

THE NUCLEUS

April 1990

Of the Northeastern Section of the American Chemical Society Vol. LXVIII, No. 7

National ACS Meeting Issue

Monthly Meeting

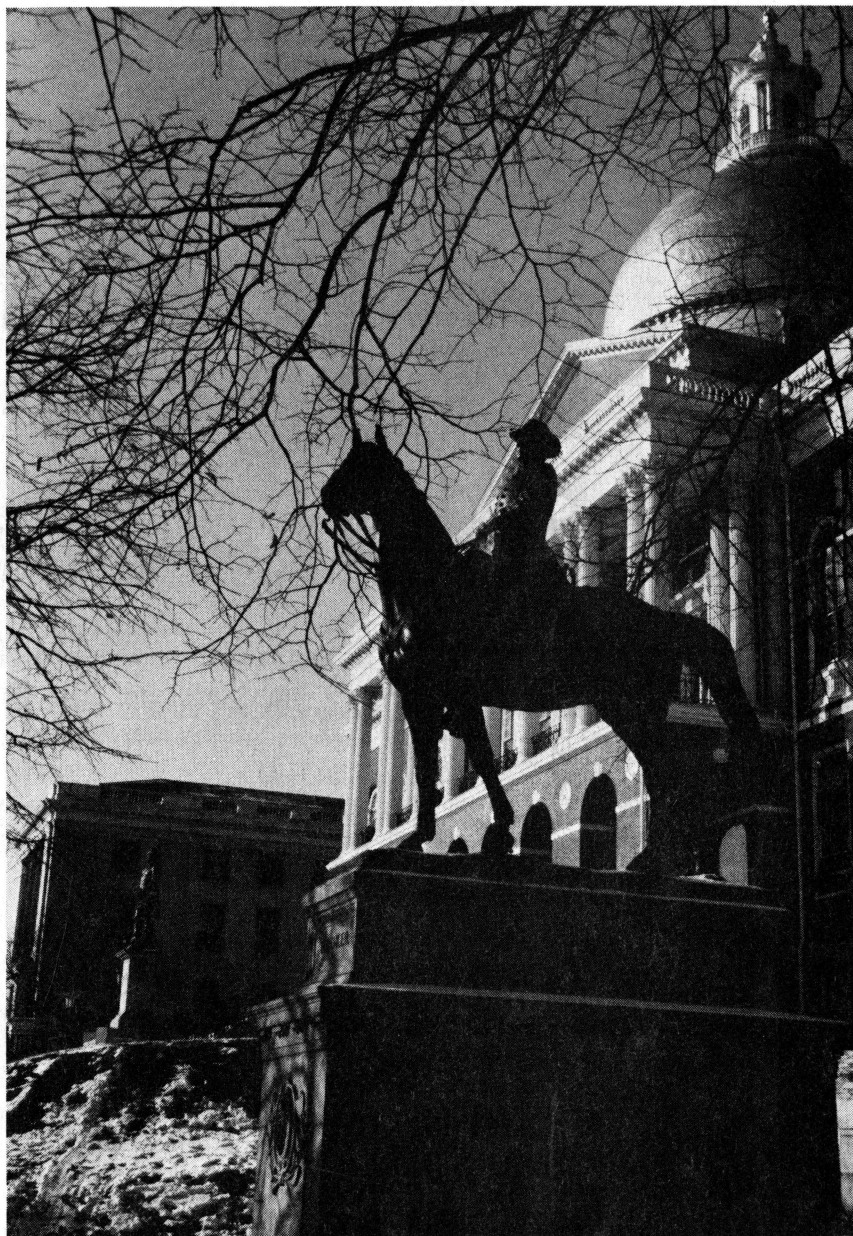
Presentation of the Gustavus John Esselen Award

Meeting Reports

January and February NESACS Meetings: AIDS and Tumor-Inhibiting Drugs

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Cover: Brig. Gen. Joseph Hooker, 1814-1879, guarding the State House, Boston. (Photo: M.S. Simon)

Deadlines: Summer Issue: May 25; October Issue: August 20.

THE NUCLEUS



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Editor: Arno Heyn, 21 Alexander Rd., Newton, MA 02161, Tel: 969-5712
Board of Publications: Catherine E. Costello (Chair), Michael E. Strem, Joseph A. Lima
Business Manager: Russell F. McCann, 10 Bassett St., Foxborough, MA 02035, Tel: 543-2155
Advertising Manager: Vincent J. Gale, 56 Bartlett Island Way, Marshfield, MA 02050, Tel: 837-0424
Associate Editor: Myron Simon, 20 Somerset Rd., West Newton, MA 02165
Contributing Editors: Edward Atkinson, History of Chemistry, Book Reviews; Maryann Solstad, Health; Bill Adams, Cartoons; Cynthia McGowan, Calendar.
Circulation Manager: Mark A. Druy, 38 Bonad Rd., Arlington, MA 02174, Tel: 641-1957
Science Reporting Coordinator: Adrienne S. Dey, 35 Laurel Dr., Needham, MA 02192, Tel: 449-9204
Proofreaders: G. Richard Handrick, Donald Rickter
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NEACT

SUMMER CONFERENCE

The New England Association of Chemistry Teachers announces its Fifty-Second Annual Summer Conference on August 13—17 at Fairfield University. The theme for this year's conference is

CHEMICAL INSTRUMENTATION

Theme speaker will be Dr. Theodore Williams of Wooster College, Wooster, Ohio. Dr. Williams' expertise has been recognized by many, including the Award for Excellence in Teaching which is cosponsored by the ACS Division of Analytical Chemistry and the DuPont Company.

Dr. John MacDonald of Fairfield University is chairing the program. For information about the program, facilities and fees, write to Dr. Aldo Pulito, 502 Ferry Rd., Orange, CT 06477. Registration: James Harris, 50 Dover Street, Keene, NH 03431.

SPRING 1990 MEETING OF THE 2YC₃

The Two-Year College Chemistry Conference (2YC₃) is holding its 108th meeting on Friday, April 20 and Saturday April 21, immediately preceding the ACS national meeting, at Middlesex Community College in Bedford. Two excellent half-day workshops of interest to teachers of science at all levels are: "Safe Handling and Legal Disposal of Laboratory Chemicals at Academic Institutions" and "How to Write a Successful Grant Proposal" with Dr. Theodore Reid of the NSF in Washington. Among the many demonstrations, videos and workshops are Microscale Organic/Inorganic Laboratory, the new ACS interactive videodisc, Doing Chemistry, and molecular modelling on workstations. Biotechnology, ethics in chemistry, nuclear technology, women in science, undergraduate research and teaching critical thinking are a few topics of the many presentations.

The 2YC₃ is part of the Division of Chemical Education of the ACS and focuses primarily on the unique needs and interests of two-year college chemistry faculty. A major goal is to enhance communication between two-year colleges, high schools, and four-year colleges, since more than half of the students who continue in chemistry begin their college studies in a two-year college. We hope many from high schools, two- and four-year schools will join us. High School faculty register free; others \$10.

Meal, hotel and travel information is available by calling Dorothy Stumpf or Mark Bollone at Middlesex Community College, Bedford, MA 01730 at 617-275-8910 x280 or x395.

April Meeting

The 724th Meeting of the Northeastern Section of the American Chemical Society

The Esselen Award Meeting

Thursday, April 5, 1990

Harvard University Faculty Club
20 Quincy Street, Cambridge

5:30 p.m. Preprandial Hour

6:15 p.m. Dinner

Harvard University Science Center
1 Oxford Street, Cambridge

8:00 p.m. Convening of the Award Meeting - E. Joseph Billo
The Esselen Award - William O. Foye
Gustavus John Esselen - Truman S. Light
Thomas J. Dougherty - Arthur S. Obermayer
Presentation of the Gustavus John Esselen Award to Professor Dougherty - Gustavus J. Esselen III
Award Address "Photodynamic Therapy for Treatment of Malignant Disease" - Thomas J. Dougherty

9:40 p.m. Reception for the Awardee

Dinner reservations should be made no later than March 26. Please call Mrs. Karen Piper at (508) 456-8227 or (800) 872-2054. Reservations not cancelled at least 24 hours in advance will be billed for the dinner price. Members, \$18.00; Non-members, \$20.00; Students and Retirees, \$5.00. Black tie optional. THE PUBLIC IS INVITED.

May Meeting: May 10, 1990; John M. Deutch (MIT) on U.S. Industrial Productivity, Simmons College.



modifiers, such as thromboxans. Current research is directed to development of photosensitizers with longer wavelength absorption (to increase penetration through tissue) and those without cutaneous retention to preclude generalized photosensitivity, a problem with Photofrin II. ◇

Biography

Thomas J. Dougherty

He received the B.S. from Canisius College in 1955 and a Ph.D. from Ohio State University in physical-organic chemistry (1959). From 1959 until 1970 he worked for E.I. duPont at Grand Island, NY and then became a Research Associate at Roswell Park Memorial Institute in Buffalo, NY. From 1971 to the present he has been in its Department of Radiation Medicine which he headed in 1975-1988.

Following several teaching assignments at the State University of New York at Buffalo he has been the Director of Graduate Research, Radiation Biology, from 1976 and became Associate Professor in 1980. From 1981 he has been President and Research Director of the Oncology Foundation of Buffalo.

Dr. Dougherty has received many awards including the Benjamin Franklin Award of the Benjamin Franklin Society (1981), the A. Ward Ford Medal of the American Society for Laser Medicine and Surgery (1982), the Inventor of the Year Award by the Western New York Patent Attorney Association (1988) and the Schoellkopf Award of the Western New York Section of the American Chemical Society (1988). He is a member of several medical societies in the fields of oncology, laser medicine and photobiology. He is also a member of the New York Academy of Sciences, the American Association for the Advancement of Science and the American Chemical Society.

His work has been published in over 65 publications and he has served as a reviewer for many journals in his field. ◇

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Abstract

"Photodynamic Therapy for Treatment of Malignant Disease"

Photodynamic therapy (PDT) involves the use of photo-activated drugs to destroy solid tumors in man. The essential elements are a photosensitizer which is retained relatively selectively in the tumor, in situ oxygen and a proper light source. Photofrin II, an oligomeric porphyrin currently is in final clinical trials for approval by health agencies around the world. These trials are randomized, controlled trials for treatment of cancers of the lung, esophagus or bladder. In addition, earlier studies have indicated the potential application of PDT to

cancers of the colon, rectum, stomach, eye, the female genital tract as well as tumors involving the skin. The photosensitizer is administered systemically and after serum clearance (2-4 days), the local tumors are irradiated with visible light (630 nm) delivered from a laser through fiber optics. With appropriate drug and light doses, complete tumor destruction is possible with a high therapeutic ratio. The basic steps include binding of the photosensitizer to sensitive tissue sites, production of singlet oxygen (the putative cytotoxic agent) through energy transfer from the excited photosensitizer and ultimate destruction of tumor. A strong vascular component has been recognized and may be a result of release of various prostaglandins and other inflammatory response

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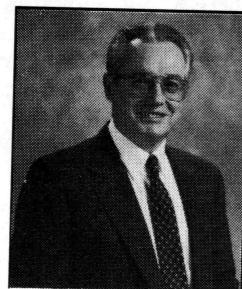
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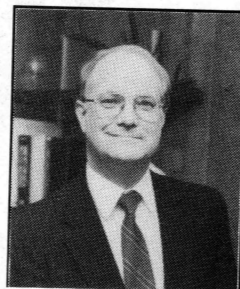
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Retroviral Proteases: Structure and Implications for Drug Design

from an address by Dr. Paula M.D. Fitzgerald. Reported by Kristin Swope

New work on the structure of retrovirus proteases, catalyst of a critical step in virus maturation, might lead to the development of a new drug for AIDS, said Paula Fitzgerald, Ph.D. at the January meeting of the NESACS.

Fitzgerald used X-ray crystallography to determine the structure of retrovirus proteases in their inhibited state. The information is being used at Merck Sharp and Dohme to develop new inhibitors to slow the infection of cells by the AIDS virus.

When the retrovirus HIV-1 infects the cell it copies its DNA into viral RNA. The host cell's DNA incorporates the viral RNA and begins to manufacture viral polyproteins

containing structural and enzyme proteins. These polyproteins are packaged into the new viruses which bud off from the host cell.

About 20 minutes after the new virus has separated from the cell a protease cleaves the polyprotein into individual proteins. Only after cleavage has occurred can the virus infect other cells.

"It is this process we hope to stop from occurring," said Fitzgerald, Research Fellow at Merck Sharp and Dohme. She hopes that understanding the structure of the protease will point the way to development of an inhibitor.

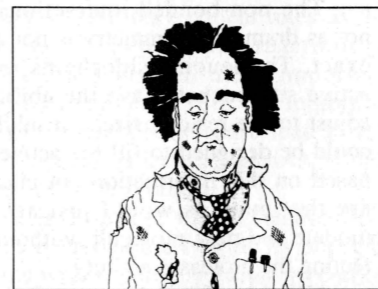
Similarities exist between the

retrovirus protease and aspartyl proteases such as pepsin and renin. Aspartyl proteases have asp-thr-gly sequences at their active sites, are bilobal and inhibited by pepstatin. Retrovirus protease has 99-125 amino acid residues and one asp-thr-gly sequence. To achieve the bilobal structure two monomers of the protease must dimerize. Only the dimer is a functioning enzyme.

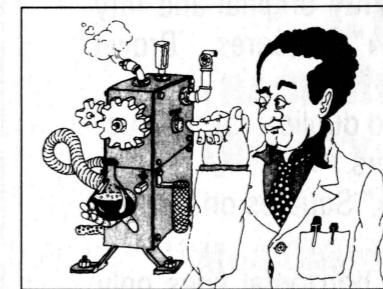
The retrovirus protease was targeted as a good possibility for drug intervention for several reasons. Changing the asp₂₅ in the active site sequence for either asparagine, threo-

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Retroviral Proteases

continued from page 7

nine or alanine completely inhibited proteolytic activity. Mammalian cells into which asp₂₅ had been transected released non-infectious viruses. The polyprotein was not cleaved. Other reasons were the existing body of knowledge about specific HIV-protease inhibitors and extensive number of pharmacological studies.

The protease sequence was transected into E. Coli and grown up with tryptophan to prevent turnover. "In the absence of tryptophan the cells just died like dogs. We just spun them down into cell paste," said Fitzgerald. She used an affinity column to isolate a fairly pure protein in two steps. Researchers grew the crystals at physiological conditions. "We were lucky to obtain the crystals fairly easily", she said.

She measured the crystal densities and found one 99 amino acid monomer.

They also discovered that two monomers would dimerize to form a single molecule with perfect two-fold symmetry.

There were three main section of the molecule. Looking from a side view the enzyme is c-shaped. The back portion of the c provides the structural support for the molecule. The pocket of the c contained the active site and on the ends of the c were two "flaps" that hung over the opening without touching.

The structure is similar to that of pencillinpepsin and rhizopepsin, two fungal proteases. They however only have one flap situated much closer to the active site. After the active site binds the substrate the flap descends to provide an anhydrous environment for the reaction to take place.

Fitzgerald was curious about how the flaps functioned in the retrovirus protease. In order to observe the structure it was necessary to grow crystals while the protease was inhibited.

This was difficult. They tried treating the crystals with the inhibitor

acetyl-pepstatin (a modification of pepstatin A) without success. They had to co-crystallize the protein and the inhibitor together. "It took a while before we would get crystals large and well ordered. We could get either one or the other but not both," said Fitzgerald. "We ended up with nice stable crystals that still weren't very big but refracted well."

The researchers used the MERLOT program Fitzgerald developed to analyze the refractions. She discovered that after binding, the flaps retained their symmetry. The two ends met straight on and formed a small "enclosure" like two gates closing on a corral. This was different from the fungal proteases where the flap would come down flat against the active sites.

The acetyl proteases are not a very efficient group of enzymes: Their turnover rates are low. "The flaps of the retrovirus protease may be a step on the way to making a very sophisticated enzyme," theorized Fitzgerald.

Hydrogen bonds link the inhibitor to the active site loop and the flaps. One bond between the inhibitor, a water molecule and the nitrogen atom on iso₅₀ held particular interest for the researchers. "This was a total unexpected result and, hopefully, an exploitable result," she said "Current research is exploring the possibilities."

The non-bonded interactions are not as dramatic. Symmetry is not quite exact. The leucine sidechains in the active site pockets have the ability to adjust to the residue size. An inhibitor could be designed to fill the active site based on this information but chances are the leucines would just accommodate the new molecule without affecting the proteases activity.

"Working for a drug company one is very aware of what one can or cannot reveal about current work. What I will mention is what the president of Merck Sharp and Dohme wrote in a letter to stockholders; he said the company can look forward to seeing a protease inhibitor in the next few years and I can say he is probably right," said Fitzgerald.◇

Deazatetrahydrofolates

G. Peter Beardsley's talk at the February meeting by Ikuo Koyasu

G. Peter Beardsley, M.D., presented his work on the highly potent new anti-tumor agent called dideazatetrahydrofolates (DDATHF) at the February meeting of NESACS.

Dr. Beardsley is an Associate Professor of Pediatrics at Yale University School of Medicine. His talk, titled Deazatetrahydrofolates: New anti-cancer drugs from structural design to clinical trial started with his design of new anti-cancer drugs. His idea, which he called "critical bond blocking," consisted of "a principle for the design of inhibitors of specific or general classes of enzymes.

The idea is to examine the structure of the substrate of a known enzymatic reaction, and determine which bonds were formed in the course of the reaction, then design an inhibitor of that reaction. The inhibitor should be identical to the natural substrate in all respects except that it would have the reactive atom in the substrate replaced by an unreactive atom in the inhibitor.

He designed an anti-cancer drug by applying this idea to tetrahydrofolates. Tetrahydrofolate (THF) is found in meat and green vegetables. Various forms of THF play critical roles as the substrates in enzymatic reactions in DNA synthesis and other important metabolic systems. So, the inhibition of THF metabolism could lead to the inhibition of cancer cell growth, which requires DNA synthesis.

His main idea was to "emasculate" THF, by replacing two of its nitrogen atoms with "relatively quiescent carbon atoms." The atoms he chose were N⁵ and N¹⁰, which are involved in almost all enzymatic reactions. The new compound was called dideazatetrahydrofolate (DDATHF). If DDATHF worked as an inhibitor of THF, it might be a new anti-cancer drug.

The next step was to synthesize the compound and determine the absolute configuration of its isomers, carried out by researchers and scientists at Eli Lilly

& Co. Because 6-(R) isomer has the same configuration as natural THF and crystallizes easily it was further developed as a drug.

He tested the effect of DDATHF on cell growth using a human leukemia cell line called CCRF-CEM. The results were good. The compound proved to be a very potent inhibitor of cellular metabolism.

The compound was licensed to Eli Lilly & Co., which screened it in mice and human solid tumor systems and found it to be highly active in a broad range of tumors.

DDATHF is now undergoing series of clinical trials. It is too early to give a real report, but the results are very encouraging.

Dr. Beardsley continues to work on the pharmacology of DDATHF and related compounds. He said, researchers were surprised to find that transport

into the cell of 6-(R) and 6-(S) forms of DDATHF is remarkably similar.

He then summarized what he has found out about the "biochemical pharmacology" of DDATHF. He has closely studied the inhibition by the compound. He found that the compound inhibits GAR TFase (Glycinamide ribonucleotide transformylase). GAR TFase is one of the first enzymes required for purine nucleotide synthesis. The consequence of DDATHF inhibiting GAR TFase is a decrease in purine nucleoside triphosphates in cells.

The most profound effect of this blockage of purine nucleotide synthesis is cell death. "That is easy to understand because cells are lacking in those metabolic constituents that are critical for the necessary intracellular metabolism," he noted.

continued on page 11

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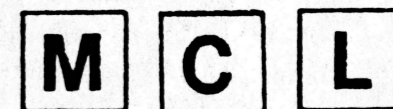
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Summerthing 1990

"Summerthing" at Newport, RI on August 3-5, 1990 to commemorate the 100th anniversary of the founding of the first local Section of the A.C.S. Joint-sponsored by NESACS and the New England Section of the American Institute of Chemists. All 19 Local Sections of Region 1 (Binghampton, Central Massachusetts, Connecticut Valley, Cornell, Corning, Eastern New York, Green Mountain, Maine, Mid Hudson, New Haven, New York, Northeastern, Northern New York, Norwich, Puerto Rico, Rhode Island, Rochester, Syracuse and Western Connecticut) are invited. Choice of Saturday only, or the entire week-end. More information in the May *NUCLEUS*.

Michaeline Chen, Chairman
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Deazatetrahydrofolates

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Another important effect of the "purine blockage" is that malignant tumors can be changed into non-malignant cells. Beardsley found that for a childhood tumor called neuroblastoma, DATHF is one of the most potent inducers of the differentiation. Cell differentiation is a process of maturation to a fully functional and less malignant cell. "As a pediatric oncologist, that is of tremendous interest to me," he added.

He is now studying the role of the compound in the treatment of various acute leukemias. "It looks as though DATHF, at least from the laboratory point of view, looks very promising" he concluded. Then he cautiously added that there is a lot of work that gets to this stage, yet never gets to the market.

There are other members of the class of deazatetrahydrofolates other than DATHF. When Beardsley initially designed an inhibitor he thought that other than the replacement of active atoms by inactive ones, everything else

needed to be the same as in the natural cofactor. He said, "I couldn't have been more wrong in that part of the idea." He found that there are certainly critical atoms. But maneuvering others gives a compound which is virtually indistinguishable from the DATHF itself in terms of its potency and its metabolism. He said that you could even put back the nitrogen at position 10.

The DATHF project was born when Beardsley was working for his Ph.D. in 1971 at Princeton. He was probably taking a shower when he hit on the idea of designing enzyme inhibitors. The idea helped him pass the "ordeal of the final exam" and it became his life's work. "One of the requirements at Princeton was that, in addition to defending your thesis, you had to have some original ideas." Therefore, he said jokingly in an informal conversation before his talk, "The three important elements for good research institutions seem to be: lots of showers; slow elevators; and lots of coffee breaks." ♦

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Shopping in Boston

by M.S. Simon

The area around the Hynes Convention Center is a haven for upscale shopping. Near the Prudential Center are Lord and Taylor and Saks, and just next door is Copley Place with Niemann-Marcus and the stores in the new malls connected to the Westin and Marriott Hotels. A large variety of specialty stores exist in Copley Place, however, such shopping opportunities can be found in many large cities. Unique to Boston are shopping areas such as Newbury Street, Downtown Crossing, and the Quincy Market behind Faneuil Hall.

If you walk out the front door of the Hynes and go one block down Hereford Street you are at Newbury Street. Newbury Street is an eclectic mixture of shops, restaurants, art galleries. A right turn here and a walk of seven blocks will take you to the Public Gardens, a fine walk for

browsing and shopping. The first floors of many old town houses have been revitalized as commercial activities. A store has been built into the beautiful building which once housed a church and later an art cinema house.

A right turn at Newbury and Arlington will take you back to Boylston Street and its shops. If you walk straight across the Public Gardens you will find the Boston Common. Crossing Tremont Street and going a block further will take you to Washington Street with its two major department stores, Filene's and Jordan Marsh. They can be reached with less expenditure of shoe leather by taking the subway to Downtown Crossing.

Quincy Market, reached by subway to Government Center, has become a must for visitors to Boston.

Shopping opportunities, the bustle of the crowd, good restaurants and "grazing" spots all combine to make a visit to this former city market behind historic Faneuil Hall an enjoyable activity for both out-of-towners and locals. ◇

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Board of Directors

Condensed Minutes, Meeting of January 11, 1990

Michael J. Hearn, Secretary

Treasurer's Report: J. Piper reported on the funds of the Section. There are insufficient funds for the day-to-day operation of the Section until allotments are received. It was MOVED and VOTED that the Treasurer, Board of Trustees and Budget Committee meet to develop a plan for addressing this problem and preventing future ones and that the Trustees make available moneys owed the Section for 1989 and advance \$ 7,000 due the Section under the proposed 1990 budget.

Nominating Committee: A slate of nominees for 1991 was presented to the Board (list published in the March 1990 NUCLEUS). At the April meeting a slate of four Board members will be presented from which the Board is to elect two members of the Nominating Committee for 1991.

Program Committee: The schedule of speakers is set through December. There will be two October meetings: On October 11 a meeting especially for new members, on October 18 the meeting will be on professional relations, Alfred Bader will be the featured speaker.

Public Relations: K. Stygall reported on the success of the holiday lectures which were also covered by Public Television.

Public Service: P. Samuel reported on upcoming lectures in February, March and April and an exhibition at the State House on April 25 during the National Meeting, also plans for Science Teaching Day and for a future Museum of Science lecture.

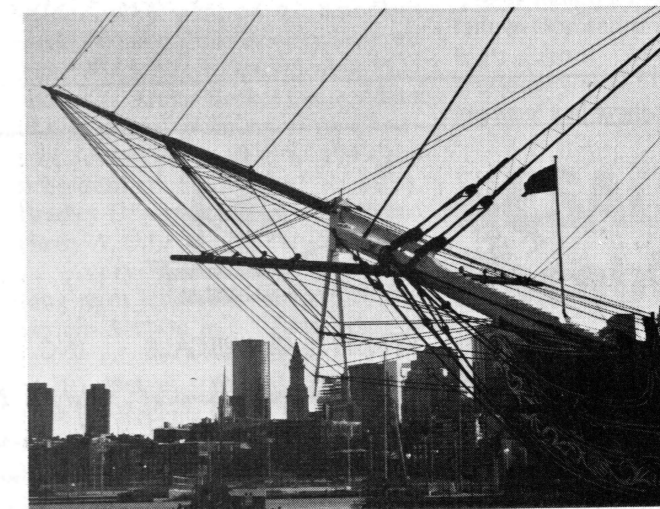
Retired Chemists Group: Efforts are being made to contact those former members who, after retirement, have given up their ACS membership. They are eligible to be affiliated with this group.

National ACS Meeting Section

The members of the Northeastern Section, ACS, welcome members and guests who are attending the Spring ACS Meeting in Boston. The following articles have been provided with the hope that they will make your stay in Boston more enjoyable and more interesting.

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Downtown Boston under the bowsprit of the U.S.F. Constitution, "Old Ironsides," the oldest vessel commissioned in the U.S. Navy.
(Photo: M.S. Simon)

Speakers Bureau: Speakers for talks to groups in central and northern New Hampshire are sought. Videotaping monthly meetings for the benefit of members in these areas was suggested.

NERM 23: T. Gilbert gave a preliminary report on plans for the NERM 23 meeting to be hosted by the Northeastern Section in 1993.

National Meeting Committee: W. Gleekman reported that plans are complete for obtaining 500 tickets to the April 24 Red Sox-California Angels

baseball game, to be subscribed to in advance by meeting attendees.

Old Business: Holders of the ACS Professional Liability Insurance are urged to check with their insurance carrier since this insurance may not be valid in Massachusetts.

New Business: The Board of Trustees announced that it will have a financial report available to the Board of Directors on the funds under the care of the Trustees. ◇



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The Northeastern Section

A brief history by M.S.Simon

Boston has hosted a number of National meetings of the American Chemical Society. In fact, the Section was founded because of such a meeting. When the A.C.S. was founded in 1876 in New York City it was not viewed favorably by the already existing coterie of chemists which had formed around Harvard and some businesses in Boston. Those Johnny-Come-Latelys from New York did not seem to offer much to the Hub of the Universe. In 1890, the ACS expanded by opening the society to Local Sections, but it was the Rhode Island Section in January, 1891, that became the first Local Section.

At the ACS meeting at the Chicago Exposition in August, 1893 many New England chemists decided to join what was trying to become a national chemical society. Still, the chemists of Boston stood aloof, although they did host the ACS national meeting in 1894. By 1898 the sentiment had shifted. Boston was to host another national meeting and chemists of Boston gathered at the venerable Parker House on Friday night, February 4, 1898, 150 strong, to establish the Northeastern Section. By August they welcomed the nation's chemists as a sturdy, though new arm of the organization.

The Northeastern Section initially comprised the northeastern corner of the United States: Vermont, Maine, New Hampshire and Massachusetts. This soon proved unwieldy. In 1911 the Connecticut Valley Section split off; in 1912 Maine and in 1916 Vermont followed.

The early days of the Northeastern Section revolved around some of the great names in American chemistry of the time: A.A.Noyes was ACS president in 1904 while at the Massachusetts Institute of Technology. His attempts to get improved recognition of American chemistry by publishing *Review of American Chemical Research* followed by *Technology Review* evolved into *Chemical Abstracts*

in 1907 with W.A.Noyes, Sr. in charge.

A.D.Little who was ACS president in 1912-13 founded the first industrial consulting firm in America.

Theodore William Richards, ACS president in 1914, was the first American chemist to win a Nobel Prize (1914).

Of great importance to the future of the national society was the Chairman of the Section in 1905. Charles L. Parsons, who became the Secretary and Business Manager of the American Chemical Society in 1907 and so shaped the ACS during the 38 years of his incumbency that it was said that his activities contributed more to the Society than those of any other American chemist. He was "Mr.ACS."

Other Northeastern Section leaders who went on to important work for the national society included James Flack Norris, president in 1925 and 1926, Arthur Becket Lamb, editor of the *Journal of the American Chemical Society* from 1918 to 1949 and president of the Society in 1933, Bradley Dewey, president in 1946 and Henry A. Hill, president in 1978.

Avery A. Ashdown, provided long term leadership for the Northeastern Section in his forty years as editor of the *NUCLEUS* (1929 to 1970). He set standards and established precedents which have lasted to this day, withstanding a revolt in the mid-seventies and providing the vital framework for the activities of the Section as it now exists.

The glory of the Northeastern Section has always been the brilliance of the science of its chemists. Richards' Nobel Prize was the first of a substantial list: Robert Burns Woodward, William Lipscomb, Har Gobind Khorana, Konrad Bloch, Dudley R.Herschbach.

The Section honors the memory of several of its former leaders by giving awards to noted chemists: The *Theodore William Richards Medal* is awarded biannually "for conspicuous

achievement in chemistry". The ACS *James Flack Norris Award in Physical Organic Chemistry* is sponsored by the Northeastern Section (the only ACS award so sponsored). It is awarded annually for outstanding achievement in physical organic chemistry. The *James Flack Norris Award for Teaching of Chemistry* is made annually "for outstanding achievement in the teaching of chemistry as distinguished from research". The *Henry A. Hill Award* is made annually to a member or former member of the Section "who has made outstanding contributions to the Section's programs and activities". The *Gustavus John Esselen Award* is made annually to 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 list of recipients of these awards reads like a chemical Who's Who.

In addition, there are a number of fellowships and prizes to outstanding high-school chemistry students, secondary school teachers, undergraduate and graduate students. ♦

NESACS Reception

Wednesday, April 25, 1990, 6-8 p.m.

Members and friends of the Northeastern Section, and faculty, students and alumni in the Northeastern Section are invited to a reception hosted by the Northeastern Sections and Chemistry Department of Boston College, Brandeis University, Bridgewater State College, Dartmouth College, Framingham State College, Northeastern University, Simmons College, St. Anselm College, Tufts University, University of Massachusetts at Boston and the University of New Hampshire, and the Chemical Engineering Department of Tufts University.

The reception will be held at the Marriott Hotel Copley Place (110 Huntington Ave.), in the Vineyard/Yarmouth Rms. (4th floor), cash bar.♦

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T is for Transportation

How to use public transit in Boston
by Adrienne S. Dey

There is no need to rent a car or use expensive taxicabs when staying in downtown Boston since the Massachusetts Bay Transportation Authority (MBTA) provides convenient service on its subways and buses. What follows is a brief guide designed for persons staying in the vicinity of Copley Square and the Convention Center but other meeting attendees will find it useful as well.

The subway system consists of four lines which are shown on maps by their respective colors: *Green*, *Orange*, *Red* and *Blue*. The Green and Orange lines bracket Copley Square. Most stations are marked by round signs on a pole featuring a large black T on a white background. Purchase a token for 75 cents at the booth in each station and put the token in the slot near each turnstile to gain access to the platform

The No. 1 bus line (Dudley — Harvard) will also be of interest since it runs along Massachusetts Ave. (known locally as Massav) not far from the Convention Center. You will need 50 cents in your hand for the fare each time you get on a bus (operators do not make change).

If you plan to use the MBTA a lot you should purchase a visitor pass good for unlimited subway and bus travel: a three day pass costs \$8 and a seven day pass can be obtained for \$16. Passes can be purchased at many locations which include the Prudential Center Convention & Visitors' Bureau and the Back Bay Station (Orange line/Amtrak station on Dartmouth St. across from Copley Place).

As in all large cities, common sense precautions are in order when using the MBTA: handbags should

be held firmly at all times and should not have clasps which can be easily opened by someone else; men should carry wallets in inside coat pockets; do not travel into bad neighborhoods such as the area south of Huntington Ave., especially after dark. In twenty-four years of constant travel on the MBTA I have had trouble only once when a pickpocket got my wallet out of a poorly chosen handbag at a crowded bus stop near Symphony Hall.

The Green Line inbound (east, towards downtown)

The *Copley* stop is on Boylston St. at the Public Library (there is no underground passage here between the inbound and outbound platforms). From the Convention Center you will be closer to the *Auditorium* stop: on Boylston St. turn left and walk to Mass. Ave., turn to the right and cross over the Turnpike; the *Auditorium* station is in the first building right after the bridge. Another branch of the Green line runs south of the Prudential Center complex: you can use the *Prudential* station on Huntington Ave. near the Christian Science Center. You can get on any inbound train since they all travel through the same tunnel.

Arlington station — here you are at the Public Garden; also near Park Square (not to be confused with Park St.!) and the Greyhound bus terminal. You can cross over to take trains in the opposite direction.

Boylston station — on one corner of the Boston Common; closest to the theater district and not far from Chinatown where good inexpensive restaurants can be found.

Park St. station — at the foot of Beacon Hill; walk uphill to the statehouse or one block in the opposite direction to the big department stores (note that the famous Filene's Basement no longer belongs to Filene's!). Inside the station you can transfer directly to the Red line by walking down a set of stairs: the Harvard-Alewife side will take you to *Charles* (closest to Mass. General Hospital

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and the Mass. Eye&Ear Infirmary), *Kendall* (on the eastern end of the MIT campus), *Central Square* in Cambridge (another mecca for inexpensive restaurants — the Indian ones are quite decent), and *Harvard Square*. The southbound side of the Red line (Quincy/Braintree or Ashmont) may be of interest if you wish to visit the U. Mass Boston campus or the JFK Library.

Government Center — on the plaza in front of City Hall; walk downhill behind City Hall to Faneuil Hall, Quincy Market, and on to the North End or waterfront. Inside the station you can transfer to the *Blue line*: the second stop on the outbound side (towards Revere — notice the airplane sign on the wall) is *Aquarium* which is on one corner of the Marriott Long Wharf Hotel and very close to the N.E. Aquarium. The fourth stop is *Airport* where you can get into a Free shuttle bus right to the terminals (this is an excellent way to avoid the traffic jams in the harbor tunnel — cabs get stuck there along with everybody else. Be sure to ask whether the shuttle goes to your airline since not all buses go to all terminals.

To get to the Science Museum you may have to wait in *Park St.* station for a train marked Lechmere; get off at *Science Park*.

The Green Line Outbound

Any train will take you from *Park St.* to *Copley*. However, at *Copley* the E-Heath St. branch diverges from the rest to go to *Prudential*, *Symphony* (at Symphony Hall), *Northeastern* (first stop outside the tunnel; at Northeastern University), *Ruggles/Museum* (near the Museum of Fine Arts where you might catch the last week of the Monet exhibit, and not far from the Isabella Stewart Gardner Museum), and *Longwood* which is on the southern end of the huge hospital/academic complex along Longwood Ave. (walk from here to Mass. College of Pharmacy, Harvard Medical

School, Simmons College, Children's Hospital, etc.).

The B,C, and D branches all continue to *Auditorium* and *Kenmore* (here you are right under the big Citgo sign; the B.U. Bookstore and the Ramakrishna Mission are here and it is a short walk to sporting events at Fenway Park). Kenmore is the last underground stop and the three branches fan out after this. The B — Commonwealth Ave. train will take you through the *Boston University* campus. The C — Cleveland Circle/Beacon St. train will take you to the intersection of Beacon St. and Harvard St. in Brookline (known as Coolidge Corner) where there are also nice restaurants, especially if you are looking for Kosher food (try the B & D Deli or the vegetarian Cafe Shalom). The D — Riverside branch is the longest and will take you through Newton all the way to Rt. 128. The second stop on this branch outside the tunnel is *Longwood* which is on the northern end of the medical complex; this is closer to the Beth

Israel Hospital, Deaconess Hospital, etc.

A note about fares: no further fare is required when you get off the train outside the tunnel. However, when you get back on in the inbound direction a fare in exact change is needed. The amount varies with distance and is posted at the station. A pass is very helpful here.

The Orange Line

This line runs roughly parallel to the E branch of the Green line and will be more convenient if your hotel is located in Copley Place. In Copley Square the station is inside the Back Bay Station in the block behind the Copley Plaza Hotel and directly across the street from Neiman Marcus. Note that the *Back Bay* station also allows you to board Amtrak trains to NYC and to the southern and western suburbs of Boston.

Inbound: when boarding the train at *Back Bay* the next stop is *New England Medical Center* followed by

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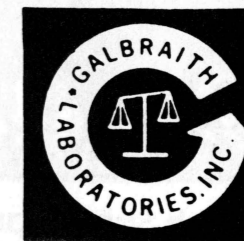
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Chinatown and then Downtown Crossing (Washington St.) where you can enter the basements of Jordan Marsh and Filene's without ever going on the street. Here you can also change to the Red Line (see above under Park St. on the Green line). The next stop is State where you can change to the Blue Line (see above under Government Center on the Green line) if you are heading for the Aquarium or the airport.

Outbound: The next stop west of Back Bay is Mass. Ave (just south of Symphony Hall) followed by Ruggles which is convenient to the Northeastern University campus and a short walk to the Museum of Fine Arts. This line does travel through areas which are probably not very safe at night. The end of the line at Forest Hills puts you near the Arnold Arboretum which is worth a visit (call

for scheduled tours; there is a good collection of evergreens among others).

The No. 1 Bus — Dudley to Harvard Square

Northbound to Cambridge, you can catch this bus in front of the Auditorium subway station (see above under the Green line). The bus crosses the Charles River to the main MIT campus, then passes through Central Square before ending its run in Harvard Square (by now you probably know that most of these "squares" are really just intersections!).

If you need more information call the MBTA at 722-3200. Information and schedules are available at a booth on the platform of the outbound side of the Green line at Park St. If these notes have been helpful, I would really love to know about it: drop me a line at 35 Laurel Dr., Needham, MA 02192. Have a good stay in Boston, bon voyage and au revoir! ♦

Dining in and around Boston

by Wallace J. Gleekman, Cathy Costello and Myron Simon

Boston offers a most varied and distinguished list of restaurants that not only satisfies the appetite of native Bostonians but also offers the visitor to Boston a rare gastronomic treat. There is an abundance of restaurants ranging from the fast food chain variety which can be found everywhere to the elegant upscale hotel dining room complete with white tablecloths, candles, crystal, etc. Most Bostonians, being of hearty New England stock, have a tendency to prefer either meat and potatoes or seafood. With the recent upsurge in ethnic style restaurants, Boston is able to cater to the dining tastes of all.

The four choices below are known to us from many personal visits. Many of the other listings are personal choices, some on recommendation of others.

There are, however, four major Boston institutions which should not be missed. If you can manage all four you'll enjoy a superb gustatory delight. If not, visit at least one of these, if not two

1. **DURGIN-PARK** (30 N. Market St.) located in the Quincy Market-Faneuil Hall area warrants a visit. You'll probably be seated at a huge long table along with other diners. The prime rib is about the best you'll have a chance to taste - a huge over-the-edge-of-the-plate portion at moderate prices. Also excellent Yankee pot roast. But save room and be sure to order the Indian Pudding for dessert - a concoction dating back to the "olde" days. The service is efficient but the waitresses are hired for their ability to annoy: hurried, surly, sometimes a bit rude, feisty and, once in a while, insulting.

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Dining in and around Boston

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2. **NO NAME RESTAURANT** (15 1/2 Fish Pier) serves some of the best seafood dinners in New England. Portions are huge and prices are inexpensive to moderate. Be prepared to wait in line if you come after seven. Bostonians get there early or very late. No name on the building (no name, get it?) but look for the line. The seafood platter is loaded with clams (including, thank goodness, the bellies), scallops, shrimp, fish and fries. Be sure to order a cup (or, if you are in the mood, a bowl) of the seafood chowder. This is what "chowdah" is all about. Originally opened to serve the fishermen who plied the waters off the Grand Banks, it now serves the common folk.

3. **LEGAL SEA FOODS** (Park Sq. in the Park Plaza Hotel) is noted for serving the freshest fish around. Originally started as a fish market located in Cambridge, the owners sold so much fish that their customers wanted cooked for them that they opened up a restaurant. They used to give out Legal Food Stamps thus the name. They do wonders with broiled fish but you can't go wrong with whatever you order. More expensive than the No Name. Crowded on weekends. Branches in Cambridge and Chestnut Hill.

4. **LOCKE-OBER CAFE** (3 Winter Place) is one of Boston's grand old establishments. Opened more than 110 years ago, it recently went modern and now allows women to enter its hallowed halls beyond the formerly-restricted and properly-escorted two exceptions: New Year's Eve and the night before the Harvard-Yale game. Designed to satisfy the needs of the "Brahmin" Bostonians its clientele included bankers, politicians and the upper crust of society. If you dine here note the mahogany bar and wood paneled walls. Gleaming silverware and sparkling crystal as well as special individualized service is the norm here. Order the

lobster Newburg or lobster Savannah. Be prepared to spend lots of money since everything is *a la carte*.

In the following, we have divided Greater Boston into major areas where the ACS visitor may be located at dinnertime. We have also categorized restaurants by price: **(I)** (inexpensive - less than \$10 for entrees), **(M)** moderate - between \$10-15 for entrees), **(E)** (expensive - between \$15-20 for entrees), and **(VE)** (very expensive - meaning "the sky's the limit"). Most entrees come with salad and potato or vegetable. State meal tax of 5% is added.

Many of the restaurants on the following list serve luncheons very similar to their dinners at prices which are often bargains. If you are on a limited budget, try eating your main meal around noontime and snacking in the evening at dinnertime. We have not listed hotel restaurants unless they are of special interest. Most hotels fall into the **(E-VE)** category, while most hotel coffee shops will serve a very adequate dinner in

the **(M)** range.

The following list is but a sampling which was designed to give you a range of price and variety. In each area there are other good restaurants to be found. If you are staying in one of the Boston suburbs, ask a Northeastern Section member for suggestions.

Also check the daily newspapers for restaurant specials and two-for-one coupons. In order to increase the volume of business there have recently been some restaurants mentioned below which offer the dinner specials.

COPLEY SQUARE-PRUDENTIAL AREA: Roughly bounded by the convention area from Copley Square to Massachusetts Avenue.

Skipjacks (500 Boylston St.) **(M)** A modern upscale restaurant with specialties in the seafood category.

Back Bay Bistro (565 Boylston St.) **(M-E)** A European style bistro complete with plenty of polished brass.

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Saturday-Sunday,
April 21-22, 1990

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Friday-Sunday, April 20-22, 1990

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Winning at Chemometrics
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April 21-22, 1990

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Controlled Release: Theory and Practice **NEW!**
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Cost Effective Discovery Research Through QSAR Design Strategies **NEW!**
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Principles of Enzymology **NEW!**
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Emulsions and Microemulsions
Saturday-Sunday, April 21-22, 1990

Fundamentals of Microencapsulation
Saturday-Sunday, April 21-22, 1990

Spectroscopic Characterization of Polymers
Saturday-Sunday, April 21-22, 1990

Synthetic Organic Chemistry: Modern Methods and Strategy
Saturday-Sunday, April 21-22, 1990

Dining in and around Boston

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The Half Shell (739 Boylston St.) (I-M) Plenty of seafood here. Good value with a hustle-bustle atmosphere. Usually crowded during lunch.

J. C. Hillary's (793 Boylston St.) (M) A good selection of meats, chicken and, of course, fish. You name it, they probably have it.

Gyuhama of Japan (827 Boylston St.) (M) The simplicity of a serene Japanese landscape is the norm here. Well prepared food and a sushi bar to boot.

The Hermitage (955 Boylston St.) (M-E) A Russian restaurant located in the Institute of Contemporary Art has regional favorites on its menu.

DuBarry's (159 Newbury St.) (M-E) One of the better restaurants serving nouvelle French cuisine. Frequented by Bostonians who know what's good and where to get it.

Harvard Book Store Cafe (190 Newbury St.) (M) What a place for a restaurant - right in the middle of a book store. Browse the shelves while you enjoy your meal.

Davio's (269 Newbury St.) (M-E) Italian cooking done to perfection. Best bet is the lunch here which is as good as the dinners but at about half the price.

Charlie's Eating and Drinking Saloon (344 Newbury St.) (I-M) Loud and noisy with an all inclusive menu. Great appetizers - try the Buffalo wings. Mostly young crowd.

Newbury's Steak House (94 Mass Ave.) (I-M) Good value and good steaks here. Frequented by some of the college crowd.

Brasserie (Westin Hotel) (I-M) Bright and airy with windows at street level. Early bird complete dinners for less than \$10. Draw your own pictures on the paper tablecloths while you enjoy their stir-fry specials.

Top of the Hub (Prudential Tower) (M-E) You can't beat the view overlooking the entire city but watch out for low flying clouds. Steaks and chops are very good here.

PARK SQUARE AREA: Roughly bounded by Arlington Street, Tremont Street, Boylston Street and Columbus Avenue.

Joyce Chen (115 Stuart St.) (I-M) Joyce brings her cooking talents to downtown (have you seen her TV show on PBS?). Luncheon buffet here is fabulous - you can't eat all the food offered, and for under \$7.

Bnu (123 Stuart St.) (M) A new restaurant with a flair for Italian food served in the most pleasant manner. Fresh, bright and tasty.

Fuddrucker's (137 Stuart St.) (I) A burger heaven delight where burgers become an art form. Also plenty of varied salads.

Kyoto (201 Stuart St.) (M) A hibachi-style restaurant with chicken, shrimp or steak and, of course, the knife wielding chef displaying his talents.

The Claddagh (335 Columbus Ave.) (M) An Irish-style eatery featuring the best of the "ould sod" with cabbage and corned beef available. Nice bar.

QUINCY MARKET-FANEUIL HALL AREA: Roughly bounded by Congress Street, Commercial Street, State Street and the City Hall area.

J. B. Winberie (16 North St.) (M-E) A good selection of good food in a good atmosphere. Sunday brunch is almost a must.

Union Oyster House (41 Union St.) (M-E) An established Boston eating place dominating the area for years. If you've never had it, you might want to try the finnan haddie. All the seafood is excellent.

The Black Rose (160 State St.) (M) An Irish haven in an Irish city with pub-style decor and a menu to match. Anything at the bar is good and will complement any sandwich you'd care to order.

Tatsukichi (189 State St.) (M-E) Japanese food at its best: pleasing, simple and tasty. This popular restaurant attracts the younger and more vivacious crowd.

NORTH END This is the traditional site of many of Boston's good Italian

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Dining in and around Boston

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restaurants. They are centered around Hanover Street which runs from Government Center to the waterfront. After dinner don't hesitate to try one of the local bakeries for some mouth-watering pastry.

Mother Anna's (211 Hanover St.) (M) If Mama makes it, you'll like it. Plenty of food here and the tomato sauce is good.

European Restaurant (218 Hanover St.) (M-E) Unpretentious and big, this traditional restaurant serves some of the best pizza to be found in the area.

Mamma Catina (326 Hanover St.) (M-E) A favorite among locals for its pasta dishes and more.

Felicia's (145a Richmond St.) (M-E) A long time favorite of local Northerners who wouldn't dream of deserting. Veal and chicken at its tastiest.

Regina Pizzeria (11 1/2 Thatcher St.) (I) The original location serving some of the finest pizza in the North End. Branches around the city.

Joe Tecce's (61 N. Washington St.) (M-E) Upscale and very popular place for the young at heart who like good Italian food. Can get a bit too crowded on weekends.

Scotch & Sirloin (77 N. Washington St.) (M-E) What's a place like this doing in the North End? Your guess is as good as mine but take the freight elevator up to the top for some of the best steaks/roasts around. Your birthday? They have a huge cake waiting for you.

CHINATOWN: Roughly bounded by Kneeland Street, Washington Street and Lincoln Street not far from the theater district. Plenty of restaurants in the area which specialize in varied cuisines of China. A few Thai and Vietnamese restaurants are located on the fringe. If you go in a group apply the (n-1) rule in ordering your main dishes: order one less main dish than the number in your party.

With an appetizer and rice you'll have more than enough.

Chau Chow (52 Beach St.) (I) Small but always chock full of customers. If you order the soup, beware, because it is a meal in itself and you may not have room for anything else. Unbelievably inexpensive.

Carl's Pagoda (23 Tyler St.) (I) Carl does wonders with meat so any of the beef dishes are worth writing home about.

Shanghai (21 Hudson St.) (I) Plain but filled with black and red decor, this well known restaurant is noted for its excellent array of Northern Chinese dishes. Spicy good.

WATERFRONT AREA: Roughly bounded from the Quincy Market area down to the harbor and then along the shoreline to Northern Avenue and out toward South Boston. **Jimmy's** (242 Northern Ave.) (M-E) One of New England's best serving some of the best seafood to a devoted clientele. Is an award winning restaurant. Try the lobster anything. Overlooks the harbor and next to the Fish Pier.

Anthony's Pier Four (140 Northern Ave.) (M-E) A well known and an award winning restaurant. Anthony Athanas prides himself in the food, service and style he provides. Fantastic popovers. Huge parking lot and celeb photos on the wall to keep you occupied while you wait.

Michael's Waterfront (85 Atlantic Ave.) (M-E) A stylish place with fine seasonal cooking, Michael's attracts a wide variety of diners. Continental cuisine with a flair. Don't miss the dessert table. MBTA Blue line to Aquarium.

Cherrystone's (100 Atlantic Ave.) (M-E) Good seafood selections served overlooking Boston Harbor. Where you want to go if you can't make it to the Northern Ave. locations. MBTA Blue line to Aquarium.

HARVARD SQUARE (CAMBRIDGE): Take the MBTA red line and get off at Harvard and you'll be in the middle of Harvard Square. If you have a chance, visit the

Peabody Museum and see the famous Glass Flowers. Or you can take a quick stroll in Hahvahd Yahd so you can tell your friends that you were there.

Harvest Restaurant (44 Brattle St.) (E-VE) Contemporary restaurant with cafe, the Harvest represents high style In Cambridge. Up-to-date menu with whatever is popular. The place all the in people want to go.

Wursthaus (4 Boylston St.) (M) A place for gutes essen. Heavy emphasis on German favorites and wurst. Good selection of beers to quench your thirst.

Grendel's Den (89 Winthrop St.) (M-E) Emphasis on international foods. Some consider this place a little funky.

Rarities (Charles Hotel) (E-VE) A deluxe downtown Boston restaurant in Cambridge. Contemporary dining while overlooking the hotel's novel mini-forest. Excellent service. There is a good jazz bar nearby.

CENTRAL SQUARE (CAMBRIDGE): Take the MBTA Red line and get off at Central. This area probably has the most concentrated group of ethnic restaurants, with a good representation of Indian, Chinese and Thai predominating. Take your pick, they are all pretty good. Among favorites are: **India Pavilion** (17 Central Sq.) (I) or **Shalimar of India** (546 Mass Ave.) (I) Good food, good prices. Food that's colorful and nutritious with subtle spices.

Mary Chung's (447 Mass Ave.) (I) Plain and unpretentious, Mary serves some of the best food around. Can get crowded but open late.

COOLIDGE CORNER (BROOKLINE): Take the MBTA Green line C car to Coolidge Corner. All restaurants are within a five minute walking distance.

Dover Sea Grille (1223 Beacon St.) (M) An excellent seafood restaurant which features early bird full dinners between 4-6 p.m. at inexpensive prices. The broiled fish is superb.

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Museums

Cultural Activities

By Arno Heyn

Boston is blessed with a variety of world-class museums. In the following directions it will be assumed that you are depending on public transportation.

See the article about the public transportation system elsewhere in this issue for details on using the MBTA.

Science Museum (723-2500, open Tu-Su 9-5, F until 9 p.m.): Reached via Green Line "Science Park" stop. The Boston Museum of Science is built over the Charles River Basin and has many permanent and special exhibits, a planetarium and the Omni theater with daily laser shows and special shows. It is very popular with school children but exhibits are of interest to adults as well. At this time, the special exhibits are "Dinosaurs III" featuring robot-dinosaurs, and "About Faces", showing how moods and thoughts are expressed by the human face.

New England Aquarium (973-5200, open at 9-5 every day, Th til 8 p.m., Sa,Su til 6 p.m.): Reached via Blue Line, "Aquarium" stop. The Aquarium features a huge circular central sea-water tank around which a walkway winds itself to the top with large windows every few feet. There are big turtles, sharks and many other sea-animals in this 200,000-gal. tank. At posted times these creatures are fed by scuba-divers. In addition, there are dozens of niches with smaller tanks devoted in groups to different environments. Shows featuring trained sea lions and dolphins are held at posted times in a separate floating theater.

Boston Museum of Fine Arts (267-9377): One of the leading art museums in the country. Reached via the Arborway "E"-branch of the Green Line. Opening times: Tu,Th,F, Sa,Su: 10-5, W 10-10 (The West

Wing special exhibit area is also open on Th,F until 10 p.m.). Especially noteworthy is the Asiatic Art collection, Egyptian Department, American Art (especially, portrait collection of leaders of the revolution), European painting, with a strong collection of Impressionists. Boston houses the largest collection of paintings by Claude Monet in this country. This is the last week of a notable exhibition: "Monet in the '90s" (1890s, that is), a special exhibition which for the first time since the 1890's brings together his "series paintings" of grain stacks, the Creuze valley, Rouen cathedral and other subjects at different times of day and seasons, showing the effect of light and atmosphere on the appearance of these scenes. If there are any tickets left, they must be picked up in person at the museum box-office, or at the Ticketron outlet in Faneuil Hall. (A short walk past City Hall from the Government Center stop). You can find out whether there are any tickets available by calling 247-4000. There is another special exhibit: Chinese porcelain, titled: "Imperial Taste". The museum also houses a very good restaurant which is open for lunch, and for dinner when the museum is open in the evening. 500 feet to the west is the **Isabella Stewart Gardner Museum** (open W-Su noon to 5:00, Tu noon to 6:30, free admission on W)

which features European Art of all periods up until Impressionist Art. Mrs. Isabella Stuart Gardner was a wealthy lady with excellent taste who was strong-willed and independent, and caused quite a stir in Boston's staid society. According to her will, the building and collection have been left as they were at the time of her death in 1925. Perhaps the most notable exhibit is the house itself, which is a facsimile of a 15th century Venetian palace.

Harvard Museums: Reached via Red Line, "Harvard" stop. All Harvard Museums are open on weekdays (incl. Monday) 9-4:45. There are a number of notable museums: The Harvard University Museum, located

a 10 min. walk from Harvard Square on Oxford Street just past the Chemistry Department building, has noted archaeological and ethnologic collections. The Botanical Museum is especially noted for its exhibit of Glass Flowers. These exact copies of flowers, arranged by plant families, were made for Harvard by a German glass-blower family between 1877 and 1936. The life-size glass replicas are exact in every detail of color and structure. **The Fogg Art Museum** on 32 Quincy Street (5 min. from Harvard Square) houses a collection of European and American paintings, sculptures and Chinese jades and bronzes. The **Sackler Museum** at 485 Broadway, quite close to the Fogg Museum features an exhibit of miniatures from the Galbraith Collection.

Institute of Contemporary Art (266-5151, W-Su 11-5, Th,F,S to 8): 955 Boylston St., one block west of the Hynes Auditorium. Special exhibits and lectures. Call them for the current exhibits.

Museum Wharf Area, a 5-minute walk from South Station includes three museums:

Computer Museum (423-6758, open Tu-Su 10-5, F to 9) Hands-on computer exhibits, computer-design demonstrations, computer graphics, robots, daily films and computer-animation films.

Children's Museum (426-8855, Tu-Su 10-5, F until 9): A new exhibit "What if you couldn't" gives an idea how those with handicaps have to cope with their surroundings. Many other exhibits to stimulate the interest of children (and parents).

Boston Tea Party Ship: A replica of one of the ships from which in 1775 tea imported from Britain was dumped into Boston harbor as a protest against the tea tax, one of the incidents which started the American Revolution.

Boston Symphony Located on Huntington Ave., take the "E" branch of the Green line to the "Symphony" stop. On Thursday night

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The Great Boston Molasses Flood

by Wallace J. Gleekman

The Boston waterfront was alive with the hustle and bustle of a busy harbor port back in January 1919. The weather had been unusually mild for January with the temperature close to 40 degrees Fahrenheit and no snow on the ground. Had the temperature been below freezing, the following may never have happened.

Opposite Copp's Hill on the harbor side of the street in the North End was a huge storage tank measuring 50 feet high and 90 feet in diameter. It was solidly built with great curved steel sides secured by rivets and its bottom embedded in a concrete base. It was built just four years before to hold molasses used in the production of alcohol for the manufacture of rum and was designed to hold two and half million gallons

of the viscous liquid. With the threat of prohibition on the horizon, the plant had been sold to the United States Industrial Alcohol Company which supplied alcohol to the commercial trade. The big Boston tank was just about filled to the brim, about 2,300,000 gallons.

It was about noontime on January 15th and work around the tank had slowed as workers took time to enjoy their lunch.

At about 12:30, there was a muffled roar as the giant molasses tank suddenly flew apart. It rose in the air and then split into sections, each hurled along the street. One of the sections struck the support for the "El" knocking it at an angle. A train that was approaching screeched to a stop as the engineer noticed the tracks

begin to sag and tilt sideways. And then a mass of brown liquid molasses poured forth from where the tank had been and surged forward.

A wave of molasses fifteen feet high flooded the area toward downtown Boston. As it moved through the neighborhood it destroyed houses; their beams splintered as if they were made of matchwood. The tidal wave enveloped everything as it passed and destroyed homes, warehouses and freight houses in its wake. It caught and killed most of the workers who had been lunching in the sun. The buoyancy effect was so great that good sized wooden buildings were carried considerable distances. Travelling at a speed of about 35 miles per hour, it caught people in the streets and young children homeward bound from school. It picked up one youngster and carried him along on the crest of the wave for several blocks before depositing him on the side of the street. His throat was so clogged with fluid that he could barely breathe. Horses tethered along the street were trapped and drowned.

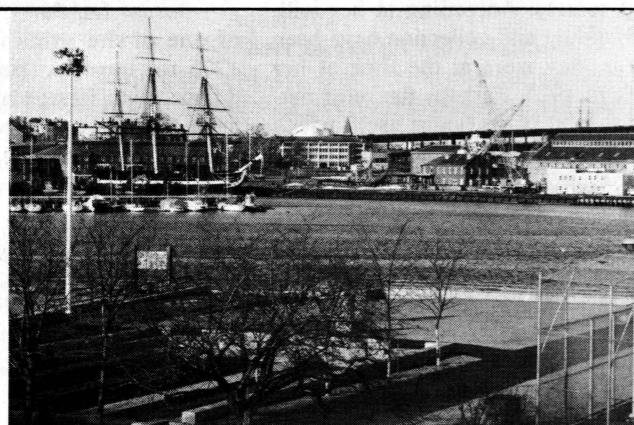
The death toll kept rising day after day. The final count included 21 dead and over 150 injured and many horses killed. The molasses wave, after spreading out, covered several blocks of downtown Boston to a depth of two to three feet. Although rescue equipment was quick to arrive, vehicles and workers could barely get through the goo that filled the streets. The Fire Department spent a number of days washing the molasses into the harbor, and all of the cellars in the neighborhood had to be pumped out, after being thinned with water. The harbor turned brown with the influx. Despite all efforts, molasses found its way into nooks and crannies through the city and suburbs as it stuck to everything it touched. An east wind carried the pungent smell into Boston for decades.

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Site of the Flood, January 1919 (Underwood & Underwood)



Site of Flood in 1989 (Photo: W.J. Gleekman)



Dining in and around Boston

continued from page 23

Mi-Vami (14A Pleasant St.) (I) Small, unpretentious, this restaurant produces some of the finest Israeli cooking around. Portions are huge and you will be hard pressed to finish. Take home the leftovers.

Chef Chow's House (230 Harvard St.) (I) One of the best in the Boston area. Try any of the Szechuan, Hunan or Peking specials: they are fantastic and will satisfy the palates of the most discriminating.

Captain's Wharf (356 Harvard St.) (I) One of Brookline's best values with a strict seafood menu. Try the seafood platter and the chowder. We think the chef used to work at the No Name.

Rubin's (500 Harvard St) (I-M) The only Kosher restaurant in Brookline featuring good deli specials. Platters are sumptuous and tasty. (Too long a walk from Coolidge Corner, so take the Green line B car from downtown) Just a short ride further on the C car will take you to Washington Square where you will find additional restaurants of note.

Golden Temple (1651 Beacon St.) (I) Newly renovated, a well-known landmark in Brookline. Extensive menu featuring Cantonese specialties. The Taw family will even cook to order.

B & D Deli (1653 Beacon St.) (I) One of the best delis in the Boston area and you can bet on it. Try the corned beef sandwich or a pastrami. The white-fish plate is out of this world.

Haim's Deli (1657 Beacon St.) (I) This is almost as good and where you go when the B & D is too crowded. Can stand on its own when compared to other delis. How can two delis so good be so close?

Masada (1665 Beacon St.) (I) An oasis in the square, you can get fine middle eastern cuisine here. Try the falafel in a pita. Hearty platters of finely spiced foods.

Oh yes, before we forget, some people claim the taste of the Fenway frank can't be duplicated. Available at Fenway Park. You may have a chance to savor one if you can get a ticket to the Boston Red Sox-California Angels game on Tuesday, April 24, offered by the Northeastern Section. Check out the hospitality suite at the convention center to see if there are any left. ◇

Museums

continued from page 23

(8pm) and Friday afternoon (2pm), April 25 and 26 there will be a regular concert in the subscription series. Left-over and returned tickets are sold shortly before the concert at the Symphony Hall box office. There will be a world premiere of a Concerto for Flute and Orchestra by Zwiligh, commissioned by the Boston Symphony, followed by Bruckner's 4th ("Romantic") Symphony, Seiji Ozawa conducting.

Numerous plays are running, obtain information from the weekly listing of activities which probably is in your hotel room. ◇

The Great Boston Molasses Flood

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Most of the facts about the Great Molasses Flood emerged in the findings of lawsuits that clogged the courts. Litigation took six years and involved thousands of witnesses. The reason for the lawsuits was a disagreement about the cause of the disaster. Three explanations were offered: 1) an explosion inside the tank caused by fermentation of the molasses, possibly set off when a worker lowered a lantern into the alcohol vapor to check the level inside, 2) a bomb set off by anarchists, and 3) a structural failure

of the tank. Eventually the court found that the tank had ruptured because the safety factor was too low and the tank contained an excessive amount of molasses.

No sign or plaque designates this place which is now a children's playground. I visited the Copp's Hill area the other day and sniffed around. Alas, the smell of the molasses is gone forever. ◇

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Rambles in Boston

A do-it-yourself guide for walks in Boston

By Arno Heyn

The best known walk is the *Freedom Trail* which starts at the Information Center on the Common on Tremont St. (just south of the Park Street MBTA station). It is marked by a line of red bricks laid into the side-walks and streets, so all you have to do is to follow this line. A guide booklet obtained at the Information Center tells you about the various historic sites you will be passing. Although a complete circuit takes about 4 hours (including stops for sight-seeing), any parts of the trail can be taken by themselves. Especially noteworthy sites are King's Chapel, Old South Meeting House, Old State House, Faneuil Hall, Quincy Market area, the North End, Paul Revere House and Old North Church.

Boston Common, Public Garden and Beacon Hill. The Boston Common, formerly the grazing ground for the cattle of the early settlers, is a fairly quiet place in midst of the bustling city. Stately trees and varied terrain make for a nice walk. Adjacent to the west is the Public Garden with its many well-kept plantings which should be in their first spring-bloom by now. On the large pond, the famous swan-boats (inspired by Wagner's Lohengrin) will be taking delighted youngsters and their parents on a leisurely ride in a few weeks. If you walk northwards on Charles Street, which you crossed while going from the Common to the Garden, you come to the foot of Beacon Hill. Beacon Hill, with the in-town residences of the upper-crust Bostonians in the last century still has many well-maintained houses - some private residences, others are condominiums. Turn right at Mt. Vernon St. (third street on the right after crossing busy Beacon St.) and walk up Beacon Hill, passing picturesque Louisburg Square and a little further up the hill, the Nichols House Museum (open M,W,S, 1-5). Turn right

on Joy Street and take Beacon Street to view the front of the State House, built by Charles Bulfinch in 1798. Beacon Hill is also the site of the *Black Heritage Trail* which leads north on Joy Street, then follows Phillips Street, Cedar St. and Pinckney Street up the hill.

A pleasant walk is along the paths bordering the Charles River, access from the Charles Red Line Station via pedestrian overpasses.

Arnold Arboretum (A few minutes walk from the Arborway end-stop of the "E" Green Line or the Forest Hills end-stop of the Orange Line). This is the 265 acre botanical garden administered by Harvard University and the Boston Park Department. Fruit trees should be in full bloom, daffodils line the gentle hills and lots of flowering shrubs will be in their spring dress. Closed to general vehicle traffic, the Arboretum is a peaceful place for walking and learning about many species of decorative plants, bushes and trees. There is no restaurant or snack-bar in or near the Arboretum, so schedule your trip accordingly.

Presidential Plenary Session:

Supply of Scientists for the 21st Century

Sunday, April 22, 4:30 - 6:00 p.m., Sheraton Boston, Grand Ballroom
The U.S. could find itself handing over the reins of scientific leadership in the not-too-distant future if fewer American students elect to pursue science as a career. Paul G. Gassman and Bassam Shakhshiri, National Science Foundation, will discuss some of the problems and possible solutions of this difficult issue.

Symposium on Women in Chemistry

Tuesday, April 24, Westin Hotel, American Ballroom South
9:00 - 11:45 and 2:30 - 5:00 p.m. J.A. Miller and M.R. Creese, Organizers, with a reception at 11:45, lunch at 12:15 (Venetian Room, Copley Plaza Hotel), reception at 5:00 - 6:00 p.m. (Essex Ballroom South, Westin Hotel). Among the speakers will be M. Rossiter, N.M. Roscher, K.E. Johnson, P.G. Abir-Am, D.C. Hodgkin, S.E. Schwartz, M.L. Good and A.J. Harrison. With two former ACS Presidents and a Nobel Laureate on the program, this is an event not to be missed.

Harvard Square and the Harvard Campus (Harvard stop on the Red Line). Harvard Square is bustling, trendy shopping area. Perhaps most famous is the Harvard Co-op, a non-profit department stores which also has one of greater Boston's two most complete book store (the other is the Boston University Bookstore at Kenmore Square). Several floors of books: scholarly, reference and also the classics, modern literature and current best-sellers. East of Harvard Square is the Harvard campus with its 17th to 19th century buildings. The chemistry building is on Oxford Street just beyond the Victorian Memorial Hall, a little further north are the University Museums. (See the Museums write-up).

Mt. Auburn Cemetery (take bus 71,73 or 75 from Harvard Square) is famous for its plantings and landscaping. It is bird-watchers' favorite birding site in greater Boston. Obtain a free map at the office near the entrance. Of chemical interest is the grave of Charles Jackson, the chemist who discovered the anesthetic properties of diethyl ether. This led in 1846 to the first operation under full anesthesia by Morton in the Bulfinch dome building of Mass. General Hospital. The "ether dome" is open to the public (Charles stop on Red Line).

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Calendar

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Thursday, April 19

Professor David M. Lemal (Dartmouth College)
"Fluorine Chemistry"
Boston College
Gasson Hall room 305 at 4:00 pm

Polymer Science/Plastic Engineering Seminar Series
Professor Gary Wnek (RPI)
"Conducting Polymer in Biomedical Application"
University of Lowell
Olney Hall 428 at 3:30 pm

Professor Stephen Berry (Phi Beta Kappa Lecturer)
Title to be Announced
University of New Hampshire
Iddles Auditorium room L-103 at 11:00 am

Friday, April 20

Dr. Seymour Cohen, N.A.S. (SUNY Stonybrook)
"Recent Advances in the Biochemistry of the Polyamines"
University of Lowell
Olney 428, call for time (508)934-3689

Minisymposium on Science Education: Perspectives for Chemistry
Professor Glenn A. Crosby (Washington State University)
Dr. Bassam Z. Shakhshiri (National Science Foundation)
Boston University
Conference Auditorium, George Sherman Union at 1:30 pm
Information: (617)353-2503

Tuesday, April 24

Dr. Jay Gibbs (Merck, Sharp & Dohme)
Title to be Announced
Tufts University Health Sciences Campus
Sackler Building De Blois Auditorium A at 4:00 pm

Wednesday, April 25

Dr. Sydney Archer (RPI)
"Oxidative Alkylation as a Basis for the Design of Antitumor Agents"
Worcester Polytechnic Institute
Goddard Hall room 217 at 4:00 pm

Thursday, April 26

Professor Virgil Stenberg (University of North Dakota)
"Corticosteroid Chemistry and the Autoimmune Disease State"
Boston College
Gasson Hall room 305 at 4:00 pm

Professor Debbie Crans (Colorado State)
Title to be Announced
University of New Hampshire
Iddles Auditorium room L-103 at 11:00 am

Monday, April 30

Professor Debbie C. Crans (Colorado State)
"Organic Vanadates as Enzyme Substrates"
Brandeis University
Gerstenzang 122 at 4:00 pm

Professor Kenneth L. Rinehart (University of Illinois)
"Biologically Active Marine Natural Products"
Boston University
Science Center Auditorium, SCI 107 at 4:00 pm

Notices for the Nucleus Calendar should be sent to:

Dr. Cynthia McGowan
Department of Chemistry
University of Lowell
Lowell, MA 01854
Phone: (508)934-3828

(Note: Material should be sent so that it arrives before June 4, 1990 for the July/August issue.)

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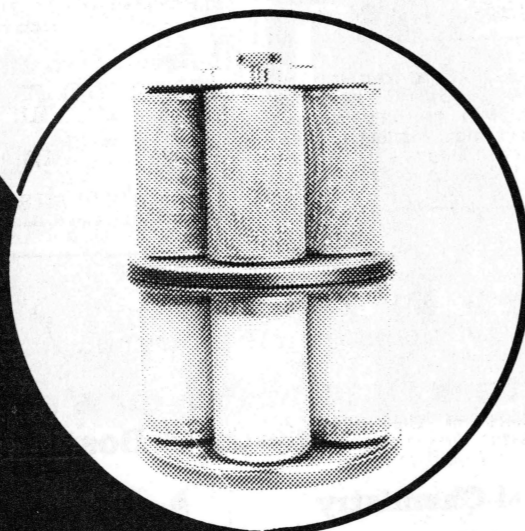
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by M.A. Solstad

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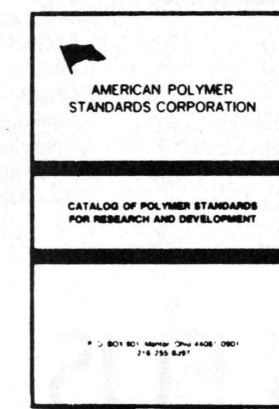
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Calendar

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Boston University - (617)353-2500

Brandeis University - (617)736-2500

Harvard University (Chemistry) - (617) 495-5333

Northeastern University - (617)437-2822

Southeastern Massachusetts University - (508)999-8246/8232

Tufts University - (617)381-3441

Tufts University Health Sciences Campus - (617)956-7000

University of New Hampshire - (603)862-1550

Tuesday, April 3

Dr. Peter Kim (Whitehead Institute for Biomedical Research)

Title to be Announced

Tufts University Health Sciences Campus
Sackler Building De Blois Auditorium A
at 4:00 pm

Wednesday, April 4

Dr. Stuart L. Licht (Clark University)

"On Angels, Pinheads and Dancing Space - Time Mapping of 10⁻¹⁹ Moles"

Southeastern Massachusetts University
Science & Engineering Building room
305 at 4:00 pm

Dr. Ignatius Turchi (BOC Group
Technical Center)

"Ring Transformation of Oxazoles.
Synthetic and Theoretical Studies"

Worcester Polytechnic Institute
Goddard Hall room 217 at 4:00 pm

Thursday, April 5

Dr. Stephen Tannenbaum (MIT)

"Proteins as Molecular Dosimeters for
Chemical Carcinogens"

Northeastern University
129HT at 4:00 pm

Professor Robert Sauer (MIT)

"Intercellular Protein Degradation"

Boston College
Gasson Hall room 305 at 4:00 pm

Monday April 9

Professor Alan Cowley (University of
Texas at Austin)

"Multiple Bonding Involving the Heavier
Main Group Elements: Some Recent
Developments"

Brandeis University
Gerstenzang 122 at 4:00 pm

Dr. Rolf Huisgen (University of Munich)

"Recent Mechanistic Studies of (2+2)
Cycloadditions"

Northeastern University
129HT at 4:00 pm

Professor Debra Dunaway - Mariano
(University of Maryland)

"The Mode of Triple Phosphoryl Group
Transfer in Pyruvate Phosphate Dikinase
Catalysis"

Boston University
Science Center Auditorium, SCI 107 at
4:00 pm

Tuesday, April 10

Professor Bertram O. Fraser-Reid (Duke
University)

Title to be Announced

Tufts University
Pearson Memorial Laboratory room 104
at 4:30 pm

Wednesday, April 11

Dr. David Hoffman (Harvard University)

Title to be Announced

Southeastern Massachusetts University
Science & Engineering Building room
305 at 4:00 pm

Iddles Lecture Series

Professor Frederick E. Brinckman
(National Institute of Standards and
Technology)

"Biogeoorganometallic Chemistry: Bases
for Needed Crystal Biotechnology"

University of New Hampshire
Iddles Auditorium room L-103 at 4:00 am

Dr. Paul Reider (Merck Sharp & Dohme
Research Labs)

"Practical Asymmetric Synthesis"

Worcester Polytechnic Institute
Goddard Hall room 217 at 4:00 pm

Thursday, April 12

Professor Phil Rieger (Brown University)

"ESR of Organometallic Radicals"

Boston College
Gasson Hall room 305 at 4:00 pm

Polymer Science/Plastic Engineering
Seminar Series

Dr. Tony Allegrezza (Millipore Corp.)

"Polymer Chemistry-Applied to Synthetic
Membranes"

University of Lowell
Olney Hall 428 at 3:30 pm

Iddles Lecture Series

Professor Frederick E. Brinckman
(National Institute of Standards and
Technology)

"Molecular Speciation of Bioactive
Metals forms Diagnostic and Predictive
Roles of Environmental Chemistry"

University of New Hampshire
Iddles Auditorium room L-103 at 11:00
am

Monday, April 16

Professor Peter Kim (MIT)

"Toward a Structural Understanding of a
Protein Folding Pathway"

Harvard University
Mb-23 at 4:15 pm

Tuesday, April 17

Dr. Wayne Matsen (ESA, Inc.)

"Principles and Methods for Multisensor
LC Analysis"

Northeastern University
129HT at 4:00 pm

Dr. Henry Mautner (Tufts University)

Title to be Announced

Tufts University Health Sciences Campus
Sackler Building De Blois Auditorium A
at 4:00 pm

continued on page 29

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