

THE NUCLEUS

May 1993

Of the Northeastern Section of the American Chemical Society

Vol. LXXI, No. 9

Monthly Meeting

*Education Night;
Stephen J. Weininger on
"Chemistry with a Human Face"*

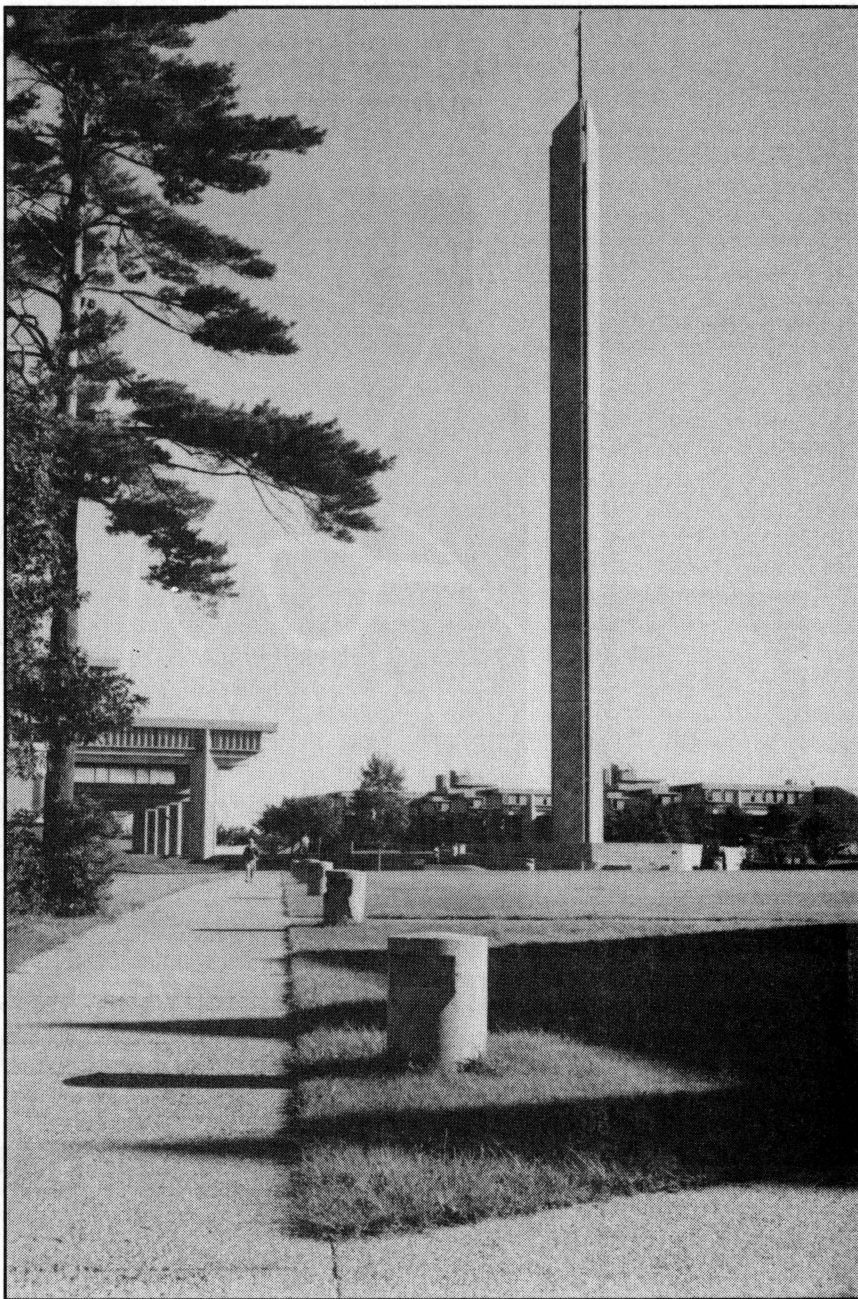
Candidates' Statements

Environmental Chemistry

*Taxing Issue:
BTU vs. Carbon*

Norris Summer Scholar's Report

*R.A. Silva on Disubstituted
3-Pyrazolidinones*



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Patricia L. Samuel	Donald O. Rickter*
Valerie A. Wilcox	Alfred Viola

**until next annual election*

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All Chairmen of standing Committees, the editor of THE NUCLEUS, and the Trustees of Section Funds are members of the Board of Directors. Any Councilor of the American Chemical Society residing within the section area is an ex officio member of the Board of Directors.



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<i>Photo: Manny Pereira, UMass Dartmouth</i>	

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THE NUCLEUS



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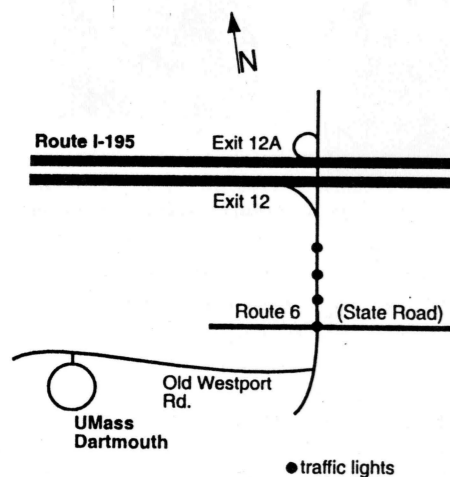
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Board of Directors

Condensed Minutes, Meeting
of February 11, 1993

Officer's Reports:

Chairman's Report: D. Phillips stated her intention of attending meetings of committees in order to become acquainted with the active members. She requested that the Section Calendar be consulted in scheduling meetings to avoid conflicts.

Treasurer's Report: The report on the Section finances for January were APPROVED.

Committee Reports:

Budget: After having presented the proposed 1993 budget at the January meeting the budget was APPROVED.

Education: M.Z. Hoffman spoke about the various activities of the committee: D. Bagley is in charge of the High School Education Subcommittee. A panel has been selected for evaluating Summer Research Scholar applications – the stipend has been increased to make them more attractive. M. Schwartz (U.Mass Boston) will oversee Student Affiliates, P. Samuel (Boston U.) is coordinating the Undergraduate Research Poster Symposium, to be held

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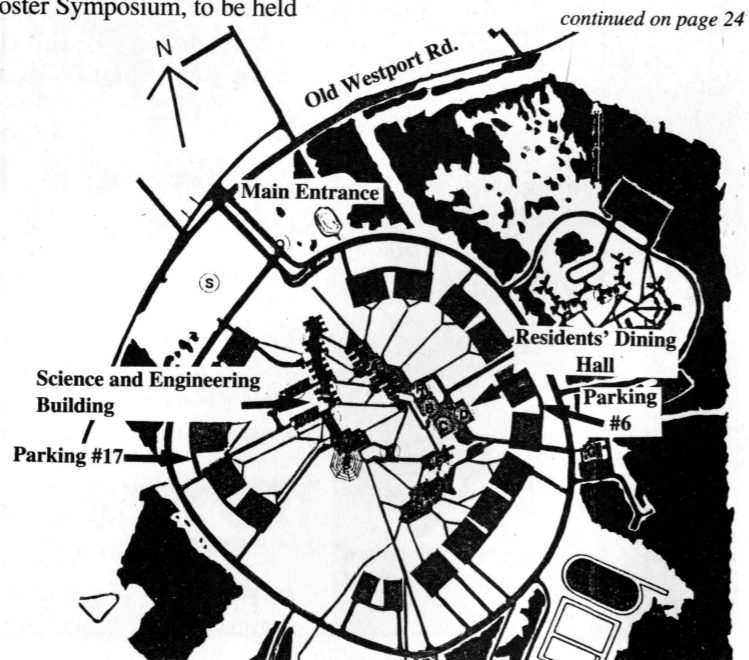
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at Boston U. in April.

Esselen Award: T. Light reported that the Awardee, J.G. Anderson of Harvard University will receive the Award at the April 15 meeting for his work on stratospheric ozone depletion. He will also be one of the panel members at the April 13 Symposium.

Publications: D. Phillips reported for the editor that there will be a special



Monthly Meeting

The 753rd Meeting of the Northeastern Section
of the American Chemical Society

Education Night

Thursday, May 13, 1993
University of Massachusetts, Dartmouth, MA
Residents' Dining Hall

3:00 Tours of the Chemistry Department, meet at Group II, Rm. 307

5:00 Social Hour

6:00 Dinner

7:30 Evening Meeting, Dr. Dorothy J. Phillips, presiding

Address *Chemistry with a Human Face: Literature, Language and the Laboratory*

Stephen J. Weininger, Worcester Polytechnic Institute

Presentation of Awards

Avery A. Ashdown Chemistry Examination; Simmons College Prize

Excellence in Teaching at the Secondary School Level

Lyman C. Newell Grants

Induction of new members into Aula Laudis

Undergraduate Research Symposium

James Flack Norris Undergrad. Research Fellowships

Theodore William Richards Undergrad. Research Fellowships

Philip L. Levins Memorial Prize

Refreshments will be served after the program.

Dinner reservations should be made no later than May 7. Please call Sue O'Connor at (800) 872-2054 and state your menu choice: Prime of Roast Beef, Stuffed Fillet of Sole, or vegetarian selection. Reservations not cancelled at least 24 hours in advance must be paid. Members, \$21.00; Non-members, \$23.00; Retirees, \$12.50; Students, \$8.00.

THE PUBLIC IS INVITED. Anyone who needs special services or transportation, please call Sue O'Connor a few days in advance so that suitable arrangements can be made.

Parking available: See map and directions on the previous page.

Election of 1994 Officers, Councilors and Committees

The ballot for voting for the 1994 candidates for the various Section positions is enclosed with this mailing. Also enclosed are the special ballot envelope and addressed return envelope. Candidates' biographies and statements are in this issue of the Nucleus beginning on page 8.

BE SURE to vote and return your ballot by the June 1, 1993 deadline.

If you are a section member and fail to receive the election materials, please call the Section office, 1-800-872-2054.

Biography

Stephen J. Weininger received his B.A. in Chemistry from Brooklyn College, CUNY and Ph.D. in Organic Chemistry from the University of Pennsylvania. After one year as Senior Demonstrator at the University of Durham, England he was appointed Assistant Professor at WPI in 1965, Professor in 1977. During 1976-78 he was NSF Faculty Science Fellow and Visiting Professor at Colorado State University, and in 1987-88 Mellon Fellow in the STS Program at MIT.

Weininger has published two textbooks, *Contemporary Organic Chemistry* (1972) and *Organic Chemistry* (1984, with Frank Stermitz). He was a founding member and past president of the Society for Literature and Science, and divides his research interests between photoinduced electron transfer and the history of chemistry, with a special interest in chemical language. ◇

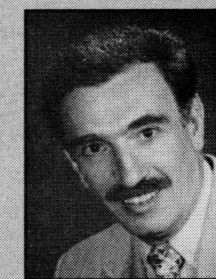


Photo: M. Richmond

Abstract

Chemistry with a Human Face: Literature, Language and the Laboratory

Students' inability to "connect" classroom material with previous knowledge and experience has been blamed for their rejection of chemistry. This disconnection usually connotes the absence of conceptual bridges from past to present knowledge. I believe that the **apparent** lack of congruity between *styles* of thinking in chemistry and in everyday life is equally harmful. The unfamiliarity of the *form* in which we convey chemical information (lack of a narrative structure) compounds the problem.

I will propose some ways in which the literature of and about chemistry and chemists, and the history of chemical language, may make a modest contribution to closing these gaps. ◇

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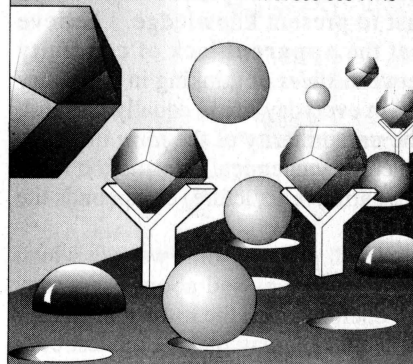
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Trustees' Report

Condensed Annual Report for 1992

The following data have been abstracted from the 28-page Annual Report submitted in January 1993. The Section office has copies of the report available for interested members.

Status of Trust Funds as of December 31, 1992

A subaccount, a Guided Portfolio Management Program, "GPMP" of the Consolidated Trust funds was established during 1992 as a conservative-growth instrument. The net worth in the eight Trust Funds at the end of 1992 represented a 2.8% increase above their value on January 1, 1992. The Consolidated (endowment) Trust alone had increased by 3.6% over this period.

Market Value of Securities + Cash Balances (Multiply \$ by 1,000) (Rounded to the nearest \$ 1,000)

	on 12/31/92			% ownership of Consol.
	alone	with endowment apportioned	total on 12/31/91	
Richards Trust	65	170	176	12.0
Norris Trust	22	531	515	58.3
Publication Trust	17	88	84	8.2
Permanent Trust	39	183	173	16.5
Hill Trust	5	49	49	5.0
Consolidated Trust	148	1,021	997	100.0
GPMP	824	-	-	
	1,021	1,021		
Esselen Trust	237	237	226	
TOTAL	1,258	1,258	1,223	

Cash Flow in 1992 The income accounts received \$ 33,000 from the Consolidated Trust, 68% of the earned income of this endowment fund, the same percentage as in 1991. The Norris Trust expended all of its 1992 earned income; the Richards Trust spent all of its 1992 earned income plus half of its cash surplus from 1991 for the biennial award. The Hill Trust spent twice the amount of its 1992 earned

continued on page 7

Employment Services at NERM23

The American Chemical Society will hold a National Employment Clearing House (NECH) during the NERM23 Boston Meeting. The NECH will be held June 23-25, 8:00 am to 5:00 pm at Northeastern University. ACS members and Student/National Affiliates interested in registering as candidates for employment, and employers interested in registering to interview and/or post positions available, should call

John Michael Sophos in the ACS employment Services Office at 1-800-227-5558 to request registration materials. ACS members and Student Affiliates who are not able to attend the meeting, but who would like to have their resumes filed for employer review, may do so. The deadline for receipt of off-site registration forms is Friday, June 11, 1993.

continued on page 7

income, making up the difference from 1991 surplus. Publications and Permanent Trusts, by spending less than their 1992 earned income, had added the income to their surplus cash balances. The Richards Trust also received \$ 2,900 from exchange of securities which could be used for expenses. Earned income to the income accounts was used to buy additional investment capital (\$1,750 into Norris, \$1,150 into Publications and \$2,300 into the Permanent Trust Fund.

Cash Flow (multiply by 1000)

	disposable income		expenses	
	from new div+int ^a	cash bal. 12/31/91	paid out 1992	cash bal. 12/31/92
Richards Trust ^b	\$ 12.1	\$ 11.5	\$ 18.6	\$ 5.1
Norris Trust	21.1	4.4	21.6 ^c	3.9
Publications Trust	3.8	9.2	2.7 ^c	10.2
Permanent Trust	7.8	5.2	5.3 ^c	7.6
Hill Trust	1.9	6.9	3.8	5.0
Consolidated Trust	46.7	37.2	52.0	31.8
GPMP	15.7	5.7	0.6	20.9
	11.6	-	1.0	10.6
Esselen Trust	74.0	42.9	53.6	63.3
TOTAL	10.3	2.5	8.8	3.9
	84.3	45.4	62.4	67.2

(a) After distribution to income accts. of \$ 33,000 from Consolidated Trust

(b) Also includes net cash proceeds received in stock exchanges

(c) Also includes net cash paid out in stock exchanges

Projected Income and Expenses for 1993

Earned income to Consolidated and income accounts for 1992 was \$ 59,530. For 1993 an income of \$53,560 is projected because GPMP will not supply any cash to the income accounts, and money market dividends are unknown at this time.

Three of the income accounts incurred large expenses in 1992 which must be reimbursed to the Section in 1993. If all cash received in 1993 is made available these expenses and the regular expenses for 1993 can be met readily and some funds should be available for adding to the capital bases.

Trustees: Adrienne S. Dey, John L. Neumeyer and Phyllis A. Brauner. Original report prepared by G. Richard Handrick, condensed for publication in the NUCLEUS by the editor. ◇

The ACS Office of Professional Services will offer the **Conducting an Effective Job Search Workshop and Resume Review and Career Assistance** during the regional NERM23 meeting.

The Workshop covers the major components of job hunting: skill identification, career values, resume preparation, job search strategies, and interviewing. The Workshop will be held on Wednesday, June 23, 9:00 am - 12:00 noon at Northeastern University. No pre-registration is required.

At the Resume Review, an ACS volunteer Career Consultant or Professional Services staff member will be available to critique your resume and answer any general career questions. The Resume Review will be held on Wednesday, June 23, 2:00 pm - 5:00 pm at Northeastern University. Individual appointments are twenty minutes long. Bring a copy of your resume. Sign-up sheets will be available at the NECH registration desk beginning at 9:00 am on Wednesday, June 23. ◇

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3. Special reduced combination advertising rates will be available in The Nucleus to exhibitors so they may pre-announce their offerings at NERM 23.
4. NERM 23 is The NorthEastern Section's "user friendly" trade show. In trade show parlance, NERM23 is a tabletop show and offers attendees excellent products by the professional companies that represent them.
5. The NorthEastern Section of the American Chemical Society is the largest single audience of buyers of chemical products and services in New England.

Call -- Noni Talbott
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Northeastern Section American Chemical Society

Election of Candidates for 1994

In the interest of providing maximum information and expression of opinions by the candidates for election in 1993, the Nominating Committee has prepared this section of the Nucleus for mailing concurrently with the ballots. All candidates were asked to submit biographical material and, with the exception of committee member nominees, position statements. The statements have been reproduced essentially as received. An official ballot along with a ballot envelope and a return envelope have been provided. The election and balloting are being carried out in conformance with Article VIII of the

Constitution of the Northeastern Section. The order of candidates on the ballot was determined by lot. Comments regarding the election or election process may be addressed to the Nominating Committee Chair, Katie Stygall.

BALLOT DIRECTIONS: Vote for the candidate(s) of your choice, insert your ballot into the ballot envelope, insert the ballot envelope into the return envelope, *sign your name on the return envelope only*, affix postage, and mail.

THE BALLOT MUST BE RECEIVED BY JUNE 1, 1993

Chairman-Elect

Valerie R. Wilcox

Employment: *Present:* Executive Director, The National Plastics Center and Museum, Leominster, MA; 1965-91: Education Associate, Museum of Science, Boston, MA; 1957-65: Planetarium Lecturer, Charles Hayden Planetarium, Museum of Science, Boston, MA

Education: M.A., Chemistry, Wellesley College, Wellesley, MA. National Science Foundation Institute in Chemistry. B.A., Mathematics, College of New Rochelle, New Rochelle, NY

American Chemical Society Activities: Member of the American Chemical Society and of the Northeastern Section since 1972. Member of the following Divisions: CHED, CHAS, POLY, PMSE Councilor from Northeastern Section, 1992-1994. Alternate Councilor, 1986-1991. Member of the Public Services Committee of the Northeastern Section, 1987-present. National Chemistry Week Chair for the Northeastern Section, 1987, 1989, 1991.

Other Professional Societies: The Massachusetts Association of Science Teachers, The New England Association of Chemistry Teachers, The International Union of Pure and Applied Chemistry — affiliate member, The Society of Plastics Engineers — affiliate member Sigma Xi, The Association of Science and Technology Centers.

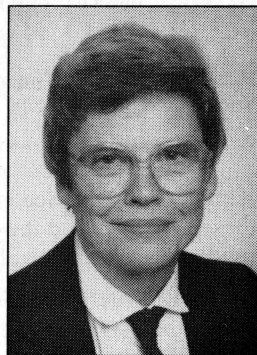
Position Statement: During my years of service on the Board of Directors of the Northeastern Section, I have seen an increase in certain emphases, reflecting those at the national level. More attention is being paid to education at the pre-college level, to chemistry in the public interest, and

to efforts to increase the public understanding of our science. Our science has as noble and proud a tradition as any activity, and understanding and enlightenment is the first step in improving the public's appreciation of this.

I would encourage the Section to continue and to expand these efforts. The Task Force on Elementary Education, National Chemistry Week, the Holiday Lectures and undergraduate activities of the Public Services Committee have gotten us off to a good start. This will require the work not only of the Chair, but also of many dedicated, committed volunteers.

Our Section covers a large geographic area, as we in Boston sometimes tend to forget. I would like to address the concerns and increase the representation of those section members not in the immediate Greater Boston area. The Legislative Affairs Day in New Hampshire in 1991 is a good model for future activities, but much remains to be done to encourage all of our members to take an active role in Section affairs.

Robin Gilroy, (withdrawn)



Trustees

G. Richard Handrick, Ph.D.

Position Statement: Perhaps my best qualification is the experience I have gained during the past twelve years of association with the Trustees managing the Section's endowment Trust Funds. I was first elected for a three year term beginning 1981 and was reelected for another three years. Then I became advisor and Treasurer to subsequent Trustees, until chosen to serve officially for six months in 1993 after John Neumeyer resigned partway through his second term. During this time, the principal Trusts have nearly tripled in value (2.7 times), to \$968,000 from \$356,000, and the disposable income has grown from \$36,700 to \$60,000 (1.6 times). At the same time, the Section was supplied with sufficient income to allow its budget for awards, public service, certain *NUCLEUS* printings, etc., to be doubled. If elected, I expect the seven Trust Funds to continue a path of aggrandizement for the benefit of the Northeastern Section. I ask for your votes to help maintain this goal of preservation of capital, with growth of both principal and income.

Service to the Section: In this year of 1993, Dr. Handrick becomes a 50-year member of the ACS. His devotion to the Northeastern Section began in 1969, when he was involved in the first computer-assisted printing of a Directory of Membership. Subsequently, he was editor and sole compiler of three more Directories. In the early 1970s he was Chairman of the Board of Publications for several years, and for more than 10 years he was responsible for tracking and preparing addresses and labels for mailing the *NUCLEUS*. As a member of the Board of Directors of the local section for much of the time since 1969, he has kept abreast of the fortunes and governance of the NESACS and the peccadilloes of its governing board.

Charles E. Kolb

Education: S.B. (1967), Chemistry, M.I.T., MA. (1968), Ph.D. (1971), Physical Chemistry, Princeton U.

Professional Experience: Aerodyne Research, Inc. (1971-present), currently president and CEO; research affiliate, M.I.T. Spectroscopy Laboratory 1981-present; associate in atmospheric chemistry, Harvard U. Center for Earth and Planetary Physics, 1976-1985; member 1987-90, chair 1990-1993, NAS Committee on Atmospheric Chemistry.

ACS Northeastern Section: Chair-elect and Program Committee chair, 1990; chair, 1991; co-chair, Elementary Education Task Force, 1991-present; chair, Nominating Committee, 1992; member, Budget Committee 1990-1992.

Statement: I have been privileged to play a leadership role in the Northeastern Section for the past several years. I would be honored to continue that effort as a trustee of the section's financial endowment. It is vital that the trustees protect and enhance the section's current financial assets of

nearly 1.25 million dollars while ensuring that sufficient income is available to fund the section's important work in chemistry education, professional services to members and recognizing and rewarding outstanding work in chemistry, chemical engineering and chemical education. I believe my experience in leading a successful corporation will help me ensure that the section remains on firm financial footing.

Secretary

Michael J. Hearn

The strong examples set by my predecessors in this office served as an encouragement to me when I was elected to this post. During the intervening time I have attained a widening perspective on the principal duties of the Secretary: helping to set the agenda and keeping the minutes of the regular meetings of the Board of Directors, certifying officers and councilors, maintaining good communications between those serving on the Board and the membership, reporting on our activities to Washington; yet it would be inappropriate to leave unmentioned the biggest thing which I have learned in becoming Secretary, the effective way in which the Section functions as the result of the cooperation of many talented and dedicated individuals. The Northeastern Section has had a long tradition of service to its members over many years and a longstanding recognition of the important role of education. It takes much hard work to put into practice the many programs in these areas which the Section sponsors, and I would like to indicate the sense of respect which I have for the people who do that hard work.

Auditor

Anthony L. Rosner, Ph.D.

It has been my pleasure to have served and grown as Auditor for the Northeastern Section of the ACS over the past four years and to have had the experience of working with Jim Piper. Since 1986, I have developed my accounting, computing, and administrative skills to the level of having managed over 120 research grants totaling \$10M at several universities and colleges nationwide. In a changing economic and political climate, I relish the opportunity of being able to continue as Auditor and would welcome your suggestions and support.

Councilor and Alternate Councilor

Michaeline F. Chen

Education: Clarke College B.A.; Boston College M.S.
Experience: Currently serving as Research Chemist in Solid State Science Team of Ceramics Research Branch,

Ceramics Div., U.S. Army Research Laboratory. Materials Directorate, Watertown, MA. During the previous 10 years, conducted work in Advanced Materials Synthesis and Processing, Surface Science.

ACS Activities: Elected Councilor of NEACS 1987-93. ACS member since 1976

At the national ACS – Member of Economic Status Committee 1987-1993, subcommittee of Early Career Concern and Survey, also member of Public Relations Committee, 1988. Member of the Task Force of the Board Committee on Professional and Membership Relations, 1993.

At the Northeastern Section ACS – Chairperson of the Hospitality Committee NEACS 1984-1987 and also of the IUPAC meeting in Boston, August 1987. Member of the Nominating Committee 1988. Chairperson of the Public Relations Committee 1988 and 1990 National Meeting. Worked on SUMMERTHING for past ten years. Member of the organizing and planning committee for the April 1990 National Meeting in Boston. Member of the Professional Relations Committee 1988-present. Member of the Board of Directors NEACS 1984-present.

ACS Statement: As an active councilor of NEACS for the past six years, I have taken my duties and responsibilities very seriously. I shall continue to broaden our section's influence on national policy decisions, to increase interaction between our Section and the National Society, to promote new and interesting programs, and to increase the involvement of the membership in its activities.

I would sincerely appreciate your support and your vote so that I may continue to serve you as Councilor.

James A. Golen

Physical Inorganic Chemistry.

Education: B.Sc., Southeastern Massachusetts University 1965, Ph.D. University of Massachusetts Amherst 1970, Postdoctoral work at University of Georgia 1970-1, University of Toronto Erindale College 1971-3, Drexel University 1973-5; Visiting Instructor of Chemistry SMU 1976-80, Assistant Professor of Chemistry SMU 1980-86, Associate Professor of Chemistry UMASS Dartmouth 1986-present.

Professional Organizations: American Chemical Society - Inorganic and Chemical Education Divisions, Sigma Xi, American Association for the Advancement of Science, New England Association of Chemistry Teachers, National Science Teachers Association.

NESACS Experience: Public Service Committee Co-chair 1992, Educational Task Force Member 1991 to present.

Position Statement: Willing to serve as a councilor in order to liaise with committees that enhance the quality and understanding of science education in this region.

Iclal S. Hartman

Professor of Chemistry and Chair of the Department of Chemistry at Simmons College, Boston. I have been active at the local level, have served as chair of the Membership Committee for the past six years and as adviser to the Student Affiliates Chapter at Simmons College for the last two years. If elected, I hope to represent our section at the national level by participating at the meetings of national committees and task forces and to bring to our section's attention the various issues and policies under consideration by the national. I'd like to serve as a voice for the interests of chemists and of chemical education at all levels.

Arno H.A. Heyn

B.S., Ph.D. (1944) U. of Michigan, Analytical Chemistry. Professor of Chemistry (emer.), Boston University.

Service in ACS: Member since 1940. Served on many committees of the Northeastern Section, Chairman 1969. Councilor 1967-. Committee on Committees 1992-, Council Policy Committee (voting) 1986-1991, Vice Chairman 1987-8; Council Committee on Constitution and Bylaws 1980-1985, Chairman 1983-5; Council Committee on Membership Affairs 1968-72, 1974-9, Secretary 1970-2, 1974-9. Currently on NESACS Committee on Constitution and Bylaws (Chairman 1979-82). Editor of the *NUCLEUS* since July 1989.

Statement: As one of the Section's representatives to the Council of the ACS I hope to continue serving as a link between the Section members and the national officers, staff and the many committees of the ACS. As a member of the Committee on Committees and liaison to the Local Section Affairs Committee and Committee on Environmental Improvement I shall promote membership of effective representatives on the committees of the ACS. The important work of the ACS: Publications, advising Congress and other government bodies on legislation and rules which involve chemistry or chemical professionals, requires the very best efforts by officers and staff. As your representative, I shall promote effective action by the Council. The positions as Editor of the *NUCLEUS* and as Councilor reinforce each other: As councilor I gain a better understanding of current concerns of the ACS, as editor I can pass on these concerns to you and, as your representative, translate your concerns into action at the Council, and thus at the ACS.

Morton Z. Hoffman

Department of Chemistry, Boston University, Boston, MA 02215.

Education: A.B., Hunter College of the City of New York, 1955; M.S., University of Michigan, 1957; Ph.D., University of Michigan, 1960. Postdoctoral Research Associate, Sheffield University (England), 1960-61.

Employment: Boston University, Assistant Professor, 1961-6, Associate Professor, 1967-72; Professor, 1972-present.

Positions: Visiting Scientist, U.S. Army Natick Laboratories. 1969-74: Acting Associate Dean. College of Liberal Arts, Boston University, 1983-84; Associate Editor, Radiation Research, 1985-89; Associate Chairman and Director of Undergraduate Programs, Department of Chemistry, Boston University, 1989-present.

Honors: Senior Postdoctoral Research Associate, U.S. National Academy of Sciences, 1969-70; Fellow, American Association for the Advancement of Science, 1992.

Research Interests: Photochemistry and photophysics of coordination complexes, kinetics and mechanisms of reactions of free and coordinated radicals, fast kinetics techniques.

ACS Activities: Member, NESACS Speakers Bureau, 1966-1972; Member, DivCHED Program Committee, 1980-86, 1993-present; Faculty Co-advisor, Students Affiliates Chapter at Boston University, 1989-present; Member, SOCED Task Force on Undergraduate Programming, 1991-present; Consultant, Presidential Task Force on Study Abroad Opportunities, 1992; Chairman, NESACS Education Committee, 1993-present.

Position Statement: Within the Northeastern Section there are more academic institutions than in any other local section. In effect, chemical education is one of this section's most important industries, occupying a substantial fraction of its membership and having a significant economic impact. I view the constituency of NESACS as including not only the teachers of chemistry within our schools, colleges, and universities, but also the students of chemistry. NESACS must continue to sponsor programs that transmit the excitement of science and chemistry to young people in junior and high school, and should expand its outreach to the many undergraduate and graduate students of the chemical sciences who are within the section. As a Councilor, I will encourage the further involvement of our students in the activities of the Society on the local and national level, and will be an energetic spokesman for the further development of educational programs that engage their imaginations. Our students are the future of our profession and our Society; I want to help the ACS and the Northeastern Section continue to nurture its future with a strengthened interface between students and their mentors.

Doris I. Lewis

Education and experience: B.S., Duke University, 1965; Ph.D., Tufts University, 1972. Academic appointments: Newton College of the Sacred Heart, 1970-75; Suffolk University, 1975-present; currently Professor of Chemistry. ACS member for 27 years; member AAAS, NEACT, NSTA/SCST, Sigma Xi; ACS National Science Funding Network 1991-present. **NESACS activities:** Continuing Education Committee, 1979-81; Student

Affiliate Coordinator, 1978-1990; 1990 National Meeting Committee; Alternate Councilor, 1991-present. Serving as Alternate Councilor I have supported education and outreach programs as well as efforts to widen member participation in activities of the Board and the Section. I also support strongly ACS efforts on the national and local level to support chemists as professionals, including providing opportunities for continuing education and employment services. All these endeavors must be continued and strengthened. In particular, community outreach to increase public understanding of chemistry should be a key effort; the rousing success of the Holiday Lectures, sponsored by this Section and presented at the Museum of Science, serves as a model for what can be achieved in this respect. The recently instituted program to make national ACS employment services more accessible to local section members is another example of a program which deserves continuing support. If elected, my aim would be to be responsive to needs and concerns of the Section membership as their elected representative, as well as giving my support to ongoing programs like these.

John L. Neumeyer

Education: B.S. Columbia University (1952); Ph.D. (Medicinal Chemistry) University of Wisconsin (1961)

Professional Experience: Research Chemist, Ethicon (Div. of Johnson & Johnson) 1952-57. FMC Corp., Sr. Research Chemist, 1961-63. Arthur D. Little, Inc., Sr. Staff Scientist 1963-69. Distinguished University Professor, Medicinal Chemistry and Chemistry, Northeastern University 1969-1992. Visiting Professor of Chemistry, University of Konstanz, Germany, 1975-77. Visiting Scientist, McLean Hospital, Harvard Medical School, 1985-86. Scientific Director and Chairman, Research Biochemicals International, 1980-present.

ACS Activities: Founder and Chairman Medicinal Chemistry Group, N.E. Section 1964-65. Division of Medicinal Chemistry — Councilor, Executive Committee 1971-81, Vice Chairman 1981, Chairman 1982, Councilor 1983-87. N.E. Section — Councilor 1988 - present, Trustee 1989-1993. Society Committee on Publications 1991 - present.

Statement: Having served the American Chemical Society in a variety of functions over the past 29 years, most recently as a Councilor and Trustee of the Northeastern Section, I have become keenly aware of the problems and concerns of its members, both on the local and national scene. If re-elected, I will continue to devote my time, energies and experience to carrying out my responsibilities as councilor, both nationally and at the local level.

Norman Rice

Education: University of Connecticut, Storrs, B.S. (1974); University of Massachusetts, Amherst, Ph.D. (1981).

Experience: American Hoechst (1974 - 1975); General Foods (1981 - 1984); Morton Thiokol/Johnson Matthey (1984 - 1992); Oryza Laboratories (1992 - Present).

ACS Activities: ACS member since 1974. Member of the Northeastern Section since 1981. Currently a member of the Elementary Education Task Force.

I feel it is important to continue and expand the efforts of the ACS to improve and enhance science education in our schools through programs such as Project Seed and local volunteer efforts. The need to educate and inform the general public about issues relating to chemistry is also an issue which I feel needs continued attention. As a councilor I will support ventures relating to these issues. In addition as a councilor I will represent the concerns and interests of the members of Northeastern Section. I look forward to further involvement in the activities of the ACS.

Donald O. Rickter

Education: University of California, Davis, AB and MS; Michigan State University, Ph.D.

Experience: 2 years as U.S. Navy Hospital Corpsman; 3 years H.S. and college teaching; Polaroid Research (Scientist since 1964; Information Scientist since 1978).

ACS Activities: Member since 1953; Congressional Science Counselor (8th District Mass.) since 1974; Liaison between the Northeastern Section and Polaroid since 1974; Program Committee 1981; Board of Publications 1983-85, Chairman 1985; Alternate Councilor 1985-1993; Polaroid exhibit at State House, June 1992.

Statement: Each of us needs to work on communicating better. We can solve many problems as chemists and citizens when we share our abilities. The public has some negative impressions of chemistry that will not go away if we are silent, neglecting our responsibilities to inform people. One of my concerns is the future of Chemical Abstracts Service. It is moving away from the understanding and "user-friendliness" of working chemists. Its powerful tools should be more useful than they are now. The Northeastern Section is unusually rich in talented chemists who need opportunities to interact socially and professionally. They can make their society and their local section great by active participation.

J. Donald Smith

Professor and Chairperson, University of Massachusetts Dartmouth. B.A. 1965, Chemistry, Columbia University; Ph.D. 1969, Biochemistry, University of Chicago; Post-Doctoral Fellow 1970-1974, Molecular Biology, Albert Einstein College of Medicine.

Professional Positions: New York State Department of Mental Hygiene, 1974-1975; Miami University, Assistant Professor of Chemistry, 1975-1982; University of Massachusetts Dartmouth: Assistant (1982-1984), Associate (1984-1989), Professor (1989) and Chairperson (1990) of Chemistry. Member: American Chemical Society,

American Society for Biochemistry and Molecular Biology (ASBMB), New York Academy of Sciences, American Society for Microbiology, New England Association of Chemistry Teachers. Professional Service: Advisory Panel for the Cellular Biochemistry Program of NSF (1989-1992); Educational Affairs Committee of ASBMB (1987-present); Nominating Committee of Northeastern Section (1985 and 1988).

Besides the responsibilities of a Councilor in representing the Section at National ACS meetings, a Councilor has major responsibilities toward the activities of the section itself. Our outreach activities for pre-college science education have become one of the strengths of the section and should be supported and strengthened. However, there are other section activities which need revitalization. As only a 10-year member of the section, I have been increasingly concerned about the poor attendance at monthly meetings and at the lack of participation of most of the membership in one of the largest ACS local sections in the country. A major question which the section needs to address is whether the structure and nature of the routine (non-award) monthly meetings needs to be changed. If we as chemists cannot generate that interest among ourselves for what we do, it should hardly be surprising that the population at large is less than enthusiastic about chemistry.

Nominating Committee

E. Joseph Billo

Education and Experience: B.Sc. (1961), M.Sc. (1963), Ph.D. (1967), McMaster University; Postdoctoral Research Associate, Purdue University (1967-1969); Assistant Professor (1969-1974), Associate Professor (1974-present), Department of Chemistry, Boston College.

Northeastern Section ACS Activities: Member of ACS since 1969. Chemical Education Committee (1974-76, 1978-86, chairman 1982-86); Organizer of the Undergraduate Research Symposium (1974-1976, 1978-1984); Nominating Committee (1981, 1991, 1993); James Flack Norris Award Committee (1985-88, chairman 1987); Alternate Councilor (1987-1996); Budget Committee (1989-1991); National Meeting Committee (chairman 1989-1990); Program Chairman (1989); Section Chairman (1990); Continuing Education Committee (1990-present).

Michael E. Strem

President, Strem Chemicals, Inc., since founding it in 1964. **Education:** A.B. Brown University (1958), M.S., Ph.D. University of Pittsburgh (1961, 1964). **Current ACS activities:** Councilor, Division of Small Chemical Businesses; Chairman, Subcommittee on Ethics, Committee on Professional Relations 1991-1992; Task Force on PEG Revision; Task force on Code of Ethics; Committee on

Committees, 1993-1994; Northeastern Section activities: Chairman, 1989.

Edward H. Wong

B.S., Chemistry, University of California, Berkeley, 1968.

Ph.D., Chemistry Department, Harvard University, 1974. Postdoctoral Fellow, Chemistry Department, University of California, Los Angeles, 1974-76.

Assistant Professor, Chemistry Department, Fordham University 1976-78.

Assistant Professor, Chemistry Department, University of New Hampshire, 1978-83.

Associate Professor, 1983-89.

Professor, 1989-present.

ACS member since 1974.

Richards Medal Committee

James E. Davis

Education: B.S. in Chemistry, Mississippi State University, 1956, Ph.D. in Physical Chemistry, MIT, 1960, Postdoctoral Study in Biochemistry, Caltech, 1960-64

Academic: Oakland University, 1964-72, University of Pennsylvania, 1972-87, Harvard University, 1987-present

Professional Organizations: American Chemical Society, American Association for the Advancement of Science, Sigma Xi Research Society

Educational Interests: For the past 28 years, I have taught general chemistry, physical chemistry and biochemistry at Harvard, Penn, and Oakland Universities. As Head Tutor at Harvard, I am in charge of the undergraduate advising in chemistry and of the chemistry teaching laboratories. I am also very interested in environmental chemistry, and have given a number of public lectures on acid rain, global warming, smog, and other environmental topics.

Last fall I gave a program of Chemical Demonstrations for the New England Section of the ACS in honor of National Chemistry Week. I would be very pleased to serve the Section as a member of the Richards Medal Committee.

Stanley C. Israel

Head, Department of Chemistry, University of Massachusetts Lowell

Born Brooklyn, NY, 1942. Parsons College, B.S. 1965, Lowell Technological Institute, Ph.D. 1970. Instructor 1968 to Professor 1980-, Department Head 1992-, Coordinator, Polymer Science Program 1990-1992, University of Massachusetts Lowell. Visiting Professor, University of Utah, 1975-1977. Director of Chemical and Engineering Research, Flammability Research Center, University of Utah 1976-1977. Memberships: American Chemical

Society, American Society for Mass Spectrometry, AAAS, N.Y. Acad. of Sciences, Sigma Xi American Association of University Professors. Listed in American Men and Women of Science, and Who's Who.

ACS Activities: Member Divisional Activities Committee, Associate Member Committee on Meetings and Expositions, Liaison to Committee on Science, Treasurer Division Officers Caucus, Top DOG 1993, Northeastern Section Bd. of Directors 1990-. Division of Polymer Chemistry: Councilor 1990-, Chairman 1989, Chairman-Elect 1988, Vice-Chairman 1987, Program Chairman 1984-1987, Treasurer 1979-1984. Founding member POLYED Education Committee.

Awards: Polymer Division Distinguished Service Award (1993), ACS Division Officer Award-Large Divisions (1991), (1989), (1985), (1983), ACS Student Affiliate Advisor Award (1978), Editorial Board of "Polymers for Advanced Technologies", Associate Editor "Fire Research," 1976-1982, and author of over 80 papers and patents in the areas of polymer science, pyrolysis-mass spectral analysis of polymers, and surface characterization by Laser Contact Angle Goniometry.

Stephen J. Lippard

(Massachusetts Institute of Technology)

B.A., 1962, Haverford College; Ph.D., 1965, Massachusetts Institute of Technology; NSF Postdoctoral Fellow, 1966, MIT; Assistant Professor, Columbia University, 1966 to Professor, 1972-1982; Professor, Massachusetts Institute of Technology, 1983-1989; Arthur Amos Noyes Professor of Chemistry, 1989-present.

Awards: Henry J. Albert Award, International Precious Metals Institute, 1985; Elected Fellow, American Academy of Arts and Sciences, 1986; ACS Award in Inorganic Chemistry Sponsored by Monsanto Company, 1987; Remson Award, Maryland Section of the ACS, 1987; Alexander von Humboldt Senior Award, 1988; Elected Member, National Academy of Sciences, 1989.

ACS Activities: Alternate Councilor, ACS Inorganic Division, 1982-1985; Chairman, Bio-inorganic Subdivision, ACS Inorganic Division, 1987; Chairman, Inorganic Division, 1992; Associate Editor, *Inorganic Chemistry*, 1984-1989; Associate Editor, *Journal of the American Chemical Society*, 1989-present; Editorial Boards, *Inorganic Chemistry*, 1979-1983, 1989-92; *Accounts of Chemical Research*, 1986-1988; *Chemical Research and Toxicology*, 1990-present.

Other Professional Activities: National Institutes of Health Medicinal Chemistry Study Section B, 1973-77; Chairman, Gordon Research Conference on Inorganic Chemistry, 1985. Chair-Elect, Metal Ions in Biology, Gordon Research Conference.

Research Interests: Inorganic, bio-inorganic, and organometallic chemistry. Synthesis, reactivity, and structure determination of transition metal complexes; mecha-

nism of action of platinum anticancer drugs; polynuclear iron centers in chemistry and biology; binding and activation of organic molecules using high coordinate or poly-metallic transition metal centers.

Richard R. Schrock

B.A., 1967, University of California at Riverside, Ph. D., Harvard University, 1971. NSF postdoctoral fellow at Cambridge University, Central Research and Development Department of E. I. duPont de Nemours and Company. M.I.T., 1975-, Professor 1980, Frederick G. Keyes Professor of Chemistry in 1989. His interests include the inorganic and organometallic chemistry of high oxidation state early metal complexes, catalysis and mechanisms involving alkylidene or alkylidyne species, the chemistry of high oxidation state dinitrogen and related complexes, the controlled polymerization of olefins and acetylenes, ring-opening-metathesis polymerization, the synthesis of ordered polymers containing organic or inorganic semiconductors, metal clusters, or luminescent groups, nonlinear optical materials, and electro-luminescent polymers. He has been an Alfred P. Sloan Fellow, a Camille and Henry Dreyfus Teacher-Scholar, the recipient of the ACS Award in Organometallic Chemistry (1985) and the Harrison Howe Award of the Rochester ACS section (1990), and has been elected to the American Academy of Arts and Sciences and the National Academy of Sciences. He has been a member of various advisory committees, was Associate Editor of *Organometallics* for eight years, and has published more than 240 research papers.

Esselen Award Committee

Phyllis A. Brauner, Ph.D.

Professor Emeritus, Simmons College
Currently Visiting Lecturer, Framingham State College
I have no unique background or experience to make me an outstanding candidate for this committee. All I can say is, (1) I personally consider this one of the most important and prestigious awards - it shows the public what chemists do and it honors those who do it. (2) I will attempt to seek superior candidates from all areas of our profession (that is, medical, environmental, new products, etc.) to receive the Esselen Award.

Arthur S. Obermayer

Esselen Award Committee: In 1985 persuaded Gus Esselen III to provide funds for an award for Chemistry in the Public Interest and, working with Esselen, set the original parameters for the award. Member of Award Committee from its beginning in 1986 to the present, and chaired committee in 1991.

Northeastern Section, ACS: Section Chair, 1982; Member, Board of Trustees from 1985 to 1990 and Chair, Board of

Trustees, 1989-90. National Councillor, 1979 to 1983.

Employment: President, Moleculon Research Co., 1961-present.

Education: M.I.T., Ph.D., Chemistry, 1956. Swarthmore College, B.A. (High Honors), 1952.

Timothy O'Sullivan

Experience: Currently Director of Freshmen Chemistry Programs at UMASS Dartmouth and Principal Investigator for the Buzzards Bay Rim Project, a collaborative NSF teacher enhancement project. Ph.D. from NYU and MS from Purdue in Chemistry.

ACS Experience: Active member of the Education Task Force of the NESACS for two years; member for fifteen years.

Philosophy: I consider the Esselen Award to be very important because it recognizes and honors the work of a chemist who has accomplished research that has benefitted mankind and because it also provides an opportunity to communicate to the general public the importance of Chemistry in their lives. I have a dual role as a teacher: I help prepare future leaders in the areas of business, political science, journalism (students who have a science requirement at the university but are not majoring in science) and I also work with students who are planning to pursue careers in the sciences, health sciences and engineering. This kind of work complements both my previous work as a bio-inorganic chemist and my current work with teachers who are looking at the ways in which science should be presented to the children who will become the next generation of citizens for whom Chemistry will play a vital role. All of these experiences have convinced me of the importance of a well-informed, well-educated citizenry and the vital role that is played by scientists whose research has a major positive impact on the public sector and on how it views science. My background and my interests in this area will enable me to contribute fully to the selection processes of the committee.

Myron S. Simon

Education: A.B., Harvard, Chemistry, 1946, Ph.D., Harvard, Organic Chemistry (R.B. Woodward), 1949.

Professional Experience: Polaroid Corporation 1949-1988. Primarily research on instant color films. A variety of research and administrative positions. Last title, Research Fellow. ACS member since 1945.

ACS Northeastern Section Activities: Section Chairman 1985; Alternate Councilor 1984-1993; Trustee 1987; Section Archivist 1993; Associate Editor of the *NUCLEUS*, 1988-Present; Chairman of the Committee on Professional Relations 1987-1992; *Co-Founder of the Esselen Award Committee*, 1985, Esselen Award Committee Member, 1985-Present, Chairman 1985-1988, 1992. Wrote the manual for the Esselen Award Committee. Would like the opportunity, by being re-elected, to continue the work of the Esselen Committee of teaching the public the positive values of chemistry. ◇

Environmental Chemistry Column

The Taxing Issue of BTU vs. Carbon

by David Ham, Envirochem, Inc.

Part of the Clinton administration's proposed economic revitalization plan is a new tax on fossil fuels based upon the energy produced from each fuel, a Btu tax. Many environmental groups and Vice President Gore in his book "Earth in the Balance" have advocated a tax on fuels based upon their carbon content, known as a carbon tax. Other types of fuel taxes have also been proposed; Ross Perot and others recommend a simple gasoline tax. Each approach affects various segments of the population differently and has different environmental benefits. What are the technical differences between the main approaches of taxing our energy use? And, why are some people so upset about the differences?

The use of fossil fuels to generate electricity, heat homes and companies, power transportation etc. produces a variety of pollutants that cause the problems discussed in this column over the past couple of years. Taxing fuel in any way is motivated partly by the desire to decrease fuel use which will reduce pollution and reduce our balance of payments deficit for oil imports. The Btu tax is proportional to the fuel's heating value, a measure of the heat released upon complete combustion. A carbon tax would be based upon the amount of carbon in the fuel, probably per unit heat release; this is motivated by decreasing CO₂, the ultimate product of the burned carbon and the largest source of the anticipated greenhouse effect.

We use a wide range of fossil fuels throughout our society that can be classified into three groups: gaseous fuels, mostly natural gas which is primarily methane; liquid fuels, petroleum distillates including gasoline; and solid fuels, a variety of coals used in this country mostly for electric power generation, primarily in the eastern and midwest states. The pollution problems caused by these fuels differ because of their different energy contents and compositions, including impurities.

Social problems result more from the location of the sources of the fuels and the jobs associated with production than with any technical aspects.

Of the natural fuels, natural gas has the simplest composition and is considered the cleanest. Natural gas is mostly methane, from 60-99%, with ethane being the other major constituent and hydrogen sulfide a common trouble-causing impurity. Compared to coal, combustion of natural gas emits only about half as much carbon dioxide, the principal greenhouse gas, but methane leaks in the production and distribution systems counteract this advantage as methane causes 7.6 times more greenhouse effect than CO₂ per molecule. More than 27% of the fossil fuel consumed in the U.S. is natural gas, and it is seen as the fastest growing energy source worldwide as countries try to reduce dependence on oil and reduce environmental problems.

Liquid fuels (fuel oil, kerosene, and gasoline) are composed of complex mixtures of a large number of hydrocarbon species. The heating values for the different distillation fractions of petroleum are all about the same, roughly 2.0 x 10⁴ Btu/lb, with carbon compositions about 86% by weight. These similarities result from the fact that each CH₂ group added to a large hydrocarbon chain adds about 150 kcal/moles to the heat of combustion

independent of the size of the hydrocarbon. Almost half the fossil energy consumed in the U.S. is produced from oil, and about 40% of this oil is imported.

Coal is the term used for a class of solid fuels with very different compositions and heating values. U.S. coals have carbon contents varying from about 30-65% and heating values from 7-14 x 10³ Btu/lb of coal. The ash contents of these coals range from 4-20% by weight, often containing toxic substances. The sulfur content which can exceed 4% by weight produces SO₂ upon combustion and is the principal cause of acid rain. About 27% of the fossil fuel used in the U.S. is coal, with low sulfur coal coming from the western states, mostly from Montana, Wyoming and North Dakota, and high sulfur coal mined in the midwest, mostly in Illinois, West Virginia, Kentucky, Pennsylvania, and Ohio.

Specific comparisons of the tax implications for different fuels and different geographical areas require consideration of the details of fuels, mostly the different characteristics of coals produced in different regions. However, a general comparison based upon typical properties gives a good impression of the situation. A typical coal might contain 70% carbon by weight with a heating value of 2.0 x 10⁴ Btu/lb carbon. Fuel oil is about 86% carbon by weight

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- Spectroscopy
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PLASTICS ANALYSIS

CHEMICAL/MECHANICAL



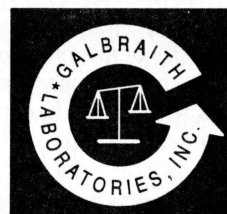
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**Environmental
 Chemistry Column**

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and produces almost 2.2×10^4 Btu/lb carbon. For methane the corresponding figures are 75% carbon and almost 2.9×10^4 Btu/lb carbon. Based on these numbers one obtains ratios for a carbon tax to a Btu tax of CH_4 : oil: coal = 1: 1.3: 1.4. Or in other terms, a Btu tax would be about 23% less for oil and 29% less for coal than a carbon tax.

One goal of all energy taxes is to reduce energy consumption in general. In addition to reducing fuel use and pollution in general, a carbon tax is intended to impose additional leverage to decrease the greenhouse effect by reducing CO_2 production. None of the proposed taxes includes considerations of many of the real costs of fossil fuel-produced pollution from acid rain, urban smog, and mining wastes. The choice of a Btu tax is a step in the direction of controlling our energy use with consideration of the impact this has on the economy, primarily jobs in the coal mining states. \diamond

Norris Summer Scholar's Report

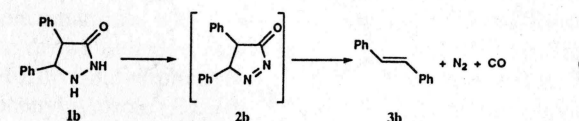
MODEL STUDIES TOWARD THE SYNTHESIS OF *cis*-4,5-Disubstituted-3-PYRAZOLIDINONES

by Richard A. Silva†

Department of Chemistry, University of Massachusetts at Boston

INTRODUCTION

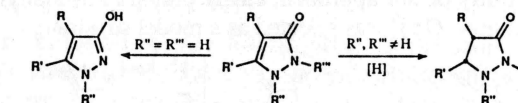
In 1968, Kent and Anselme discovered that the oxidation of 3-pyrazolidinones (**1**)¹ was followed by the fragmentation of the putative α -carbonyl azo intermediates (1-pyrazolin-3-ones, **2**)² to yield alkenes after extrusion of nitrogen and carbon monoxide (Eq. 1). Since the starting 3-pyrazolidinones **1** are obtained by Michael addition of hydrazine to α,β -unsaturated esters, the stereochemistry of 4,5-sub-



stituents in **1** is most likely *trans*. Thus, the fact that for example, *trans*-stilbene (**3b**) is formed from what is pre-

sumed to be *trans*-4,5-diphenyl-3-pyrazolidinone (**1b**)¹ suggests that this reaction might be stereoselective. However, both the stereochemistry of the starting pyrazolidinones and the oxidative fragmentation of *cis*-4,5-disubstituted-3-pyrazolidinones need to be studied in order to establish the stereochemical features of this reaction. To this end, the synthesis of *cis*-4,5-disubstituted-3-pyrazolidinones was undertaken.

Our approach was based on the fact that the 4,5-disubstituents have to be forced into being *cis*- to each other; a reaction which might serve this purpose is the *cis*-addition of hydrogen to a double bond at the 4,5-positions (Scheme 1). However, substrates for such a sequence would have to be protected at both nitrogens in order to prevent aromatiza-



Scheme 1

† 1992 James Flack Norris Undergraduate Research Fellow; 1992 Pfizer Undergraduate Research Fellow; advisor: Prof. J.-P. Anselme.

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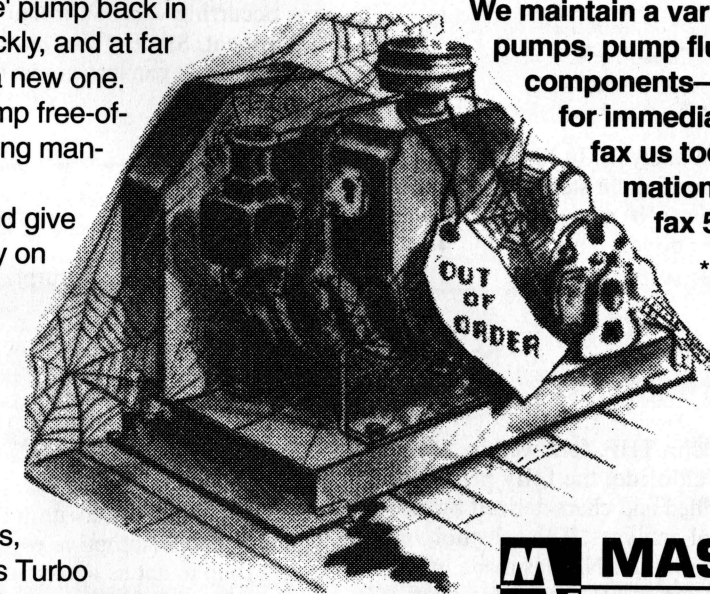
* Registration Information: To register, contact Mary Postweiler, ATI Applications Seminar Coordinator, TEL: (608)831-5515 or FAX: (608)831-2093. Participants may attend either morning (8:30 a.m.) or afternoon (1:30 p.m.) sessions for \$35 per sessions, or both sessions for \$50. Registration fee includes a practical, easy-to-follow handbook that helps you be proficient at these new techniques the next day and refreshments.

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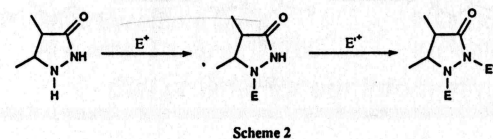
Norris Summer Scholar's Report

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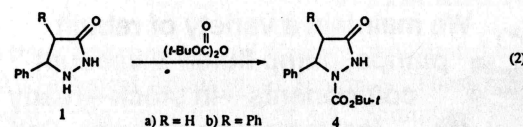
tion to pyrazoles.³ The protective groups would have to be not only removable (without loss of stereochemistry at carbons 4 and 5 and rupture of the ring) but also able to withstand the conditions necessary to introduce the double bond. Two strategies were considered, the "ylide" approach and the "classical" route. The latter strategy will be the subject of this report.

Results and Discussion

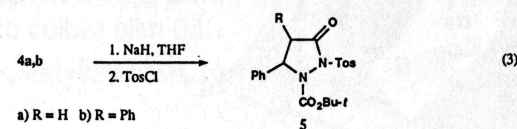
The widely different reactivity of the two nitrogens of the pyrazolidinone ring makes it inevitable that electrophilic substitution will generally occur first at N1 (*amino* nitrogen).^{4,5} Once the *amino* nitrogen is substituted, the *amido* nitrogen (N2) could be induced to react with electrophiles, under basic conditions (Scheme 2).⁴ It has been shown by Dorn and Arndt^{4c} that acid cleavage of 1-benzyl-2-benzoylpyrazolidinones gave the corresponding 2-benzyl-3-pyrazolidinones without rupture of the ring. In order to determine the feasibility of our approach, easily prepared 5-phenyl-3-pyrazolidinone (**1a**)⁶ was selected as a model substrate.



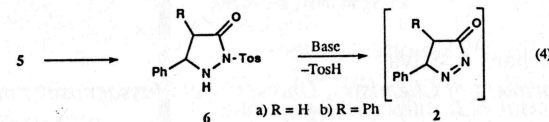
Carbo-*t*-butoxylation of **1a** with di-*t*-butyl pyrocarbonate afforded the expected 5-phenyl-1-carbo-*t*-butoxy-3-pyrazolidinone (**4a**).⁷ Its structure was confirmed by IR and



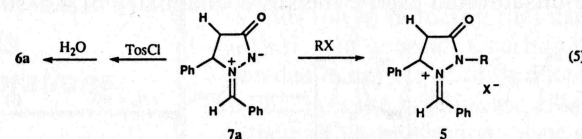
NMR spectra and elemental analysis. In like fashion, treatment of the eventual substrate for the stereochemical study, 4,5-diphenyl-3-pyrazolidinone (**1b**) gave **4b**, the structure of which was established as above. When **4a** and **4b** were



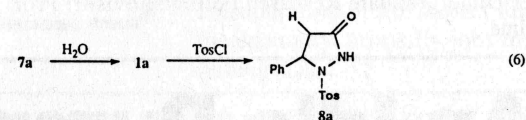
treated with sodium hydride in THF, followed by the addition of *p*-toluenesulfonyl chloride, the fully protected 3-pyrazolidinones **5** were formed and characterized by IR and NMR spectra and elemental analyses. The selection of the tosyl group as a protective group for N2 was made in anticipation that, after deprotection of N1, base-catalyzed 1,2-elimination of the elements of *p*-toluenesulfinic acid might provide a novel, alternate and "non-oxidative" route to the α -carbonyl azo intermediates (Eq. 4).



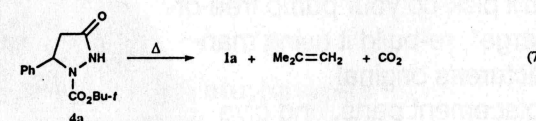
During the course of an earlier approach to this type of compounds, we had shown that the corresponding 3-oxopyrazolidinone ylides (**7**) could be alkylated at the anionic nitrogen.⁸ Thus it was thought that tosylation of easily prepared **7a**, followed by hydrolysis of the intermediate hydrazone salt might provide an easier route to **6a** (Eq. 5). Attempted tosylation of **7a** gave instead 5-phenyl-1-tosyl-3-



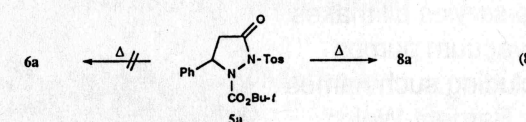
pyrazolidinone (**8a**) whose structure was established by comparison with an authentic sample, prepared by tosylation of **1a**.⁹ It was thought that the adventitious presence of water could have hydrolyzed the ylide to **1a**⁴ which then underwent tosylation to **8a** (*vide supra*); however, even



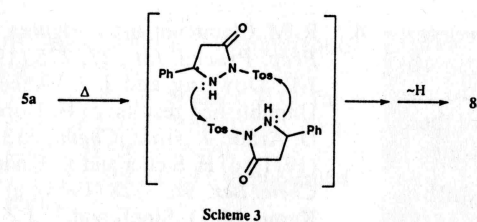
when great care was taken to exclude moisture, the same result was obtained. The suspicion that an unusual reaction was occurring was confirmed by the result of a subsequent experiment. Since it was known that the N-carbo-*t*-butoxy groups (Eq. 7) can be removed by pyrolysis,¹⁰ compound **5a**



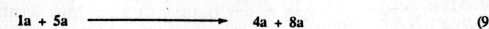
was pyrolyzed at 120°; surprisingly **8a** was formed instead of the expected 2-tosyl derivative **6a** (Eq. 8). It appeared



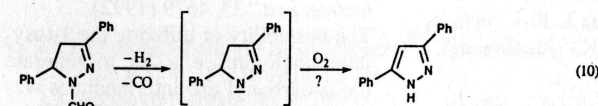
that somehow **5a** was undergoing self *trans*-tosylation (Scheme 3); presumptive evidence for the ability of the 2-tosyl group to act as a tosylating agent came from the reaction of **5a** with **1a**; both **4a** and **8a** were characterized; apparently the carbonyl function attached to the nitrogen bearing the tosyl group makes this type of grouping behave



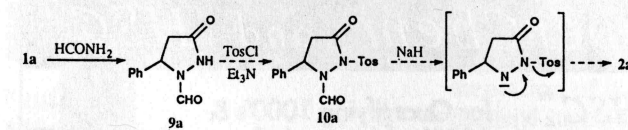
as a source of incipient sulfonylium ion (Tos⁺).



We have begun another approach which involves CHO as the protective group. It is known that treatment of formates and formamides with sodium hydride results in the elimination of the hydrogen and carbon monoxide;^{11a} similarly, N-formyl-3,5-diphenyl-2-pyrazoline is converted to 3,5-diphenylpyrazole (Eq. 10).^{11b} In anticipation of the investiga-

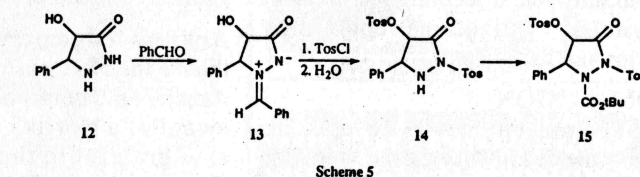


tion of this alternate route, 5-phenyl-1-formyl-3-pyrazolidinone (**9a**) has been prepared from the reaction of **1a** with formamide and characterized. We expect that tosylation under conditions which would not result in the loss of the N-formyl group should lead to the fully protected compound **10a**; upon treatment with sodium hydride, the anion generated should

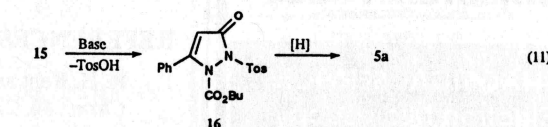


eliminate *p*-toluenesulfonate ion to yield **2a** (Scheme 4). These experiments are currently under investigation.

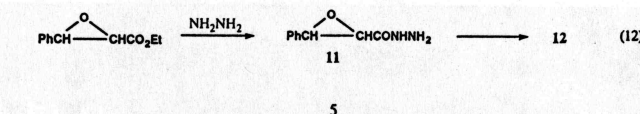
The availability of 5-phenyl-4-hydroxy-3-pyrazolidinone (**12**)¹² prompted the concurrent examination of yet another route. It was anticipated that the ylide from **12** could



be N- and O-tosylated stepwise or in one reaction and then hydrolyzed to afford **14**. Protection of amino nitrogen followed by the introduction of unsaturation at the 4,5-position would lead to **16** (Scheme 5); hydrogenation should lead to the known **5a** and this sequence would establish the validity



of the process (Eq. 11). So far, ylide **13** has been prepared and characterized. However, the insolubility of compound **12** in several common solvents¹³ compelled us to reassess the pursuit of this route as a main line of attack. Indeed, even if the whole sequence proved viable, its application to the 4-phenyl analogue of **12**¹⁴ might be fraught with solubil-



ity problems. In the context of this work, it was established that compound **12** could be obtained *directly* from the action of hydrazine on ethyl phenylglycidate. Furthermore, it was shown that the hydrazone **17** derived from the reaction of **11**



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with benzaldehyde could be induced to cyclize to ylide **13**; it is to be noted that **17** does not possess the steric "crowding" on the carbon attached to the imino nitrogen, a seeming requirement of similar cyclizations reported by Taylor and his students.¹⁵

CONCLUSION

The present results have established the feasibility of the stepwise introduction of protective groups onto the two differing nitrogens of the 3-pyrazolidinone ring. Considerably

more work will be required to determine the best combination of substituents necessary to lead to the desired compounds. Work toward these goals is continuing in our laboratories.

Acknowledgements. The author thanks the Northeastern Section of the American Chemical Society for the award of a Norris Fellowship. He is also grateful to the Department of Chemistry of the University of Massachusetts at Boston for chemicals and supplies, to Dr. B. H. Arison of Merck Sharp and Dohme (Rahway, NJ) for spectra and to Pfizer Inc. (Groton, CT) for the award of a fellowship.

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- 2a. W. Nagata and S. Kamata, *J. Chem. Soc. (C)*, 540 (1970); b) T. R. Lynch, F. Maclachlan and Y. K. Siu, *Can. J. Chem.*, **49**, 1598 (1971).
3. B. C. Hamper, M. L. Kurtzweil and J. P. Beck, *J. Org. Chem.*, **57**, 5680 (1992).
4. R. M. Claramunt and J. Elguero, *Org. Prep. Proced. Int.*, **23**, 275 (1991); J.E. Dowling and J.-P. Anselme, Unpublished results; c) H. Dorn and D. Arndt, *J. prakt. Chem.*, **313**, 115 (1971); d) H. Stetter and K. Findeisen, *Chem. Ber.*, **98**, 3228 (1965); e) D. S. Kemp, M. D. Sidell and T. J. Shortridge, *J. Org. Chem.*, **44**, 4473 (1979).
5. It is possible that the Mitsunobu reaction could be used to *alkylate* the amidic nitrogen (N2); such a reaction has never been reported and would not be useful in the current investigation.
6. By reaction of hydrazine with commercially available methyl cinnamate.
7. The acylation was first performed with *t*-butyl azidoformate. All new compounds herein reported gave correct elemental analyses (within ± 0.30).
8. J. E. Dowling and J.-P. Anselme, *Bull. Soc. Chim. Belges.*, **100**, 359 (1991); J. E. Dowling, K. Hoogsteen, B. H. Arison and J.-P. Anselme, *Tetrahedron Lett.*, **33**, 4679 (1992).
9. The possibility of utilizing the 1-tosylated analogues, e. g. **8a**, to generate the α -carbonyl azo intermediates was considered too risky in view of the possibility of 1,5-elimination to yield the pyrazoles.

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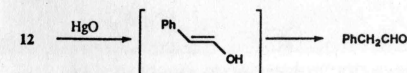
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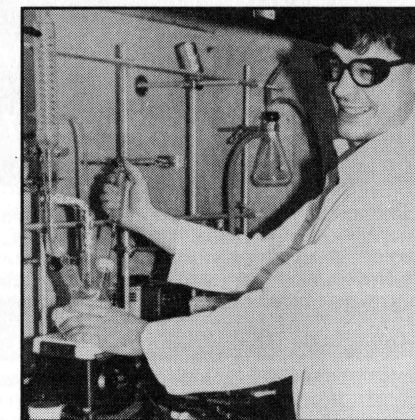
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10. J.-P. Anselme *et al.*, Unpublished results.
11. a) J. C. Powers, R. Seidner, T. G. Parsons and J. J. Berwin, *J. Org. Chem.*, **31**, 2623 (1966); b) J.-P. Anselme *et al.*, Unpublished results.
12. C. Sabaté-Alduy, J. Bastide, P. Berçot and J. Lematre, *Bull. Soc. Chim. France*, 1942 (1971).
13. So far the problem of solubility has precluded a full and thorough investigation of the oxidative fragmentation of **12**. Only poor yields of the expected phenylacetaldehyde were obtained because of decomposition (polymerization?) caused by the necessarily long and tedious removal of the large amount of solvent used.



14. This compound should be obtainable from the action of hydrazine on ethyl 2,3-diphenylglycidate [F. F. Blicke, J. A. Faust and H. Raffelson, *J. Am. Chem. Soc.*, **76**, 3161 (1954)].
15. E. C. Taylor, N. F. Haley and R. J. Clemens, *J. Am. Chem. Soc.*, **103**, 7743 (1981). \diamond



Richard A. Silva

Prof. J.-P. Anselme writes: Richard Silva was a biology major in the process of completing his senior year when I met him in the spring of 1991. He decided to become a chemistry major. He had to take several courses required for his new major. He began research in my laboratories during the summer of 1991 and became interested in the chemistry of 3-pyrazolidinones and their ylides. One aspect of this general project was to devise approaches to the synthesis of *cis*-4,5-disubstituted 3-pyrazolidinones, needed to explore the stereochemistry of the oxidative fragmentation of these compounds. The financial support provided by the James Flack Norris Scholarship has further encouraged Richard to pursue his studies beyond the B.Sc. degree. He will be attending graduate school in the Fall of 1993. \diamond

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continued from page 4

NUCLEUS issue for the NERM 23 meeting in June.

Membership: I. Hartman requested that due efforts be made to include women speakers for Section meetings.

Nominations: E.J. Billo read the list of nominees for the several elected positions and committees, to be published in the March *NUCLEUS*, as well.

Other Committees:

Continuing Education: A. Viola announced the symposium on biological catalysts in industrial processes, to be held April 24 at Northeastern U.

NERM 23: T. Gilbert reminded members that the deadline for submitting abstracts of papers for presentation at NERM23 in Boston will be March 5. NERM23 will meet at Northeastern University on June 22-25.

Public Service: Plans for the Esselen Symposium on April 13 are nearly complete.

Project SEED: There will be 6-8 students supported for summer research work under the sponsorship of Millipore Corp.

Summerthing: It was announced that this event will be merged with a social event at NERM 23.

New Business: J.D. Smith offered to host May 13 Education Night at the U. Mass. Dartmouth. The board ACCEPTED this offer. An open house in the chemistry department will precede the evening meeting. ◇

Calendar

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May 3

Prof. John Snyder (Boston University)
“Recent Advances in Natural Product Chemistry: Isolation, Structure Elucidation and a Little Synthesis”
Brandeis University
Gerstenzang 122 at 4:00 pm

May 4

Dr. I. Chaiken (SmithKline and Beecham Pharmaceuticals, Inc.)
“Analytical Uses of Affinity Chromatography: Probing Macromolecular Recognition and Assembly Using Immobilized Ligands”
Northeastern University
Hurtig Hall, Rm. 129 at 4:00 pm

Arthur D. Little Lectures in Inorganic Chemistry
Massachusetts Institute of Technology
Physical Chemistry Seminar Series
Rm. 4-370 at 4:00 pm

May 6

Mr. Chrysostomos Sfatos (Harvard University)
“Microphase Separation and Freezing in Random Copolymers”
Harvard University, 12 Oxford Street
Rm. Mb-23 at 5:00 pm

May 11

Prof. Daniella Goldfarb (Weizmann Institute)
“Molecular Structure and Dynamics by Pulsed ESR Spectroscopy”
Massachusetts Institute of Technology
Physical Chemistry Seminar Series
Rm. 4-370 at 4:00 pm

May 17

“Symposium in Honor of Dr. Alfred Bader”
Harvard University, 12 Oxford Street
Rm. Mb-23 at 2:30 pm

Prof. Chi-Huey Wong (Scripps)
“Bioorganic Synthesis of Inhibitors Related to Cell Adhesion”

Prof. Hisashi Yamamoto (Nagoya University)
To be Announced

May 19

Prof. M. Rosenblum (Brandeis University)
“Synthesis and Properties of Polymeric Stacked Face-to-Face Metallocenes”
Northeastern University
Hurtig Hall, Rm. 129 at 4:00 pm

May 27

Dr. John Snyder (Boston University)
“Recent Advances in Natural Indole Chemistry”
Northeastern University
Hurtig Hall, Rm. 129 at 4:00 pm

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