

# THE NUCLEUS

January 1996

*Of the Northeastern Section of the American Chemical Society*

Vol. LXXIV, No. 5

## Monthly Meeting

*Geoffrey Davies talks  
on Humic Substances*

## From Your Chairman

*Greetings by  
Patricia Samuel*

## 1995 Nobel Laureate

*In Chemistry for pioneers  
on stratospheric ozone,  
Mario Nolina featured*

## Health and Safety

*Chemical Hygiene Officers  
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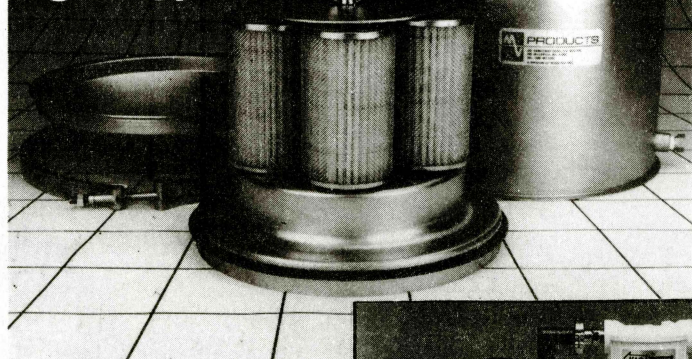
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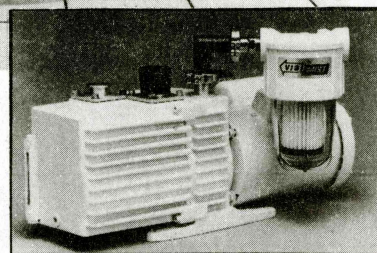
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**Cover:** Patricia L. Samuel, your 1996 Chairman  
 (photo: Boston University Photo Services)

**Deadlines:** March 1996 issue: January 19, 1996

## THE NUCLEUS

Dedicated to the Memory of James Flack Norris  
 Published monthly from September to May by the Northeastern Section of the American Chemical Society, Inc.



The Nucleus is distributed to the members of the Northeastern Section of the American Chemical Society, to the secretaries of the Local Sections, and to editors of all local publications. Forms close for advertising on the 1st of the month of the preceding issue. Text must be received by the editor six weeks before the date of issue.

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## From the New Chairman

by Patricia L. Samuel

**Greetings to you all and best wishes for a happy and productive new year!** I look forward to serving you as Chair of the Northeastern Section.

My overarching goal for the section in 1996 is increased member involvement. We are a large section with members in both eastern Massachusetts and New Hampshire. The work of the section is carried out by our committees and by the Board of Directors. But only a small fraction of our several thousand members participate in activities beyond reading the *NUCLEUS*. Some of you, I know, cannot do any more than you are doing already. But for those who have some time, whether a little or a lot, there is work to be done in the service of the profession of chemistry.

This work comes in all sizes and flavors. There are well-defined tasks and those that are open-ended, one-shot projects, and continuing activities. For instance, the Hospitality Committee is responsible for planning the physical details of our monthly meetings and greeting members and guests at each one. Many committees, such as Public Service and the Chemistry Edu-

cation Committees plan and execute events which occur less frequently. How can you get involved? Call me or send e-mail (see p. 3) or call the section office. In the February *NUCLEUS* you will find a list of all the committees and their heads. Many hands make light work.

I would also appreciate hearing *your* ideas of what the section should be doing. There is plenty of room for new ideas, and potentially many folks to carry them out.

To reach our goal of increased member involvement requires good communication within the section. Our primary means, in addition to the telephone, is the excellent newsletter which you are now reading. We can be very proud of the *NUCLEUS* and I wish to thank our editor, Arno Heyn, the editorial staff, and the Board of Publications for making it a high-quality publication. To complement the *NUCLEUS* we are exploring ways of establishing a home page for NESACS on the world wide web. This will not only enhance communication among NESACS members but also help to bring our section to the attention of ACS members across the country; as well as to anyone with access to the web.

Watch for a wider geographical distribution of NESACS events in 1996. I look forward to working with you and meeting you at activities around the section. Together we can make our fine section even better. ♦

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## Board of Directors

*NOTE: Board meetings are held on the Monthly Meeting day at 4:30 p.m. Section members are invited to attend*

**Notes of Meeting of September 21, 1995** (At the National Plastics Center and Museum in Leominster)

### Officer's Reports:

**Chairman:** Ms. Wilcox announced that the recent amendments to the constitution of the Section have been approved by the ACS.

**Chairman-Elect:** Dr. Samuel stated that the Central Mass. Section had been invited to the evening meeting. She also announced speakers for

*continued on page 11*

### WANT MORE ARTICLES?

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## Monthly Meeting

*The 776th Meeting of the Northeastern Section of the American Chemical Society.*

Thursday, January 11, 1996  
Wellesley College, Wellesley, Mass.

**5:30** Social hour, Davis Dining Hall

**6:30** Dinner

**8:00** Evening Meeting, Rm. 277, Science Center  
Dr. Patricia Samuel, Chairman,  
Northeastern Section, presiding  
Dr. Geoffrey Davies, Northeastern University  
*New Insights into Humic Substances*

Refreshments will be served after the program.

Dinner reservations should be made no later than noon, January 4. Please call or fax Marilou Cashman at (800) 872-2054. Reservations not cancelled at least 24 hours in advance must be paid. Members, \$25.00; Non-members, \$28.00; Retirees, \$15.00; 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 on campus.

*Next meeting: February 8, 1996 at Curry College, Milton, Mass.: Dr. Amir Hoveyda, Boston College, will speak on "Asymmetric Catalysis: Mechanism, Design and Applications to Synthesis." 5:30 Social hour and dinner, 8:00 evening meeting.*

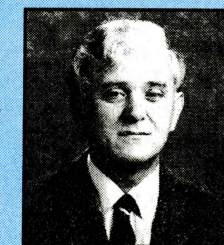


Photo: J.D. Levine,  
Northeastern University

## Biography

Geoffrey Davies received the B.Sc. and Ph.D. degrees from Birmingham University, England. He studied the pathways of very fast solution reactions in research positions at Brandeis University, Brookhaven National Laboratory, and the University of Kent, England. He joined the faculty of Northeastern University in 1971. He has taught undergraduate and graduate courses in general and inorganic chemistry, chemical kinetics, inorganic spectroscopy and modern analytical methods. He especially enjoys teaching freshmen and has twice received the Northeastern University Excellence in Teaching Award. He edits the "Cooperative Education" feature in *J. Chem. Ed.* and "Forensic Science" for the ACS.

He has been recognized for his work in inorganic synthesis, materials and environmental science, and catalyzed reactions of small molecules like oxygen. Work with colleagues from Egypt uncovered large families of new heteropolymetallic complexes that have many material and catalyst applications. He has stabilized coal-derived liquid fuels and is active in studies of polymer biodegradation.

Dr. Davies is a consultant for government agencies, professional organizations, and industries. He was awarded an honorary Doctor of Science degree by Birmingham University in 1988 and the Certificate of Honour by Alexandria University in 1989. He is a Matthews Distinguished University Professor at Northeastern and was elected a Fellow of the Royal Society of Chemistry in 1995. ♦

## Abstract

We are interested in the adsorptive and other properties of humic substances (HS), the familiar brown or black organic polymers in animals, compost, live plants, soils and sediments. Biomass that contains HS or is easily composted enables soil creation, improvement and remediation. HS are water retainers, buffers, selective solute and metal absorbents, and system regulators, but understanding HS functions needs better knowledge of their structures.

A subset of HS called humic acids (HA, average  $\langle M_w \rangle$  ca 12 to >100 kDa) are insoluble in water below pH 8. HA contain carboxyl, carbonyl, phenol and quinone functional groups in known amounts and ratios that agree very well from sample to sample. This information leads to a proposed HA building block with some interesting properties. It appears that any reasonable HA building block is polyfunctional. Hence, HS primary and higher structures are more complicated than those of proteins and nucleic acids.

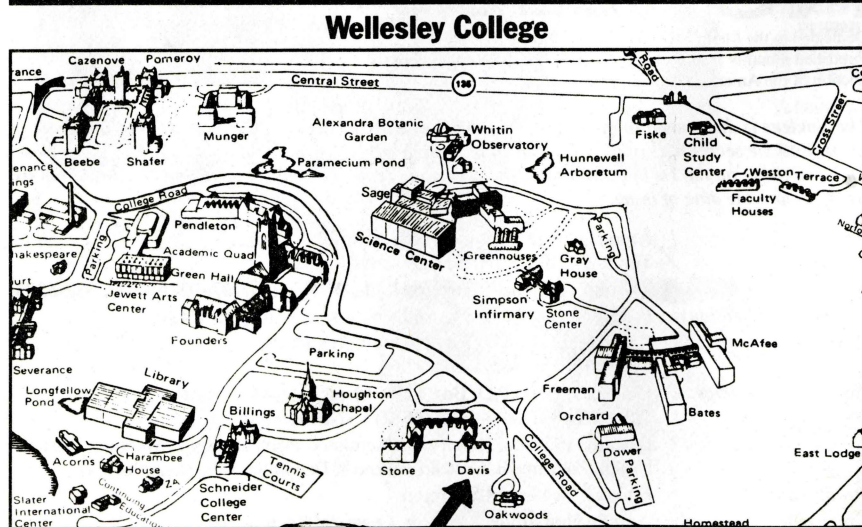
HA molecules are fully extended at high pH because of their surface negative charge, but protonation of their carboxylate and phenolate groups at lower pH causes aggregation to give HA "particles." Data for adsorption of nucleic acid constituents on compost derived HA particles indicate at least three adsorption sites, each with its own distinct solute selectivity. The data indicate smart HA polymers that can create new sites as a result of primary solute adsorption. ♦

## Grants-in-Aid

### Awarded to Undergraduates

Grants-in-aid of \$250 each have been awarded by the Education Committee to four undergraduates. These grants will enable them to attend the ACS National Meeting in New Orleans, Louisiana, and present papers at the Undergraduate

*continued on 8*



left to Wellesley Coll. Club

## Norris Award Address

A report of the talk given by Michael P. Doyle, Trinity University, San Antonio, Tex., upon receipt of the 1995 James Flack Norris Award for Excellence in Teaching Chemistry.

Reported by M. Simon

Professor Doyle has had a distinguished career most notable for encouraging chemical research and publication at the undergraduate level in his teaching at Hope College and Trinity University. In his talk he decried the current drop-off in undergraduate research, a likely result of the attacks on the use of undergraduate research in the curriculum.

He cited a television program, *60 Minutes*, in which Leslie Stahl at a northern Arizona university mourned

that great scientists and philosophers are "Distinguished Professors", i.e. they no longer teach the students. He reported that Ernest Boyer of the Carnegie Foundation has argued that there is a conflict between teaching and research which had led to a single model of scholarship. Status is awarded to the researcher and the student loses the benefit of great teaching. Too much time is devoted to gaining research support and doing research at the expense of teaching. Teaching should be limited to activity not including research and should have equivalent status.

Doyle rejected Boyer's argument as a damaging concept. He regards it as a veiled attack on science, and an idea which shows a lack of understanding of the role of research in good teaching. He mentioned a *J. Chem. Ed.* article in 1924 in which W.H. Packer of Johns Hopkins University said that teaching and research should be kept separate. Teachers do not make good researchers, and are considered inferior

to researchers. Packer advised that good teachers be given the same recognition as good researchers. Harry Holmes of Oberlin College replied to Packer that he was promulgating a "dangerous doctrine", and cited Remsen whose career at Johns Hopkins included teaching undergraduates, at the same time carrying out his research.

Doyle believes that research adds to teaching, refreshes the teachers and excites the students. He noted a paper, by Philip Abelson in *Science* in the 80's, castigating the teaching of obsolete material which defrauds the students. He cited the experience of small undergraduate schools such as Hope or Juanita or Trinity U. which supply more future Ph.D.'s than large institutions, such as Johns Hopkins or Fordham. The reason he alleged for the large number of students being oriented to research in these small colleges is that the professors do not have time other than in the summer to do their research, and therefore seek

student help during the summer. The students become involved and continue their projects throughout the college year. The publication of their results in established journals removes any feeling of inadequacy, any thought that research is beyond their capabilities.

Doyle founded the Council on Undergraduate Research; its newsletter became a journal, and he has published a directory of institutions offering undergraduate research opportunities. He reported that this has attracted highly qualified faculty to make careers at undergraduate schools.

The concept of undergraduate research had built up so that by 1986 when John Stevens at the University of North Carolina held a conference on that subject, 450 attended from thirty states and 250 students spoke. The following conference, at Trinity U. had 1100 attendees and 800 students spoke. The conference at Union had 1500 attendees. Doyle opined that undergraduate research is the best of what is happening in undergraduate education.

Support for undergraduate research has grown with grants by the Research Corporation, the ACS Petroleum Research Fund, the NSF and many business corporations. Locally, Polaroid Corporation has had a record of encouraging undergraduate research, for example, teaming up with NSF to sponsor work at Brandeis University. The picture is clouded, however, by a drop in faculty requests for grants for undergraduate research. In the medical section of the NIH such proposals have dropped 50% in the past five years. Doyle wondered whether this was the result of Boyer's attack.

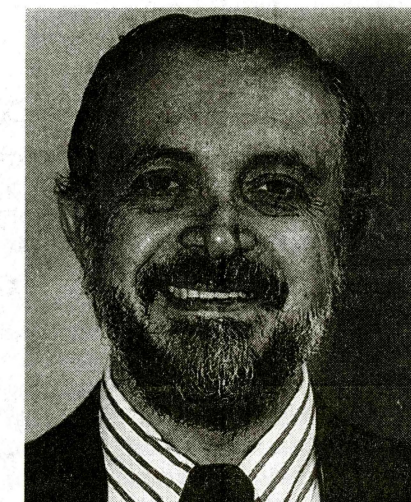
Doyle feels that discovery in science is an important part of education, and would like to see research introduced even into high school chemistry laboratories. He echoed Roald Hofmann's injunction that the public be taught the lure and dynamics of research. He left no doubt about where he stood in the attacks on undergraduate research which he had described. ◇

## 1995 Chemistry Nobel Laureate

M.I.T.'s **Mario Molina** Named 1995 Chemistry Nobel Laureate for Ozone Depletion Studies by C.E. Kolb, Center for Chemical and Environmental Physics, Aerodyne Research, Inc., Billerica, Mass.

Mario J. Molina, Martin Professor of Environmental Sciences in the Department of Earth, Atmosphere and Planetary Sciences and the Department of Chemistry at M.I.T., is a co-recipient of the 1995 Nobel Prize for Chemistry. He shares this year's prize, awarded for studies of free radical catalytic cycles which deplete the stratospheric ozone layer, with F. Sherwood Rowland of the Chemistry Department at the University of California at Irvine and Paul J. Crutzen, Director of the Department of Atmospheric Chemistry at the Max Planck Institute for Chemistry in Mainz, Germany. Mario has been a professor at M.I.T. and a member of the Northeastern Section of the ACS since 1989. He and Rowland were also co-recipients of the Section's first Esselen Award for chemistry in the public interest in 1987.

Mario, a native of Mexico, earned a Chemical Engineering degree from the Universidad Nacional Autonoma de Mexico in 1965 and started postgraduate studies in polymerization kinetics at the University of Freiburg in Germany, interrupted by a stint of teaching at his alma mater. In 1968 he moved on to the University of California at Berkeley where he earned a Ph.D. in physical chemistry, studying chemical laser kinetics with George Pimentel. After a post-doctoral appointment at Berkeley, Mario took a second post-doctoral appointment at Irvine from 1973 to 1975. There he collaborated with Rowland to assess the threat that atomic chlorine free radicals, Cl and associated chlorine oxide radicals, ClO, (Cl reacts with O<sub>3</sub> to form ClO) could catalytically destroy a significant portion of the stratospheric ozone layer which protects the biosphere from very harmful levels of UV-B (280-315 nm) solar radiation. Their work led to the Montreal Protocol, first world-wide interna-

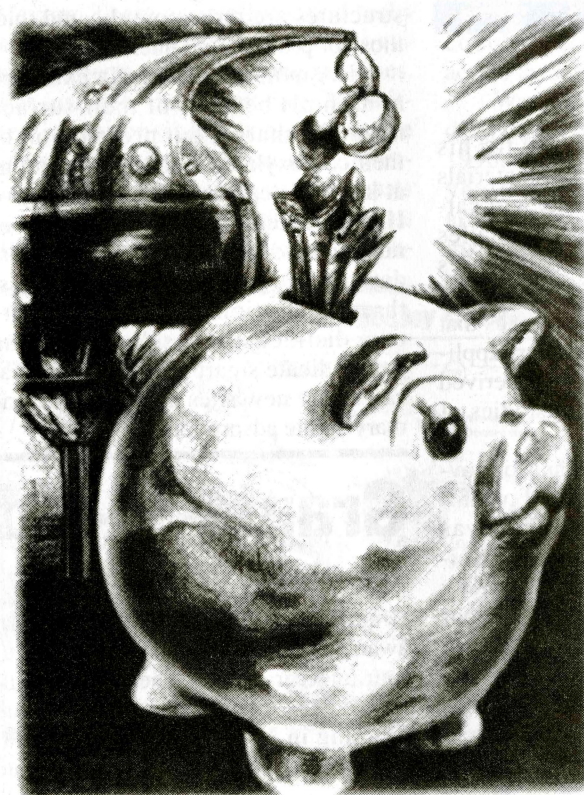


tional treaty which banned industrial activity to protect the environment.

The original Rowland and Molina work on this topic was published in 1974 and achieved great acceptance among atmospheric chemists (if not from many industrial chemists and the CFC industry). Paul Crutzen had shown in 1970 how NO and NO<sub>2</sub> free radicals, photochemically produced in the stratosphere from nitrous oxide, N<sub>2</sub>O, could also trigger effective catalytic cycles which destroy large amounts of stratospheric ozone. Crutzen's work, along with a 1971 paper by Harold Johnston at Berkeley, had triggered a new round of research on stratospheric ozone and helped discourage the Nixon administration from proceeding with the development of a fleet of supersonic transport aircraft (which would have released large amounts of exhaust NO and NO<sub>2</sub> directly into the atmosphere). (For a more detailed account of the atmospheric chemistry discovered by Crutzen, Row and Molina, as well as key discoveries by M. McElroy and S. Wofsy at Harvard, see: *Stratospheric Ozone Depletion I. Freezing out Freons*® in the December 1991 *NUCLEUS*.)

After completing his post-doctoral work at Irvine, Mario joined the Chemistry Department faculty there and stayed until 1982 when he moved to the Jet Propulsion Laboratory (J.P.L.) at

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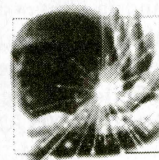
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## Nobel Laureate

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Caltech as a Senior Research Scientist. In 1985, Joe Farman and co-workers of the British Antarctic Survey announced their discovery of the Antarctic Ozone Hole. This dramatic continental size hole in the ozone layer formed during the austral spring was far more dramatic and at a lower altitude than the Cl/CIO catalyzed ozone destruction originally predicted by Rowland and Molina. It soon became apparent that heterogeneous chemical reactions on acid ice crystals in the very cold polar winter helped produce far higher levels of chlorine oxide free radicals than the original theory, based on gas phase chemistry alone, had forecast. Mario's lab was among the first to demonstrate the surprising efficiency of these critical reactions on cold ice surfaces. In addition, Mario and his wife and colleague, Luisa, who is also a Berkeley trained physical chemist, were the first to recognize that a weakly bound dimer of ClO (ClOOC1), formed under polar

stratospheric conditions, led to a new and efficient catalytic ozone destruction cycle at the lower stratospheric altitudes characteristic of the ozone hole. (For more detail on the chemistry of polar ozone depletion, including critical airborne measurements indicating chlorine catalytic cycles in ozone loss by Jim Anderson and colleagues at Harvard, see *Stratospheric Ozone Depletion II. Holes at the Poles* in the January 1992 *NUCLEUS*.)

Mario's research in atmospheric chemistry and his role in successfully advocating international control of ozone depleting substances have led to a wide range of honors which preceded his Noble Prize. In addition to the Esseen Award in 1987, noted above, he won the Tyler Energy and Ecology Award in 1983, the Science and Technology Achievement Award of the Society of Hispanic Professional Engineers in 1983, the A.A.A.S. Newcombe-Cleveland Prize in 1987-88, NASA's Medal for Exceptional Scientific Achievement in 1989, the United Nations Environmental Programme Global 500 Award

in 1989, the Orange County A.C.S. Service through Chemistry Award in 1989, and was named a Pew Scholar on Conservation and Environment (1990-92). He was elected a member of the National Academy of Sciences in 1993 and the Academia Mexicana de Ignieria in 1994. Since 1994 he has also served on President Clinton's Committee of Advisors on Science and Technology.

Since joining M.I.T. in 1989, Mario and Luisa have continued laboratory studies of atmospheric chemical kinetics and have added new studies on the thermodynamics and nucleation kinetics of stratospheric acid/water aerosol particles characteristic of both polar stratospheric clouds and the predominantly sulfate aerosols found at lower altitudes. Mario is also very active in counseling Hispanic students and helping to develop environmental science and engineering studies at M.I.T. He and Luisa reside in Lexington with their son Filipe who is a freshman at Brown University. Mario, who is both a gentle man and a gentleman, is also a surprisingly aggressive and effective tennis player when he finds the time and a free court. ◇

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## Grants-in-Aid

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Research Poster Session in the Division of Chemical Education on Monday, March 25, 1996. Matching funds have been committed by their institutions to support the travel of the students.

Sheena Kiley, Boston University (Profs. Alfred Prock and Warren P. Giering), "Exploration of Stereoselective Asymmetric Hydrosilylation Reactions Through the Quantitative Analysis of Ligand Effects (QALE)," Casey C. McComas, Boston College (Prof. Lawrence T. Scott), Benzocorannulene. Novel Synthesis and Properties of a New Bowl-Shaped Fullerene Subunit," George A. Moniz, University of Massachusetts-Dartmouth (Prof. Gerald B. Hammond), "Synthesis of a New Aminogluthimide Derivative," and Roya Nakhgevan, Northeastern University and Wellesley College (Prof. Patricia A. Mabrouk), "Pegylation and Purification of Cytochrome P-450." ◇

## Nominations

### 1996 James Flack Norris Award *Aula Laudis*

Nominations are being received for the 1996 James Flack Norris Award for Outstanding Achievement in the Teaching of Chemistry. The Norris Award, one of the oldest awards given by a Section of the American Chemical Society, is presented annually by the Northeastern Section. The Award consists of a certificate and an honorarium of \$ 3000. Nominees must have served with special distinction as teachers of chemistry at any level: Secondary school; college and/or graduate school. Since 1951 awardees have included eminent and less-widely-known but equally effective teachers at all levels. The awardee for 1995 was Professor Michael P. Doyle of Trinity University, San Antonio, Texas.

Nominations for 1996 will be received until April 15, 1996. The nominating material must be limited to 30 pages and focus specifically on the nominee's contribution to and effectiveness in teaching chemistry as distinguished from research. These qualities are demonstrated by a condensed curriculum vitae as a portion of a nominating letter which, in turn, is supported by as many seconding letters as are necessary to convey the nominee's qualification for the award. Some seconding letters may show the impact of the nominee's teaching in inspiring colleagues and students toward an active life in chemistry and/or related sciences. Other seconding letters may attest to the influence of the nominee's other activities in chemical education, such as textbooks, journal articles, or other professional activity at the national level. Materials should be of a standard 8 1/2 by 11-inch size for binding by the committee but should not include books or reprints.

1996 nominating material should be sent before April 15, 1996 to Dr. K.C. Swallow, Department of Chemistry, Merrimack College, Turnpike Street, North Andover, MA 01845. Internet address: kswallow@merrimack.edu

Since 1985, the Northeastern Section has annually honored teachers of Chemistry at the secondary level from our region by choosing about five each year for selection to AULA LAUDIS. This is an honorary society designed to reward teachers who have shown unusual skill in the classroom in any of several different ways:

- they may have served their colleagues by active involvement in teacher groups, conferences, etc., such as service to NEACT.
- they may have served their schools for many years and are now in retirement.
- their students may have performed well in interscholastic chemistry competitions such as the Avery-Ash-down exam, or Science Olympics.

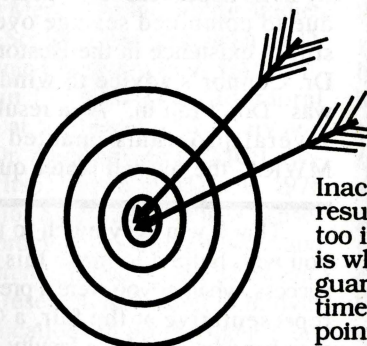
d. they may have pioneered in using new curriculum developments.

The awardees are invited to the awards dinner hosted by NESACS in the spring, at which they are given a plaque and certificate. There are no dues or obligations for membership in Aula Laudis. It is strictly an honor society.

The selection committee invites nomination of names for consideration from any source. If you would like to suggest a name, please submit a short (one page) summary of the nominee's relevant accomplishments. By February 15, 1996 nominations are to be sent to:

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# National Chemistry Week Events

## Undergraduate Day

by Patricia Samuel, Co-Organizer

On Saturday, 4 November 1995, 141 students from 22 New England and eastern New York schools attended the Fourth Annual ACS Northeast Regional Undergraduate Day, sponsored by NESACS and hosted by the Boston University Chemistry Department and Chemia, the B.U. Student Affiliate Chapter. The program included technical talks, career information, workshops on resumé writing and doing hands-on chemistry with children, and a graduate school and industrial fair. The purpose of this day is to allow undergraduates to hear and meet chemists from across the broad spectrum of our profession.

The keynote address on polymeric materials was given by Valerie Wilcox, Executive Director of the National Plastics Center and Museum and 1995 NESACS Chairman. The polymer theme was continued by Randy Meiowitz of Waters Corporation. Arlene Light, who runs the NESACS employment service with her husband Ted, spoke to the students on employment assistance provided by the ACS and gave some valuable tips on resumé writing and interviewing. The Lights also reviewed individual resúmes for students during the afternoon. In two sessions before and after lunch students could choose a topic: a technical talk on molecular supercollisions by Amy Mullin, or the chemistry of Alzheimer's disease by Jonathan Lee, chemistry faculty members at Boston University; advice on choosing a graduate school by Warren Giering of Boston University; a Student Affiliates Roundtable led by Patricia Samuel; or the workshop on chemistry with children, conducted twice by James Golen of the University of Massachusetts-Dartmouth. The Graduate School and Industrial Fair was of great interest to the students and attracted representatives from 14 graduate schools and companies.

## Water Quality Issues in the Metropolitan Boston Area

Reported by David Billo

Report of the National Chemistry Week Symposium at Boston University on Nov. 1, 1995

"Water Quality Issues in the Metropolitan Boston Area" a symposium at Boston University moderated by **Dr. Gary Robinson** of Aerodyne Corporation of Billerica, Massachusetts, was one of several events sponsored by the Northeastern Section during National Chemistry Week. Dr. Robinson introduced this evening program by explaining that "citizens who eat fish, drink water, swim, and pay taxes owe it to themselves to understand the management of water quality."

**Dr. Michael Connor**, Director of the Environmental Quality Department of the Massachusetts Water Resources Authority (MWRA) reviewed for the audience the water quality of Boston Harbor and the several watersheds that flow into the harbor. The largest watershed, the Charles River, was described as having good water quality in its upper reaches. Unfortunately, due to combined sewage overflows still in existence in the Boston basin, Dr. Connor's advice to windsurfers was "Don't fall in." As a result of the several programs enacted by the MWRA, the overall water quality in

Thank you very much to those of you who helped to make this event a success, whether you were a presenter, a representative at the fair, a Chemia member who worked, a faculty member who brought students, or a student attendee. Undergraduates are the seed corn of our profession. We would love to have more industrial representatives at next year's Undergraduate Day, as well as continued support from academic participants. If you would like to help with this event next year, please contact me by e-mail at "psamuel@chem.bu.edu" or via the section office. ◇

Boston Harbor is believed to be better now than at any time since the beginning of the century. As the sewage and sludge loading into Boston Harbor is reduced by the new Deer Island treatment plant, the MWRA will be able to investigate the sources and control methods for other smaller sources of harbor pollution.

**Professor Philip Gschwend** of MIT presented research into the migration of organic and inorganic contaminants into the Aberjona River watershed in Woburn, Massachusetts. The research may someday provide answers to the high number of leukemia cases brought to light in Woburn in the 1970's and 80's. Researchers have theorized that contaminated well water from wells located adjacent to the Aberjona River may have caused this cluster of leukemia cases.

Levels of arsenic in the parts per thousand range have been found in samples from leather tanning waste piles found in the Industriplex Superfund site located along the Aberjona River. Core samples of river sediment collected from downstream locations show historical "blips" of arsenic contamination. Dating of the sediments indicate that significant releases of arsenic occurred in 1963 and 1971. Professor Gschwend's group at MIT also used tracers to simulate the transport of toluene and diphenylsulfone released into the river from the Industriplex area. Propane was used as a tracer for measuring the volatilization from the river. Salt was used to measure downstream dilution effects.

**Dr. Matthew Liebman** of the U.S. Environmental Protection Agency Massachusetts Bays Program discussed environmental issues in Boston Harbor and Massachusetts Bays. Dr. Liebman described a study performed by the Massachusetts Bays Program of the effect of sediment contamination on living organisms. The study looked at three bays representative of the range of conditions found in Massachusetts: Salem, Boston, and Wellfleet Harbors. Three measures of the effect of sediments on the bays were used: pore water toxicity, chemical

effect, and bottom dweller or "benthic" diversity. The results of the study included the finding of some of the highest chromium levels in the country in the sediments of Salem Harbor. Wellfleet Harbor, which was considered the most pristine in this study, had a measurement station with the highest degradation of a benthic system of any of the three harbors. The unexpected Wellfleet finding suggests that a cause for the decrease in diversity in benthic organisms has not yet been determined.

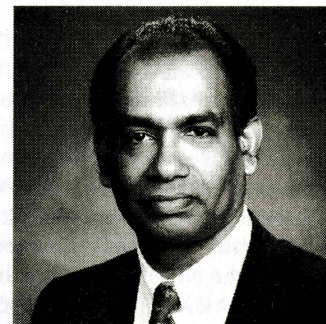
The Massachusetts Bays Program has just recently completed a Comprehensive Coastal Management Plan to assist Massachusetts cities and towns manage estuaries. The management plan is currently in the public review phase and will begin to be implemented in the near future.

**Dr. Warren Lyman** of the Industrial and Hazardous Waste section of Camp Dresser and McKee (CDM), Cambridge, Massachusetts presented a discussion of groundwater remediation technologies. The EPA has estimated that in the U.S. there are 500,000 hazardous waste sites of all types. Many of these sites include contaminated groundwater. The traditional method of dealing with contaminated groundwater creates complex and hugely expensive treatment systems. Dr. Lyman contended that the best use of cleanup funds may not be to clean every contaminated groundwater site with traditional methods that have drinking water as a goal.

Dr. Lyman discussed emerging technologies for the treatment of groundwater. These included soil vapor extraction, air sparging, zero valent metal treatment walls, and bioremediation. In addition to improved technical solutions, changes in regulations could also put site cleanup money to better use. Proposals such as containment instead of cleanup strategies, less strict cleanup goals, and the recognition that the remediation of some sites is technically impractical would shift dollars to sites that pose real health risks to human health and the environment. ◇

# Member News

K.M. Abraham



Kuzhikalail M. Abraham of Needham, Mass. has received the Research Award of the Battery Division of the Electrochemical Society for outstanding research on Primary and Secondary Lithium Batteries. The award was presented to him at the society's annual meeting in Chicago on October 10, 1995.

K.M. Abraham received B.Sc and M.Sc degrees in chemistry from Kerala University in India in 1965 and 1967, respectively. He is the recipient of the Gold Medal from his Alma Mater for first rank in the B.Sc. examination and a National Merit Scholarship for studies at the M.Sc. level. He received a Ph.D. in Inorganic Chemistry from Tufts University in 1973. After postdoctoral research at Vanderbilt University and M.I.T., Dr. Abraham joined EIC Laboratories, Inc., Norwood, Mass. in 1976 as a Senior Scientist, and was subsequently promoted to Group Leader and to his current position of Vice President.

His research has resulted in over 100 publications in professional journals, a number of patents and numerous presentations in national and international meetings. Dr. Abraham is a member of the Electrochemical Society, the ACS, the AAAS, the New York Academy of Sciences, the Materials Research Society and Sigma Xi. He serves as a member of the Editorial Board of the *Journal of Power Sources*. ◇

# Board of Directors

continued from page 4

the remainder of the fall program: Dr. Esther Hopkins for the October meeting and a joint meeting with the Medicinal Chemistry Group in December.

**Secretary:** Dr. Hearn detailed plans for two future meetings on education, scheduled with the help of William Gray (ACS, State and Local Government Affairs Office) on Sept. 29 with State Senator David Magnani (Chair, Committee on Education, Arts and Humanities, Mass. State Senate), and with Thomas W. Noonan (Office for the Advancement of Mathematic and Science, Mass. Dept. of Education).

**Treasurer:** Dr. Piper presented the current budget report which was ACCEPTED.

**Trustees:** Dr. Handrick reported that there had been a notable increase in the net asset value of the trust funds and that the economizing measures this year have helped greatly.

**Archivist:** Dr. Simon reported that he has received a good response to his request for historical materials.

## Committee Reports:

**Board of Publications:** Speaking for the board, Dr. Heyn indicated that advertising revenue is well ahead of budget and that the *NUCLEUS* should finish the year on target. A Section Directory is to be published after our member records have been updated by National. It is expected to be self-sustaining.

**Education:** Dr. Samuel reported that arrangements for the annual Undergraduate Day on November 4 are in place.

**Professional Relations:** Dr. Light stated that there will be an Employment Clearing House at the October Meeting.

**Project SEED:** Dr. Phillips reported that Project SEED programs at Boston Univ. and Northeastern Univ. have been very successful this summer.

**Public Service:** On Nov. 1 a public symposium on water quality will be held at B.U.

**Old Business:** It was the sense of the Board that A. Rosner should be re-appointed as Auditor.

continued on page 13

# Health and Safety On My Mind

## Chemical Hygiene Officer Certification?

by Mary Ann Solstad

In January of 1991 the Laboratory Standard under OSHA came into existence. Every laboratory, or group of laboratories, was to have a Chemical Hygiene Plan, or CHP, under control of a Chemical Hygiene Officer, or CHO. ACS is now proposing a program for certification of these CHOs.

Essentially, this was to be a written plan, tailored to your own institution or company, to assure knowledge of health risks in your lab, of safe work practices, and of equipment to minimize those risks.

In suggesting safe laboratory practices OSHA relied on "Prudent Practices for Handling Hazardous Chemicals in Laboratories" by the National Research Council, 1981. The frequently updated "Safety in the Academic Laboratory" by members of the ACS Committee on Chemical Safety has also been a resource, though not specifically referenced by OSHA in the standard.

In some institutions people already involved in laboratory safety were appointed as CHO and found that only small modifications of their existing plans were necessary to bring them into OSHA compliance. In others, ill-prepared or uninterested persons were put into these positions. Some were working bench chemists, others were in teaching or supervisory positions, while a few came from careers outside of the laboratory. Often the CHO post has been combined with that of hazardous waste manager, or institutional safety officer, concerned with many safety hazards unconnected to the laboratory.

Often the position is being held by a Certified Industrial Hygienist (CIH). For those of you who think that an industrial hygienist only takes air samples, a review of those fields he/she is required to be conversant in might be enlightening: chemistry, toxicology, physiology, measurement and assessment of industrial and laboratory ventilation, heat stress, ergonomics, noise

control, safety management, government regulations, and personal protection equipment are some of the subjects in which they are tested after six years of professional work experience. Recently, indoor air quality assessments have been added to the above topics; not surprising, since the primary focus of the CIH's work is to assure a healthy work environment. Certification in this field is accomplished by resumé, academic and work records, and examinations totalling sixteen hours. Re-certification every six years is maintained by providing confirmation of continuing professional activities and regular attendance at a variety of approved workshops, courses, and meetings.

If you think that this makes us generalists, you're often right—many CIH's are just that, while others have worked in only one or two niches in their professional life.

You can see how many Certified Industrial Hygienists are an ideal fit for the position of Chemical Hygiene Officer. Some others need some reinforcement of their chemical skills and knowledge. Many gaps in knowledge are likely to exist for the reluctant chemist thrust into the position of CHO. Those may include ventilation basics, OSHA and EPA regulations, toxicology, safety management and personal protective equipment (PPE) principles.

For some time now, Ned Heindel, Past President of the ACS, has shepherded a plan past and through several ACS committees for ACS sponsorship of a mechanism of certifying CHO's. I was present at two groups when Dr. Heindel proposed such a plan: the Executive Committee of the Division of Chemical Health and Safety, and the Joint Board-Council Committee on Chemical Safety. As were many industrial hygienists/chemists present, I was intrigued by the idea, and wondered if there was a perceived need for this spe-

cial certification. After talking – off the record – to some ACS staff familiar with the project, I took it upon myself to apprise the American Board of Industrial Hygiene of ACS efforts and unofficially seek their brotherly cooperation. This was done at the Professional Conference on Industrial Hygiene, held in San Diego last October, where I met with Chairman Terry Thedell and Executive Director Lynn O'Donnell, of ABIH, the CIH certifying body.

Some years back the ACS took under its wing a group which had the mission to certify or register clinical chemists. The current proposal would expand that group or board of registration to set up a mechanism for certifying CHOs. Present CHOs would suggest both topics and specific questions for the exam. The ACS cannot itself be the certifying body for legal reasons. Also, it is necessary that certification not be limited to ACS members. This proposal was discussed by the ACS Board of Directors at their December meeting.

I think that such a certifying body would alert chemists to areas where they need increased background, and validate those who are unsure of their ability to perform the tasks asked of a CHO. Also, such a board might be willing to excuse Certified Industrial Hygienists for most of the examination after reviewing, and perhaps updating, their strictly chemical knowledge.

I expect that this item may be on the agenda for the Spring National ACS Meeting. If you have any thoughts on the subject, I would think that Dr. Heindel would like to hear them. ◇

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## Board of Directors

continued from page 11

**New Business:** The Board charged the Nominating Committee with designating suitable candidates to fill the positions of directors-at-large created by the recent amendments.

### Notes of Meeting of October 12, 1995

#### Officer's Reports:

**Chairman-Elect:** Dr. P. Samuel indicated that the remaining programs of the year were in place.

**Secretary:** Dr. Hearn described the meeting on Sept. 29 with State Senator David Magnani and Dr. Tom Noonan (Mass Dept. of Ed., Office of the Advancement of Math. and Sci.), in the course of which these officials were made aware of education activities of the Section and its willingness to offer assistance.

**Treasurer:** Dr. Piper presented the budget report which was ACCEPTED.

**Trustees:** Dr. Handrick suggested that the Directors might consider increasing the amount of the Norris Award in Physical Organic Chemistry.

**Archivist:** Dr. M. Simon reported that the Section had received a Certificate of Excellence. He also stated that a site for the archives is still being sought.

#### Committee Reports:

**Board of Publications:** Dr. Heyn stated for the board that NUCLEUS finances continue to be in good shape with advertising revenue ahead of budget.

**Chemical Education:** Dr. M.Z. Hoffman reported on the plans for the upcoming Annual Undergraduate Day on Nov. 4 and other Chemistry Week activities. Two teachers had received Section funds to attend this year's Northeast Regional Meeting for which sent their thanks. A student from the Section participated in the National Chemistry Olympiad.

**Continuing Education:** Dr. Viola reported that Dr. Billo will offer a course at BC. "Microsoft Excel for Chemists" on Nov. 18.

**Medicinal Chemistry Group:** Dr. Singer described the upcoming Weinberg Symposium on Nov. 16 and the December joint meeting with the Section, at which Dr. A. Smith will be one of the speakers.

**Membership:** Dr. I. Hartman discussed the problems created by the untimeliness of member data received from National. She MOVED that the Section notify National to expedite using gender-free terminology in referring to leadership positions. PASSED.

**Nominating:** Dr. Kaufman indicated that the committee will submit names for filling the newly created director-at-large positions at the next meeting.

**Professional Relations:** Dr. Rubin indicated that tonight's meeting would feature Dr. E. Hopkins, speaking about "Chemists Becoming."

**Public Service:** The committee is sponsoring a major Water Quality Symposium on Nov. 1, featuring issues on water quality in the Boston area.

**New Business:** It was suggested that the NUCLEUS directions to the Henderson House be updated. ◇

## Solicited for Membership?

The staff of the ACS Department of Membership Activities apologizes to members who received an invitation to join.

ACS purchases scientific mailing lists for recruiting, but these lists may give a work address where the ACS files have a home address, or vice versa, thus defeating the computer cross-check which was designed to delete members' names. Similarly, changes in name (marriage) or spelling (e.g. addition or omission of middle initials) will defeat the cross-check.

If you've received an invitation to join, please return the invitation in the prepaid return envelope to correct the mailing lists. Include a note, stating that you are a member. ◇

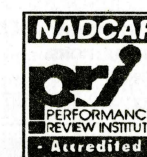
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## January 17

Dr. Shashi Kent Sharma  
(Bhopal Univ., India)  
“The Role of Hemagglutinin-33 Protein of  
*Clostridium botulinum* in Food Poisoning”  
UMass Dartmouth  
Sci. & Eng. Bldg., Rm. 305, at 4:00 pm

## January 23

Prof. Jon Kenny (Tufts Univ.)  
“*In Situ* Monitoring of Soil and  
Groundwater Using Lasers and  
Fiber Optics”  
Tufts University  
Rm. 104, Pearson Bldg., at 4:30 pm

## January 24

Dr. Farid Benayoud  
(Univ. de Paris-Sud, Orsay, France)  
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Blocks for Biological Targets”  
UMass Dartmouth  
Sci. & Eng. Bldg., Rm. 305, at 4:00 pm

## Notices for the Nucleus Calendar should be sent to:

Prof. Cathy Costello  
Mass Spectrometry Resource  
Dept. of Biophysics  
Boston Univ. Med. Ctr., R-806  
Boston, MA 02118-2394  
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# THE NUCLEUS

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