

# THE NUCLEUS

October 1995

Of the Northeastern Section of the American Chemical Society

Vol. LXXIV, No. 2

## Monthly Meeting

*Professional Relations Meeting,  
Hill Award, 50-year members*

## MCG Meeting

*Effects of Nucleotide Modification*

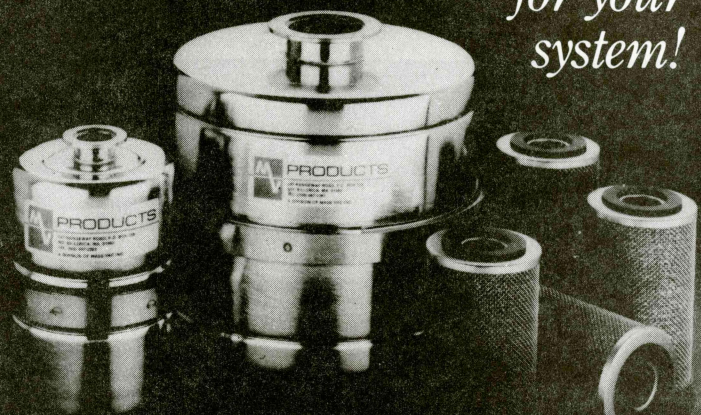
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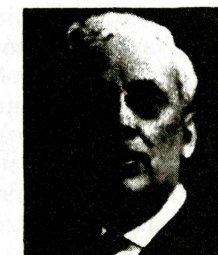
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**Cover:** Michael E. Strem, Henry A. Hill awardee

**Deadlines:** December Issue: October 23, 1995

## THE NUCLEUS

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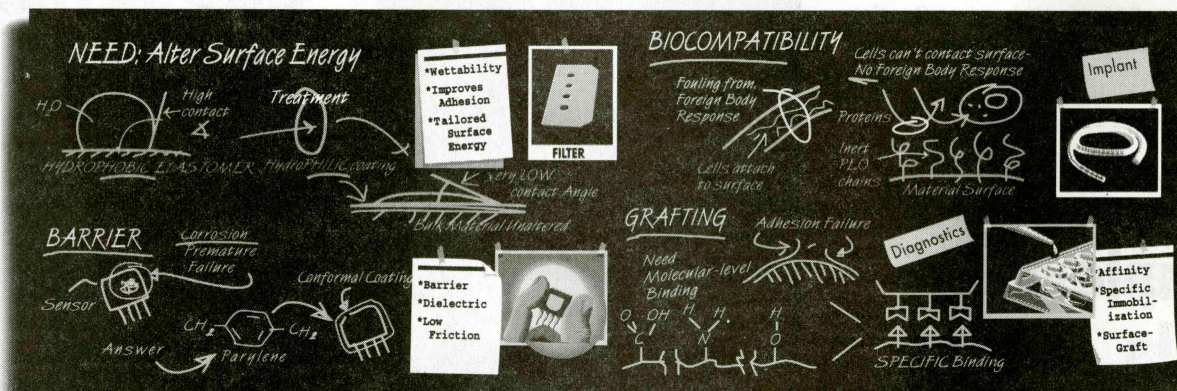
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## Our 1995 Henry A. Hill Awardee

Michael E. Strem

Michael E. Strem attended Brown University where he received an A.B. degree in 1958, and the University of Pittsburgh where he earned an M.S., and Ph.D. in 1964.

For Strem, 1964 was a busy year: not only did he complete his doctorate, but also founded Strem Chemicals, Inc., a company for the synthesis of specialty research chemicals. More than 30 years later, he is still president of this internationally recognized company.

He has been a member of the A.C.S. since 1960, and an active member of the Northeastern Section since 1980. In 1989 he became chairman of the section. In that year the ACS Local Section Affairs Committee recognized the Northeastern Section as the outstanding large section.

This was just the beginning: Single-handedly Dr. Strem initiated the Corporate Associates Program. Currently 16 corporations within the section donate significant sums of money, increasing the section's ability to carry out many programs, not only for the membership, but for education awards, symposia, workshops, and public service programs, such as the Holiday Lectures. (Strem Chemicals contributed to the first Holiday Lecture.)

Dr. Strem has worked with several committees of the section, including the Board of Publications. He also was exhibits chairman of the Northeast Regional Meeting in 1993. During the year he was chairman, he took a personal interest in all standing committees, attending their meetings, listening, suggesting, and thus unifying the section's activities.

Although the Hill Award is specifically for service to the Northeastern Section, activity in national ACS activities honors the local section as well. Dr. Strem has served on at least seven national committees, including as chairman of the Task Force on Ethical

## The Henry A. Hill Award

*For distinguished service to the Northeastern Section*

The Henry A. Hill award was established in 1980 to honor the memory of Henry A. Hill, long-time member of the Northeastern Section, its Chairman, and a Director of the American Chemical Society and later its President. He died unexpectedly in 1979. ◇

## Directions

### Henderson House

Henderson House is located in Weston, Mass, just north of the Weston-Wellesley line.

**Going West on Route 30.** A little over a mile west of the intersection of Rtes. 128 and 30 and the Mass. Turnpike, take the hairpin left onto Oak Street ("Oak Street to Cliff Road" sign). Follow the road one mile to a stop sign. Continue 200 yards further, take the first right onto Westcliff Rd. and continue up the hill to Henderson House.

**Going West on Route 9.** Right after Rte. 9 passes under Rte. 16 in Wellesley Hills, just after the GULF station, take the sharp right turn onto Cliff Rd. Proceed north on Cliff Road for about 1/2 mile, just past the Wellesley/Weston line. Turn left onto Scotch Pine Rd. Bear right on the curves and follow the sign to Henderson House, which is on Westcliff Rd. on the left on top of the hill. ◇

Guidelines and as a member of the Task Force on Professional Employment Guidelines. He has been active in the Division of Small Chemical Businesses, serving as its councilor and chairman.

Dr. Strem and his wife Ann are the parents of two daughters, one recently graduated from Cornell University, the other is currently at Brown University. ◇

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## ACS Council Meeting

August 23, 1995, Chicago, Ill.

The Northeastern Section was represented by nine Councilors/Alternate Councilors (two short of the representation we are entitled to).

The several officers gave reports which will be in C&E News, but also spoke about additional items which occurred since the written reports had been submitted. Paul Walter, the outgoing Chairman of the Board of Trustees reported that negotiations are underway with the Smithsonian concerning the Science Exhibit co-sponsored by the ACS. A good deal of unhappiness has been voiced by scientists who have seen the exhibit concerning the unbalanced tone of the exhibit which emphasizes the problems with technology and science and slights the contributions made. Time will tell whether these discussions with the Smithsonian

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## Monthly Meeting

*The 773rd Meeting of the Northeastern Section of the American Chemical Society*

**Professional Relations Meeting  
The Henry A. Hill Award  
Honoring 50-year Members**

Thursday, October 12, 1995

Henderson House, Weston, MA

**5:00-6:15** Information table staffed by the Committee for Employment Services. See p. 10 for additional information

**5:30** Social Hour

**6:15** Dinner

**7:30 Evening Meeting, Valerie Wilcox, presiding**  
Presentation of the Henry A. Hill Award to Michael E. Strem  
*Henry A. Hill* — Anthony Hill  
Introduction of the Award Recipient — Katie Stygall O'Sullivan  
Presentation of the Award — Valerie Wilcox  
Presentation of certificates to 50-year members

**8:00 Chemists Becoming: How our Society helps**  
Esther A.H. Hopkins, Mass. Dept. of Environmental Protection

Refreshments will be served after the program.

Dinner reservations should be made no later than noon, October 5. 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.

See directions on page 4.

*Next meeting: Thursday, November 9, 1995 at Framingham State College, Justin McCarthy Student Center. The James Flack Norris Award will be presented to Prof. Michael Doyle of Trinity University, San Antonio, Texas. Reception and dinner at 5:30, evening meeting at 8:00 p.m.*



## Biography

Esther Hopkins received a B.A. from Boston University, an M.S. from Howard University, and a Ph.D. in Biophysical Chemistry from Yale University and a J.D. at Suffolk University. She is a registered patent attorney. After a career at Polaroid Corp, she is now chief fiscal counsel in the Office of the General Counsel of the Massachusetts Department of Environmental Protection. She has been active in town government of the town of Framingham, Mass. She has held many offices in the Northeastern Section, including Chairman in 1983. For 25 years she has been a Councilor of this

## Abstract

**Chemists Becoming:  
How our Society helps**

The conduct, aims and qualities a career in chemistry entails, and the Career Services provided to members to help them start, maintain, and conclude that career with knowledge, and dignity. ◇

Section and has been on many committees of the national ACS, including the Committee of Professional Relations (Chairman 1987-9) and is currently on the Council Policy Committee. ◇

## Council Meeting

*continued from page 4*

staff will result in a more balanced presentation. He also mentioned that Chemical Abstracts is the leading innovator for science information services: SCN is the fastest growing information service and SciFinder simplifies Chemical Abstracts and journal searches greatly. (See p.13 of the September 1995 NUCLEUS).

In the absence of Dr. Crum because of illness, his report was presented by staff. ACS investment returns have been 11%, for the Petroleum ResearchFund 10.5%. The conversion of member data to a new computer system turned out to be much more involved than anticipated. Although no records have been lost, there has been a greater delay than anticipated. Joan Shields reported on the work of the Budget and Finance Committee. Results for 1995 are expected to be in the black by \$835,000 due to good results for CA services and good investment results. \$50,000 has been set aside for the Science Teachers Program of the Society Committee on Education for 1996.

Joseph Dixon reported that, as all publishers, the ACS faces a challenging future. Member subscriptions have remained flat, non-member and library subscriptions to ACS publications have decreased, paper prices have doubled over the last year and postage rates have increased. The subscription rates for ACS journals are still only about 2/3 of the rate of comparable commercial non-ACS chemistry journals. In order to control ACS journal costs, the number of pages will have to be cut: papers will have to be shorter, or fewer papers have to be published. In 1996 *Analyt. Chem. and Envir. Sci. & Technol.* will change formats to save paper. He spoke at length about electronic media as a substitute for some of the publication effort. For instance, the high cost of color printing in some of the ACS publications can be cut greatly if the delivery is via internet.

The Local Section Affairs Committee had announced earlier at the

*continued on page 8*

## MCG Meeting

Medicinal Chemistry  
Group Meeting  
Thursday, October 5, 1995

*The Effects of Nucleotide Modification on Structure, Binding and Activity*

Sheraton Tara Hotel, Newton, MA

3:00 p.m. Coffee and Refreshments

3:30 p.m. Dr. Larry W. McLaughlin, Boston College: *Probing the Cleavage Activity of the Hammerhead Ribozyme Using Analogue Complexes*

4:30 p.m. Dr. Sudhir Agrawal, Hybridon, Inc.: *Antisense Oligonucleotides as Drugs*

5:30 p.m. Social Hour

6:30 p.m. Dinner

8:00 p.m. Dr. Eric Kool, University of Rochester: *Improving the Properties of Nucleic Acids by Synthetic Modification*

Dinner reservations should be made no later than Monday, October 2. Please call Marilou Cashman at (800) 872-2054. Reservations not cancelled at least 24 hrs in advance must be paid. Members, \$24.00; Non-members, \$27.00; Students & Retirees \$14.00. THE PUBLIC IS INVITED. Anyone who needs special services or transportation, please call Marilou Cashman a few days in advance so suitable arrangements can be made. See directions below.

## Directions

**Sheraton Tara Hotel, Newton, Mass.**  
From Rte. 95/128 (North or South): Take Exit # 25. Follow signs for the Mass Turnpike East. Take turnpike exit #17 (Newton/Watertown). Head straight. At the second set of lights bear left following the sign for West Newton (Do not take the sharp left turn to the Mass Turnpike West). After about 400 ft, just after Applebees Restaurant turn left into the hotel parking lot.

From Rte. 93 (North or South of Boston): Head towards Boston, Follow signs to Mass. Turnpike West. Exit Turnpike at Exit #17 (Newton/Watertown). \*Go straight off exit following West Newton signs. About 400 ft. after the traffic light, just after Applebees Restaurant, turn left into hotel parking lot.

From Intown: Take Mass Turnpike West to Exit # 17, then proceed as at \* above. ◇

## Biographies

**Larry W. McLaughlin**

Ph.D. (Organic Chemistry) Univ. of Alberta, 1979. Group leader at the Max Planck Institut für Experimentelle Medizin, 1981-85. Asst. Prof. of Chemistry, Boston College, to Prof. of Chemistry. Current interests: The role of nucleic acids in biochemical processes involving recognition and catalysis.

**Sudhir Agrawal**

Ph. D. in Chemistry, Allahabad University, India (1980). Medical Research Council's Molecular Biology Laboratory, Cambridge (UK) with Dr. Michael Gait (1984), (work on solid phase oligonucleotide chemistry). Worcester Foundation for Experimental Biology, Shrewsbury, Mass. with Dr. Paul Zamecnik (1987-9), (antisense oligonucleotide based therapeutic approaches). Since 1990 he has led a team of scientists at Hybridon, Inc., Worcester, Mass. to understand various parameters of antisense oligonucleotides as therapeutic agents for AIDS and several other diseases. His current position is Senior Vice President of Discovery and Chief Scientific Officer. He has published over 115 scientific papers and has edited two books on oligonucleotide synthesis. He is on the editorial board of several research journals in his field.

**Eric T. Kool**

Ph.D. in Organic Chemistry, Columbia University (with Ronald Breslow, 1988). NIH Postdoctoral Fellow, California Inst. of Technology (with Prof. Peter B. Dervan 1988-90), studying triple helical DNA complexes. University of Rochester (1990-). Currently he is an Associate Professor and directs about 12 grad. students and postdoctoral associates. His research interests in bioorganic chemistry include the design of molecules which can recognize DNA and RNA sequence and structure, and of molecules which mimic biological functions. ◇

## Abstracts

**Probing the Cleavage Activity of the Hammerhead Ribozyme Using Analogue Complexes.**

Larry W. McLaughlin

The hammerhead ribozyme is a relatively short RNA sequence containing a catalytic domain capable of effecting RNA cleavage by a simple internal transesterification reaction. The complex can be formed from two sequences such that the cleavage of a "target" sequence by the ribozyme occurs *in trans*. We have probed the cleavage activity of this catalytically competent complex after the substitution of a series of nucleoside analogues into the conserved region of the hammerhead sequence. This approach has permitted, by what amounts to atom-directed mutagenesis, the identification of specific functional groups critical to the efficiency of the cleavage reaction. These functional groups, located on individual bases, carbohydrates, or internucleotide phosphates, may be involved in interactions critical for the stabilization of the transition state structure. The identified functional groups could be specific hydrogen bonding or metal coordinating sites, or they may function as general acids/bases to facilitate catalysis. In a related study, we have examined the activity of truncated sequences, those in which portions of the non-conserved complex have been replaced by simple non-nucleoside linkers in order to generate synthetically simpler catalysts that can maintain near native-like cleavage activity. We will describe our efforts to investigate the hammerhead ribozyme through the use of these various analogue complexes.

**Antisense Oligonucleotides as Drugs: A Novel Therapeutic Principle.**

Sudhir Agrawal

Antisense oligonucleotides are small synthetic pieces of single-stranded DNA. Their ability to selectively

inhibit gene expression led to the suggestion that they would be useful therapeutic agents. Gene expression is inhibited by hybridization of the oligonucleotide to sequences in the gene or the messenger RNA target by Watson-Crick base pairing, in which adenosine and thymidine, or guanine and cytidine interact through hydrogen bonding. These simple base pairing rules govern the interaction between the antisense oligonucleotide and the target nucleic acid, allowing the design of oligonucleotides to target any gene of a known sequence. One major advantage of this strategy over the use of conventional drugs is in the potential specificity of action of antisense oligonucleotides. Presently, a number of human clinical trials are ongoing using antisense oligonucleotides for viral infections and cancer.

The efficiency of an oligonucleotide to regulate gene expression in cell cultures depends on cellular uptake, stability towards nucleases and its affinity towards the target. However, for use *in vivo*, as therapeutic agents, oligonucleotides must have favorable pharmacokinetics, tissue disposition and elimination, pharmacological and immunological parameters and safety. Most of these properties are largely dependent on modifications of the internucleotide linkages. Studying various chemical modifications of oligonucleotides and their impact on these properties allows us to design a more potent antisense oligonucleotide as therapeutic agent more efficiently.

**Improving the Properties of Nucleic Acids by Synthetic Modification.**

Eric T. Kool

DNA molecules in nature serve both as recognition elements for binding specific proteins and nucleic acids, and as encoders of genetic information. Ways will be described in this talk in which these two functions can be altered or enhanced by making structural and topological changes in the DNA. A useful approach to increasing binding affinity and selectivity of a given ligand is to make

## Announcement

**Pediatric-Chemotherapy Drug Development Symposium**

Co-Sponsored by the Andrew H. Weinberg Memorial Fund and the Medicinal Chemistry Group

November 16, 1995, 2-6:30 p.m.

Jimmy Fund Bldg.  
35 Binney St., Boston, MA.

Moderator: H.E. Grier (Dana-Farber); Speakers: J.S. Weinberg *Opening Remarks*, B. Chabner (MGH) *New Drugs for Treating Pediatric Malignancies*, P. Ho (NCI) *Oncologic Drug Development within the Beltway: NCI and FDA Efforts*, C. Pratt (St. Jude's Children's Res. Hosp.) *The Clinical Evaluation of New Drugs in Pediatric Oncology*, N. Dean (ISIS Pharmaceuticals) *Antisense Oligonucleotides, from the Bench to the Clinic*.

*The full program, abstracts and bios will be in the November issue. Further information: Holcomb E. Grier, M.D., Dana-Farber Cancer Institute, (617) 632-3971*

**Contributions:** Andrew H. Weinberg Memorial Fund at Dana-Farber, c/o M.J. Rafferty, Director of Corporate Relations, Dana-Farber Cancer Institute, 377 Longwood Ave., Boston, MA 02215-5347. ◇

it more conformationally rigid. In this vein we describe new modes of DNA recognition which involve the use of two strands to bind one target DNA or RNA strand. Linking these strands can lead to dramatic increases in binding affinity and sequence selectivity as a result of added conformational rigidity. This has been documented in our laboratory by building cross-linked, cyclic, and bicyclic oligonucleotide derivatives, some of which bind complementary DNAs or RNAs with among the highest affinities and selectivities known. In addition, we have shown that topological modification of DNA structure can lead to interesting new ways of encoding genetic information. ◇

## IN MEMORIAM – HOWARD G. ROGERS

by Lloyd Taylor with Myron Simon

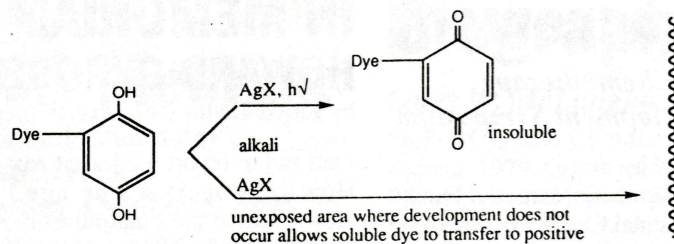
I am sad to report the recent passing of Howard Rogers at the age of 80. Howie was at the Polaroid Corporation for 50 years: long-time inventor, scientist, and Senior Vice President and Director of Research. I always thought of Howie as a super chemical inventor, whose ideas gave Polaroid chemists the opportunity to work on many different challenging areas of chemistry. Howard Rogers was named on 146 issued US patents. He made very original, significant contributions in the areas of instant photography, chemistry, optics, visual polarizers and highly birefringent polymers.

His key inventions are those relating to the color chemistry of instant photography. I consider his major invention to be the patent on dye-developers, the basis for instant color photography which is still being practiced world-wide.

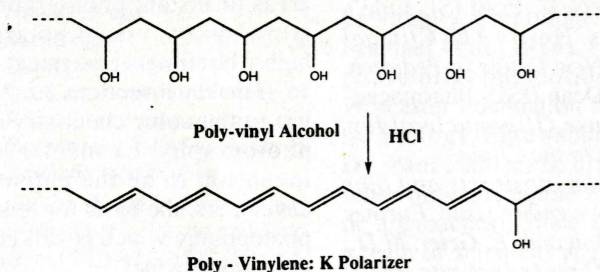
The concept of the *dye-developer* and its subsequent development in making instant color photography available to everyone is truly an example of an idea whose resultant product is novel, fun, and useful to all. The fundamental patent describing the invention of dye-developers is U.S., 2,893,606 (1961). Besides this pioneering patent, several others that were issued later were ruled valid, infringed and resulted in the largest damage award ever, to the Polaroid Corporation in the Polaroid vs. Kodak suit.

Another of Howie's chemical inventions goes back before WWII and is one of my favorites. He found he could dehydrate poly-vinyl alcohol to poly-vinylene which was an efficient, dichroic, visible light polarizer that could polarize out past 1 $\mu$ . This invention is used in both linear and circular polarizers, in liquid-crystal displays, in anti-glare screens for computer CRTs and in flat-panel displays. The chromophore is the same as that derived from poly-acetylene.

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Howard Rogers was the principal inventor of instant color photography which has produced millions of color photographs. He also conceived several other color processes, including a silver-catalyzed dye-release process, now also in commercial use. He created a polarizer, still in active use after over 50 years. He was my mentor, colleague, enthusiastic boss and friend for 37 years. I and my associates have been the recipients of countless "WIBNI" phone calls which usually started us on the quest for some seemingly impossible chemical imaging scheme. His opening line would be: "Wouldn't It Be Nice If" ...? It would be our opportunity to respond with chemistry that might fit the problem Howie created,



such as a rubber lens. Because his interests were so vast, Polaroid chemistry was never dull, repetitive or boring!

In 1993 he was the first recipient of the Edwin H. Land medal of the Society for Imaging Science and Technology. He has been a Fellow of the American Institute of Chemists since 1968. He also received the Weatherill Medal of the Franklin Institute in 1966 and the Achievement Award of the Industrial Research Institute in 1988. ◇

## Council Meeting

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meeting the winners of Section awards for the several categories of sections. Among the Large Sections, Philadelphia and Chicago shared the award, based on their 1994 annual reports.

There were two bylaw amendment petitions for action, both of them having to do with dues: Allowing members who have long-term family-care responsibilities a 50% reduction in dues for up to 3 years. Similarly, unemployed members who are seeking full-time employment to be given a waiver of dues for up to 2 years.

Both bylaws require a year of paid membership before these provisions can be invoked, but allow repeated applications after an intervening period as fully-paid members.

Both bylaws were passed overwhelmingly and will require approval by the Board of Directors before taking effect.

The Committee on Meetings and Expositions reported that as of Tuesday night there were 9,932 registrants for the meeting (the target is 10,500, which is likely to be met by the meeting's end). M&E has developed guidelines for informal presentations which are not on the official program. Questions had been raised in committee discussions of this topic concerning conflicts with the ACS bylaws, which will be examined. The committee recommended a \$10 increase in the registration fees for the 1996 national meetings, which after considerable discussion was narrowly APPROVED.

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## Council Meeting

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The Committee on Economic and Professional Affairs reported that there has been a sharp increase in unemployment of chemists in the 20-29 and 50-59 age ranges, although the overall unemployment among chemists is still quite low. At the Employment Clearing House 1588 job seekers were registered and 121 employers had 424 positions available.

The Divisional Activities Committee recommended the establishment of a Probationary Division of Chemical Toxicology, which was APPROVED. Similarly changes in the objects of the Division of Cellulose, Paper and Textiles were APPROVED.

The Constitution and Bylaws Committee, among others, approved the amendments to the constitution of the Northeastern Section which were approved by NESACS members at the March 1995 meeting which provide for Directors-at-Large. (See p.6 of the February 1995 NUCLEUS for the amendments).

The Committee on Environmental Improvement recommended that the ACS become an Advisory Class Member of the Chemical Industry Environmental Technology Project, to be submitted for action at the next Council meeting in New Orleans in March. The committee also promotes the application of strong science to industrial environmental problems. Such contacts with industry may have a beneficial effect for the ACS by promoting managements' favorable view of ACS membership by their professional chemists.

The International Activities Committee is seeking donors as well as suggestions for recipients of scientific instruments.

The Public Relations Committee presented samples of TV shorts (ave. length 1min. 47sec.) on topics of interest to the public and to be made available without charge. These brief topics are based on papers presented at ACS meetings which are of general interest.

## CHICKENS AND EGGS

Membership surveys show that you want more articles in the Nucleus. If you tell our advertisers that you saw their ad in the Nucleus, they will provide more financial support and this will allow us to add articles.

## Microsoft Excel for Chemists

A One-Day Workshop Presented by the Northeastern Section A.C.S. Committee on Continuing Education

Instructor: Prof. Joseph Billo, Boston College

Saturday, November 18, 1995. 8:30 AM - 4:00 PM, Boston College, 140 Commonwealth Ave., Chestnut Hill MA, Room 248, O'Neill Library

A hands-on workshop for Mac or PC users. Learn how to apply Microsoft Excel to chemical problems. Use spreadsheet calculations to analyze curved calibration charts, the spectra of mixtures, titration curves, complex chemical kinetics data, and much more. Create sophisticated spreadsheet formulas to perform multivariable regression analysis, matrix mathematics, numerical differentiation and integration. Produce customized X-Y charts. Automate spreadsheet tasks by recording simple macros, and write advanced macros to carry out complex, repetitive calculations automatically.

Program:

	A	B	C
1	8:30 - 9:00 AM		Registration and Coffee
2	9:00 - 10:30		Worksheet formulas. Charts.
3	10:30		Coffee break
4	10:45 - 12:00		Solving chemistry problems.
5	12:00		Lunch
6	1:00 - 2:30		Automating with macros.
7	2:30		Coffee break
8	2:45 - 4:00		Advanced applications.

Pre-registration required. Registration is limited to 28 attendees. Lunch available at BC dining facilities. Free parking.

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# Employment Aids

by Tanya Fogg (ACS), and T. and A. Light

The Employment Services Committee, a NESACS subcommittee of the Professional Relations Committee, will staff an information table during the Social Hour of the October meeting. The table will be staffed by subcommittee members Leon Rubin, Anthony Bevilacqua, Arlene and Truman Light. Consultation will be available to both seekers of positions and to employers. Consultation is available on resume preparation, and job-searching techniques. ACS literature aids will be available for distribution and the two videos "Career Transitions: Catalyst for Change," and "Formula for Success: Turning Job Leads into Gold" will be running.

The American Chemical Society has a long standing tradition of providing service to its members. One of these areas, employment aids, has grown tremendously over the last several decades.

Originally, in the form of classified ads, such as job listings in ACS journals; today, the service has expanded to providing members with a multitude of employment-related programs, services, and publications under the umbrella of the Department of Career Services. The Department of Career Services provides members with an extensive approach to employment and job search through three mediums: direct contact with employers, one-on-one career assistance, and information on employment trends and issues.

## Employment Clearing House (ECH)

The most popular service is the Employment Clearing House. It assists members with identifying and contacting employers and provides employers with a cost-effective and efficient medium of identifying scientific talent. Started in 1937, serving 20 members

and student affiliates: today, employment clearing houses are located at all national and regional meetings serving thousands of members and hundreds of employers per year. Another direct avenue to employers is the year-round Professional Data Bank (PDB) which puts job seekers and employers in touch with one another. This computerized registry matches members' qualifications to specific job requirements. Supplement these services with the **Employer Mailing List**, a listing of scientific employers throughout the U.S., and you have direct access to hundreds of employers, nationwide — year-round.

## Personal Assistance

Personal assistance in all aspects of professional and career development is also available via numerous programs and services: Through the Career Consultant Program, volunteer ACS members provide advice on resume preparation, job search, interview strategies, and career transitioning, as well as on-the-job employment issues. Mock Interview Sessions give the member a unique opportunity to practice interviewing skills and receive immediate feedback from chemical professionals, while the Resume Review and Career Assistance workshop allows members to review and discuss their resumes directly with chemists in the field. These workshops review successful resumes and approaches to gaining employment. Members may attend a recruiters' panel at any national meeting and gain insight into the hiring process and employment outlook as discussed by recruiters in industry. Many of these workshops are conducted at national and regional meetings and at local section meetings by request. Additionally, questions regarding salaries and any other employment concerns can be answered by ACS staff by calling 1-800-227-5558, press 9, 3, 2.

## Videotapes

For members who are unable to attend the workshops, information covered in these sessions has been reformatted into three videotapes, "Career Transitions: Catalyst for Change," "Formula for Success: Turning Job Leads Into

Gold," and "Developing the Right Picture: Resume Preparation" are available for purchase. A fourth videotape on interviewing will be available at the end of 1995.

## Publications

A myriad of published information on employment trends and issues (e.g., Current Trends, Tips on Resume Preparation, What a BS Chemist Should Look For In A Position) is produced by Career Services and are based on research and conversations with employers and chemical professionals.

## Electronic Access

Through the World Wide Web, ACS's home page defines the many programs and services available through the Department. The address for this directory is <http://amerchem.acs.org/>. Information can also be requested through the e-mail address: [careers@acs.org](mailto:careers@acs.org).

In an effort to provide members the knowledge and tools necessary to stay on top of changes in employment, the Department seeks to create and develop new programs and services that allow the member to maintain a professional edge. One effort in this direction is the computerization of the Employment Clearing House which has been tested at the national meeting in Chicago. By year end, the Professional Data Bank is expected to be on-line via the WEB. Employers may scan this ACS record in a search for qualified candidates selected from over 150 specialty fields and qualifications. Through an aggressive marketing campaign, we are working harder and harder to bring more employers into the network, particularly small companies because they do more hiring than either the large or medium size companies.

## New Programs

Obviously, careers services to members has come a long way since 1937. The ACS Board of Directors remains committed to providing programs and activities to facilitate the career development of chemical professionals (ACS Strategic Plan 1995-1997). In fact, the Board approved \$245,000 for new career programs for 1995-1996; specifically:

1. On-line employment databank expected by year end to provide job ads on-line, links to company home pages, and *situations wanted* to employers.

2. Development and implementation of local section career services program to provide services "at home" including efforts to help Local Section members network with area employers.

3. Career services for graduate students in the chemical sciences has expanded by increasing the number of career planning workshops offered on university campuses throughout the country. Over 20 universities have booked job searching and resume preparation programs.

4. A book on alternative careers reviewing at least 14 non-traditional career areas is being researched, to be available in early 1996.

5. An aggressive ad campaign in C&EN and other ACS journals to better inform members of available career assistance is an on-going project which began this year.

6. A one year experiment to offer ACS Short Courses at no cost to unem-

ployed members on a first-come, first-served basis, with no limit placed on the number of courses one member may take per year, is currently available. For more information on short courses call (202) 872-4508 or 1-800-227-5558.

ACS is dedicated to providing personal career assistance, information to help in career decision making, and direct contact with employers. Services have grown tremendously over 60 years and continues to grow. A full list and explanation of services is provided in the publication, "Your Ticket to a Brighter Future." Access to information is available through numerous venues:

Phone: 1-800-227-5558, press 9,3,2

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4:00pm Thursday, October 12

On the Molecular Mechanisms of Solar Energy Storage by the Other Photosynthetic System in Nature, Bacteriorhodopsin: The Proton Pump

4:00pm Friday, October 13

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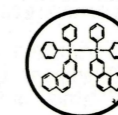
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# The Birth of Gas Chromatography in the USA

by Arno Heyn

In 1954 the Analytical Chemistry Gordon Conference, held in August at the New Hampton School in New Hampshire, was under the chairmanship of the late "Buck" Rogers<sup>1</sup>. When we arrived on Sunday afternoon and received the schedule, a rather distraught Englishman wondered why there was no slot for his talk. He had been sent over by Imperial Chemical Industries (ICI) in England where A.J.P. Martin's explorations into multi-stage separation processes (for which Martin and Syngge shared the 1952 Nobel Prize in Chemistry) had been adapted for use in their laboratories.

Ettre gives a good historical account in his review<sup>2</sup>. Column chromatography was well known by that time, but Martin had applied it to gas-liquid phase systems by coating a solid matrix with high-boiling organic liquids such that gases could percolate through a tube filled with this stationary phase. This had been done before the war by German chemists, but the war had interrupted their work. Martin first used titration to determine the quantity of volatile organic acids (and later bases) eluted from the column<sup>3</sup>, but better was their use of a sensitive detection device, a micro-scale gas-density balance, which, though sensitive, never became popular<sup>4</sup>.

Although thermal conductance detectors on a macro scale were well known, the miniaturization of these devices was carried out at ICI which made this process practical for laboratory use. ICI had written to the Gordon Conference office at the Univ. of Rhode Island that they wished to present their work at the conference. Somehow, the correspondence didn't reach Buck Rogers, and so there was no slot on the schedule. After some quick inquiries to make sure that Mr. Smythe (I think that was his name) was legitimate and knew what he was talk-

ing about, Buck asked the speaker for the Monday morning session to share the session, giving half the morning to Mr. Smythe's talk. Mr. Smythe described the process and the new miniaturized detector they had built and the results they obtained. Everybody pricked up their ears!

I am sure that of the many worthwhile presentations at the 1954 Analytical Chemistry Gordon Conference, this presentation by Mr. Smythe is the one still remembered by those who attended.

Until then, no commercial equipment for this new process of gas chromatography was available, so after the conference there was feverish activity in many labs to put together equipment for this new method. By spring 1955 the first commercial gas chromatograph systems became available in this country, using thermal conductance detectors: the Burrell Corp. Kromotog, and Perkin-Elmer's Mod. 154 Vapor Fractometer, followed a few weeks later by a gas chromatograph made by the Podbielniak Co.<sup>2</sup>

Later, the first US paper on modern gas chromatography presented at a national meeting was given at the 1954 Fall ACS meeting in New York, NY by chemists from Tennessee Eastman Co.<sup>5</sup> The chemists at ICI and Tennessee Eastman were running neck-to-neck!

We must therefore recognize Buck Rogers as the midwife at the birth of modern gas chromatography in the USA. ◇

<sup>1</sup>Obituary: The *NUCLEUS*, 70, No. 9, 4 (Summer 1992).

<sup>2</sup>L.S. Ettre, *J. Chromatogr.* 1975, 112, 1-26.

<sup>3</sup>A.T. James and A.J.P. Martin, *Biochem. J.*, 1952, 50, 679.

<sup>4</sup>A.T. James and A.J.P. Martin, *Brit. Med. Bull.* 1954, 10, 170-176.

<sup>5</sup>H.W. Patton, J.L. Lewis and W.I. Kaye (Tennessee Eastman Co.), *Anal. Chem.* 1955, 27, 170.

## Nominations

*Gustavus John Esselen Award*

The Esselen Award for Chemistry in the Public Interest is one of the most prestigious honors provided by the Northeastern Section of the American Chemical Society.

The award annually recognizes a chemist whose scientific and technical work has contributed to the public well-being and has thereby communicated positive values of the chemical profession. The significance of this work should have become apparent within five years preceding nomination and the Awardee shall be a living resident of the United States or Canada at the time of nomination.

There is no limitation to the field within chemistry: Thus, past awardees have worked in environmental chemistry, radiochemistry, steroid chemistry, ecological chemistry, biochemistry and medicinal chemistry.

The Award consists of a bronze medal and a sum of \$ 5,000. Travel expenses incidental to the conferring of this award will be reimbursed. The award is normally given in Cambridge, Massachusetts at the April meeting of the Northeastern Section. The Awardee will deliver an address on the subject of the work for which the honor is being conferred, or for work in progress which is also directed to chemistry in the public interest.

To Nominate a candidate please provide the names of two co-sponsors as well as a biography of the candidate, a description of the work which has been recognized as communicating the positive values of the chemistry profession, and copies of pertinent articles. Popular news and feature articles should be included as an indication of the public interest.

The Nomination deadline is November 1, 1995. Nominations and inquiries should be directed to Dr. Phyllis A. Brauner, 15 Benton St., Wellesley, MA 02181. Joint nominations are acceptable. The award recipient will be notified by February 1, 1996. ◇

## ACS News

*ACS Scholarships to Minority Science Students*

*From an ACS News Service Release*

The ACS has announced the selection of 201 African-American, Hispanic and American Indian students who will receive more than \$600,000 in scholarships for the 1995-96 school year. Over the next five years the ACS expects to provide a total of \$5 million to needy minority students with good academic records who plan to major in chemistry, biochemistry or chemical engineering.

Scholarships are renewable and are for up to \$2,500 each for freshmen and sophomores and \$5,000 each for juniors and seniors, up to a maximum of \$15,000 per student for the four years. These funds may be applied to tuition, books, supplies or lab fees and lodging.

Dorothy Rodman, administrator of the ACS Minority Scholars Program, said that the program is intended to "give students financial support and encourage their interest in the study of chemical sciences" and that "we want to help students replace their loans with scholarship money and reduce their need to engage in work-study programs."

About half of this year's minority scholars are college freshmen, a quarter sophomores and the rest juniors and seniors. Almost 57% are female. A little more than half of the students are African-American, about 40 percent Hispanic and 4 percent American Indian.

Through this scholarship program the ACS hopes to increase interest in and participation by minority students in the chemical sciences.

Students interested in applying for the 1996-7 academic year should contact Ms. Rodman at (202) 872-6250 or by mail, c/o American Chemical Society, 1155 16th St., NW, Washington, DC 20036. Applications for 1996-97 will be accepted any time until February 1996.

This program has been funded by the Board of Directors from funds other than member dues. ◇

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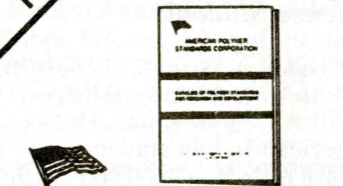
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## October 2

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“The Dynamics of 3-Dimensional Organizing Centers in BZ Reaction and Myocardial Tissue”  
Brandeis University  
Rm. 122, Gerstenzang at 4:00 pm

Prof. George Stephanopoulos (Dept. of Chem. Eng., MIT)  
“Development and Design of Batch Process with Environmental Considerations”  
Tufts University  
Rm. 136, STC Bldg. at 2:30 pm

## October 16

Prof. Richard J. Farris (UMass Amherst)  
“Experimental Stress Analysis Methods for Coating”  
Tufts University  
Rm. 136, STC Bldg. at 2:30 pm

## October 20 and 21

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lademan@mit.edu

## October 25

Dr. David R. Walt (Dept. of Chemistry, Tufts Univ.)  
“Fiber-Optic Chemical Sensors: Preparation and Applications”  
UMass Dartmouth  
Sci. & Eng. Bldg., Rm. 305 at 4:00 pm

## October 25

Prof. Andrew D. Hamilton (Dept. of Chem., Univ. of Pittsburgh)  
“The Design and Synthesis of Artificial Receptors for Complexation, Catalysis and Controlled Aggregation”  
Brandeis Univ.  
Rm. 122, Gerstenzang at 4:00 pm

Prof. Paul D. Liu (Biopure Corp., Boston)  
“Development of Biopharmaceutical Manufacturing Processes—Case Studies in Chromatography”  
Tufts University  
Rm. 136, STC Bldg. at 2:30 pm

## November 1

Dr. George Musrush (Dept. of Chemistry, George Mason Univ.)  
“Chemical and Environmental Changes Caused by a Half-Million Gallon Spill of Petroleum Product”  
UMass Dartmouth  
Sci. & Eng. Bldg., Rm. 305 at 4:00 pm

## November 6

Prof. Barbara E. Wyslouzil (WPI)  
“Binary Nucleation: Thermodynamics, Kinetics and Transients”  
Tufts University  
Rm. 136, STC Bldg. at 2:30 pm

# Announcement

The Northeastern Section of the ACS is sponsoring a public interest symposium on Water Quality in the Metropolitan Boston Area along with the Department of Chemistry, Boston University, to be held from 7 – 9 PM on Wednesday, November 1, 1995 in the George Sherman Union Conference Auditorium, Boston University, 775 Commonwealth Avenue, Boston. The speakers will be Professor Phil Gschwend, MIT, Dr. Mike Connor, MWRA, Dr. Matt Liebman, Mass Bays Program, and Dr. Warren Lyman, Camp, Dresser and McKee. The symposium will be free and open to the public. For further details, please contact Dr. Gary Robinson, (508) 663-9500 (ext. 222); email: robinson@aerodyne.com.

## November 8

Dr. Jeffrey R. Bocarsly (Dept. of Chem., UConn)  
“Understanding How Metallo-Enzymes Control Their Redox Potentials”  
UMass Dartmouth  
Sci. & Eng. Bldg., Rm. 305 at 4:00 pm

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

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Dept. of Biophysics  
Boston Univ. Med. Ctr., R-806  
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