UNIVERSITY OF MINNESOTA
TWIN CITIES

Department of Chemistry
139 Smith Hall
Minneapolis, Minnesota 55455

MINNESOTA CHEMISTS NEWSLETTER

No. 6

February 1977

Dear Alumni and Friends:

I am pleased to report that both the Department of Chemistry and I have survived my first year as Chairman of the Department. During 1976, the Department has witnessed many changes. New faculty, additional support personnel, new instrumentation, and some minor renovation of Smith Hall are among the improvements that have kept the Department in a state of vigorous activity.

As part of our overall program of enlarging and diversifying the faculty, we hired Professors Dixon, Hoye, Miller and Siegel during 1976. We are attempting to add four additional faculty during 1977. We believe that the availability of these faculty positions alone substantiate the University's commitment to the improvement of the Chemistry Department. Outside recognition of the changes which are occurring has been manifested in many ways. Increased graduate enrollment, increased activity in Chemistry by industrial recruiters, increased industrial grant-in-aids, and significantly increased federal funding of our research activities, all indicate that the outside world recognizes that Minnesota is a place where "things are happening" in Chemistry.

Perhaps the most exciting aspect of what has occurred in Chemistry in the last year pertains to those who were already here. A spirit of aggressive cooperativeness among the faculty is becoming firmly established. The morale and enthusiasm of the faculty have dramatically changed. We are now operating with a cohesive group of faculty who are determined to see the Department of Chemistry at the University of Minnesota become one of the very best in the world.

We currently see our goals becoming more possible and probable with each passing week. We have been attempting to take full advantage of those opportunities provided by the University and hope to continue to do so. In attaining our objectives, we will be very dependent not only on the University and the associated State support, but also on our many alumni and friends. We ask that you bring to the attention of those who might be prospective graduate students or postdoctorals, the vigorous evolution which we are undergoing. In terms of funding, we are seeking various types of support. Fellowship funds, unrestricted grant-in-aids, and funds for visiting lectureships, library improvement, and equipment updating are essential. On a larger scale we would hope to acquire funds for the complete remodeling of Smith Hall and for the establishment of named endowed chairs in Chemistry (we have one of the few major departments of chemistry in the country which has no named professorships). From those of you in a position to influence our level of financial well being, your help would be most welcome.

With best wishes,

Paul D. Isaman

NEWS FROM ALUMNI

Dr. Charles D. Hurd, Clare Hamilton Hall Research Professor, Emeritus of Northwestern University, Evanston, Illinois writes that Lauder W. Jones was the first dean of the combined schools of chemistry, engineering and architecture from 1919-1920. Dr. Jones became Dean of Chemistry when he arrived in Minnesota in 1918. Professor Hurd spent the first two years of his graduate work (January 1919 to August 1920) under the guidance of Dean Jones and was a classmate of Walter Lauer and Thoris Hogness. When Dr. Jones left Minnesota for Princeton in September 1920, Dr. Hurd went with him to finish his Ph.D. in 1921.

Dr. Richard N. Hurd, Ph.D. 1956, son of Professor Charles N. Hurd, is currently director of Manufacturing and Technical Affairs for G. D. Searle International Company.

William von Fischer, B. Ch. 1932, is currently a retiree from the University of Illinois and doing volunteer work (Dollar-a-Year-Man) at Florida Institute of Technology, Melbourne Beach.

David Schrader, Ph.D. 1962, Professor of Chemistry at Marquette University, Milwaukee, Wisconsin, spent January 1976 in India giving talks on his research, touring laboratories, and exploring prospective collaborative research ideas with chemists and physicists in Calcutta, Kanpur, and Bombay. He will spend the academic year 1976-1977 at the Mathematics Department, University of Nottingham, England, as an S.R.C. Senior Visiting Fellow.

The former Mrs. Albert L. Chaney notes that her husband Albert L. Chaney, Ph.D. 1930, died in 1970. He was noted for being the originator of the PBI test for determining the performance of the thyroid gland. In his later years he was head of the Albert L. Chaney Chemical Laboratory in Glendale, California.

William L. Hammerquist, B. Ch. E. 1930, died December 24, 1975. He lived in Miltona, Minnesota and until the time of his death was an avid radio ham. He and R. W. Sandelin, Ph.D. 1941, maintained a weekly ham radio contact for many years.

FACULTY CHANGES

Thomas R. Hoye joined the Department as an assistant professor in organic chemistry in September. He received his B.S. and M.S. in 1972 from Bucknell University and his Ph.D. in 1976 from Harvard.

His research interests are in the discovery of new synthetic reactions or concepts and in the application of these to the synthesis of natural products, or to the construction of unique structural units which are themselves portions of more complex, often biologically active, natural materials.

Some specific projects currently under investigation are methods for the preparation of hydroxy exo-methylene lactones, structural units which have been postulated to be responsible for the activity of many anti-tumor, sesquiterpene lactones; the use of synthetic organic photochemistry for the formation of strategic carbon-carbon bonds and the application of this idea to the generation of medium ring carbocycles; and extensions of the intramolecular ene reaction and its application to the synthesis of the sesquiterpene, Gymnomitrol.

Larry L. Miller joined the Department as a full professor in organic chemistry in December. He received his A.B. in 1961 from Colorado State College and his Ph.D. from the University of Illinois at Urbana. He came to Minnesota from Colorado State University where he was a professor in organic chemistry.

Professor Miller and his students are generally interested in organic chemistry, electrochemistry, and surface chemistry. The research goals and the techniques employed are quite diverse and often interdisciplinary, allowing students to pursue a variety of interests. Some projects are very practical; for instance, a photodegradable pesticide has recently been developed.

One interdisciplinary area of particular concern is that of organic electrochemistry. Currently, Professor Miller and his group are working on projects in electrochemical analyses, syntheses, and mechanisms. Recently, they demonstrated for the first time that surfaces can be modified by covalent attachement of compounds to the surfaces of electrodes. An amino acid can, for example, be attached to the surface of a carbon electrode. Since electrochemical reactions take place on such surfaces, the possibility of preparing unique, selective catalysts exists. The uses of these materials in syntheses and analyses and detailed structural studies are being pursued.

Electrochemistry has seen little use in organic syntheses. It appears, however, to be a potent approach. Students in Professor Miller's group are, for instance, developing a technique for the direct hydroxylation of aromatic compounds.

Another area under investigation is organic plasma chemistry. If an organic vapor is passed through a radio frequency discharge, the material is partially ionized; this forms a plasma which, in turn, induces reactions. It has recently been shown that selective and unique reactions can be performed in this way. The research program has as its goal elucidation of the mechanism of such reactions and the development of useful, new reactions through this understanding.

In much of the chemistry outlined above, electron transfer reactions and ion radical intermediates are of central mechanistic importance. Other studies being pursued by Professor Miller and his students are aimed at developing a general understanding of such chemistry. It has been recently shown, for example, that certain organometallic reactions involve ion radical chain mechanisms.

Brock Siegel joined the Department as an assistant professor in organic chemistry in September. He received his B.S. in 1969 from Syracuse University and his Ph.D. from the University of Illinois at Urbana in 1974.

The ultimate goal of the research program of Professor Siegel and his students is the discovery of new areas for chemical investigations based on an understanding of the energetics of enzyme mechanisms. Research problems are approached fundamentally from a physical-organic perspective with the application of a variety of kinetic, thermodynamic, and spectroscopic techniques. Projects include mechanistic studies of chemical model reactions that will lead to the design of new reagents useful for selective synthetic transformations. The function and influence of molecular structure on the reactivity of biomimetic reagents (artifical enzymes) will be the principal focus of the research efforts. Specific areas of interest include the following:

Aliphatic Oxidations. The role of α-keto carboxylic acids in chemical models for the reaction of the mixed function oxidase enzyme, proline hydroxylase, is being studied both to provide a chemical basis for understanding the enzyme mechanism and to develop a reagent capable of oxidizing unactivated aliphatic carbons. The scope and limitations of the reagent (iron-oxygen-ascorbic acid-α-keto acid) will be determined for the stereoselective hydroxylation of natural products, including alkaloids and plant sterols.

Thiocyclodextrins. A series of reagents derived from the cyclic polysaccharide, cyclodextrin, by replacing specific hydroxyl groups with mercapto, disulfide, sulfoxide, or sulfonium groups (CD-SH, CD-SSR, CD-S(O)R, CD-SR_2^+) are being used for the study of selective nucleophilic displacement, redox, and alkylation reactions of compounds of biological interest, such as nicotin-

amides, flavins, phenethylamines, and antibiotics. Cyclodextrin models for both ferredoxins and cytochromes are being synthesized. The goal will be to develop synthetically useful artificial enzymes in which the well-defined geometry of an initially formed substrate-cyclodextrin molecular complex directs a regio- or stereospecific reaction.

Associate Professor Ronald Barnett left the Department in July to accept an appointment as an Associate Professor of Biochemistry at Virginia Polytechnic Institute and State University. The Department's loss was expressed by Chairman Gassman who wrote in part to the faculty, "Not only will Professor Barnett's excellent research contribution be missed in the bio-organic area but it will have a real void in the whole Department."

Professor Paul O'Connor who joined the faculty in 1947 as an assistant professor in analytical chemistry has terminated his appointment in the Department. For the two years previous to his termination Dr. O'Connor was on a medical leave. The Department regrets that circumstances brought about Professor O'Connor's termination and wishes him well in his future endeavors.

FACULTY PROMOTION

Donald G. Truhlar was promoted to a full professor by the Board of Regents in 1976. He received his B.S. in 1965 from St. Mary's College in Winona, Minnesota and his Ph.D. in 1970 from the California Institute of Technology. He joined the faculty in 1970 as an assistant professor. His research interests are in examining the quantum theory of molecular collisions and electron impact spectroscopy.

Harold S. Swofford, Jr., was promoted to a full professor by the Board of Regents in 1976. He received his B.A. in 1958 from Western Washington State College and his M.S. and Ph.D. degrees in 1960 and 1962 from the University of Illinois. He also serves as Academic Vice-Chairman of the Department. His research interests are in two major areas of analytical chemistry: a) investigations involving the applications of modern electroanalytical technique to the solution of problems in medically related bioanalytical chemistry, and b) the development of Chemical Ionization Mass Spectrometry (CIMS) as an analytical tool for the determination of trace organic constituents at the subparts per billion concentration level.

WALTER McCLELLAN LAUER
1895 - 1976

Walter M. Lauer died November 11, 1976 of a heart attack in St. Paul, Minnesota at the age of 81. He was born July 18, 1895 at Thomasville, Pennsylvania. He attended Ursinus College in Collegeville, Pennsylvania and received his A.B. degree in 1913. During the school year 1913-1914 he served as an instructor in mathematics and physics at the Dassel High School in Dassel, Minnesota. From 1914-1917 he was a graduate assistant in organic chemistry and received his M.S. degree in 1917. He served from 1917-1919 in the U.S. Army Ordnance Department in Pennsylvania. In 1919 he returned briefly to the University of Minnesota as the Shevlin Fellow but left to work for du Pont Company for 18 months during 1919-1920. In 1920 he returned to studies at the University of Minnesota and received his Ph.D. degree in 1924. In 1925 he was promoted to associate professor and to full professor in 1939.

During his career Professor Lauer served as a consultant to the 3M Company Central Research Laboratory, and the Abbott Laboratories. He was a member of the Organic Research Panel of the Office of Naval Reserach. In WWII he served as a civilian investigator with the Committee of Medical Research of the Office of Scientific Research and Development. He was a charter member of the Board of Directors of the Hormel Institute and served until his retirement in 1964, and thereafter served as a consultant. He was active in the Minnesota Section of the American Chemical Society and served as chairman during 1955 - 1956.

Awards which were granted to Professor Lauer were: a Guggenheim Fellowship, the Sigma Xi Distinguished Service Award from the University of Minnesota Chapter of Sigma Xi and the Outstanding Achievement Award of the University of Minnesota. Dr. Lauer's research covered a wide scope in the field of organic chemistry from microanalytical methods of analyses to the syntheses of unsaturated fatty acids. He was author of over 70 chemical papers and patents.

Walter Lauer is survived by his wife, Kathryn of St. Paul and a daughter, Jean (Mrs. David R. Milton) of Houston, Texas; a brother, Luther M. Lauer of Orchard Park, New York; and a sister, Carrie (Mrs. Guy Preston) of Alexandria, Minnesota.

LAUER MEMORIAL FUND ESTABLISHED

A memorial fund has been established by the Lauer family to honor Walter's memory. Those who wish to contribute may send their contributions to the Walter M. Lauer Library Fund, Department of Chemistry, University of Minnesota, 207 Pleasant Street SE, Minneapolis, Minnesota 55455.

WILLIAM EUGENE PARHAM
1922 - 1976

William E. Parham died May 21, 1976 of a coronary occlusion near his summer home on Deer Lake near Deer Lake, Minnesota at the age of 53. Bill Parham was born in Dennison, Texas, and attended Highland Park High School in Dallas, Texas from 1935 - 1939. In 1943 he graduated with his B.S. degree from Southern Methodist University. He obtained his M.S. and Ph.D. degrees from the University of Illinois at Urbana in 1944 and 1946 respectively. In 1946 he joined the faculty of the University of Minnesota as an assistant professor in the Department of Chemistry. He became an associate professor in 1950 and a full professor in 1955. In 1958 he became Chief of the Organic Division of the Department. In 1972 he joined the faculty at Duke University, North Carolina as the R. J. Reynolds Professor of Chemistry.

During his career Professor Parham served on the advisory boards for the National Science Foundation, the Army Office of Ordnance Research, the National Institutes of Health, the Office of the Surgeon General and the Petroleum Research Fund. He was a consultant for the E. I. du Pont de Nemours Company, the Sinclair Oil Company and the Atlantic Richfield Company. Professor Parham was very active in the American Chemical Society. He served as Chairman of the Organic Division in 1961 in addition to serving on many other national A.C.S. committees. His service on boards of publications include: Treasurer and Member of the Board of Directors of the Advisory Board of Organic Syntheses; member of the editorial Advisory Board of the Journal of Organic Chemistry, Chemical Reviews, Advances in Chemistry. He authored the text book: Synthesis and Reactions in Organic Chemistry and was associate editor of volume 13 of Organic Reactions.

Awards which were granted to Professor Parham were: Guggenheim Fellowship, Honorary Doctor of Science Degree from Southern Methodist University, the Kresge-Hooker Lectureship at Wayne State University, the Robert A. Welch Foundation Lectureship, and the Minnesota Award of the Minnesota Section of the A.C.S. Dr. Parham's research spanned the field of heterocyclic compounds, a field in which he published over 100 scientific papers.

Professor Parham is survived by his mother, Mrs. James Hall, and his sister, Mrs. William Kirkham, both of Dallas, Texas, his wife, Billie Lou, two daughters, Dr. Janice Jean (Mrs. Thomas A.) Ophoven, Judy (Mrs. Robert Olein) both of Saint Paul, Minnesota and three grandchildren.

PARHAM MEMORIAL FUND ESTABLISHED

A memorial fund has been established by the Parham family to honor Bill's memory. Those who wish to contribute may send their contributions to the William E. Parham Library Fund, Department of Chemistry, University of Minnesota, 207 Pleasant Street SE, Minneapolis, Minnesota 55455.

THE EARLY DAYS

The following essay was written by Walter Lauer eight months or so before his death. The essay is a remembrance of his early years at Minnesota. Many of you who remember those early days may recall some of the incidents Professor Lauer recounts in his essay.

SOME EARLY HISTORY OF THE DEPARTMENT OF CHEMISTRY

by Walter M. Lauer March 3, 1976

Dean George Bell Frankforter came to Minnesota from Nebraska in 1894 as head of perhaps the earliest independent school of chemistry in the United States. He was born in Ohio in 1859 and received his B.A. and M.S. from the University of Nebraska in 1886 and 1888 respectively. His study at the University of Berlin with Professor A. W. von Hoffman led to the Ph.D. degree in 1893. He returned to Nebraska for a year before coming to the University of Minnesota.

During his tenure, graduate work in chemistry was initiated, and one of the first university buildings (Smith Hall) in the United States devoted exclusively to chemistry was built and a faculty including MacDougall, Hunter, Frary, Harding, Temple, Sidener, Nicholson, Cohen, Baker, Kritchevsky, Sternberg and others, was recruited. The first Ph.D. in chemistry, granted by the University of Minnesota, was awarded to Paul Glasoe in 1902. Dr. Glasoe served with distinction as professor of Chemistry at St. Olaf College for many years. The second Ph.D was awarded to Francis Frary in 1912. He remained at the University of Minnesota to establish what ultimately became the Department of Chemical Engineering. During World War I he was a major in the Chemical Warfare Service and in 1919 became the Director of research in the Director of Research for the Aluminum Company of America. Miss Lillian Cohen received her Ph.D. degree in 1913 and after some time spent with Professor Treadwell in Zurich returned to the University of Minnesota. As a teacher in General Chemistry she was held in high regard by generations of students. Former students upon returning to the campus, would invariably seek out Miss Cohen for a visit. Harold Brown, who served in the U.S. Bureau of Chemistry, received his degree in 1914 and Sterling Temple, later to become Director of the R. & H. Chemical Division of the duPont Company was awarded the Ph.D. degree in 1915. Paul H. M-P Brinton, Head of the Division of Analytical Chemistry (1921-26) at Minnesota was the sixth recipient of the Ph.D. degree in 1916.

Dean Frankforter was given a leave of absence upon the entrance of the United States into World War I. He served as a Major in the Ordnance Department of the Army and at the close of the war was a visiting Professor of Chemistry at Stanford University for one year. His return to Minnesota as Professor of Organic Chemistry was clouded

by an unfortunate situation prior to his entrance into the military service. Dean Frankforter decided not to renew the appointment of one of the junior members of his staff. In the opinion of many of the faculty members, this action was justifiable. However, others, finding gullibility on the part of the junior faculty member and prodded by long standing antagonisms which were apparently developed during the earlier days at Nebraska; succeeded in bringing charges against Dean Frankforter. They charged that the dismissal was arbitrary and without reason, that Dr. Frankforter's administration of the School of Chemistry was inefficient, that the work done in classrooms and laboratories was unsatisfactory to student and instructors and that reliance could not be placed on the word of Dean Frankforter. Testimony dealing with these allegations was heard and included in several voluminous documents. The net result of the entire unfortunate affair was 1) that the dismissal stood and 2) that in view of the turmoil it was to the best interests of the School of Chemistry that Dean Frankforter be granted leave to serve in the Graduate Department and that he relinguish his administrative duties but that he continue to serve as a faculty member until his retirement.

The charges were not proved; indeed letters from Presidents Vincent and Burton were indicative of support for Dean Frankforter. This lack of support for the dismissed faculty member led to a scathing letter by the junior staff member to President Burton (who had resigned and was then President of the University of Michigan) and to the Governor of the State of Minnesota appealing for castigation of the Board of Regents.

With the passage of time, the disappearance of some of the principals, the end of the war, and the appointment of Lauder W. Jones as the Dean of the School of Chemistry, the atmosphere cleared and graduate work expanded. Dean Jones was one of Nef's students at Chicago. During the war Dean Jones was in the military service and on leave from the University of Cincinnati.

Dr. M. C. Sneed, H.H. Barber, and J. C. Maynard, from Cincinnati joined the faculty and G. B. Heisig, C. D. Hurd, A. S. Scott enrolled as graduate students at the end of the war. Dr. Frank Whitmore spent a year here at Minnesota before going to Northwestern to head the Department of Chemistry. There was a lot of excitment and enthusiasm in the Department during this time.

Some of Dr. Frankforter's decisions were perhaps misunderstood. In the European universities, the Professor Ordinarius gave the lectures in the courses with high enrollment, since his income was augmented according to the number of students enrolled. While this was not true at Minnesota, Dr. Frankforter lectured to the beginning students in General Chemistry and in Organic Chemistry. He was an excellent lecturer and as was the custom in European universities, he always had a display of apparatus and chemicals on the lecture table for each lecture. Of course, when the bell rang at the end of each lecture, most of the students were on their way to the next class without the slightest attention being given to the display. This system, as you

can well imagine, irritated the junior staff members who were relegated to the quiz sections and laboratory without gaining the experience of lecturing to a large group of students, and without making much of a contribution to the content of the course. This was a mistake on Dr. Frankforter's part, but understandable.

Another decision which may have been the source of criticism but in my opinion added to the strength of the Chemistry Department was the appointment of Dr. Kritschevsky. Dr. W. Kritchevsky, a young Russian who received his Ph.D. in Germany with Professor Ullmann and according to the story current during my early days at Minnesota, was in some sort of political difficulty in Russia so that he consequently decided to leave his native country. He landed in New Orleans and since he was fluent in several languages, he acted as an interpreter. He finally landed on a ship that sailed up the Mississippi River to St. Paul. When he arrived in St. Paul he learned that there was a university in Minneapolis and he decided to explore the possibility of employment. He met with Dean Frankforter who was impressed. Dr. Frankforter supplied him with some of the necessities of life and put him to work on a research problem. His English was not without accent to put it mildly, and he did not appear as a lecturer for some time except upon one occasion when Dr. Hunter asked him to give a lecture in organic chemistry in German to his pre-medical students. Medical students in that day were required to study German. There was little money available then for research purposes and perhaps some faculty members resented the fact that Dr. Kritchevsky was kept on the staff, solely as a researcher.

Nonetheless, Dr. Frankforter and Dr. Kritschevsky studied the condensation of chloral and bromal with various aromatic compounds and it is very likely that they accomplished the synthesis of DDT twenty years before it was discovered in Switzerland. Dr. Kritchevsky continued on at the University until World War I when he went to Sherwin-Williams in Chicago to head a group interested in dyes. Later he developed the product with the trade name RIT. He brought his family and some relatives to this country and the faculty name of Kritchevsky has become familiar to biochemists. It is interesting to note that Dr. W. Kritschevsky never lost his belief in the virtues of "Naturkupfer C", a discovery of his advisor Professor Ullmann.

It may be of some interest to document the salary scale in effect during Dr. Frankforter's time. For example, Dr. W. H. Hunter, with a Ph.D. degree just received from Harvard was appointed as an Instructor in Organic Chemistry for the year 1909 at a salary of $1,000. However, he more than doubled his salary to $2,500 by 1916.

# # #

AWARDS

Professor William N. Lipscomb, Harvard University, former Professor of Chemistry at the University of Minnesota, was awarded the Nobel Prize in Chemistry. The prize consists of $160,000 and was presented by Swedish King Carl Gustav in Stockholm on December 10, 1976. Dr. Lipscomb was honored primarily for his studies in the chemistry of boranes. Professor Lipscomb joined the University of Minnesota Chemistry faculty in 1946 after his graduation from the California Institute of Technology and became full professor in 1954 and Chief of the Physical Chemistry Division in 1954, a position he retained until his departure to Harvard in 1959.

Professor Bryce Crawford has been selected to receive the 1977 Pittsburgh Spectroscopy Award, given by the Spectroscopy Society of Pittsburgh. Dr. Crawford will be the 22nd recipient of the award presented annually since 1957 by the Society to individuals who have made outstanding contributions to the field of spectroscopy.

Dr. Harold Wittcoff, Adjunct Professor of Chemistry, is the 1976 Minnesota Award winner. The award has been given by the American Chemical Society annually since 1958. Dr. Wittcoff received the award at the Award meeting held on October 19, 1976.

The University of Minnesota Outstanding Achievement award was presented to William J. Bailey, 1943 B.S. Chemistry on November 5.

The Alumni Association of the College of Liberal Arts of the University of Minnesota conferred a Distinguished Teacher Award on Professor Edward Leete in May, 1976.

VISITING PROFESSORS

During the month of May, Professor Harry L. Frisch of the Department of Chemistry, State University of New York at Albany visited the Department and presented a series of five lectures, "Topics in Theoretical Chemistry and Biology." Dr. Frisch was born in Vienna, Austria in 1928. He received his A.B. from Williams College in Massachusetts in 1947 and his Ph.D. in 1952 in Physical Chemistry from the Polytechnical Institute of Brooklyn. He was an instructor in chemistry at the University of Southern California in 1954-55 and an assistant professor 1955-56. From 1956-67 he was a member of the technical staff at Bell Telephone Laboratories. In 1967 he joined the faculty at Albany.

Professor David Rislove spent a spring quarter leave with the Department. Dr. Rislove has been at Winona State University since 1968 where he now serves as an Associate Professor in organic/analytical chemistry. Professor Rislove obtained his B.A. degree in chemistry from Winona State College in 1962 and his Ph.D. in organic chemistry from North Dakota State University in 1968.

Dr. Ronald E. Verrall, Associate Professor, Department of Chemistry, University of Saskatchewan, spent his sabbatical leave this academic year in the Department with Professor Rufus Lumry. He worked on Dr. Lumry's grant from the American Cancer Society. He measured the diffusion rates of small molecules through proteins and the factors which influenced these rates. Dr. Verrall received his Ph.D. in physical chemistry from the University of Ottawa in 1966.

LEAVES

Professor W. Ronald Gentry was granted a sabbatical leave for 1976-1977 to originate a new research program involving the study of energy transfer in molecular collisions. He is spending his sabbatical at the University of Minnesota.

Professor Maurice Kreevoy is on sabbatical leave for the period 1976-1977 to do research with time to be spent in Oxford, England; Lauzanne, Switzerland; and Zagreb, Yugoslavia.

Professor Robert G. Bryant, on sabbatical leave 1976-1977 is conducting research to expand his experience in the biochemical aspects of bioinorganic chemistry by studying with John Wood of the Freshwater Biological Institute in Navarre, Minnesota. He will also make measurements of proton NMR dispersion on water systems at the IBM Watson Laboratories in New York.

Professor C. Alden Mead spent spring quarter 1976 on a single quarter leave in West Germany. During the week of April 4 to April 10 he was in Freudenstadt for the Spring Quarter Meeting of the German Physical Society where he presented a paper entitled, "Der Mischungscharakter in der Irreversiblem Thermodynamik". During the remainder of the quarter he was in Berlin visiting the Quantum Chemistry Institute of the Free University. Dr. Mead mainly pursued research in the field of irreversible thermodynamics.

COLLOQUIA, CONFERENCES, LECTURES, MEETINGS, SEMINARS, SPEECHES, SYMPOSIA

Professor Victor Bloomfield presented seminars on "Physical Chemistry of Bacterial Viruses" at: Hormel Institute, Austin, Minnesota, March 18, 1976; Mayo Clinic Biochemistry Seminar, Rochester, Minnesota, April 15, and the Purdue University Joint Biochemistry Seminar on April 19. He also was appointed to a five-year term on the Editorial Committee of Annual Review of Physical Chemistry, which began in the fall of 1976. Professor Bloomfield traveled to San Francisco June 2 - 11 on a variety of business. On June 2 he attended the Physical Biology seminar at the Cardiovascular Research Institute, University of California Medical Center and presented "Physical Chemistry of Bacterial Viruses". June 3 - 5 he attended the National Institutes of Health Study Section meeting. From June 7 - 10 he attended and presented a paper entitled, "Binding Kinetics of Proflavin to T2L and T4D Bacteriophage" at the American Society of Biological Chemists Meeting. He attended the Gordon Conference on "Physics and Physical Chemistry of Biopolymers" from June 27 to July 2 at Holderness School, New Hampshire. He was chairman of the session on "Physical Problems in Phage Morphogenesis." At the 10th International Biochemistry Congress in Hamburg, Germany, July 25 - August 2, Professor Bloomfield presented a paper on "The Slow-Fast Transition in Bacteriophage T2L".

On August 3 he presented the seminar "Inelastic Light Scattering from Polymer Solution" to the Theoretical Physics Institute Free University of Berlin. A meeting of the Editorial Committee of the Annual Review of Physical Chemistry in Palo Alto, California was attended by Professor Bloomfield on October 15. While on the West Coast he also presented lectures on "Physical Chemical Studies of Bacterial Viruses" to the Molecular Biology Seminar, University of California, Santa Cruz, October 13 and also to the Biophysical Chemistry Seminar, University of California, Berkeley, October 12. Professor Bloomfield was appointed to the Advisory Board of Biopolymers for a three year term which began January 1977. "Physical Chemistry of Bacterial Viruses" was presented by Professor Bloomfield at the Illinois Institute of Technology Chemistry Department on December 10, 1976.

Professor Robert C. Brasted presented Sigma Xi lectures at the University of Montana at Missoula and Montana College of Mineral Science and Technology at Butte on March 5 and 8 respectively. Seminars were also given in the Departments of Chemistry of each institution on the subject of Calcogen-Nitrogen Cyclic Imides. He traveled to Binghamton, New York March 28 - 31 to attend the External Evaluation of Undergraduate Programs of All Colleges and Department of the State University of New York - Binghamton. On March 31 he was a plenary speaker at the Centennial Meeting of the St. Louis Section of the American Chemical Society. April 1 - 8 he attended the New York meeting of the American Chemical Society, and attended the following meetings: Council, Committee of Nominations and Elections, International Activities Committee; Executive Committee - Division of Chemical Education; Executive Committee Examination Committee; Younger Chemists International Project (1951) 25th Anniversary; and presented an invitational paper entitled. "Education of Foreign Chemists." Dr. Brasted, on April 11 through 15, visited Monmouth College, Monmouth, Illinois; Illinois Benedictine College, Lisle, Illinois and Wheaton College, Wheaton, Illinoins. He also attended the Biennial Conference on Chemical Education in Madison, Wisconsin August 7 - 9. He was Chairman of a technical session. He visited Los Angeles State College enroute to the San Francisco American Chemical Society meeting August 23 - September 6. Among the activities at the latter were: Executive Committee of the Division of Chemical Education; American Chemical Society Examinations; Executive Committee; General Chemistry Subcommittee (1977 Exam); International Activities UNESCO-IUPAC; Committee on Nonimations and Elections of the American Chemical Society Council; Younger Chemists International Project reunion dinner (Diamond Jubliee Meeting, 1951) at which he received an "ACS Golden Key" award for contributions to foreign activities of the Society; and the Council of the ACS as a Minnesota Section representative. He attended a meeting of the International Activities Committee of the American Chemical Society October 8 - 10 in Salt Lake City, Utah. He is serving on Subcommittees concerned with the development of "An International Chemical Society" and he is the prime investigator in the development of educational materials to help foreign prebaccalaurate and predoctoral students adjust to and better understand the United States systems of education in chemistry. Liberal Arts Colleges were visited by Professor Brasted in early November at which seminars were given on "The Chemistry of Some Cyclic Sulfur Imides - The Development of a Research Program." Ripon College, Beloit College and Lake Forest College were involved. He also gave a paper entitled: "Origin of Life" at the International Conference on Unity of Science in Washington, D.C. November 25 - 28.

Professor Brasted participated in the National Science Teachers Association Regional Meeting held in Minneapolis November 18 and 19. His paper was devoted to cooperative ventures and programs of the American Chemical Society that are of direct and potential concern to the teachers in the secondary schools.

Professor Robert G. Bryant attended the Experimental NMR Conference in Pittsburgh, Pennsylvania April 25, 1976. He also attended the Gordon Research Conference on Water in Holderness School, Plymouth, New Hampshire August 1 - 6 to exchange scientific information with other scientific communities on research then being conducted in his laboratory. He attended the annual meeting of the American Chemical Society in San Francisco August 29 - September 3 to present several papers at the meeting and to exchange scientific information.

Professor S. E. Buttrill, Jr. presented seminars on research being conducted under the National Science Foundation support at the University of California, January 6 - 9, at Los Angeles and Menlo Park. He also attended the 24th Annual Conference on Mass Spectrometry and Allied Topics in San Diego, California May 9 through May 14 and presented five papers on research carried out at the University of Minnesota.

Professor Lawrence E. Conroy returned from sabbatical leave in August 1976. He spent the first portion as a Guest Professor at the Institute of Chemistry, Aarhus University, Aarhus, Denmark. He carried out research on transition metal nitrides and silicides. The second portion he served as a Visiting Lecturer at the Department of Chemistry, University College, Cardiff in Wales. During his stay in Europe he presented seminars at the Institute of Chemistry in Aarhus, before the Gesellschaft Deutscher Chemiker in Kiel, at the Research Institute for Physical Chemistry at the University of Kiel, and at the University College, Cardiff. He also visited other solid state inorganic chemists at a number of institutions in Germany, The Netherlands, Denmark, France and Great Britain.

Professor Bryce Crawford attended a meeting of the Governing Board of the National Research Council in Washington, D.C. on January 9 and 10, 1976. On January 23 and 24 he traveled again to Washington to attend a committee meeting of the National Academy of Sciences. He attended the Editor's Conference on Improved Publication format on behalf of the American Chemical Society January 27 to February 1. He attended meetings of the Council of the National Academy of Sciences and the Governing Board of the National Research Council February 13 - 15 in Washington. Professor Crawford attended a meeting of the United States National Committee on International Union of Pure and Applied Chemistry in Washington, D.C. February 20 and 21. "Molecular Relaxations in Liquids or Where Does the Energy Go?" was presented at the Mardi Gras Symposium in Theoretical Chemistry at St. Mary's Dominican College in New Orleans February 27. He also lectured at the University of New Orleans on February 26 on IR Intensity Standards and Their Use. On February 28 he lectured at the Endymion Ball at the University of New Orleans. He attended the Pittsburgh Conference in Cleveland on Analytical Chemistry and Applied Spectroscopy March 3 and 4.

Professor Crawford attended the Centennial Meeting and the Board of Directors Meeting of the American Chemical Society in New York City, March 31 to April 6. He traveled to Washington, D.C. to consult with ERDA on behalf of the National Academy of Sciences April 18 and 19. On April 23 through 28 he attended meetings of the Governing Board of the National Research Council and the Council of the National Academy of Sciences. He also attended the annual meeting of the National Academy of Sciences during that time. Board meetings of the United Kingdom Chemical Information Service at Nottingham, England were attended by Dr. Crawford, May 9 - 15. June 14 - 18 he attended the Symposium on Molecular Structure and Spectroscopy in Columbus, Ohio. Professor Crawford attended meetings of the NAS Council and NRC Governing Board in Woods Hole, Massachusetts August 7 - 11. From August 18 through September 6 he gave a talk at the 10th Australian Spectroscopy Conference at the University of Western Australia in Perth. During this time he also visited labs and consulted with colleagues in Tokoyo and Osaka, Japan (by way of Penang, Malaysia and Bangkok, Thailand). From September 9 to 16 he was on the teaching staff of the NATO Advanced Studies Institute on Modern Methods in Vibrational Spectroscopy at the University of Florence, Italy. Professor Crawford also attended meetings of the NRC Governing Board in Washington, D.C. September 17 and 18. He attended the annual meeting of the Midwest Association of Chemistry Teachers in Liberal Arts Colleges in Holland, Michigan October 7 - 9. A meeting of the United States National Committee for the International Union of Pure and Applied Chemistry in Washington, D.C. was attended by Dr. Crawford October 15 and 16. He consulted with the du Pont Company, Wilmington, Delaware, October 28 and 19. October 30-31 he attended the National Academy of Sciences Council meetings and the National Research Council Governing Board meetings in Washington, D.C. He also visited the Environmental Monitoring and Support Lab for the Science Advisory Board, Environmental Measurements Advisory Committee of the Environmental Protection Agency at the Research Triangle Park, Raleigh-Durham, North Carolina November 1 - 3. He presented a seminar at North Dakota State University at Fargo, North Dakota November 18 and 19. He also attended a screening meeting of the candidates for the Marshall Scholarship Program, Midwestern Regional Committee in Chicago, November 22. Professor Crawford took part in the selection of the Marshall Scholars for the Midwestern Region in Chicago, December 10 - 12. He took part in a subcommittee meeting of the National Research Council in Washington, D.C. December 20

Professor W. Ronald Gentry visited and gave invited seminars at Grinnell College, Iowa, Drake and Iowa State Universities from January 24 to 29, 1976. He also was in Washington, D.C. from February 29 to March 2 to make an invited presentation on a research proposal entitled, "Energy Transfer in Molecular Collisions" at the annual meeting of Project Squid (Office of Naval Research) and to make personal contact with other agencies then reviewing the same proposals. Dr. Gentry also attended the IX International Quantum Electronics Conference in Amsterdam June 12 - 26. He attended the

Gordon Conference on the Dynamics of Molecular Collisions in Plymouth, New Hampshire July 25 to 30. Professor Gentry also presented a departmental seminar at the University of Minnesota-Duluth campus on December 1.

Professor John Dahler attended a Gordon Research Conference on Atomic and Molecular Interactions in Wolgeboro, New Hampshire August 8 - 14, 1976.

Professor John E. Ellis presented a paper entitled, "Synthesis of Super-Reduced Metal Carbonyls" at the Centennial Meeting of the American Chemical Society in New York, April 5 to 10, 1976. He also delivered a paper entitled: "Vanadium Carbonyl Trianions" at the American Chemical Society meeting in San Francisco as well as gave an invited talk entitled: "Super-reduced Carbonyls" at the University of California, Berkeley.

Professor Paul G. Gassman attended the Centennial Meeting of the American Chemical Society in New York, March 30 - April 6; the 8th American Chemical Society Central Regional Meeting in Akron, Ohio on May 19 - 20; the 10th Great Lakes Regional Meeting of the American Chemical Society at Northwestern University June 17 - 19 and presented a paper there. He also attended the Organic Mechanisms Conference in Williamsburg, Virginia June 21 - 25. He also attended the Gordon Conference on Hydrocarbon Chemistry and presented an invited lecture, June 13 - 19, at Brewster Academy, New Hampshire.

Professor Paul G. Gassman presented the following invited lectures:

January 26	"Transition Metal Complex Promoted Rearrangements of Strained Ring Systems," at the Department of Chemistry, University of Nevada, Reno, Nevada.
January 27	"Transition Metal Complex Promoted Rearrangements of Strained Ring Systems," at the Department of Chemistry, University of California, Davis, California.
January 29	"Nitrenium Ions - Past, Present, and Future" at the Mojave Desert Section of the American Chemical Society at China Lake, California.
February 6	"Azasulfonium Salts - Useful Intermediates in Organic Synthesis," presented at the Department of Chemistry, Drake University, Des Moines, Iowa.
March 5	"Azasulfonium Salts - Useful Intermediates in Organic Synthesis," at the Department of Chemistry, Bowling Green State University, Bowling Green, Ohio.
April 15	"Recent Developments in Strained Ring Chemistry," presented at the Department of Chemistry, St. Olaf College, Northfield, Minnesota.
May 7	"Recent Advances in Strained Ring Chemistry," at the Department of Chemistry, University of Minnesota at Duluth, Minnesota.

June 3	"Azasulfonium Salts. Useful Intermediates in Organic Synthesis," at the Research Laboratories, A. H. Robins Company, Richmond, Virginia.
August 19	"Azasulfonium Salts - Useful Intermediates in Heterocyclic Synthesis," at the Central Research Department, E. I. du Pont de Nemours and Company, Wilmington, Delware.
September 15	"Transition Metal Complex Promoted Rearrangements of Organic Hydrocarbons," at the T. R. Evans Research Center, Diamond Shamrock Corporation, Painesville, Ohio.
October 26	"Azasulfonium Salts - Useful Intermediates in Organic Hydrocarbons," presented at the Department of Chemistry, Wayne State University, Detroit, Michigan.
October 27	"Transition Metal Complex Promoted Rearrangements of Hydrocarbons," at the Department of Chemistry, University of Michigan, Ann Arbor, Michigan.
October 29	"Transition Metal Complex Promoted Rearrangements of Hydrocarbons," presented at the Department of Chemistry, University of Wisconsin at Eau Claire.
November 4	"Transition Metal Complex Promoted Reactions of Hydrocarbons - Olefin Metathesis," presented at the Department of Chemistry, University of Wisconsin, Milwaukee, Wisconsin.
November 5	"Azasulfonium Salts - Useful Intermediates in Organic Synthesis," at the Department of Chemistry, Marquette University, Milwaukee, Wisconsin.
November 10	"Transition Metal Complex Promoted Rearrangements of Hydrocarbons," at the Department of Chemistry, Bucknell Univeristy, Lewisburg, Pennsylvania.
December 8	"Transition Metal Promoted Rearrangements of Hydrocarbons," at the Department of Chemistry, Indiana University, Bloomington, Indiana.
December 9	"Azasulfonium Salts - Useful Intermediates in the Synthesis of Heterocyclics," at the Department of Chemistry, Purdue University, West Lafayette, Indiana.

Professor Gassman presented the following invited symposia lectures. "Trapping of Metal-Carbenoid Intermediates," at the Symposium on Olefin Metathesis, Eighth Central Regional Meeting of the American Chemical Society, at Akron, Ohio, May 19 - 21. "Interaction of Transition Metal Complexes with Strained Rings," at the Gordon Conference on Hydrocarbon Chemistry at the Brewster Academy in Wolfeboro, New Hampshire, June 14. "Azasulfonium Salts - Useful Intermediates in Aromatic Substitution," at the Symposium on Natural Products Chemistry, Tenth Great Lakes Regional Meeting of the American Chemical Society, Evanston, Illinois, June 17 - 19.

Professor Gary R. Gray traveled to Cedar Falls, Iowa where he presented a seminar at the University of Northern Iowa on March 18. He presented a seminar at the invitation of the University of California at Santa Barbara and also presented a talk at the ASBC Biochemistry meetings at San Francisco June 2 - 10, 1976. Dr. Gray attended the 1976 Gordon Research Conference on "Cancer" at Colby-Sawyer College, New Hampshire August 29 - September 3.

Professor Robert M. Hexter attended the 4th Biennial Conference on Chemical Education, Division of Chemical Education in Madison, Wisconsin, August 8 - 10, 1976. He also attended the International College on Applied Physics and a course in Synchroton Radiation Research in Alghero, Italy September 12 - 14. He spent the period October 29 - November 1 at the Stanford Synchrontron Radiation Project (SSRP) where he carried out experiments on X-ray lithography and on EXAFS (Extended X-ray Absorption Fine Structure). In the first set of experiments he made the first use of a new facility at SSEP - a focussed source of high intensity X-rays. He was in Yorktown Heights, New York December 8 - 12 to compare experimental procedures in X-ray Micrography and Lithography with groups at IBM which are carrying out similar research.

Professor Emeritus I. M. Kolthoff was invited to act as honorary chairman of the American Chemical Society Symposium on the Past 100 Years in Analytical Chemistry held on April 7, 1976 at the Centennial Meeting of the American Chemical Society in New York City. He delivered the introductory first talk on the program entitled, "Analytical Chemistry in the USA in the First Quarter of this Century." He also participated on a Panel of Reactors for a Conference on Aging, "Society's Response to Aging: Effect and Challenge ... Today and Tomorrow" at the Nicollet House on September 24. Professor Kolthoff was invited to present a seminar on October 14 to the staff and students of the Chemistry Department of Colorado State University, Fort Collins. The topic of this talk was "Hydrogen Bonding in Acid-Base Equilibria in Aprotic Dipolar Solvents."

Professor Maurice M. Kreevoy attended the Organic Mechanisms Conference in Williamsburg, Virginia June 22 - 25. He also attended the Gordon Research Conference on Chemistry and Physics of Isotopes, June 4 - 9, 1976 in Plymouth, New Hampshire. Professor Kreevoy, on sabbatical leave at Oxford University, was elected a "Member of the Senior Common Room. of the University College, Oxford." He also presented

a seminar at University College on "Hydrogen Bonding between Bases of Approximately Equal Strength." He presented a seminar entitled, "Some Recent Advances in Borohydride Chemistry" on October 6 before students and faculty of the Department of Chemistry at Dartmouth College. On November 30 at the University of Canterbury, Professor Kreevoy presented a seminar on "Some Aspects of the Dynamics of Proton Transfer in Solutions." He was in Mexico City, November 30 - December 7 to attend the 1st Chemical Congress of the North American Continent. He gave a paper entitled, "The UV Spectra and Fractionation Factors of Strangely Bonded Complexes."

Professor Edward Leete attended the 1st Chemical Congress of the North American Continent held in Mexico City, November 30 - December 5, 1975, and presented a paper entitled, "Biocynthesis of the Alkaloids of Dendrobium pierardii using ^{13}C-NMR." He also presented a paper on the "Biosynthesis of the Tobacco Alkaloids using ^{13}C-NMR" at the 17th Medicinal Chemistry Symposium at SUNY - Buffalo, New York May 16 - 18. Professor Leete was a participant in an NSF-sponsored joint seminar of United States and Japanese chemists on the biosynthesis of natural products held at the East-West Center, Honolulu, Hawaii, June 14 - 18. He gave a talk entitled, "Biosynthesis and Metabolism of the Tobacco Alkaloids." He attended the Gordon Research Conference on Natural Products and presented a paper at the meeting of the Biosynthesis of the Tropane Alkaloids in New Hampton, New Hampshire July 25 - 30. At the American Chemical Society Centennial Meeting in San Francisco, August 29 - September 3, he gave a paper entitled: "A New Systematic Degradation of Nicotine to Determine Activity at C-2' and C-5'. The pattern of labeling in nicotine and nornicotine formed from [2-^{14}C]ornithine in Nicotiana Clutinosa, and in nicotine obtained from N. tabacum exposed to [^{14}C,^{13}C]-carbon dioxide." Professor Leete attended the 30th Tobacco Chemists Research Conference held in Nashville, Tennessee. He presented a paper entitled, "Investigation of the Biosynthesis of the Tobacco Alkaloids Using Precursors Containing Contiguous Carbon-13 Atoms" October 16 - 20. He was in Great Britian from December 13 until January 3. He presented lectures at the Imperial College, London, and the University of Manchester on "Dioscorine - A Novel Biosynthetic Pathway Established by Means of ^{13}-C-NMR."

Professor Sanford Lipsky and Dr. Thomas Gregory attended the 12th International Conference on Photochemistry to present a paper June 27 through July 1, 1976. Professor Lipsky also chaired the session on Energy Transfer at the Gordon Research Conference on Radiation Chemistry in August 22 - 29, 1976.

Professor Rufus Lumry was invited to attend and present a paper at a scientific meeting held in honor of Jeffries Wyman's 75th birthday on June 17 - 27, 1976 in Rome Italy. He traveled to Boulder, Colorado July 3 - 9 to inspect a liquid-liquid heat of reaction

calorimeter in the laboratory of Professor Stan Gill at the University of Colorado, Boulder, in order to aid in the building of a duplicate for his own laboratory. At Wesleyan University in Middleton, Connecticut July 30 Professor Lumry gave an invited lecture to the Biology and Chemistry Department. From there he attended the Gordon Conference on Chemistry and Physics of Water and Aqueous Solutions in Plymouth, New Hampshire. He was the chairman of the session of "Water as a Solvent" August 2 - 6. He also attended the LaCura Conference on Hemoglobin in Varenna, Italy August 9 - 14 as an organizer and invited participant. On August 15 - 20 he was an invited lecturer and consultant at the Unilever Research in Bedford, England. Professor Lumry was invited to serve on a Visiting Committee for review of the Department of Biology at the University of Virginia, Charlottesville, Virginia and to lecture in the Department of Pharmacology, Medical School November 3 - 7.

Professor C. Alden Mead spent spring quarter on a single quarter leave in West Germany. During the week of April 4 to April 10 he was in Freudenstadt for the Spring Quarter Meeting of the German Physical Society where he presented a paper entitled: "Der Mischungscharakter in der Irreversiblem Thermodynamik." During the remainder of the quarter he was in Berlin visiting the Quantum Chemistry Institute of the Free University. While there he gave a few lectures, but mainly was pursuing research in the field of irreversbile thermodymanics.

Professor Albert Moscowitz attended the meeting of the American Chemical Society in San Francisco August 29 to September 3 and pursued collaborative research at Stanford University pursuant to his National Institutes of Health grant. Professor Moscowitz presented invited lectures at the following institutions: Ohio State University, Physical Chemistry Seminar, Columbus, Ohio on January 12; North Dakota State University, Departmental Seminar, Fargo, North Dakota, February 16; Danish Chemical Society, Theoretical Section, Copenhagen, Denmark, May 24; Four lectures at the University of Copenhagen during May - June, 1976; University of Kiel, Institute for Physical Chemistry Seminar, Kiel, Germany, June 21; University of Groningen, Department of Organic Chemistry Seminar, Groningen, The Netherlands, June 28.

Professor Victor G. Mossotti attended the American Chemical Society meeting in San Francisco from August 29 to September 3 and presented an invited paper entitled, "Noise Coherence in Flame Spectroscopy." He also participated in the Third FACSS Meeting in Philadelphia and visited the ERDA office in Washington, D.C. November 14 - 20. Professor Mossotti presented a seminar at the University of Southern California - Stanford Chemistry Department in Menlo Park, December 21 and 22. From December 30 to January 13, 1977 Professor Mossotti was in Europe. He presented a seminar at the Imperial College in London, gave a keynote lecture at the 4th Annual Analytical Atomic Spectroscopy Editorial Conference in Sheffield and also presented a seminar at Phillips Research in Eindhoven, The Netherlands.

Professor Wayland E. Noland attended the American Chemical Society meeting in New York City, April 3 - 7. While there he attended the following meetings of Organic Syntheses, Inc. on April 4: Board of Directors; Board of Editors; and Corporate Meeting. As secretary of Organic Syntheses he was responsible for organizing and overseeing these meetings. He attended the Symposium on Recent Advances in the Chemistry of Nitro Compounds at the 7th American Chemical Society in Albany, New York, August 9 where he presented an invited paper entitled, "Rearrangements of Nitro-norbornenes and Nitronorbornanes". Professor Noland attended and was responsible (as secretary) for the meetings of Organic Syntheses, Inc. held in conjunction with the 172nd National Meeting of the American Chemical Society in San Francisco.

Professor John Overend had spent some time this past 1976 summer at Los Alamos, New Mexico as a visiting staff member. He worked on the problems of Laser-isotope separation, and in particular the two problems of multi-photon dissociation of octahedral molecules. He coauthored two papers on this work at the Columbus Symposium on Molecular Structure and Spectroscopy and coauthored two more papers at the San Francisco American Chemical Society Meeting.

Professor Louis Pignolet attended the New York National Meeting of the American Chemical Society and presented a paper there April 3 - 10, 1976. He also attended the National Meeting of the American Chemical Society in San Francisco to present a paper August 27 to September 1. Professor Pignolet presented an invited Departmental seminar at the University of Illinois, Urbana, October 11 and 17. Professor Pignolet, Brian Casement, Terry Smith, Mike McGuiggan, Steven Wann, Robert C. Brasted, Jr., and Jay Simonson (undergraduate students) attended and presented papers at the Undergraduate Symposium at the North Dakota State University in Fargo, North Dakota on November 6.

Professor Stephen Prager attended the Gordon Research Conference on Interfaces, where he gave a talk entitled, "Dynamic Models for Permeation through Thin Membranes" July 19 - 23. He also presented a seminar to the physical chemists at Brown Univeristy. He spoke on "Dynamic Models of Transport through Thin Membranes" October 29.

Professor Harold S. Swofford, Jr. presented a seminar entitled, "Electrochemistry of Vitamin B_{12}" at the University of Wisconsin at Oshkosh on November 12, 1976.

Professor Donald G. Truhlar presented "Classical and Semiclassical Theories of Atomic-Diatomic Molecule Energy Transfer and Reactive Collisions" at the James Franck Institute Colloqiuim at the Department of Chemistry, University of Chicago on February 10, 1976. On April 13 he gave a seminar at the Department of Chemistry, University of Utah, Salt Lake City, entitled, "Vibrational Energy Release and Utilization in Chemical Reactions as Studies by Quasiclassical Trajectory Calculations." On March 15 - 19 he attended the Research Conference on Gas Kinetics at the University of Texas, Austin where he contributed a paper entitled, "Test of the Quasiclassical Trajtectory Method and Classical S Matrix Theory for Reactions H + Cl_2 (n_1 = 0,1,2) → HCl (n_2) + Cl (where n_1 and n_2 are vibrational quantum numbers)." Professor Truhlar also presented an invited lecture entitled, "Collision - Induced Dissociation" at the Gordon Research Conference on the Dynamics of Molecular Collisions at Plymouth, New Hampshire, June 26 - 30. He presented another invited lecture, "Classical and Semiclassical Studies of H + H_2" at the Gordon Research Conference on Atomic and Molecular Interactions at Wolfeboro, New Hampshire August 4 - 13. On October 26 he presented a seminar entitled: "Collision-Induced Dissociation of Diatomic Molecules" at the University of Wisconsin Physical Chemistry seminar. He attended a workshop on National Resource for Computation in Chemistry (NRCC) at Lawrence Berkeley Laboratory, Berkeley, California on November 11 and presented a research seminar entitled: "Collision-Induced Dissociation of Diatomic Molecules" at the Lawrence Livermore Laboratory, Livermore, California on November 12 and discussed electron-molecule scattering with the members of the Theoretical Atomic and Molecular Physics group of the Lawrence Livermore Laboratory.

Professor Fred A. Van-Catledge attended the Centennial Meeting of the American Chemical Society and a meeting of the Editorial Board of the Journal of Physical Chemistry in New York City, April 4 to April 8, 1976.

Professor John E. Wertz was in Washington, D.C. April 4 to 7 to consult with the National Science Foundation regarding the Metric Conversion Study and to attend the Second Metric Conference of the American National Metric Council.

Professor Archie S. Wilson was in Seattle, Washington June 11 to June 20 and in Ellensburg, Washington where he attended a meeting of present and former trustees of Central Washington State College. He also attended the 172nd National Meeting of the American Chemical Society, August 27 to September 1, 1976 in San Francisco.

During the month of February, Adjunct Professor of Chemistry, Harold Wittcoff, presented seminars on industrial chemistry at the University of Wisconsin - Eau Claire, the University of Puget Sound, Tacoma, Washington and Seattle-Pacific College, Seattle, Washington. He has been appointed a member of a joint National Science Foundation - Industrial Research Institute Committee to plan a workshop to define how best to penetrate the industrial - academic interface. The workshop will be charged with laying plans for implementing their recommendations. Dr. Wittcoff presented a talk to the Adhesive Section of the National Association of the Mexican Chemical Industry on March 18 - 19 in Mexico City on adhestive technology. On April 1 he attended the opening of the American Chemical Society Centennial Exhibit in the Union Carbide Building, New York City, commemorating the society's 100th anniversary. Dr. Wittcoff was head of a task force which contributed input to the exhibit on food and nutrition. On April 8 - 9 Dr. Wittcoff presented a two-day short course on the teaching of industrial chemistry at the college and university level at the annual meeting of the Iowa Academy of Science at Clark College, Dubuque, Iowa.

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. Thirteen students were selected from 200 applications and participated in advanced research projects under faculty supervision in the Department of Chemistry. The thirteen students who participated in the summer of 1976 were:

NAME	SCHOOL	RESEARCH GROUP HEAD
Frank Baiocchi	DePaul University Chicago, IL	Crawford
Carl Blackburn	Bowdoin College Brunswick, ME	Overend
P. Chongswangvirod	University of Wisconsin Eau Claire, WI	Dodson
Clifford Ehrlich	State University of New York Albany, NY	Gassman
Daniel Getman	State University of New York Buffalo, NY	Gassman
Rose Marie Holt	College of Idaho Caldwell, ID	Lipsky
Barbara Kamicker	Pennsylvania State University University Park, PA	Gray
Michael Lilga	State University of New York Fredonia, NY	Ellis
Michael McGuiggan	Southwest Minnesota State Marshall, MN	Pignolet
Jim McNamara	Carleton College Northfield, MN	Gassman
Jim Nietzel	Macalester College St. Paul, MN	Gray
Jim Smith	Drake University Des Moines, IA	Gassman
Larry Weston	Nebraska Wesleyan Lincoln, NE	Crawford

NATIONAL SCIENCE FOUNDATION - UNDERGRADUATE RESEARCH PROGRAM FOR SUMMER 1976

The Department was awarded $20,700 to conduct a summer research program for undergraduates. The program was directed and organized by Professor John E. Ellis. The participants who were at Minnesota for twelve weeks were:

NAME	COLLEGE	RESEARCH GROUP HEAD
David Ashpole	University of Minnesota	Ellis
Paul Barger	University of Minnesota	Ellis
David Brand	University of Minnesota-Morris	Kreevoy
Robert Brasted, Jr.	University of Minnesota	Reynolds
Fanny Chan	Concordia - Moorhead	Reynolds
Laura Clemens	University of Colorado	Truhlar
Mary Henry	University of Minnesota	Lumry
David Horner	Otterbein College	Overend
Waikwok Kwong	University of Minnesota	Dahler
Terence Leung	University of Minnesota	Dahler
Francis McGuiggan	Southwest State	Pignolet
Lawrence Merwin	Hamline	Gassman
Diane Niedzwiecki	University of Wisconsin-River Falls	Gray
Steve Richtsmeier	Gustavus Adolphus	Gentry
James Schwab	University of Minnesota	Gentry
Jay Simonson	University of Minnesota	Noland
Dan Walker	University of Northern Iowa	Gassman
Steven Wann	University of Minnesota	Noland

RESEARCH GRANTS TO THE FACULTY

Graduate School grants to faculty members during calendar year 1976 totaled $90,022.98 and were distributed as follows:

NAME	PROJECT	AMOUNT
Borch, Richard	Alterations of Prostaglandin Synthesis and Platelets Treated with Aggregation Inhibitors	$4,000.00
Bryant, Robert Ellis, John Pignolet, Houls Swofford, Harold	Analysis of Heavy Metals in Bio-inorganic Systems (PAR "Electro-chemistry Systems" for Chemistry)	7,500.00
Conroy, Lawrence	A New Method for Preparing Intercalcation Complexes of Layered Dichalconides	3,158.00
Crawford, Bryce	Acquisition of Perkin-Elmer 283 Infrared Spectrometer	6,700.00
Dahler, John	Dynamics of Adsorbed Molecules	4,109.00
Ellis, John	Photopromoted Reduction of Metal Carbonyls	2,600.00
Gentry, W. Ronald	Lasers for Experiments in Chemical Dynamics	4,000.00
Gougoutas, Jack	X-Ray Crystallographic Studies of Molecular Structures and Their Chemical Transformations in the Crystalline State	690.62
Hexter, Robert	Elementary Analysis on a Cyctochemical Scale Using Synchrotron Radiation	5,065.36
Hexter, Robert	Fluorescense Probes of Metal Surface - Adsorbed Molecule Interactions	8,000.00
Hoye, Thomas	Synthetic Organic Photochemistry	6,000.00
Leete, Edward	Metabolism of the Tobacco Alka-loids and Related Compounds	2,500.00
Lumry, Rufus	Equipment to complete the PDP-11	2,800.00

NAME	PROJECT	AMOUNT
Miller, Larry	Organic Reactions in Plasma	15,000.00
Miller, Larry	Organic Reactions in Plasma	10,000.00
Overend, John	Infrared Spectroscopy	900.00
Siegel, Brock	New Organometallic Catalysts; Preparation of a Ferredoxin Model of Potential Synthetic Value	7,000.00

Grants to faculty members during calendar year 1976 from sources outside the University totaled $1,343,041 and were received by the following professors:

NAME	PROJECT TITLE	GRANTING INSTITUTION	AMOUNT
Robert Bryant	Solvent and Small Solute in Tissues and Proteins	USPHS	$34,048
	Chemistry of Metal Ion-Protein Interactions	PHS	34,998
Bryce Crawford	Infrared Optical Studies on Molecular Relaxation Processes in Liquids	NSF	57,000
John Dahler	Kinetic Theory of Polyatomic Fluids	NSF	37,700
	Theory of High-Energy Ion Atom and Atom-Atom Collisions	NSF	32,500
John Ellis	Synthesis and Chemistry of Highly Reduced Organometallics	NSF	27,700
Paul Gassman	Vincristine and Vinblastine Derivatives and Models	PHS	37,566
	Highly Strained Nitrogen Heterocyclics	PHS	88,502
	Stereospecific Functionalization of Aromatic Amines	USPHS	21,576
	Chemistry of Bent Bonds	NSF	55,300
	Anhydrous Hydroxide - A Powerful Reagent in Organic Chemistry	ACS/PRF	24,000
Ronald Gentry	Chemical Dynamics of Biomolecular Reactive Collisions	NSF	26,000
	Reactions of Ions with Atomic and Molecular Free Radicals	ERDA	30,000
	Energy Transfer in Molecular Collisions	NSF	81,000

NAME	PROJECT TITLE	GRANTING INSTITUTION	AMOUNT
Gary Gray	Antitumor Active Components of BCG Walls	PHS	$84,739
Robert Hexter	Fluorescence Probes of Metal Surface - Adsorbed Molecule Reactions	DAAG	35,000
I. M. Kolthoff	Polarography with Albumin and Cancerous Human Blood Sera	USPHS	27,566
	Acid Base Equilibria in Aprotic Solvents	NSF	50,700
Maurice Kreevoy	The Relations Among Rate, Structure and Solvent, Proton and Hydride Transfer	NSF	36,000
	DMSO-Water as a Medium for BH_4 Reductions	Ventron Corp.	2,500
Edward Leete	Research on Biogenesis of Morphine	PHS	66,858
Sanford Lipsky	The Contribution of Electronically Excited States to the Radiation Chemistry of Organic Liquids	ERDA	70,000
Rufus Lumry	Conformational Basis of Enzymic Catalysis	USPHS	52,208
	Systems Approach to Protein Function	NSF	36,000
C. Alden Mead	The Principal of Increasing Mixing Character in Irreversible Statistical Mechanics	ACS/PRF	16,000
Larry Miller	Anodic Synthesis	ACS/PRF	36,000
Wilmer Miller	Cholesteric BioPolymer Liquid Crystals	PHS	53,180
	Dynamics and Thermodynamics of Polymer and Oligomer Adsorption at the Solid-Liquid Interface	ACS/PRF	24,000

NAME	PROJECT TITLE	GRANTING INSTITUTION	AMOUNT
Albert Moscowitz	Magnetic Circular Dichroisms of Forbidden Transition in Organic Molecules	NSF	$75,300
Louis Pignolet	Photochemical, Redox Magnetic and Kinetic Properties of Transition Metal Complexes with Sulfur Containing Ligands. Metal Complexes as Reagents in Organic Synthesis.	NSF	30,100
Donald Truhlar	Scattering Theory and Calculations for Chemical Reactions and Electron Impact Processes	NSF	21,000
John Wertz	Electronic Properties of Oxides	NSF	38,000

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 industrial grants are noted in parentheses.

Allied Chemical Company	$3,000
Amoco	6,000
Dow Chemical Company	10,000
E. I. du Pont de Nemours and Company	26,000
Eastman Kodak Company	1,000
General Electric Co. (Gassman)	7,500
General Mills, Inc.	1,000
Lubrizol	1,000
Merck & Company	1,000
Minnesota Mining and Manufacturing Co.	5,000
Pillsbury Company (Bryant)	11,500
Proctor and Gamble	6,000
Rohm & Haas (Gassman)	5,000
Union Carbide	3,000
Uniroyal	3,000
Ventron (Kreevoy)	2,500

POST-DOCTORAL ASSOCIATES

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

NAME	INSTITUTION	GRAD YEAR	COLLABORATING PROFESSOR
Chang, John C.C.	Iowa State U	1976	Gassman
Chenier, Philip	Loyola U	1969	Gassman
Childs, Michael	U of So. Calif.	1976	Gassman
Evans, April	U of Minnesota	1975	Gassman
Hahnfeld, Jerry	U of Iowa	1975	Gassman
Maier, Helmut	U of Tubingen	1975	Gassman
Balchunis, Robert	Ohio State U	1975	Gassman
Sugawara, Tadashi	U of Tokoyo	1974	Gassman
Yamaguchi, Ryohei	Kyoto U	1975	Gassman
Parton, Richard	U of Colorado	1974	Gassman
Kihara, Sorin	Kyoto U	1974	Kolthoff
Sawamoto, Hiromiti	Kochi U	1970	Kolthoff
Chantooni, Miran	U of Minnesota	1961	Kolthoff
Tohyama, Kohji	Osaka U	1976	Miller
Raj, Tilak	U of Illinois	1976	Bryant
Bennett, Charles	U of Georgia	1971	Bryant
Hsi, Edward	U of Minnesota	1975	Bryant
Nielsen, Svend	Tech U Copenhagen	1963	Dahler
Jhon, Myung	U of Chicago	1974	Dahler
Knox, Donald	Notre Dame	1976	Lumry
Werness, Peter	Rice U	1974	Lumry
Adiarte, Arthur	U of Pittsburgh	1972	Lumry
Haddad, Louis	Indiana U	1975	Lumry
Seamans, Lloyd	U of Minnesota	1974	Moscowitz
Gregory, Thomas	Notre Dame	1971	Lipsky
Modler, Robert	U of Minnesota	1965	Kreevoy
Swanson, Douglas	U So. Calif.	1973	Crawford

PLACEMENT OF POSTDOCTORAL STUDENTS IN 1976

Collaborating professor is in parenthesis.

NAME	POSITION TAKEN
Luh, Tein-Yau (Gassman)	Assistant Professor at Chinese University of Hong Kong
Faulkner, Thomas R. (Moscowitz)	Postdoctoral appointment at University of Virginia-Charlottesville
Numrich, Robert W. (Dahler)	Postdoctoral appointment at Kansas State University at Manhattan
Carter, John V. (Lumry)	Assistant Professor, Horticultural Science and Landscape Architecture, University of Minnesota

PLACEMENT OF POSTDOCTORAL STUDENTS IN 1976

NAME	POSITION TAKEN
Kakimoto, Masao (Crawford)	Institute for Molecular Science at Okazoki, Japan
Veksli, Zorica (W. Miller)	returned to Zagreb University, Zagreb, Yugoslavia
Vogt, Gerald J. (Bryant)	Los Alamos Scientific Laboratories, Los Alamos, New Mexico
Pike, William (Gassman)	Dow Chemical Midland, MI
Gilbert, David (Gassman)	Eastman-Kodak Rochester, NY
Harrington, Clinton (Gassman)	Ciba-Giegy Ardsley, NY

GRADUATES - 1976

On the following pages are listed the names, theses, advisers and positions of those students who graduated in 1976 with an M.S. or Ph.D. degree.

DEGREE	NAME	DATE REC'D	THESIS TITLE	ADVISER	POSITION
M.S.	Blanco, Ruth	8/76	The Hydrolosis of Tetrahydrofolate Analogs.	Barnett	
Ph.D.	Bodem, George	12/76	Biosynthesis of Orchidaceae Alkaloids Shihunine and Pierardine.	Leete	Eastman Kodak Co. Rochester, NY
MS	Conover, Sr. Karen	12/76	The Oxidation of Triphenylphosine Catalyzed by Bistriphenylphosine-diiodonickel (II).	Pignolet	
M.S.	Dighe, Vinay	8/76	Optical Behavior of Resolvable Metal Complexes in the Presence of Resolved Transition Metal Complexes-Environmental Effects.	Brasted	Environmental Scientist TKDA & Assoc. St. Paul, MN
Ph.D.	Faltynek, Robert	8/76	Synthesis and Reactivity of Transition Metal Carbonylates: Substitution Products of Hexacarbonylvanadate (-I). The Chemistry of Tetracarbonylmanganate and Tetracarbonylrhenate (-III).	Ellis	Postdoctoral Position MIT Cambridge, Mass.
Ph.D.	Faulkner, Thomas	3/76	On the Infrared Optical Activity of Small Molecular Systems.	Moscowitz	Research Associate University of Virginia Department of Chemistry
M.S.	Gantzer, Mary Lou	12/76	Partial Purification and Characterization of Membrane-Bound Mg++-ATPase from Sheep Kidney Outer Medulla.		Junior Scientist Medical Oncology University of Minnesota

DEGREE	NAME	DATE REC'D	THESIS TITLE	ADVISER	POSITION
Ph.D.	Goplen, Thomas	12/76	The ATR Spectra of Some Simple Polyatomic Liquids.	Crawford	Postdoctoral Position National Research Council Ottawa, Canada
Ph.D.	Hanson, Joseph	3/76	Extrusions and Sulfer-Oxygen Rearrangements of Catechol Derivatives.	Dodson	Research Chemist Amoco Chemical Co. Naperville, Ill.
Ph.D.	Harris, L. Scott	12/76	The Acetylated Methylmannose Polysaccharide of Streptomyces Griseus.	Gray	Dow Chemical Co. Midland, Mich.
Ph.D.	Hareland, Willard	3/76	Analysis and Characterization of Noise in Flame Spectroscopy.	Mossotti	Bendix Corp. Staff Engineer Kansas City. MO
M.S.	Heiman, Jerome	6/76	Ligand Exchange of Metal Dithiocarbamate Complexes by Nuclear Magnetic Resonance Studies.	Pignolet	Electrochemist Globe-Union, Inc. Milwaukee, Wis.
Ph.D.	Heinitz, Maxine	6/76	The Addition of Sulfur Monoxide to Non-Conjugated Dienes.	Dodson	Chemist Food and Drug Administration Minneapolis, MN
Ph.D.	Kirven, Edward	3/76	Studies on the Biosynthesis of Tropic Acid and Related Metabolism In Datura.	Leete	Asst. Professor Dept. of Chemistry University of The South Sewanee, TN
M.S.	Lovey, Raymond	8/76	The Action of Bases on N-substituted 1,4-thiazine Dioxides.	Noland	Shering Research Corp. Bloomfield, NJ
Ph.D.	Lee, Chang Kiu	8/76	Reactions of Pyrroles with Acetylenic Esters.	Noland	Postdoctoral Position School of Pharmacy University of Minnesota
Ph.D.	Lucast, Donald	6/76	The Synthesis of Metalloidine.	Leete	Postdoctoral Position University of Detroit Detroit, Mich.

DEGREE	NAME	DATE REC'D	THESIS TITLE	ADVISER	POSITION
M.S.	Magil, Gary	8/76	The Heats of Formation of Some Simple Gas-Phase Hydrocarbon Ions.	Buttrill	
Ph.D.	McClure, Donald	3/76	Reactive Scattering in D_2 + N and D_2 + O Combinations.	Gentry	Bell Laboratories Murray Hill, NJ
M.S.	Minich, Martha	6/76	The Biosynthesis of the Alkaloids of Phalaris arundinacea L.	Leete	Interplastics Corp. Minneapolis, MN
Ph.D.	Palazzotto, Joyce	8/76	Role of Ion Transport in Membrane Regulation.	Barnett	Postdoctoral Position Tufts-New England Medical Ctr. Boston, MA
Ph.D.	Palazotto, Michael	6/76	An NMR Study of the Stereochemical Nonrigidity of Tris(Dithiocarbamato)Iron(III) Complexes and of the Electron Transfer Reaction between Tris(Dithiocarbamato) Complexes of Iron(III) and Iron(IV).	Pignolet	Postdoctoral Position MIT Cambridge, Mass.
Ph.D.	Price, Philip	12/76	Analytical Applications of Conventional and Drift Tube Chemical Ionization Mass Spectrometry.	Swofford	Union Carbide Corp. So. Charleston, WV
M.S.	Rudolph, William	12/76	The Conformation of Synthetic Polymers Adsorbed at a Solid, Liquid Interface.	W. Miller	
Ph.D.	Schreck, David	3/76	The Synthesis of Cardenolide Analogs.	Barnett	Union Carbide Corp. So. Charleston, WV
M.S.	Van Rij, Jacomijntje	8/76	X-Ray Diffraction Studies.	Britton	
Ph.D.	Yamaguchi, Shinichiro	3/76	The Neophelometric Analysis of Silver Bromide Suspensions.	Meehan	Kao Soap Co. Wakama-shi, Japan

DEGREE	NAME	DATE REC'D	THESIS TITLE	ADVISER	POSITION
Ph.D.	William Pike*	7/76	Synthesis and Solvolysis of Exo- and Endo- Bicyclo[2.1.0]Pentane 2-Carbinyl Tosylates. Synthesis and Metal-Catalyzed Rearrangements of 2-Aryl- and 2-[4-pyridyl]Bicyclo[1.1.0]butanes	Gassman	Dow Chemical Midland, MI
Ph.D.	David Gilbert*	6/76	The synthesis of 2,3-Bisubstituted Indoles	Gassman	Eastman-Kodak Rochester, NY
Ph.D.	Clinton Harrington*	5/76	Synthesis and Solvolysis of Highly Fluorinated Allylic Systems	Gassman	Ciba-Geigy Ardsley, NY

*Research work conducted at Minnesota, degree awarded by Ohio State University