



UNIVERSITY OF MINNESOTA  
TWIN CITIES

Department of Chemistry  
Kolthoff and Smith Halls  
207 Pleasant Street S.E.  
Minneapolis, Minnesota 55455

No. 8

MINNESOTA CHEMISTS NEWSLETTER

February 1979

Dear Alumni and Friends:

It is again that time when we look back at the past calendar year and attempt to assess our progress. Fortunately, we can say that 1978 was an excellent year for the Department of Chemistry at the University of Minnesota.

Most importantly, the legislature formally approved a commitment of \$2.4 million for a start on the total renovation of Smith Laboratory. This is an initial installment on what we believe will be an \$8-10 million project. This initial funding is for architectural planning, partial renovation of the fourth floor, and the updating of services (water, electricity, air-conditioning). The firm of Smiley and Glotter has been chosen to plan the renovation.

Our rebuilding of the faculty has progressed significantly in the last twelve months. During the period we have hired Drs. Ted Fisher, William Fristad, Wayne Gladfelter, Thomas Livinghouse and Kent Mann. Professor Fisher will have his principle association with Bioorganic-Biophysical Division, Professors Fristad and Livinghouse with the Organic Division, and Professors Gladfelter and Mann with the Inorganic Division. During 1979, we plan to add one additional staff member to our Analytical Division. This will bring us to a steady-state faculty population of 44.

Through the combined efforts of our faculty we have again made significant improvements in our instrumentation. With help from the National Science Foundation, we have added a state-of-the-art x-ray crystallographic set-up to the Department and a major data system to our mass spectrometry laboratory. The faculty have continued to be quite successful in attracting research funds. In addition, the generosity of our friends in the industrial sector has continued.

As of September 15, 1979, I will be stepping down from the Chairmanship to return to teaching and research. Professor John Overend has agreed to take on the Chairmanship for a three-year term. As I prepare to vacate this office, I owe a great amount of gratitude to my colleagues, who have worked with tremendous effort and spirit to bring about the changes which have occurred during the last four years. Today, the Department of Chemistry at the University of Minnesota is able to provide an excellent education to students at both the undergraduate and graduate level. Our research is on the forefront of what's happening in chemistry. Our instrumentation is state-of-the-art. Smith Laboratory will soon be modernized. We hope that our alumni and friends will bring to the attention of those who might be prospective students or postdoctorals the quality of the operation which exists today in our Department.

With best wishes, I am

Sincerely yours,

*Paul G. Gassman*  
Paul G. Gassman

## FACULTY ADDITIONS

Jed F. Fisher will be joining us in the Fall of 1979 as assistant professor. Dr. Fisher received his bachelors degree from the State University of New York at Stony Brook, his Ph.D. at Massachusetts Institute of Technology and carried out postdoctoral duties with Jeremy Knowles at Harvard. Dr. Fisher will be joining our bioorganic-biophysical group. His research interests are in the mechanism of electron transfer to and from enzymes containing flavin nicotinamide and iron-heme cofactors, particularly as the electron transfer applies to arene oxides, anti-neoplastic quinones, quinone epoxides and halogenated organic substrates.

William E. Fristad will be joining the staff as assistant professor as of the Fall of 1980. He received his bachelors degree from St. Thomas College and his Ph.D. from the Ohio State University. He will spend the 1979-1980 academic year as a postdoctoral with Professor Geoffrey Wilkinson in England. Dr. Fristad's area of research interests will be in the development of new synthetic organic technology particularly with reference to the use of organometallics in organic synthesis.

Wayne L. Gladfelter will be joining our staff as assistant professor in the area of inorganic chemistry in the Fall of 1979. Dr. Gladfelter received his bachelors degree at Colorado School of Mines and his Ph.D. at the Pennsylvania State University. He is currently a postdoctoral in the laboratory of Professor Harry Gray at CalTech. Dr. Gladfelter anticipates carrying out research in the area of photochemistry of metal nitrosyls, photochemistry of low coordinate metal complexes, catalytic reactions of carbon monoxide - hydrogen on the mechanism of metal-metal bond forming reactions and on the reactions of metal clusters with carbon monoxide.

Thomas S. Livinghouse will be joining us in the Fall of 1980 as assistant professor in the area of organic chemistry. Dr. Livinghouse received his bachelors degree at UCLA, his Ph.D. at Rice University under the direction of Professor Robert Stevens. He will be postdocing during the 1979-1980 year with Professor W. S. Johnson at Stanford. Dr. Livinghouse will be involved in a variety of synthetic endeavors aimed at the total synthesis of alkaloids, the synthesis of sesquiterpenes and the total synthesis of antibiotics. These synthetic studies will be a vehicle for the development of novel synthetic methodology.

Professor Kent R. Mann joined the faculty in the Fall of 1978 as an assistant professor in the area of inorganic chemistry. Dr. Mann received his bachelors degree at the University of Illinois and his Ph.D. from California Institute of Technology. He is engaged in research that may be broadly categorized as physical inorganic chemistry. In particular, he is interested in the area of transition metal photochemistry which is related to solar energy applications.

## VISITING PROFESSORS

Professor Yehuda Mazur of the faculty of the Department of Chemistry at the Weizmann Institute of Science, Rehovot, Israel, was a visiting professor during the Fall Quarter 1978. Professor Mazur received a masters degree in 1947 from the Hebrew University and his Ph.D. in 1952 from the Federal Institute of Technology in Zurich, Switzerland. Since 1954 he has been on the faculty of the Weizmann Institute.

## FACULTY PROMOTIONS

Gary R. Gray was promoted to associate professor by action of the Board of Regents in 1978. Dr. Gray received his bachelor of science degree from Ouachita Baptist College in 1964, his graduate degrees were taken at the University of Iowa where he received a masters degree in biochemistry in 1967 and a Ph.D. in the same subject in 1969. Following the awarding of his degree he was a postdoctoral at the University of California at Berkeley for three years. He joined the faculty with the Department of Chemistry in the Fall of 1972 as an Assistant Professor. Dr. Gray's research interests are primarily in the area of bioorganic chemistry. He is involved in the isolation of biologically active materials from natural sources. He has also worked extensively in chemical transformations in the area of carbohydrates. Professor Gray has a career development award from the American Cancer Society.

## AWARDS

Professor Bryce Crawford was selected as the recipient of the 1978 Ellis R. Lippincott Award. The Lippincott Award was established in 1975 and is presented annually to recognize significant contributions to vibrational spectroscopy. The award is jointly sponsored by the Coblentz Society, the Society for Applied Spectroscopy, and the Optical Society of America. The award to him sites his contributions to our understanding of the molecular dynamics of liquids and of vibrational intensities and simultaneous transitions in gases, and his theoretical contributions to the treatment of normal coordinates.

Professor David Dixon was awarded a Dreyfus Teacher Scholar Award during the past year. The award consisted of \$35,000 in unrestricted funds. The award was given in recognition of his excellent achievements in the past and promising future.

Dr. Frank A. Bovey II, head of the polymer research department at Bell Telephone Laboratories, Murray Hill, New Jersey, received the William H. Nichols Medal of the ACS New York Section at an awards dinner on March 31, 1978. The prestigious gold metal award, established in 1902, honors Bovey for his "research into the structure of high polymers and insights into the relationship between structures and properties".

Bovey was born in Minneapolis in 1918. He received his Ph.D. from the University of Minnesota in 1948. Before joining Bell Labs in 1962, Bovey was head of polymer research at 3M's central research department.

## LEAVES

Professor Gary Gray spent the 1978-1979 academic year on sabbatical leave in residence at the University of Minnesota. During the same period, Professors John Ellis, W. Ronald Gentry, Robert Hexter, Wayland Noland and Louis Pignolet had single quarter leaves.

## LANDO SUMMER FELLOWSHIPS

The Lando (the late Maximillian N. Lando was a University of Minnesota chemistry graduate, B.S. 1902, who left a large endowment to the University) Summer Research Fellowship Program sponsored by the Department of Chemistry, was conducted again this summer. The program was for outstanding undergraduate students who have completed three years of undergraduate study in chemistry or related fields. Students were selected in a national competition. Nine students were selected from 101 applications and participated in advanced research projects under faculty supervision in the Department of Chemistry. The nine students who participated in the summer of 1978 were:

<u>NAME</u>	<u>SCHOOL</u>	<u>RESEARCH GROUP HEAD</u>
Marianne Begemann	Vassar College Poughkeepsie, NY	Farneth
Branden Borgias	Reed College Portland, OR	Pignolet
Kyle Bottorff	Simpson College Indianola, IA	Hoye
Carolyn Cassady	Pfeiffer College Misenheimer, NC	Carr
Gerald Fraser	Loyola University Chicago, IL	Truhlar
Beth Jacobs	Mt. Mary College Milwaukee, WI	Wertz
Paul Jasien	DePaul University Chicago, IL	Bryant
Mary Kappel	College of St. Catherine St. Paul, MN	Moscowitz/Overend
Michael Lundy	U of Southern Mississippi Hattiesburg, MS	Gassman

NATIONAL SCIENCE FOUNDATION - UNDERGRADUATE RESEARCH PROGRAM  
FOR SUMMER 1978

The Department was awarded \$19,620 to conduct a summer research program for undergraduates. The program was directed and organized by Professor John E. Ellis. The thirteen participants who were at Minnesota for ten weeks were:

<u>NAME</u>	<u>SCHOOL</u>	<u>RESEARCH GROUP HEAD</u>
Greg R. Almen	University of Minnesota Minneapolis, MN	Conroy
David P. Anderson	University of Minnesota Minneapolis, MN	Siegel
Mark A. Berg	University of Minnesota Minneapolis, MN	Farneth
Terry J. Cameron	University of Minnesota Morris, MN	Gray
Joseph E. Henry	St. John's University Collegeville, MN	Gassman
Jodi I. Huggenvik	Winona State University Winona, MN	Reynolds
Diane K. Jacobson	Harvard University Cambridge, MA	Bryant
Mary A. Johnson	University of Northern Iowa Cedar Falls, IA	L. Miller
Charles R. Ojala	College of Great Falls Great Falls, MT	Noland
Claire E. Pavlik	University of Minnesota Minneapolis, MN	Overend
Michael J. Rother	University of Minnesota Minneapolis, MN	Hoye
Robert E. Stevens	University of Wisconsin Madison, WI	Ellis
John D. Wood	University of Northern Iowa Cedar Falls, IA	Gassman

## POSTDOCTORAL ASSOCIATES

In the following table are listed the persons who held post-doctoral appointments in the Department.

<u>NAME</u>	<u>INSTITUTION</u>	<u>GRAD YEAR</u>	<u>COLLABORATING PROFESSOR</u>
Albrecht, Grant	London U	1975	Hexter
Bearman, Gregory	Brandeis U	1975	Gentry
Bradic, Zdravko	U of Zagreb	1974	Lumry
Chantooni, Miran	U of Minnesota	1961	Kolthoff
Childs, Michael	U of Southern California	1976	Gassman
Cooper, Charles	U of Missouri	1978	Gassman
Ellis, Peter	U of Illinois	1977	Gassman
Etzler, Frank	U of Miami	1978	Lumry
Evans, April	U of Minnesota	1975	Gassman
Fesciyan, Sezar	Belfer Grad Sch of Sci	1972	Dahler
Garrett, Bruce	U of California-Berkeley	1977	Truhlar
Huang, Harry	Rensselaer Polytechnic	1977	Gray
Jhon, Myung	U of Chicago	1974	Dahler
Kerr, John	U of Edinburgh	1978	Miller, L.
Knox, Donald	Notre Dame	1976	Lumry
McGaw, Brian	Leicester Polytechnic	1978	Leete
Mossman, Allen	UCLA	1976	Gassman
Mullins, Michael	U of Wisconsin	1978	Gassman
Nichols, Henry	U of Oklahoma	1977	Hexter
Onda, Kunizo	U of Tokyo	1973	Truhlar
Pasternak, Mordechai	Tel Aviv U	1975	Miller, L.
Raj, Tilak	U of Illinois	1976	Bryant
Raynolds, Peter	Ohio State U	1977	Gassman
Seamans, Lloyd	U of Minnesota	1974	Moscowitz
Shirley, William	North Carolina State U	1978	Bryant
Starkey, Frank	Brown U	1973	Gassman
Szabo, Andras	U of Tubingen	1969	Miller, L.
Tezuka, Meguru	Tokyo U	1975	Miller, L.
Tohyama, Kohji	Osaka U	1976	Miller, W.
Turner, Ralph	U of British Columbia	1978	Dahler
Van de Mark, Michael	Texas A & M	1976	Miller, L.
Yamaguchi, Ryohei	Kyoto U	1975	Gassman

## PLACEMENT OF POSTDOCTORAL STUDENTS IN 1978

<u>NAME</u>	<u>POSITION TAKEN</u>
Evans, April (Gassman)	Amoco Chemicals Corp.
Yamaguchi, Ryohei (Gassman)	Assistant Professor - Kyoto University
Chang, John (Gassman)	3M Company
Ellis, Peter (Gassman)	Armour-Dial
Childs, Michael (Gassman)	Universal Oil Products
Albrecht, Grant (Hexter)	Postdoc at University of Kent
Raj, Tilak (Bryant)	Postdoc at Elec Eng, U of Minnesota
Tohyama, Kohji (W. Miller)	returned to Japan
Kihara, Sorin (Kolthoff)	returned to Japan
Van de Mark, Michael (L. Miller)	Assistant Professor - University of Miami, Coral Gables

## GRANTS

Grants to faculty members during calendar year 1978 from sources outside the University totaled \$2,056,564 and were received by the following professors:

<u>NAME</u>	<u>PROJECT TITLE</u>	<u>GRANTING INSTITUTION</u>	<u>AMOUNT</u>
Victor Bloomfield	Physical Chemistry of Bacterial Viruses	NIH	\$85,000
Richard Borch	Platelet Aggregation Inhibition of Altered Synthesis	American Heart Assoc.	19,426
	Synthesis of Platelet Aggregation Inhibitors	Minnesota	9,650
	Reduction of Toxicity in Cancer Chemotherapy	NIH	55,149
Robert Bryant	Solvent and Small Solute in Tissues and Proteins	USPHS	65,771
	Alkaline Earth Ion Nuclear Magnetic Resonance	NIH	35,835
	Cross Polarization NMR of Rate Spins in Protein Systems	NIH	42,508
Peter Carr	New Developments in Thermochemical Analysis	NSF	28,900
Lawrence Conroy	Characterization of Aquatic Organics and Complexes	NSF	46,957
Bryce Crawford	Vibrational Intensities and Band Shapes in Liquids	NSF	62,000
John Dahler	Kinetic Theory of Polyatomic Fluids	NSF	46,000
	Theory of High-Energy Ion Atom and Atom-Atom Collisions	NSF	33,600
David Dixon	Molecular Beam Chemistry	Research Corp	19,300

John Ellis	Synthesis and Chemistry of Highly Reduced Organometallics	NSF	\$38,150
	Chemistry and Synthesis of Metal Carbonyl Tri- and Tetraanions	PRF	15,000
John Evans	Secondary Ion Mass Spectroscopic Analysis of Chemically Modified Solid Surfaces	PRF	10,000
	Interactions of Reactive Plasmas with Solid Materials	Research Corp	8,000
William Farneth	Infrared Laser-Induced Organic Reactions	ACSPRF	10,000
	Infrared Laser Initiated Organic Reactions	Research Corp	11,500
Paul Gassman	A Stereospecific Functionalization of Aromatic Amines	NIH	38,434
	Chemistry of Bent Bonds	NSF	72,700
W. Ronald Gentry	Chemical Dynamics of Bimolecular Reactive Collisions	NSF	26,000
	Reactions of Ions with Atomic and Molecular Free Radicals	ERDA	45,000
Gentry/Giese	Energy Transfer in Molecular Collisions	NSF	65,965
Gary Gray	Antitumor-Active Components of BCG Cell Walls	NIH	68,694
	Career Development Award	American Cancer Soc	25,000
Robert Hexter	Fluorescence Probes of Metal Surface Adsorbed Molecule Reactions	DAAG	39,000
	Surface Chemistry Studies Using Fluorescence Probes	Navy	36,000



Thomas Hoyer	Synthesis of Anti-neoplastic Chemotherapeutic Agents	NIH	56,986
I. M. Kolthoff	Acid Base Equilibria in Nonaqueous Solvents	NSF	58,500
Maurice Kreevoy	The Relations Between Rate, Structure and Solvent, Proton and Hydride Transfer	NSF	36,000
	The Origin of Barriers to Chemically Pumped, Selective Transport Across Membranes	NATO	5,109
Edward Leete	Research on Biogenesis of Morphine	PHS	74,718
Sanford Lipsky	The Contribution of Excited States of the Radiation Chemistry of Organic Systems	USERDA	78,000
Rufus Lumry	Molecular Details of Direct Water Participation in Protein Membrane and Whole Cell Function	American Cancer Soc	28,750
	Role of Water in Function of Hemoglobin and Myoglobin	NIH	53,805
	Conformational Basis of Enzymic Catalysis	NIH	38,926
Kent Mann	The Photochemical Generation of Species with Multiple Open Coordination Sites	ACSPRF	10,000
Larry Miller	Electrochemical Medicinal Synthesis	PHS	47,547
	Organic Plasma Chemistry	NSF	35,668
	Anodic Substitution	PRF	12,000
Wilmer Miller	Chloesteric Biopolymer Liquid Crystals	PHS	60,671

Albert Moscowitz	Magnetic Circular Dichroisms of Forbidden Transition in Organic Molecules	NSF	75,000
	Hemoglobin and Red Cell Systems in Hemo- Globinopathies	NIH	20,000
John Overend	Dipole Strengths of Multiquantum Transitions in Molecules - An Approach to a Model for Multiphoton Laser Disassociation	ACSPRF	30,000
	The Contributions of FF Nonbonded Inter- actions to Vibrational Anharmonicity in SF <sub>6</sub> , CF <sub>4</sub> and Related Molecules	NSF	29,588
Louis Pignolet	Photochemical, Redox, Magnetic and Kinetic Properties of Transi- tion Metal Complexes with Sulfur Containing Ligands	NSF	34,000
Brock Siegel	Biomemetic Organic Redox Chemistry	NIH	49,757
Donald Truhlar	Scattering Theory and Calculations for Chemical Reactions and Electron Impact Processes	NSF	50,000
Departmental Grant	Acquisition of Auto- matic X-Ray Diffracto- meter	NSF	30,000
	Purchase of Gas Chromatography Mass Spectrometer Data Systems	NSF	82,000

## INDUSTRIAL GRANTS TO THE DEPARTMENT

The following industrial organizations have made grants to the Department for fellowships and unrestricted use. Faculty and students greatly appreciate this support, for without it many deserving and talented students would not be able to complete successfully their research programs. Individual faculty members who received unrestricted industrial grants are noted in parentheses. This industrial support totaled \$91,500.

Amoco	\$6,500
E. I. du Pont de Nemours and Company	27,000
Eastman Kodak	10,000
General Electric Company (Gassman)	7,500
General Electric Company (L. Miller)	7,500
Lubrizol	1,000
Minnesota Mining and Manufacturing	13,000
Proctor and Gamble	6,000
Union Carbide	3,000
Uniroyal	3,000
Ventron (Kreevoy)	4,000
Merck Sharpe and Dohme	1,000
Celanese	2,000

## OTHER SUPPORT

During 1978, the Department of Chemistry was very fortunate in that it received excellent support from its alumni and from the Dreyfus Foundation. Dreyfus funds were received in the form of a Dreyfus Teacher Scholar Award to Dr. David Dixon. These monies which are unrestricted in terms of his use amounted to \$35,000. The award was given in recognition of his excellent achievements in the past and promising future.

In terms of individual giving, we were extremely pleased to receive an endowment of approximately \$95,000 from an anonymous friend of the Department for the establishment of a series of lectures to be named in honor of Professor Isaac Kolthoff. The Department has decided to establish a series of three lectures during the 1979-1980 year. These lecture series will be each of a one week duration and will be held during the three quarters of the year. These lectureships will be filled by distinguished chemists from throughout the world.

In terms of individual giving, we were again extremely pleased to receive a gift of \$3,000 from Robert and Mame Heinze (class of 1960) and an employer matching gift of \$9,000 from the Exxon Foundation. As you may remember, the Heinzes established an initial challenge gift last year toward the establishment of an Alumni Endowed Chair of Chemistry. The current gift has been added to that original gift. To reiterate part of what I indicated to you last year, the Department of Chemistry at the University of Minnesota is one of the few major departments of chemistry in the United States which has no "chaired" professorships. The Heinzes have provided a solid start in

establishing such an endowed chair. We have strong hopes that many of our alumni will contribute toward this fund. This is especially effective with those alumni whose companies provide matching gifts. It should be noted that donated funds should be sent to the Minnesota Foundation and specified for the use of the Chemistry Department or for the Alumni Endowed Chair in Chemistry. This is true for both individual donations and for matching gifts from employers, both must be designated. We hope that we will see a strong response to the "challenge gift" which we have received.

#### UNIVERSITY SPONSORED RESEARCH GRANTS TO THE FACULTY

Graduate School grants to faculty members during calendar year 1978 totaled \$82,585 and were distributed as follows:

<u>NAME</u>	<u>PROJECT</u>	<u>AMOUNT</u>
Borch, Richard	Introduction of Highly Unsaturated Trans Fatty Acids into Animal Cell Membranes Grown in Culture	\$2,500
Dixon, David	Molecular Beam Research	18,000
Ellis, John	Reactions of Organic Species with Superreduced Organometallics	3,500
Evans, John	Secondary Ion Mass Spectrometry of Chemically Modified Reactions	5,000
Gassman, Paul/ Pignolet, Louis	X-Ray Crystallography Unit	20,000
Mann, Kent	Laboratory Set-Up	15,000
Truhlar, Donald	Collision Theory of Nonadiabatic Chemical Reactions	3,600
Crawford, Bryce	Vibrational Band Shapes of the Molecular Relaxation Process in Liquids	2,700
Overend, John	Stereochemistry of Hemoglobins by Vibrational Circular Dichroism Measurements	4,715

#### FACULTY ACCOMPLISHMENTS

During 1978, our faculty was extremely active. Their accomplishments have been widely recognized by invitation to provide lectures at symposia, National American Chemical Society Meetings, and numerous universities. The faculty has also distinguished itself in terms of attracting federal funding and in the area of the publication of scholarly findings. The following pages provide a sampling of some of these achievements.

VICTOR BLOOMFIELD

- January 13      Department of Chemistry, Baylor College of Medicine, Houston, Texas; "Dynamic Light Scattering Studies of Biomolecular Assembly"
- March 13      Kendall Award Symposium, Division of Surface and Colloid Chemistry of the American Chemical Society, Anaheim, California; "Hydrodynamics in Biological Chemistry"
- March 17      Symposium on Dynamic Light Scattering, Division of Physical Chemistry of the American Chemical Society, Anaheim, California; "Biological Applications of Dynamic Light Scattering"
- March 17      Biochemistry and Molecular Biology Seminar, University of California, Los Angeles, California; "Biological Applications of Dynamic Light Scattering"
- March 26-29    Biophysical Society Meeting, Washington, DC; "Length Regulation of T4 Phage Tail Tubes"
- April 12-13    International Conference on Electro-optics of Macromolecules and Colloids, Brunel University, Oxford, England; "Rotational Diffusion Coefficients of Complex Macromolecules"
- April 15-19    Institute of Biochemistry and Biophysics, Tehran University; "Physical Factors in Bacterial Virus Assembly"
- April 28      Department of Physical Chemistry, Universidad de Extremadura, Badajoz, Spain; "Physical Chemistry of Bacterial Viruses"
- May 4      Molecular and Physical Sciences Department, University College of North Wales, Bangor, Wales; "Physical Factors in Bacterial Virus Assembly"
- May 8-11      International Dairy Federation Conference on Chemistry of Milk Proteins, Ayr, Scotland; "Association of Proteins"
- June 26-30    Gordon Conference on Chemistry and Physics of Biopolymers, Plymouth, New Hampshire; "Physical Problems in Bacterial Virus Assembly"
- September 11-13    Miami Beach American Chemical Society Meeting, Eli Lilly Award Symposium: The Use of Light in the Study of Biochemical Systems; "Dynamic Light Scattering Studies of Biomolecular Assemblies"
- September 17-21    6th Biennial Conference on Bacteriophage Assembly, Toronto, Ontario, Canada; "Physical Studies of DNA Condensation"

- October 9      Joint Biochemistry-Microbiology Seminar, University of Illinois, Urbana; "Physical Problems in Bacterial Virus Assembly"
- October 25-28      National Institutes of Health, Bethesda, Maryland; "Physical Problems in Bacterial Virus Assembly"

ROBERT C. BRASTED

- January 11-14      University of Florida, Gainesville; "The Educational Evolution and Revolution", "Recent Chemistry of the Sulfur-Nitrogen Imides" and "Akademgorodok and other Experiences on the Trans Siberian"
- April 10-11      University of South Dakota, Vermillion, South Dakota, William Haines Lecturer, Departmental Honors Program; "Resolvable Complexes in the Presence of Resolved Species-Pfeiffer Effect" also "Akademgorodok and other Experiences on the Trans Siberian"
- April 29      Minnesota Academy of Science, 46th Annual Meeting, Macalester College, St. Paul; "Teaching Effectiveness in the Introductory Course Based upon Analyses of the 1975 ACS Standardized Examination"
- May 11      Winona State University, Winona-LaCross Section of the American Chemical Society, "From Yokohama to Leningrad via the Trans Siberian"
- September 8-14      American Chemical Society Meeting, Miami Beach, Florida; "Text Book Publications"
- November 22-27      ICUS and Brown University, Boston, Massachusetts; "Science as a Language for International Understanding and Peace"

PETER W. CARR

- January 12-13      Department of Chemistry, University of Michigan; Departmental seminar "Immobilized Enzymes in Analytical Chemistry"
- February 25      Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Cleveland, Ohio; presented invited paper entitled, "Determination of Serum Triglycerides"

March 8	3M Technical Forum, Analytical Chapter, St. Paul, Minnesota; seminar "Applications of Immobilized Enzyme Reactors and Electrodes: A Review"
April 30 - May 3	Midland Macromolecular Institute, Midland, Michigan, invited paper at the session on Enzymes and Silylated Surfaces "Fundamental Analytical Characteristics of Immobilized Enzymes"
May 6	Department of Chemistry, Georgia Institute of Technology, Atlanta, Georgia, invited seminar, "Immobilized Enzymes in Analytical Chemistry"
September 17	National American Chemical Society Meeting, Miami, Florida, invited paper "A High-Sensitivity Thermochemical Analyzer"
September 28	University of Iowa and Grinnell College, invited seminar "Application of Immobilized Enzyme Reactors in Analytical Chemistry"
October 16	Department of Chemistry, Concordia College, Moorhead, Minnesota; Department of Chemistry, North Dakota State University, Fargo, North Dakota, invited seminar "Analytical Application of Immobilized Enzymes"
October 30	Federation of Analytical Chemistry and Spectroscopy Societies, Boston, Massachusetts, two invited papers "Flow Enthalpimetric Analysis" and "Fundamental Limitations of Kinetic Methods of Analysis"

LAWRENCE CONROY

April 28	Department of Chemistry, University of Minnesota, Duluth, Minnesota, seminar "Solid State Chemistry of Layered Dichalcogenides. Intercalates and Isoelectronic Analogs"
December 10-13	Workshop on Synthesis and Characterization of Advanced Materials, National Academy of Sciences, Washington, DC, invited talk "Solid State Inorganic Chemistry in the Undergraduate Curriculum"

BRYCE CRAWFORD, JR.

- August 19-24      Gordon Conference on Vibrational Intensities, Wolfesboro, New Hampshire, invited paper "Present Position and Future Needs in IR Intensities"
- August 28-September 3      11th Australian Spectroscopy Conference held in Brisbane, Australia, invited talk "The Scientific Journal"
- September 4-9      6th Raman Conference, Bangalore, India, invited paper "Spectroscopic Observations on Relaxation in Liquid Haloaromatics"
- October 5-6      Macromolecular Research Center, University of Michigan, talk at Current Contributions in Polymer Science Symposium "Maintaining Healthy Chemical R&D for the National Interest"
- October 30 - November 1      5th Annual Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Boston, Massachusetts, invited talk "The Rediscovered Significance of Vibrational Intensities"
- November 1-4      Annual Meeting of the Optical Society of America, San Francisco, California, Professor Crawford received the 1978 Ellis R. Lippincott Award, presented a seminar entitled "Vibrational Band Shapes"
- November 30      Institute of Paper Chemistry, Appleton, Wisconsin, invited seminar "The History and Evaluation of Infrared and Raman Spectroscopy"
- November 10      Department of Chemistry, University of Wisconsin, Eau Claire, Wisconsin, seminar "What Happens to the Energy Absorbed by Liquids?"

DAVID DIXON

- May 16-18      Midwest Theoretical Meeting, Columbus, Ohio, invited talk "The Electronic Structure of Substituted Lithium Clusters"
- October 8-12      Georgia Institute of Technology, Atlanta, Georgia, invited talk "The Chemistry of van der Waals Molecules"



JOHN E. ELLIS

- February 10-11 Department of Chemistry, University of North Dakota, Grand Forks, invited talk "Superreduced Organometallics"
- March 21-23 Spring Foster Lecture Series, Department of Chemistry, State University of New York, Buffalo, seminar "Superreduced Organometallics"
- November 13 Department of Chemistry, University of Wisconsin, Madison, invited seminar "Highly Reduced Organometallics"

JOHN F. EVANS

- May 1-4 Midland Macromolecular Institute Symposium on Silylated Surfaces, Midland, Michigan; symposium "Probing the Structure of Silanized Surface with SIMS"
- May 16 Department of Chemistry, North Dakota State University, Fargo; seminar entitled "Aspects of Covalent Surface Modification and Analysis Thereof"
- November 1-7 Department of Chemistry, University of Guelph, Toronto, Ontario; seminar "Secondary Ion Mass Spectrometry of Chemically Modified Surfaces"
- December 6-7 Lake Superior Section of the American Chemical Society, Duluth, Minnesota; seminar "Modern Aspects of Surface Analysis"

PAUL G. GASSMAN

- March 7 Research Laboratories, Warren Lambert/Parke-Davis Co., Ann Arbor, Michigan; "Azasulfonium Salts. Useful Intermediates in Heterocyclic Synthesis"
- April 13 Winona-LaCrosse Section of the American Chemical Society, Winona, Minnesota; "Bent Bonds In Organic Chemistry"
- April 20 Department of Chemistry, University of Southern Illinois, Carbondale, Illinois; "The Chemistry of Bent Carbon-Carbon Bonds"

April 24	Department of Chemistry, University of British Columbia, Vancouver; "Azasulfonium Salts. Useful Intermediates in Aromatic Substitution"
April 25	Department of Chemistry, University of Victoria, Victoria, British Columbia; "The Chemistry of Bent Carbon-Carbon Bonds"
April 26	Department of Chemistry, University of Washington, Seattle, Washington; "Azasulfonium Salts. Useful Intermediates in Aromatic Substitution"
April 27	Department of Chemistry, University of Oregon, Eugene; "Azasulfonium Salts. Useful Intermediates in Heterocyclic Synthesis"
May 25	Corporate Research Department, Dow Chemical Co., Midland, Michigan; "Azasulfonium Salts. Useful Intermediates in Heterocyclic Synthesis"
July 18	Research Laboratories, Tennessee Eastman Company, Kingsport, Tennessee; "Azasulfonium Salts. Useful Intermediates in Aromatic Substitution"
September 26	Hoechst-Roussell, Pharmaceuticals, Inc., Somerville, New Jersey; "Recent Advances in Synthesis of Indoles and Oxindoles"
October 2	Research Laboratories, Ethyl Corporation, Baton Rouge, Louisiana; "Aromatic Substitution via [2,3]-Sigmatropic Rearrangements"
November 13	Reilly Lecture, Department of Chemistry, University of Notre Dame, South Bend, Indiana; "Azasulfonium Salts. Useful Intermediates in Aromatic Substitution"
November 15	Reilly Lecture, Department of Chemistry, University of Notre Dame, South Bend, Indiana; "Reactions of Highly Strained Polycyclic Molecules"
November 17	Reilly Lecture, Department of Chemistry, University of Notre Dame, South Bend, Indiana; "Carbonium Ion Reactions and Neighboring Group Participation"

#### W. RONALD GENTRY

June 22-23	SRI International Molecular Physics seminar, Asilomar, California "Inelastic Scattering Experiments with Pulsed Molecular Beams"
June 26-30	1978 Conference on the Dynamics of Molecular Collisions, Asilomar, California, invited lecture "Pulsed Molecular Beam Experiments"

- July 23-28      Gordon Conference, Wolfeboro, New Hampshire; invited lecture "Inelastic Scattering Experiments with Pulsed Molecular Beams"
- September 5-15    NATO Advanced Study Institute on Ion-Molecule Reactions, La Baule, France; major invited lecture "Molecular Beam Studies of Ion-Molecule Reactions"
- September 20-23   European Physical Society Conference on the Physics and Chemistry of Laser-Induced Processes in Molecules, Edinburgh, Scotland; paper "Laser Photodissociation of van der Waals Molecules"
- November 28 -    Division of Electronic and Atomic Physics of  
December 1       the American Physical Society, Madison, Wisconsin, two invited papers "Dynamics of the Reaction  $D_2^+ + C \rightarrow CD^+ + D$ , and the Influence of the Atomic Quadrupole Moment on the Cross Sections at Very Low Kinetic Energies" and "Pulsed Molecular Beam Study of Ethylene Dimer Photodissociation with a  $CO_2$  Laser"
- December 13      University of Rochester, Rochester, New York, Colloquium "Inelastic and Reactive Scattering Experiments with Pulsed Molecular Beams"
- December 14      Columbia University, New York City, New York, Colloquium "Inelastic and Reactive Scattering Experiments with Pulsed Molecular Beams"
- December 15      Brookhaven National Laboratory, Brookhaven, New York, Colloquium "Inelastic and Reactive Scattering Experiments with Pulsed Molecular Beams"

#### GARY R GRAY

- February 14      Department of Pharmacology, University of Arizona; seminar "Mycobacterial Components in Cancer Immunotherapy"
- February 16      Department of Biochemistry and Biophysics, University of California, Davis, California; seminar "Mycobacterial Components in Cancer Immunotherapy"
- March 2           University of Minnesota, Morris; seminar "Cancer Immunotherapy"
- June 4-8          Meeting of the American Society of Biological Chemists, Atlanta, Georgia; paper "Mycolic Acids. A Reinvestigation"
- September 12     Department of Chemistry, University of South Carolina, Columbia, South Carolina; seminar "Chemistry of Antitumor-Active Immunogens"

ROBERT M. HEXTER

- January 27      Solid State and Low Temperature Physics Seminar,  
School of Physics, University of Minnesota; "Selection Rules for Infrared and Raman Processes on Metal Surfaces"
- March 9        IBM Corporation, General Systems Division, Rochester, Minnesota; "Raman Spectroscopy, I"
- March 23      IBM Corporation, General Systems Division, Rochester, Minnesota; "Raman Spectroscopy, II"
- April 20      IBM Corporation, General Systems Division, Rochester, Minnesota; "Raman Spectroscopy of Surfaces"
- April 28      Meeting of ONR Grantees in Surface Science, Thomas B. Watson Research Center, IBM Co., Yorktown Heights, New York; "Selection Rules for and Intensity Enhancement of Raman Spectra at Metal Surfaces"
- June 13       Bell Telephone Labs, Holmdel, New Jersey; "Metal Surface Raman Spectroscopy"
- June 15       33rd Symposium on Molecular Spectroscopy, Columbus, Ohio; "Metal Surface Raman Spectroscopy; Selection Rules"
- June 15       33rd Symposium on Molecular Spectroscopy, Columbus, Ohio; "Metal Surface Raman Spectroscopy; Theory of Intensity Enhancement"
- August 22     Gordon Conference on Vibrational Spectroscopy, Brewster Academy, Wolfeboro, New Hampshire; "Metal Surface Raman Spectroscopy"
- October 20    Fourth Symposium on Fluid-Solid Surface Interactions, National Bureau of Standards, Gaithersburg, Maryland; Invited paper "Enhanced Raman Intensity of Molecules Adsorbed on Metal Surfaces"
- October 20    Naval Research Laboratories, Washington, D.C.; "Enhanced Raman Intensity of Molecules Adsorbed on Metal Surfaces"

THOMAS HOYE

- March 13-16   National Meeting of the American Chemical Society, Anaheim, California; paper "Methods for Generating Oxaethano Bridges in Decalin and Hydrindane Systems"
- September 9-14   Fall Meeting of the American Chemical Society, Miami Beach, Florida; paper "Brominative Cyclizations of Geranyl Derivatives"

I. M. KOLTHOFF

November 13      Pharmaceutical Analysis Section of the Academy of  
Pharmaceutical Sciences, 'Kolthoff Seminar',  
Hollywood, Florida

MAURICE M. KREEVOY

February 17      Winona State University, Winona, Minnesota;  
seminar "Isotopes in Chemistry"

February 17      Viterbo College, LaCrosse, Wisconsin; seminar  
"Isotopes in Chemistry"

March 10-17      National American Chemical Society meeting, Anaheim,  
California; paper "The Nature of the Hydrogenic Co-  
ordinate in the Orthoester Hydrolysis Transition  
State"

May 1-3          6th Biennial Atlantic Provinces CIC Student Con-  
ference, St. Johns, Newfoundland; talk entitled  
"Spectra, Isotopic Fractionation Factors, and  
Structure of Hydrogen-Bonded Substances"

May 23-26      Regional Conference of the American Chemical  
Society, Indianapolis, Indiana; paper entitled  
"The Structure and Isotopic Fractionation Factors  
of Hexafluoroacetylacetone"

June 25-29      Seventeenth Conference on Reaction Mechanisms, Uni-  
versity of Minnesota, Duluth, Minnesota; paper en-  
titled "The Nature of the Hydrogenic Coordinate in  
Acetal and Orthoester Hydrolysis"

September 4-8    IUPAC Conference on Physical Organic Chemistry, York,  
England, U.K.; paper "The Nature of the Hydrogenic  
Coordinate in the Orthoether Hydrolysis Transition  
State"

September 11    University of Glasgow, Glasgow, Scotland, U.K.;  
seminar, "Spectra, Isotopic Fractionation Factors,  
and Structure of Hydrogen-Bonded Substances"

EDWARD LEETE

February 8      Department of Chemistry, University of West Virginia,  
Morgantown, West Virginia; "The Discovery of New  
Biosynthetic Pathways using  $^{13}\text{C}$  Nuclear Magnetic  
Resonance"

May 16-20      25th Congress of the Gesellschaften für Arzneipflanzen-  
forschung, University of Münster, West Germany; plenary  
lecture: "Biosynthesis and Metabolism of the Tropane  
Alkaloids"

- September 14 Pan Hellenic Pharmaceutical Conference, University of Athens, Greece; "Biosynthesis of the Hemlock and Other Alkaloids, using Isotopes"
- September 17-23 IUPAC Meeting on Natural Products, Golden Sands, Bulgaria; paper "Biosynthesis, Synthesis and Metabolism of Anatabine"
- October 30-  
November 1 32nd Tobacco Chemists Research Conference, Montreal, Quebec, Canada; paper "The Biosynthesis, Synthesis and Metabolism of the Tobacco Alkaloid, Anatabine"
- November 2 Department of Chemistry, St. Olaf College, Northfield, Minnesota; "Biosynthetic Studies using  $^{13}\text{C}$ -NMR"
- November 15 Department of Chemistry, Colorado State University, Fort Collins, Colorado; seminar entitled "The Use of  $^{13}\text{C}$ -NMR in the Study of the Biosynthesis of Natural Products"

#### SANFORD LIPSKY

- May 14-19 26th Annual Meeting of the Radiation Research Society, Toronto, Quebec, Canada; "Radiation Chemistry Today"
- November 19-20 Physical Chemistry Colloquium, Ohio State University, Columbus, Ohio; "Some Aspects of the Electronic Absorption, Emission and Electron-Impact Spectra of Ammonia"

#### RUFUS LUMRY

- January 15 University of California at Davis; "The Missing Dimension of Chemistry"
- February 8 University of Calgary, Calgary, Alberta, Canada; "Revision of Thermodynamics - The Missing Dimension of Chemistry"
- February 10-14 University of Lethbridge, Alberta, Canada; "Revision of Thermodynamics - The Missing Dimension of Chemistry"
- March 23 Ames Division, Miles Laboratories, Elkhart, Indiana; "Water in Biology"
- March 27 Annual Biophysics Society Meeting, Washington, D.C.; "Dynamical Basis of Macromolecular Association and Tissue Recognition"

April 10	University of Virginia, Charlottesville, Virginia; "The Fluctuational Basis of Biology"
April 14	Florida State University; Dedication address for R.J. Fisher Lecture Hall "Historical Errors in the Use of Thermodynamics"
April 16-20	University of Virginia; Six lectures on theoretical biochemistry
May 7	University of California, San Diego, Scripps Institute of Oceanography; "Fluctuational Basis of Biology"
May 28- June 5	University of California, San Diego, Department of Marine Biology; "Fluctuational Basis of Biology"
July 26	33rd Annual Calorimetry Conference, Logan, Utah; "Specific Bases for Enthalpy-entropy Compensation Phenomena - Thermodynamics Revisited"
July 30	Gordon Research Conference on Water, Plymouth, New Hampshire; "Resolution of the Riddle of Enthalpy-entropy Compensation Behavior"
September 3-9	Sixth International Congress of Biophysics, Kyoto, Japan; "Enthalpy-entropy Compensation Patterns Resolved"
September 9	Symposium on Dynamic Properties of Polyion Systems, Kyoto, Japan; "Boundary-Layer Control of Protein Conformation"
September 14	Rikagaku Kenkyusho (The Institute of Physical and Chemical Research) Tokyo, Japan; "Meaning of Enthalpy-entropy Compensation Phenomena in Biology"

C. ALDEN MEAD

May 4	Maximum Entropy Formalism Conference, Massachusetts Institute of Technology, Cambridge, Massachusetts; talk "The Special Role of Maximum Entropy in the Application of 'Mixing Character' to Irreversible Processes in Macroscopic Systems"
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LARRY L. MILLER

March 31	3M Company, St. Paul, Minnesota, invited lecture; "Organic Electrochemistry"
April 5	University of Dijon, Dijon, France, invited seminar; "Organic Electrochemistry"
April 7	Roussel-UCLAF Symposium on New Synthetic Methods, Paris, France, invited lecture; "Organic Electrochemistry"

June 7-9	National Science Foundation, Department of Energy and National Science Foundation, Washington, DC, talk; "Electrochemistry"
June 28	Mechanisms Conference, Duluth, Minnesota, invited lecture; "Organic Plasma Chemistry"
August 5	Monsanto Company, St. Louis, Missouri, invited seminar; "Direct Synthesis of Hydroxylated Metabolites"
October 23	Iowa State University, Ames, Iowa, invited seminar; "Organic Electrochemistry"
October 25	Indiana University, Bloomington, Indiana, invited seminar; "Organic Electrochemistry"
October 31	Clarkson College, Potsdam, New York, invited seminar; "Organic Electrochemistry"
November 1	University of Pittsburgh, Pittsburgh, Pennsylvania, invited seminar; "Organic Electrochemistry"
November 7	Auburn University, Auburn, Alabama, invited seminar; "Organic Electrochemistry"

WILMER G. MILLER

March 12-17	National American Chemical Society Meeting, Anaheim, California; "Experimental Studies on the Applicability of the Ising Model to the Helix-Random Coil Transition in Synthetic Polypeptide Homopolymers" and "Phase Behavior of a Pure Alkyl Aryl Sulfonate Surfactant"
June 4-7	CIC Conference, Winnepeg, Manatoba, "Relaxation Studies in the System Poly(ethyl methacrytet)-Chloroform by Carbon-13 and Proton NMR"
August 7-9	20th Annual Rocky Mountain Conference on Analytical Chemistry, Denver, Colorado, "Relaxation Studies in the System Poly(ethyl methacrylate)-Chloroform by Carbon-13 and Proton NMR"
August 20-25	Midland Macromolecular Symposium on Application of ESR to Synthetic Organic Polymers, Midland, Michigan; "Spin Label Studies of Polymer Motion at or Near an Interface"
November 15	Joint Biophysics Science Seminar, University of Minnesota; "Formation of Ordered Phases in Rod-like Biopolymer"
November 13-15	71st Annual American Institute of Chemical Engineers Meeting, Miami Beach, Florida; "Relation of Phase Behavior to Interfacial Tensions in Mixed Surfactant Systems"
December 12	Departmental Seminar, University of Wisconsin, Madison; "Lyotropic Polymer Liquid Crystals"



ALBERT MOSCOWITZ

September 10-22 NATO Advanced Institute on Optical Activity and Chiral Discrimination, University of Sussex, England, invited lecture; "Vibrational Optical Activity"

LOUIS H. PIGNOLET

August 6-18 Gordon Research Conference in Inorganic Chemistry and Organometallic Chemistry, New Hampton and Andover, New Hampshire; invited seminar entitled "Catalytic Decarbonylation Reactions Using Cationic Rh(I) Complexes with Diphosphine Ligands"

October 15 Penn State University, invited Departmental Seminar; "Catalytic Decarbonylation Using Transition Metal Complexes"

November 28 - December 1st International Symposium on Homogeneous Catalysis, Corpus Christi, Texas; "Catalytic Decarbonylation Reactions Using Cationic Rh(I) Complexes with Diphosphine Ligands"

December 10 3M Company, St. Paul, Minnesota, Inorganic Seminar; "Thermal and Photochemical Decarbonylation Reactions"

WARREN REYNOLDS

March 13-17 National American Chemical Society Meeting, Anaheim, California, invited paper "Intermediates in the Base Hydrolysis of Ligandopentaamminecobalt(III) Complexes"

April 22 Undergraduate Symposium in Chemistry, Bethel College, Arden Hills, Minnesota; invited paper "De-metallation of  $\alpha, \beta, \gamma, \delta$ -Tetrakis(p-sulfophenyl)-porphyriniron(II) in Mineral Acid-Ethanol-Water Media"

May 16 Department of Chemistry, Winona State University, Winona, Minnesota; departmental seminar "The Mechanism of Base Hydrolysis of  $\text{Co}(\text{NH}_3)_5\text{X}^{(3-\text{X})+}$  Complexes"

BROCK SIEGEL

March 11-16 National Meeting of the American Chemical Society, Anaheim, California; paper "Biomimetic Organic Redox Chemistry"

April 10-11 Argonne National Laboratory, Argonne, Illinois, invited seminar "Elusive Oxo-Iron Intermediates in Organic Redox Reactions"

HAROLD S. SWOFFORD, JR.

- November 7      Princeton Applied Research Corporation, Chicago, Illinois; invited paper "The Determination of HEME by Adsorption Preconcentration" )
- December 12     University of Wisconsin/River Falls; "The Electrochemistry of Cobalt Corrinoids" (Invited Seminar)

DONALD G. TRUHLAR

- June 21      Symposium on Current Status of Kinetics of Elementary Gas Reactions: Predictive Power of Theory and Accuracy of Measurement, National Bureau of Standards, Gaithersburg, Maryland; invited lecture "Accuracy of Trajectory Calculations and Transition State Theory for Thermal Rate Constants of Atom Transfer Reactions"
- June 28      1978 Conference on the Dynamics of Molecular Collisions, Asilomar Conference Grounds, California; paper "Orbitally and Rotationally Adiabatic Basis Sets for Atom-Molecule Collisions"
- July 13      Chemistry and Nuclear Chemistry Seminar, Los Alamos Scientific Laboratory, Los Alamos, New Mexico; "Variational Transition State Theory"
- August 2      Electron- and Photon-Molecule Collisions Workshop, Asilomar Conference Grounds, California; "Electron-Molecule Scattering: Polarization Potentials"
- August 4      Electron- and Photon-Molecule Collisions Workshop, Asilomar Conference Grounds, California; "Single-Center Techniques: Adiabatic Basis Functions and the  $\lambda$ -Dominant Approximations"

ARCHIE S. WILSON

- October 29      Adult Forum of the First Unitarian Society, Minneapolis, Minnesota; "Plutonium, Friend or Foe"

## FACULTY PUBLICATIONS

"The Crystal Structure of Sodium Dicyanide Dihydrate,  $\text{NaCN} \cdot 2\text{H}_2\text{O}$ ", C. Van Rij and J. D. Britton, *Acta, Cryst.*, B34, 2080 (1978).

"The Crystal Structure of 2,4-Dibromo-3-Iodobenzonitrile," W. B. Gleason and J. D. Britton, *Cryst. Struct. Comm.*, 7, 365 (1978).

"The Crystal Structures of 4-Bromobenzoisonitrile and 4-Iodobenzoisonitrile", J. D. Britton, J. Konnert and S. Lam, *Cryst. Struct. Comm.*, 7, 445 (1978).

"The Crystal Structure of Bromomalononitrile,  $\text{HBrC}(\text{CN})_2$ ", J. D. Britton and J. R. Witt, *Cryst. Struct. Comm.*, 7, 733 (1978).

"Electrolyte Ion Correlation Times at Protein Binding Sites", K. D. Rose, R. G. Bryant, *J. Mag. Reson.*, 31, 41 (1978).

"NMR Relaxation Studies of Solute-Solvent Interactions", R. G. Bryant, *Ann. Rev. Phys. Chem.*, 29, 167 (1978).

"Magnetic Cross-Relaxation Among Protons in Protein Solutions", S. H. Koenig, R. G. Bryant, K. Hallenga, G. S. Jacob, *Biochemistry*, 17, 4348 (1978).

"A Coulometric Flow Analyzer for Use with Immobilized Enzyme Reactors", R. E. Adams and P. W. Carr, *Anal. Chem.*, 50 944 (1978).

"Thermoanalysis", P. R. Carr, *Yearbook of Science and Technology*, 1978, McGraw-Hill Book Co., New York, New York, page 361.

"Kinetic and Equilibrium Assays Based on the Effect of Extent of Reaction and the Uncertainty of Rate Parameters", P. W. Carr, *Anal. Chem.*, 50, 1602 (1978).

"Effect of Thermal Lag and Measurement Precision in Differential Scanning Calorimetry: Theoretical Guidelines for Enzyme-Substrate Reactions by the Method of Orthogonal Colocation", L. F. Whiting and P. W. Carr, *Anal. Chem.*, 50, 1997 (1978).

"Multicomponent UV Spectra Analysis of Aquatic Organics" L. E. Conroy, W. Maier, S. J. Eisenreich, M. J. Hoffman, C. A. Macko, and P. D. Nath, *Proc. Int. Cong. Analytical Chemistry*, 1978.

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"A Reactive Collision Model for Use in Kinetic Theory", N. Xystris and J. S. Dahler, *J. Chem. Phys.*, 68, 345 (1978).

"Mass and Momentum Transport in Dilute Reacting Gases", N. Xystris and J. S. Dahler, *J. Chem. Phys.*, 68, 354 (1978).

"Enskog Theory for Chemically Reactive Fluids", N. Xystriis and J. S. Dahler, J. Chem. Phys., 68, 374 (1978).

"Kinetic Theory of Simple Reacting Spheres", N. Xystriis and J. S. Dahler, J. Chem. Phys., 68, 387 (1978).

"Continued Fraction Formalism and Its Application to Lattice Dynamics", M. S. Jhon and J. S. Dahler, J. Chem. Phys., 68, 812 (1978).

"Sum Rules and Their Applications to Surface Tension", M. S. Jhon, R. C. Desai and J. S. Dahler, Chem. Phys. Letters, 56, 151 (1978).

"The Origin of Surface Waves", M. S. Jhon, R. C. Desai and J. S. Dahler, J. Chem. Phys., 68, 5615 (1978).

"A Kinetic Theory of Analysis of Photodissociation", M. S. Jhon and J. S. Dahler, J. Chem. Phys., 69, 819 (1978).

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"Photochemical Reactions from Upper States", N. J. Turro, V. Ramamurthy, W. Cherry and W. E. Farneth, Chem. Rev., 76, 125 (1978).

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"A Ten Microsecond Pulsed Molecular Beam Source and a Fast Ionization Detector", W. R. Gentry and C. F. Giese, Rev. Sci. Instrum., 49, 595 (1978).

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Certain N-Phenyl or N-Pyridyl Azasulfonium Salts. P. Gassman. U.S. Patent #4,067,875.

Carbazolenine and Indole Compounds. P. Gassman. U. S. Patent #4,080,341.

Process for Preparing Azasulfonium Halide Salts. P. Gassman and G. D. Gruetzmacher. U. S. Patent #1,032,948.

"Alpha-methylthio-alpha-(2-aminophenyl)-acetaldehyde Diloweralkyl Acetals. P. Gassman. U. S. Patent #4,101,583.

"Synthesis of Oxindoles from Anilines and Intermediates Therein. P. Gassman. Canadian Patent #1,042,447.

#### GRADUATES - 1978

On the following pages are listed the names, theses, advisors and positions of those students who graduated in 1978 with an M.S. or Ph.D. degree.

DEGREE	NAME	DATE REC'D	THESIS TITLE	ADVISOR	POSITION
M.S.	John W. Arnold	6/78	Fractionation of Polymer Latexes by Gel Chromatography	W. Miller	Honeywell, Inc. 10701 Lyndale Avenue S Bloomington, MN 55420
Ph.D.	Murray W. Brockman	6/78	Topic in Natural Optical Activity	Moscowitz	Postdoctoral Position University of Wisconsin Madison, WI 53706
Ph.D.	Tony E. Catka	6/78	Part I: The Synthesis of 1,2,3,5,6,10b-Hexahydro-pyrido[2,3-g] Indolizine of Nicotine in Nicotiana Glutinosa	Leete	Chemist DuPont Co. Biochemicals Department Bldg 234, Exp. Station Wilmington, DE 19898
M.S.	Barbara M. Cederberg	12/78	N-Acetyl - D O glucosamine Binding Lectins. A Model System for the Study of Lectin Specificity	Gray	Emulsion Research Chemist Minnesota 3M Research Ltd. Pinnacles, Harlow, Essex England CM19 5AE
Ph.D.	Jonathan Chasman	3/78	Sigma and Bent Bond Participation: The Synthesis and Solvolysis of 7-Norbornyl and Related Derivatives	Gassman	Research Chemistry 3M Company St. Paul, MN 55101
M.S.	Chitong Chung	12/78	The Reactions of Benzalacetophenone and 1,5-Diphenyl-1,4-Pentadienyl-3-One with Thiourea Dioxide	Dodson	Department of Biochemistry University of Minnesota Minneapolis, MN 55455
M.S.	Delbert L. Coon	6/78	Relaxation in Glassy, Amorphous Polystyrene: Temperature and Diluent Effects	W. Miller	Research Chemist Dow Chemical Company Midland, MI 48640

DEGREE	NAME	DATE REC'D	THESIS TITLE	ADVISOR	POSITION
M.S.	James Gagnon	3/78	Solvent Effects on Depolarization Ratios of Olefinic Systems	Fenton	Research Chemistry 3M Company St. Paul, MN 55101
Ph.D.	Kerry W. Given	8/78	The Reaction Chemistry and Photochemistry of Ruthenium and Osmium Dithiocarbamate Complexes	Pignolet	Research Chemistry B.F. Goodrich 9921 Brecksville Road Brecksville, OH 44141
Ph.D.	William G. Golden	12/78	Infrared Reflection -- Absorption Spectroscopy	Overend	Staff Engineer IBM - Gen. Products Division 5600 Cottle Road San Jose, CA 95193
Ph.D.	Siamak Hafezi	3/78	Studies of Assisted Aquation and Base Hydrolysis of Some Ligando-Pentaammine Cobalt-(III) Complexes	Reynolds	Kerman University PO Box 333 Kerman, Iran
Ph.D.	Gary P. Hagen	8/78	Synthesis and Reactivity of Transition Metal Carbonylates: The Chemistry of Pentacarbonylchromate, Pentacarbonylmolybdenate, and Pentacarbonyltungstate (-II)	Ellis	Exploratory Research Chemist Amoco Research Center Building 501 D-2 PO Box 400 Naperville, IL 60540
Ph.D.	Bruce D. Hilton	3/78	Nuclear Magnetic Resonance Relaxation in Aqueous Protein Systems	Bryant	Biochemistry Department University of Minnesota St. Paul, MN 55108

DEGREE	NAME	DATE REC'D	THESIS TITLE	ADVISOR	POSITION
Ph.D.	William A. Larsen	6/78	The Chemistry of Localized Corrosion	Meehan	Research Chemist Dow Chemical Building 824 Midland, MI 48640
Ph.D.	Gary L. Miessler	12/78	The Photochemistry of Iron and Ruthenium Dithiocarbamate Complexes	Pignolet	Assistant Professor St. Olaf College Northfield, MN 55057
Ph.D.	Sing-Chong Park	6/78	Mixing Distance and Its Application to the Time-Development of Correlation in Non-Ideal Thermodynamic Systems	Mead	Agency of Defense Develop. C.P.O. Box 3089 Seoul, Korea
Ph.D.	Wayne Ranbom	3/78	Synthetic Approaches to Lysergic Acid	Gassman	Research Chemistry Chemical Research & Develop. FMC Corporation Princeton, NJ 08540
M.S.	Ossana M. Rasmy	12/78	Electroorganic Synthesis of Cyclic Compounds via $\alpha, \beta$ -Unsaturated Ketones	Gassman	Research Chemist Applications Laboratory Eli Lilly Company Lafayette, IN 47904
M.S.	Margaret I. Rice	8/78	Plan B Paper	Borch	Medical School University of Minnesota Minneapolis, MN 55455
Ph.D.	Geoffrey Ringer	3/78	Reactive Scattering in $H_3^+$ + He and N + O Collisions	Gentry	Max-Planck Institute fur Strommzsforschung Bottingerstrasse 4-8 3400 Göttingen Postfach 867 West Germany



DEGREE	NAME	DATE REC'D	THESIS TITLE	ADVISOR	POSITION
Ph.D.	Craig L. Schmidt	12/78	The Voltammetric of Vitamin B <sub>12</sub> and its Reduced Forms	Swofford	Teaching Position Department of Chemistry Bethel College St. Paul, MN 55112
Ph.D.	Joseph F. Stieber	3/78	Reactions of Heterocyclic N-Oxides with Acetylenic Dipolarophiles	Noland	Research Chemist Uniroyal Chemical Division of Uniroyal Inc. Naugatuck, CT 06770
M.S.	Siew H. Tan	12/78	The Dynamic Mechanical Properties of Polyvinyl- acetate and Polymethylme- thacrylate Reinforced (Filled) with Glass Beads	W. Miller	Department of Geology University of Kebangsaan JLN, Pantai Baru Kuala Lumpur, Malaysia
M.S.	Pui Tsui	6/78	Plan B Paper	Dodson	returned to Hong Kong
Ph.D.	Margaret Wong	12/78	Part I: A General Synthesis of 2-Deoxyladose. Part II: Isolation and Partial Structural Characterization of the Mycolic Acids From Mycobacterium Smegmatis	Gray	Department of Chemistry University of Western Ontario London, Ontario Canada N6A 5B7
Ph.D.	Zachary Yim	6/78	A Continuous Dilution Cuvette System for Concentration Difference Spectroscopy with Applications in the Hemoglobin Systems - A New Design for an Old Method	Lumry	Department of Chemistry University of Wisconsin Madison, WI 53706
Ph.D.	Ronald J. Zygmunt	6/78	Plasma Membrane Enzymes and Enzyme-Lipid Interactions	Borch	Research Chemist Sigma Chemical Company St. Louis, MO

DEGREE	NAME	DATE REC'D	THESIS TITLE	ADVISOR	POSITION
Ph.D.	Larry R. Wilson	12/78	Pressure Effects on Molecular Rydberg States	Lipsky	Research Chemist Dow Chemical Midland, MI 48640