil from this site. These tests showed that the naturally occurring consortia of bacteria present in the soil were capable of transforming TCE into *cis* and *trans*-1,2-dichloroethylene. These bacteria opened up the possibility of bioremediation of chlorinated hydrocarbon contamination.

Bioremediation processes still rely on naturally occurring bacteria found to work for the particular problem. Researchers are now using genetic engineering to develop improved microorganisms to expand this technology. A group in The Netherlands is trying to mutate wild bacteria using genetic insertion to obtain organisms that break down chlorinated hydrocarbons and survive higher levels of the toxic intermediate 1,2-dichloroethane. Microorganisms are still not available to destroy many important pollutants such as dioxins.

In situ bioremediation in particular provides an especially complex challenge for analytical chemists. The physical, chemical, and biological properties of any site vary widely in space and slowly in time. Chemists must charac-

terize a complex chemical mix down below the 5 microgram level for many of the compounds and microbiologists must assess the effectiveness of complex biological ecosystems. Evaluating a site and designing a process is a demanding interdisciplinary challenge for analytical chemists, microbiologists, hydrologists, geologists, soils engineers and undoubtedly others.

In situ bioremediation has had many recent successes in treating hazardous wastes *in situ*, making it a technology to be seriously considered. Still, one observation of results presented at the "Second International Symposium on *In Situ* and On-Site Bioreclamation" last April was that at least half of the efforts so far fail to achieve their desired results. Many problems contribute to the failures: Reactions are slow, taking days to weeks, and strongly dependent on the physical environment, especially temperature. Toxic materials other than those being treated, such as heavy metals or reaction intermediates or products, can inhibit biological activity. Heterogeneous distribution of contaminants makes it impossible to contact all of the pollutant. And, there is still a shortage of microorganisms capable of degrading target contaminants and uncertainty if they can survive and grow in any new environment.

In spite of the difficulties and uncertain results, bioremediation has moved from speculation to a useful technology in less than a decade. Last year, bioremediation was considered or used in over 135 Superfund, Resource Conservation and Recovery Act (RCRA), and underground storage sites in the U.S. It is being actively pursued in Europe. This is a very young technology based upon Mother Nature's well established chemistry. It offers many opportunities for chemists to help implement bioremediation processes as well as design treatments that complement the biology to remove other contaminants without poisoning the microorganisms. ◇

Chemistry at Northeastern University

A historical account by Karl Weiss

Where individuals, groups or organizations are heading is greatly influenced by where they are and from where they came. So it is with chemistry departments, which inevitably reflect their origins and the ethos of their institutions. In Northeastern's case, an unusual pattern of development whereby basic arts and sciences programs started as service offerings for professional curricula and the early adoption of the cooperative plan of education were powerful factors in determining the structure and activities of the chemistry department. Triggering the demand for formal science instruction was the establishment of the engineering college in 1909, the same year that cooperative education was introduced at Northeastern. Other professional schools annexed or founded in subsequent years, in particular the Colleges of Pharmacy and Allied Health (1962), Nursing (1964), Boston-Bouvé (1964), Criminal Justice (1967) and Computer Science (1982), had significant impacts on the department's evolution.

A separate identity as the chemistry department coincided with the creation of the College of Liberal Arts in 1935. Chemistry was one of the first majors available in the College. Early markers of progress were the publication of the first chemistry research paper in 1935, the introduction of an M.S. program coupled with the employment of the University's first teaching assistants in 1940, and achieving ACS accreditation of the undergraduate program in 1941. The remainder of the 1940's and the 1950's were dedicated to the further development and growth of a rigorous undergraduate major in chemistry which included a co-op work experience option. First year major enrollments reached about 50 students during this period, with approximately 30 graduates annually. These numbers have declined to a mere handful in recent years.

The University's decision, in 1958, to substantially expand graduate



Hurtig Hall
(photo by J.D. Levine, Northeastern Univ.)

education, particularly in technical fields, represents an important milestone for chemistry. It led to the introduction of Northeastern's first doctoral programs in 1961, among them the one in chemistry. A group of external experts that included L.B. (Buck) Rogers, at that time chemistry professor at MIT, established the University to be ready for this venture. The same year also saw the transfer of the New England College of Pharmacy to Northeastern, an event which created many new liaisons and opportunities for chemistry. To accommodate the new graduate study and research thrusts, the department's faculty was expanded from 6 to 20 members. No account of the department's history to this point would be complete without mentioning some of the pioneers whose efforts during the formative years have had a lasting impact. Although the major research emphasis dates from the early 1960's, some widely recognized efforts go back to the 1940's.

Arthur Andrew Vernon (1902-1973) served as chairman for 20 years, until 1958. A photochemist who did his doctoral work with Hugh Taylor at Princeton, he devised the structure of the chemistry major program, set high quality standards for all chemistry offerings, and designed undergraduate instructional laboratories which represented the state-of-the-art at that

time. He subsequently became Dean of the University's new graduate school. Saverio (Sal) Zuffanti (1908-1976) was one of the most popular teachers of all time at Northeastern. An organic chemist, he was the author of over 40 publications (most in the *Journal of the American Chemical Society*) and several books. This is an enviable record, considering the 30-40 hours per week teaching loads that were standard during most of his career. Sal's name is associated with that of Fay Luder as co-author of the widely acclaimed book *The Electronic Theory of Acids and Bases* (Wiley 1946), a standard work on this topic in its day. Luder, a Brown University-educated electrochemist, authored about 50 publications and 5 books. The latter included the popular *General Chemistry* text, co-authored by Zuffanti and Vernon (and Robert Shepard for the last edition in 1965), which was first published in 1953 by Saunders and translated into several languages. Not all of Luder's publications were in science. A deeply religious man, he also wrote a novel about the life of Jesus and *A New Approach to Sex*, a slim volume which stresses traditional family values.

It is tempting to speculate that, symbolically at least, George Shannon Forbes (1882-1979) set the stage for the department's later forays into the domain of photochemistry. This well-known chemist taught physical chemistry at Northeastern for about 5 years in the early 1950's after his retirement from Harvard.

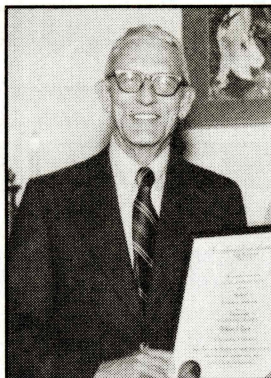
Robert Andrews Shepard served as chairman from 1958 to 1968, a period of transition from which the department emerged with strong chemistry major and service course components and its current research orientation. Shepard guided the implementation of the new doctoral program and was the driving force that secured the department its own building - Hurtig Hall. By the mid-1960's, chemistry was spread over four buildings to



Arthur A. Vernon (1902-1973)
photographer unknown



Saverio Zuffanti (1908-1976)
half-tone copy by Glenn Pike



William E. Cass (1914-1987)
photo by JET Commercial Photographers

accommodate growing research activities and enrollments, so the need for consolidation was obvious. But other departments experienced similar expansions and also had pressing space needs. Legend has it that chemistry was given priority in receiving new quarters owing to the location of the department's stockroom right beneath President Knowles' office. The lingering odor from what is said to have

been an accidental spillage of caproic acid persuaded the President that it was time to get chemistry out of Richards Hall as soon as possible. Construction of Hurtig Hall was started in 1968 and the building was occupied in the following year.

By the end of the Shepard era in 1968 the department had instituted the annual Arthur D. Little Lectureship and, in 1965, had the honor of graduat-

ing the University's first two Ph.D.s. When Bob assumed the Deanship of the College of Liberal Arts, William E. Cass (1914-1987) became Acting Chairman and subsequently, until 1976, the department's Executive Officer. A polymer chemist who did some of the early work on the decomposition of organic peroxides, Bill held positions as research manager at General Electric, Owens-Corning and A.D. Little prior to joining Northeastern in 1964. His stewardship occurred during a turbulent year that was marked by student unrest. The department's claim to fame (or notoriety) in this period was that three of the "Weathermen" leaders in the Boston area were Northeastern chemistry majors. Some served time for their actions, but all have become productive citizens.

My 10-year stint as chairman began in 1969. This year marked the beginning of substantial research growth and the emergence of group efforts, particularly in the areas of analytical chemistry, photochemistry and spectroscopy, and materials science. In graduate education, a unique Doctoral Internship program was initiated in 1972 which augments the traditional scientific training with experience in a participating non-academic laboratory. The program, which is intended to broaden perspectives and offset the academic focus of doctoral study, has produced about 50 graduates to date. A Dreyfus Foundation-sponsored conference was held on this topic in 1979, and the program has been emulated at least at four other institutions.

In 1973 an event of considerable significance for chemistry at Northeastern occurred - the creation of a center that evolved into the well-known Barnett Institute of Chemical Analysis and Materials Science. Geared to interdisciplinary efforts from the beginning, the Institute's original focus on forensic science came about through a collaborative project with the College of Criminal Justice that was funded by the U.S. Law Enforcement Assistance Administration. With Barry Karger as Director and Bill Giessen as Associate Director, the Institute soon extended its sphere of activities to encompass bio-

analytical chemistry and the chemical aspects of materials. Today, it maintains productive research liaisons with other Colleges (Pharmacy and Allied Health, Engineering) and science departments and enjoys significant support from industry.

Also in 1973 the M.S. program in Clinical Chemistry was started in collaboration with the College of Pharmacy and Allied Health. An action that anticipated the impact of computers in chemistry was the introduction of a graduate course on this topic in 1974.

Since 1979 the department has had three chairmen: John Roebber, the Executive Officer since 1976, served twice in an acting capacity for extended periods, Philip LeQuesne from 1979 to 1987, and Philip Warner from 1988 to 1993. In this period a comprehensive departmental microcomputer facility was installed to support and enhance instructional functions, and a joint biochemistry major was initiated with the biology department. A number of old-timers retired, notably Conrad Jankowski, an analytical chemist with interests in ocean chemistry; Elmer Jones, author of the organic laboratory manual that was used for many years; Bob Shepard who, after his stint as Dean, served as Director of the University's Marine Science Institute in Nahant before returning to chemistry; David Howell, an inorganic chemist who, as Faculty Advisor, guided the ACS Student Affiliates Chapter at Northeastern to receive "Outstanding Chapter" awards for several years; and Karl Weiss, who served as Vice Provost and Vice President of the University between 1979 and 1991.

Although establishing and maintaining strong graduate and research programs has been given energetic attention during the past three decades, the department has also continued its traditional emphasis on the undergraduate instructional function. Excellence-in-Teaching awards have been received by Geoff Davies, Bob Shepard and Al Viola. Research accomplishments have gained national recognition over the years. Barry Karger, Arthur Halpern and Mary Ondrechen became Sloan Fellows and

Bill Giessen recently received the Hume-Rothery Award of the American Institute of Mining, Minerals and Metallurgical Engineers. Barry Karger is also the recipient of the 1990 ACS Award in Analytical Chemistry, the Del Nogare Award in Chromatography, and the Tswett Medal of the U.S.S.R. Academy of Sciences.

Northeastern chemists have been active participants in American Chemical Society affairs, both nationally and locally. The Northeastern Section has benefitted from the activities of Bob Shepard, and Tom Gilbert as Chairman, John Neumeyer and Al Viola who, among others, have served as Councilors, Alternate Councilors and members of various committees. David Howell deserves special recognition for his efforts as the Section's Treasurer (1970-1973) and Secretary (1988-1991), and as editor of the *NUCLEUS* (1967-1970). Bill Cass was Secretary of the Division of Polymer Chemistry, Karl Weiss served twice as ACS Tour Speaker, and he and Geoff Davies participated in national task

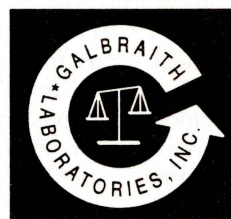
forces and committees devoted to educational and industrial-academic cooperation matters.

William M. Reiff, an inorganic chemist who is well-known for his work in solid state and coordination chemistry, has just assumed leadership of the department. He faces formidable challenges as this unit, like its counterparts elsewhere, is vulnerable to the effects of enrollment shifts and declining student interest in science and technology in general, and chemistry in particular. In chemistry there are currently more PhD's awarded annually (about 12) than undergraduate degrees. At the same time, there are strengths to draw upon, notably a history of innovation and effective collaborative efforts that can help the department adapt to changing emphases in chemical education and research.

Acknowledgement. Dave Howell has kindly allowed me to benefit from his keen memory regarding departmental and ACS Section matters, and his ability to locate some of the information used in this article. ◇

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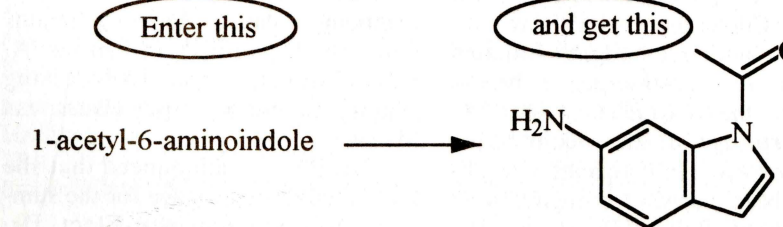
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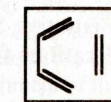
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Board of Directors

Condensed Minutes,
Meeting of May 13, 1993

Officer's Reports:

Chairman's Report: Dr. Phillips reviewed the calendar of section activities for the year. Dr. Phillips asked for volunteers to act as tellers in the current election.

Treasurer's Report: Dr. Piper's report of the Section funds for April was APPROVED.

Board of Trustees: Dr. Brauner reported that the finances of the Section funds continue to be sound. \$90,000 from the Consolidated Fund has been transferred into improved investments. The Treasurer complimented the Board of Trustees for their assiduity in constantly examining investments to optimize income for the programs of the Section.

Committee Reports:

Education: Dr. Hoffman indicated his enthusiasm for the upcoming evening's award program. At the recent Undergraduate Research Symposium 33 students from 11 colleges and universities presented posters on their work, including two from chemical engineering departments.

Publications: Dr. Heyn stated that the summer issue of the *NUCLEUS* will be 24 pages, with several articles intended for visitors of the NERM 23/Analytical Summer Conference. Advertising continues to be above budget estimates resulting in overall expenses below budget for the *NUCLEUS*, so far.

Summerthing: M. Chen reported for V. Wilcox that a full program of activities has been planned for August 14, to be held in the Bolton/Clinton area. The National Plastics Museum and the Nashoba Valley Winery will be sites for Summerthing activities with additional activities being under discussion. Costs to the Section and to individuals will be low. Details will be mailed to members at a later time.

Council Meeting

Chicago ACS Meeting,
August 25, 1993.

Voting Issues

This time there were no world-shaking issues to be voted on: mostly matters to fine-tune existing policies. The one item of substance on "industrial" and "non-industrial" Directors-at-Large was referred to the Council Policy Committee.

Meetings of Council - Recorded Vote

The language of the current Bylaw lacks clarity. The amendment provides specific means for taking a recorded vote at council meetings, including exactly how and when a recorded vote can be requested.

Director-at-Large Industrial and Director-at-Large Nonindustrial

The amendment seeks to assure that Directors-at-Large come from both industrial and non-industrial backgrounds by having separate slates for each of these categories. The Com-

Educational Task Force: Dr. Golen described the current activities of the Educational Task Force, including the receipt of the Duracel Grant, and the status of the proposal to the NSF.

Project SEED: Dr. Phillips noted that Millipore has requested three preceptors, and Boston University eight, so this project is proceeding successfully.

New Business: The Board VOTED to reappoint in their respective positions under the Board of Publications: A. Heyn (Editor), V. Gale (Advertising Manager) and K. Piper (Business Manager).

Dr. Phillips announced that she will be on medical leave for the summer and that Chairman-Elect, Dr. James Kaufman, will carry out her duties during this leave.

The post of Administrative Secretary is now open, applications for the position are invited.

Sue O'Connor will be on vacation May 22 to May 31. ◇

mittee on Nominations and Elections found technical difficulties with the language of the petition and requested that it be referred to the Council Policy Committee for further revision. The Council approved this referral.

C&EN Allocation - Finances

The present bylaw gives C&EN an allocation of 23% of dues collected, regardless of the actual cost of producing the number of copies sent to members. The amendment seeks to have the Board of Directors set the allocation on recommendation from the Committee on Budget and Finance. This amendment has no direct impact on the amount of dues, only on the way dues are used to support publication of C&EN. After rejecting a substantive floor amendment, the petition was approved.

Basic Allotments - Divisions

Some time ago, allotments to Local Sections were made dependent on the same factor by which dues are calculated from year to year, partly based on changes in the cost of Services index. Divisions, however, receive an base allotment of \$500 plus one dollar for each paid member of the Division. This formula has remained unchanged over the years. The petition seeks to apply the same index used in calculating the member dues for calculating the base divisional allotments and the additional allotment based on the membership count. The Council passed the amendment.

Reporting Date, Local Section Annual Reports

The petition seeks to delay the reporting date by two weeks, from February 1 to February 15 in order to allow sections to include complete financial data of the previous year which may not be available before February 1 from financial institutions. After approving "Urgent Action" in order to allow immediate action (rather than the usual delay until the following meeting), the petition was approved.

In addition, Votes were taken to approve changes in the Professional Employment Guidelines (approved), setting meeting registration fees for the 1994 meetings at \$ 180 (approved), changing the name of the Small Chem-

Member News ACS TV Satellite Program

The following have been named as recipients of ACS awards, to be presented at the San Diego meeting in March 1994:

William A. Klemperer, Harvard University, the *Peter Debye Award in Physical Chemistry*, sponsored by the DuPont Co.; **Stephen J. Lippard**, Mass. Inst. of Technology, the *Award for Distinguished Service in the Advancement of Inorganic Chemistry*; **Stuart L. Schreiber**, Harvard University, the *ACS Award for Creative Work in Synthetic Organic Chemistry*, sponsored by Aldrich Chemical Co.; **George M. Whitesides**, Harvard University, the *James Flack Norris Award in Physical Organic Chemistry*, sponsored by the Northeastern Section.

In addition, *Arthur C. Cope Scholar Awards* have been bestowed on **Eric N. Jacobsen** and **Gregory L. Verdine**, both of Harvard University. These awards will be presented at the 1994 Fall meeting of the ACS in Washington, D.C. ◇

ical Businesses Division to Chemical Marketing Division (approved) and approving a New Section, the Texas Coastal Bend Section and changing the name of the Southeast Kansas Section to "MO-KAN-OK, The Tristate Section" (approved).

The usual listing of NESACS votes is omitted, because all NESACS representatives voted as the Council actions indicated above. The only differences arose whether or not a floor amendment should be allowed, and on the name change of the Small Chemical Businesses Division, where some of your representatives approved, others disapproved. The Council voted to accept the name change to "Chemical Marketing Division".

The following Councilors and Alternate Councilors reported their council votes to the editor: E. Becker, M. Burgess, M. Chen, T. Gilbert, A. Heyn, E. Hopkins, T. Light, P. Samuel, M. Strem (Divisional Councilor), V. Wilcox. ◇

ACS TV Satellite Program

Teaching Introductory Chemistry

The Department of Chemistry at the University of Massachusetts Dartmouth will sponsor an American Chemical Society TV satellite seminar program entitled:

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For registering and information call Dr. James Golen, Department of Chemistry, University of Massachusetts Dartmouth, (508) 999-8245 ASAP.

This program will also be available at the University of Massachusetts Lowell. Call Dr. Ruth Tanner, (508) 934-3662 for information. ◇

Calendar continued from page 16

November 17

Dr. Phyllis R. Brown (Univ. Rhode Island) "Capillary Electrophoresis of Small Anions and Cations"
UMass Dartmouth, Rm. 305 Sci. & Engin. Bldg. (Group II)/4:00 pm

Prof. John Markley (Univ. of Wisconsin-Madison)
TBA
Brandeis Univ., Gerstenzang 122/4:00 pm

November 18

Dr. Sharon Wang (Biogen Corporation) "¹³C and ³¹P Nuclear Magnetic Resonance Studies of Protein and Metabolite Behavior in the Crowded Macromolecular Environment of the Ocular Lens"
Northeastern, Rm. 129 Hurtig Hall/4:00 pm

Prof. Jeffrey S. Moore (Univ. of Michigan) "Modular Construction of Molecular Crystals and Liquid Crystals"
Boston Coll., Merkert Chem. Ctr., Rm. 127/4:00 pm

Prof. Alexander Bradshaw (Fritz-Haber Inst.) "Structure and Bonding of Molecules Adsorbed on Metal Surfaces"
Harvard Univ., Rm. Mb-23/5:00 pm

November 22

Prof. Albert Padwa (Emory University) "The Rhodium Route Heterocycles"
Boston Univ., Sci. Ctr. Auditorium, SCI 107/4:00 pm

Prof. Todd Przybycien (RPI) "Mixing Effects in Protein Precipitation Processes"
Tufts Univ., Rm. 136, Sci. & Tech. Ctr., 4 Colby St., Medford/2:30 pm

November 29

Prof. David Tannor (Univ. of Notre Dame) "Design of Femtosecond Pulse Sequences to Control Photochemical Reactions"
Boston Univ., Sci. Ctr. Auditorium, SCI 107/4:00 pm

Prof. Robert McMahon (Univ. of Wisconsin - Madison) "C-H Bond Insertion Reactions to Reactive Organic and Organometallic Intermediates"
Harvard U., 12 Oxford St., Mb-23/4:15 pm

Prof. Robert Alberty (MIT) "Thermodynamics of Biochemical Reactions"
Brandeis Univ., Gerstenzang 122/4:00 pm

November 30

Prof. George Comsa (KFA Forschungszentrum, Julich, Germany) "Epitaxial Growth of Metallic Films Far From Equilibrium Using Molecular Beam and STM Techniques"
MIT, Rm. 2-105/4:00 pm

Notices for the Nucleus Calendar should be sent to:

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Historical Notes

by Edward R. Atkinson

The conclusion of the obituaries started in September, 1993.

Katherine E. (Menton) Wickenden, 78, died on January 19, 1993. She held the B.S. (1936) from Wellesley College, the M.S. (1964) from Bridgewater State College, and the M.S. (1979) from Simmons College. She taught chemistry for 50 years at Tabor Academy before retiring in 1986. She also served as chairwoman of the school's science department during the 1972-1980 period. In 1992 the Academy honored her for her years of loyalty, devotion, and superb teaching. At various times, Mrs. Wickenden also worked for the Sippican School in Marion, MA and for the Educational Testing Service in Princeton, NJ.

Paul T. Woodberry, 71, died on June 2, 1993. He was a Beverly native and received the B.S. in chemistry from Northeastern University in 1944. He served as a Navy lieutenant in the Pacific theater during World War II and remained active in the reserves for 18 years thereafter. He studied at the Colorado School of Mines, then was a research chemist at the Battelle Memorial Institute in Columbus, OH from 1947 to 1959. He joined Avco in Wilmington, MA and during the next five years developed a re-entry heat shield for the Apollo program. He subsequently was employed by IBM (1964-1966), P.R. Mallory (1966-1968), Western Electric (1968-1978), and the Wang Laboratories as chief safety engineer (1980-1991). He was president of the Massachusetts section of the American Electroplaters Society. His avocations were gardening, sailing, skiing, and scuba diving. ♦

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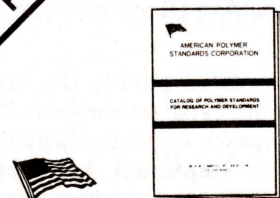
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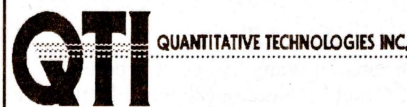
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Calendar

For additional information, call:

Boston College – (617) 552-3625
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Tufts University (Chemistry, Medford Campus) – (617) 627-3441
Tufts University (Chemical Eng., Medford Campus) – (617) 627-3900
Tufts University Health Science Campus – (617) 956-6867
UMass Dartmouth – (508) 999-8232
University of New Hampshire – (603) 862-1550

November 1

Prof. Eric Jacobsen (Harvard University)
“Enantioselective Catalysts for the Oxidation of Unfunctionalized Olefins”
Boston U., Sci. Ctr. Auditorium,
SCI 107/4:00 pm

Prof. Peter Lansbury (MIT)
“Model Systems for Protein Folding: Conformation-Directory Effects of Polar and Non-Polar Interactions”
Harvard U., 12 Oxford St., Mb-23/4:15 pm

Erin Johnson (MIT)
“Macromolecular Diffusion and Partitioning in Charged Gels”
Tufts University, Rm. 136, Sci. & Tech. Ctr., 4 Colby St., Medford/2:30 pm

November 2

Prof. Mitchio Okumura (CalTech)
“Mechanism of Stratospheric Chemical Reactions”
MIT, Rm. 2-105/4:00 pm

Prof. Elinor Adman (Univ. of Washington)
“Pseudoazurin and Nitrite Reductase: A Model for Electron Transfer”
Brandeis Univ., Gerstenzang 122/4:00 pm

November 3

Prof. Marie Kraftt (Florida State Univ.)
“Transition Metals in Organic Synthesis”
Boston Univ., Sci. Ctr. Auditorium,
SCI 107/4:00 pm

Prof. Mitchio Okumura (CalTech)
“Mechanisms of Reactions in the Stratosphere”
Harvard U., 12 Oxford St., Mb-23/4:00 pm

Dr. N. Dennis Chasteen (UNH)
“Iron-Oxidation Chemistry in the Iron Storage Protein Ferritin”
UMass Dartmouth, Rm. 305 Sci. & Engin. Bldg. (Group II)/4:00 pm

November 4

Prof. Marie Kraftt (Florida State Univ.)
“Transition Metals in Organic Synthesis”
Boston Coll., Merkert Chem. Ctr.,
Rm. 127/4:00 pm

November 8

Prof. Jiali Gao (SUNY Buffalo)
“Solvent Effects on Organic Reactions from the Combined Quantum Mechanical and Classical Approach”
Boston Univ. Sci. Ctr. Auditorium,
SCI 107/4:00 pm

Prof. Jack Howard (MIT)
“Combustion Synthesis of Fullerenes”
Tufts Univ., Rm. 136, Sci. & Tech. Ctr.,
4 Colby St., Medford/2:30 pm

November 9

Prof. Charles Lieber (Harvard University)
“Chemistry, Phenomenology, and Microscopic Mechanisms of High T Superconductivity”
MIT, Rm. 2-105/4:00 pm

November 10

Dr. Albert Robbat, Jr. (Tufts University)
“Development of Rapid (5 Min.) GC-MS Analysis for On-Site Organic Compounds Present at Hazardous Waste (Superfund) Sites”
UMass Dartmouth, Rm. 305 Sci. & Eng. Bldg. (Group II)/4:00 pm

Prof. Clifford Dykstra (Indiana U.-Purdue)
“What the HF-Dimer May Tell Us About Proteins, At Least In Theory”
Harvard U., 12 Oxford St., Mb-23/4:00 pm

November 11

Prof. Graham R. Fleming (U. of Chicago)
“Wave-Packet Studies of Reaction Dynamics in Solution”
Boston Coll., Merkert Chem. Ctr.,
Rm. 127/4:00 pm

November 15

Prof. Peter Lillya (UMass Amherst)
“Discoidal Liquid Crystals”
Boston Univ. Sci. Ctr. Auditorium,
SCI 107/4:00 pm

Prof. Peter Gray (Gonville & Caius Coll.)
“Autocatalysis and the Speed of Isothermal Chemical Waves”
Brandeis Univ., Gerstenzang 122/4:00 pm

November 16

The New England Section of the Electrochemical Society Presents Dr. Mildren Dresselhaus (MIT)
“Intercalation Science and Applications to Fullerenes”
The Cottage Crest Restaurant, 610 Trapelo Rd., Waltham, MA; Social Hour: 5:30 pm; Dinner: 6:30 pm; Presentation: 8 pm. For dinner reservations, call Prof. John Reardon at (617) 287-6155

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