

MINNESOTA CHEMISTS NEWSLETTER

No. 1

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This will be the first issue of what will become an annual report to alumni of changes, accomplishments and recent events in the Department of Chemistry. We also plan to bring you news of interest about alumni from the Department from time to time. We hope you will find this of interest and will keep us informed of your activities.

New Faculty

Beginning with the Fall Quarter, 1969 - 1970 and continuing over a two-year period, thirteen new faculty have joined the Department. These additions did not correspond to an expansion; rather, a number of vacancies that had developed over the years and which had been filled with temporary appointees were made available to the new chairman to fill as his first task. In addition, several retirements and resignations had occurred. This project could not have come at a better time, of course, since few major universities have been in a position to hire new faculty. Thus Minnesota has been fortunate to acquire some promising and distinguished young men. These are:

Assistant Professor Ronald E. Barnett, Ph.D., Brandeis University, 1969

Research Interests: The mechanism of the sodium-potassium ion activated adenosine triphosphatase of mammalian cell membranes, the mechanism of carbonyl, acyl, and organophosphate reactions in aqueous solution, application of epr techniques to biological problems.

Assistant Professor Robert G. Bryant, Ph.D., Stanford University, 1969

Research Interests: Application of magnetic resonance techniques to the study of macromolecules and their interactions with metal species; outer sphere metal complexes in both inorganic and protein systems; water and low molecular weight solutes in protein crystals.

Assistant Professor Sidney E. Buttrill, Jr., Ph.D., Stanford University, 1969

Research Interests: Rates and mechanisms of gas phase ion-molecule reactions using the techniques of ion cyclotron resonance spectroscopy. Comparison of the reactions of an ionic species in solution with its reactions in the gas phase, thus the intrinsic chemical properties of ions distinct from effects due to strong ion-solvent interaction.

Assistant Professor John E. Ellis, Ph.D., Massachusetts Institute of Technology, 1971

Research Interests: Synthesis and characterization of organometallic and inorganic compounds; reactions of coordinated ligands, the use of metallic compounds in organic synthesis and inorganic model systems in biologically important processes.

Assistant Professor W. Ronald Gentry, Ph.D., University of California (Berkeley), 1967

Research Interests: Molecular beam studies of the processes by means of which atoms and molecules interact in single bimolecular collisions to undergo chemical reaction or energy transfer.

Associate Professor J. Zanos Gougoutas, Ph.D., Harvard University, 1964

(Previously Associate Professor, Harvard University)

Research Interests: Chemical reactions and concomitant phase changes in molecular crystals; crystal and molecular structure of organic substances.

Associate Professor Victor G. Mossotti, Ph.D., State University of Iowa, 1964

(Previously Senior Research Chemist, Materials Research Lab,
University of Illinois)

Research Interests: The use of analytical atomic spectroscopy to characterize chemical systems in terms of the processes which are important in the generation and recovery of analytical signals. Exploration of the optical properties of flame plasmas using the theory of stochastic processes.

Assistant Professor Louis H. Pignolet, Ph.D., Princeton University, 1969

Research Interests: Stereochemical studies of transition metal complexes by nmr spectroscopy especially to elucidate the mechanisms of metal centered rearrangements. Organometallic synthesis of systems containing two or more metals in close proximity in order to study electrochemical and magnetic properties.

Assistant Professor Josef Takats, Ph.D., Massachusetts Institute of Technology, 1969

Research Interests: Organometallic chemistry; transitional metal complexes of reactive organic ligands and of sulfur donor chelates.

Assistant Professor Donald G. Truhlar, Ph.D., California Institute of Technology, 1969

Research Interests: The quantum mechanical description of chemical reactions with particular emphasis (a) on comparisons of exact results, molecular beam experiments and approximate theories and (b) on the role of vibrational energy in reactants and the production of vibrational energy in products. Also, the study of the quantum mechanics of electron impact spectroscopy.

Assistant Professor Frederick A. VanCatledge, Ph.D., Wayne State University, 1968

Research Interests: Physical and theoretical organic chemistry, molecular orbital theory in organic chemistry, the sizes and shapes of organic molecules, pseudo-aromatic systems.

New Chairman and Associate Chairman

On July 1, 1969 Professor Robert M. Hexter joined the Department as Professor and Chairman. Dr. Hexter did his undergraduate work at Minnesota (Class of 1948). He received his Ph.D. at Columbia University in 1952, where he was a DuPont Fellow and Lecturer in Chemistry. Immediately thereafter he joined the Chemistry Department at Cornell. In 1957 he was one of three people who accompanied Paul Flory to Mellon Institute, as Senior Fellow, to initiate its fundamental research program. In 1965 he became Adjunct Professor of Chemistry at Carnegie Institute of Technology. Two years later, upon the formation of Carnegie-Mellon University he became Professor of Chemistry there. He has held both Guggenheim and Fulbright Fellowships. He has been Visiting Professor at Florida State University and Israel Institute of Technology, as well as Summer Visitor, Radiation Laboratories, University of California. Dr. Hexter's research interests include rapid scanning infrared spectroscopy, infrared and ultraviolet spectra of solids (particularly at very low temperatures), matrix isolation and the theory of the spectra of molecular crystals.

On July 1, 1971 Archie S. Wilson joined the Department as Professor and Associate Chairman. Dr. Wilson did his undergraduate work at Iowa State University (Class of 1946). From 1943 to 1946 he was a research associate in X-ray crystallography of metals and alloys with the late Dr. R. E. Rundle on the Manhattan Project. In 1946 he joined the Quartermaster Corps, U.S. Army as a Second Lieutenant and spent the next two years in a special program as a graduate student in chemistry at the University of Chicago. In 1950 he received his master's degree and in 1951 his Ph.D. degree from the University of Chicago in inorganic chemistry under the direction of Professor Henry Taube. During the academic year 1950 - 1951 he was a Lecturer in Chemistry at the University of Nebraska. In 1951 he joined the chemistry section of the Hanford Laboratories operated for the Atomic Energy Commission by the General Electric Company. In 1954 he became a Lecturer in Inorganic Chemistry for the Center for Graduate Studies operated by the University of Washington. From 1959 to 1969 he served as a Trustee for Central Washington State College. Dr. Wilson's research interests include: aqueous complex ion chemistry, ruthenium chemistry, solvent extraction phenomena, and the crystal structures of actinide compounds.

Kolthoff and Smith Halls

Construction of an addition to the Chemistry Building was begun in the summer of 1968 and was completed in early 1971. The new building has seven storeys and lies immediately south of the original building, linked at the second, third and fourth floors of the latter. It was designed by the architectural firm of Hammel, Green and Abrahamson of St. Paul, under the guidance of Professors Fenton and O'Connor. It has now been named Kolthoff Hall and the older building re-named in honor of Professor Lee Irvin Smith. Joint dedication ceremonies are being planned for June 2, 1972, with Dr. Max Tishler, President-Elect of the American Chemical Society, as principal speaker. All alumni will shortly receive invitations to attend.

The 1971 Minnesota State Legislature appropriated \$300,000 to begin the renovation of Smith Hall, as the first phase of a \$4,400,000 project. The program for this renovation was written by Anton J. Egner & Associates of Ithaca, New York. Work will commence in early March 1972 and will include a tunnel linking Smith Hall to Walter Library next door, where Chemistry's library is now housed; new modular freshman laboratories; a new research laboratory for Professor Bryant's group; a new electronics shop; and a commons room.

Departmental Research Funds

In early 1967 the University sought the counsel of four distinguished professors of chemistry - John D. Roberts of Caltech, William T. Lipscomb of Harvard (formerly of Minnesota), John Ross of MIT and Herbert Laitenin of Illinois (an illustrious alumnus). Among many things, they recommended a substantial increase in the Department's supply budget, the main resource for those graduate students whose research may not be supported by fellowships or government grants.

The University has followed the advice of the "Roberts Committee" and the supply budget is now in the vicinity of \$300,000 per year, some five times what it was in 1967. A system of "minigrants" has been developed to support graduate research not otherwise supported. Each faculty member annually submits a short proposal to a committee of his peers and grants are made commensurate with need. They vary from \$1000 to \$5000 per year.

In order to achieve more timely and accurate reporting on the expenditure of all departmental funds, the national public accounting firm of Lybrand, Ross Bros. and Montgomery was retained to develop the Department's own computerized accounting and inventory system. The system has been in full operation since July 1, 1971.

Organizational and Curricular Changes

In keeping with recommendations made by an internal departmental reviewing committee (1966) as well as by the "Roberts Committee," the Department abandoned the divisional system in 1969 - 1970. At the graduate level, only a single degree - in Chemistry - is now offered. Students may concentrate, however, in any of seven specialty areas - chemical dynamics, bio-organic and bio-physical chemistry, chemical instrumentation and analysis, spectroscopy and molecular structure, inorganic, organic or physical chemistry. (The influence of the Westheimer Report may be recognized.) Each professor is a member of at least two areas. Each area has a representative with a four-year, staggered term on a Graduate Operations Committee, which guides the work of first-year graduate students, carries out curricular revision at the graduate level, and so forth.

At the undergraduate level, the Department attempts to carry out the functions formerly delegated to the Divisions in an all-department manner. Much of the work is carried out by committees chosen annually from the department at large. For example, curriculum review and reform is carried out by an undergraduate Curriculum Committee, etc. In fact, the latter committee has developed a rather bold and experimental new curriculum for undergraduate chemistry majors. The curriculum offers several tracks to the B. Chem. degree such as Basic Chemistry (in preparation for graduate work), Chemical Instrumentation, Chemistry of Materials, Eco-chemistry, and Physical Biochemistry. The curriculum has been more fully described in C & E News and has attracted much interest at other universities. Some of those which have shown particular interest are: Cornell University, Clark University, State University of New York at Albany, University of Utah, Illinois Institute of Technology, University of Waterloo and Carleton College.

Still another example has been the institution of a departmental seminar which meets bi-weekly.

New Equipment

In recent years, the Department has benefited very much from the NSF Chemical Instrumentation Program. In each case, the NSF grant has been matched on a one-to-one basis by the University. Some of the instruments acquired and their approximate cost are as follows:

<u>Instrument</u>	<u>Cost</u>	<u>Year Added</u>
Hilger & Watts Model Y290 - X-ray Diffractometer	\$130,000	1968
Varian 100 XL NMR Spectrometer	92,000	1969
Hitachi-Perkin Elmer FIS-3 Far Infrared Spectrometer	34,400	1970
Fourier Transform Accessory to Varian 100 XL	70,500	1971
AEI MS-30 Double Focusing Mass Spectrometer	105,885	1972
	<u>\$432,785</u>	

In addition, with the cooperation of the Graduate School and the University's Central Administration the new members of the faculty have been amply funded to initiate the research programs of each. A total of \$425,000 has been provided for these purposes over the past two years. Examples of major instrumentation provided by these sources are:

Cary Model 16K Spectrophotometer (Prof. Barnett)	\$ 14,600
Beckman Model L3-40 Preparative Ultracentrifuge (Prof. Barnett)	6,300
Varian Ion Cyclotron Resonance Spectrometer (Prof. Buttrill)	55,000
Bruker Faraday Balance (Prof. Pignolet)	11,400
Molecular Beam Apparatus (Prof. Gentry)	89,400
	<u>\$176,700</u>

Finally, as a part of the construction costs of Kolthoff Hall, approximately \$50,000-worth of technical (research) equipment was added.

New Facilities

The University also took note of the poverty of the Department's machine and electronics shops. Beginning in early 1970 and ending July 1, 1971 the University allocated a total of \$127,738 for upgrading both of these facilities. Of this total, \$95,338 was expended on machine tools, instruments, accessories and furniture and the remainder on physical remodeling, principally in the machine shop. As can be well imagined, it is now a well equipped, modern shop. In addition each shop is now staffed by a foreman plus three machinists or technicians.

As part of a program of the Graduate School, a large liquid nitrogen storage facility was installed at the rear of Smith Hall, at a cost of ~ \$18,000.

The Department's stockrooms have been relocated, reorganized and restocked. Stockrooms which service undergraduate laboratories are now separately operated and budgeted from those which service research laboratories. Both are located in the sub-basement of Smith Hall, although the Research Stockroom has a "branch office" on the fourth floor of Kolthoff Hall. The annual budget of the undergraduate stockroom is now \$68,000. Beginning in the summer of 1969, the Department initiated an improvement program for its Research Stockroom. As of 6/30/72, approximately \$60,000 will have been expended in this program. The Research Stockroom's inventory has been computerized for about a year now and has a current value of more than \$117,000. Following a two-year experiment of operation in a "super market" mode, the stockroom has reverted to a "general store" mode. Withdrawals are charged to the appropriate budget (departmental account, research grant or "minigrant") by the presentation of an authorized credit card.

Visiting Professors

- Professor James Ibers, Department of Chemistry, Northwestern University, Spring Quarter, 1969 - 1970.

- Professor J. C. Decius, Department of Chemistry, Oregon State University, Fall Quarter, 1970 - 1971.

- Professor Robert D. Gillard, University of Kent at Canterbury, academic year 1970 - 1971.

Visiting Committee

The Department is pleased to announce the acceptance of invitations by four distinguished chemists as the first members of a regular visiting committee. This committee will visit the Department annually to aid in program evaluation. The members will be:

- Dr. Herbert S. Eleuterio, Director, Explosives Department, E. I. DuPont deNemours & Company
- Dr. Ronald E. Kagarise, Superintendent, Chemistry Division, Naval Research Laboratory
- Dr. Robert A. Plane, Provost, Cornell University
- Dr. Irving Shain, Vice Chancellor for Academic Affairs, University of Wisconsin

Promotions

- Associate Professors Bolton and Garbisch to Professor in 1969.
- Associate Professors Miller and Ware to Professor in 1970.
- Assistant Professor Borch to Associate Professor in 1969.

Awards

- Professor Robert C. Brasted was awarded the Distinguished Teacher Award of Institute of Technology, University of Minnesota and the Manufacturers Chemists Association's College Chemistry Teachers Award for 1971.

- Professor Richard F. Borch was awarded an Alfred P. Sloan Fellowship in 1970.

- Dean Bryce L. Crawford and Professor William E. Parham were awarded the Minnesota Awards of the Minnesota Section, American Chemical Society for the years 1968 and 1970, respectively.

- Professors Ronald E. Barnett and Robert C. Bryant were each awarded Merck Grants for Faculty Development by the Merck Company Foundation in 1969 and 1971, respectively.

Recent Sabbatical Leaves

1969 - 1970:

Professor Maurice M. Kreevoy - University of Zagreb, Zagreb, Yugoslavia and Oxford University.

Professor Lawrence E. Conroy - Institute of Inorganic Chemistry, Münster and Argonne National Laboratory.

Professor Paul R. O'Connor - Staff Chemist on the NSF Liaison Staff in New Delhi, India.

1970 - 1971:

Professor Robert C. Brasted - Stuttgart University.

Professor Edgar W. Garbisch - Johns Hopkins University.

Professor Ernest B. Sandell - University of Minnesota.

1971 - 1972:

Professor J. Doyle Britton - Swiss Federal Institute of Technology, Zurich.

Professor C. Alden Mead - Institut für Quantenchemie der Freien Universität, Berlin.

Tours

Professor Leete participated in the 7th International Symposium on the Chemistry of Natural Products in Riga, USSR, June 20 - 27, 1970.

Professors Gougoutas and Hexter participated in the 2nd International Symposium on Organic Solid-State Chemistry in Rehovoth, Israel, September 14 - 18, 1970.

Dean Crawford visited several chemistry departments in Columbia, February 21 - 28, 1971, in connection with a joint program between the Colombian Fund for Scientific Research and the U.S. National Academy of Sciences.

Departures

The Department regrets to announce the following retirements, moves, etc.

Professor Ernest B. Sandell - Retired June 15, 1971.

Professor James R. Bolton - Resigned to join the faculty of the University of Western Ontario, Waterloo, Ontario, June 15, 1970.

Assistant Professor Josef Takats - Resigned to join the faculty of the University of Alberta, Edmonton, Alberta, Canada, June 15, 1971.

Professor William R. Ware - Resigned to join the faculty of the University of Western Ontario, Waterloo, Ontario, June 15, 1971.

Professor Edgar W. Garbisch - Is resigning effective June 15, 1972 to enter private consulting in salt marsh reclamation.

Professor William E. Parham - Is resigning effective June 15, 1972 to become R. J. Reynolds Professor at Duke University.

[Several of the new positions mentioned earlier arose due to the vacancies created by the retirement of Professor Sandell and the moves of Professor Bolton and Takats. Due to the University's financial retrenchment, Professors Ware, Garbisch and Parham will not be replaced.]

Returns

Professor Bryce L. Crawford, Jr. has resigned as Dean of the Graduate School effective June 15, 1972 and will return to the Department to fully resume his professorship. We look forward to his return with great expectations.

New Editorial Offices

The Department is now the international headquarters of two major chemistry periodicals:

- Professor Wayland E. Noland became Secretary to the Board of Editors of Organic Synthesis in 1969.

- Dean Bryce L. Crawford became Editor, Journal of Physical Chemistry; Professors Prager and VanCattedge are Associate and Assistant Editors, respectively, in 1970.

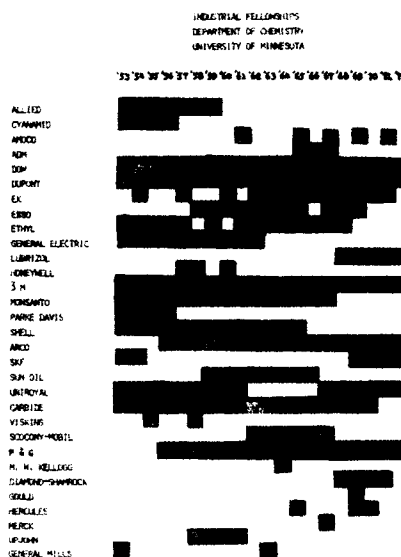
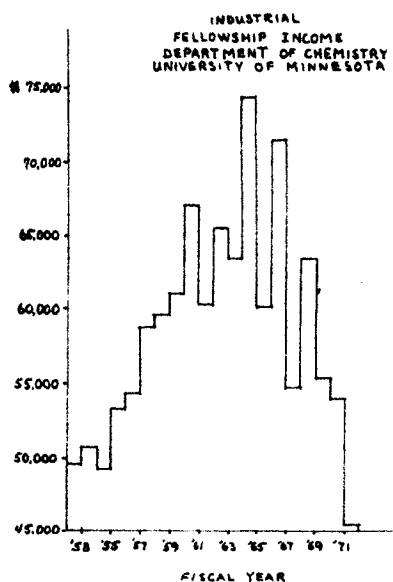
Bequest

The Regents of the University have accepted a \$400,000-plus bequest from alumnus Maximilian Lando (Class of 1902). Lando died in 1966. His will directed that the funds be held for 100 years of growth, then used for science scholarships, especially in chemistry. However, a Los Angeles court has now held that stipulation to be in violation of legal rules against trust held in perpetuity. The Department has suggested that it be used for graduate fellowships.

The Funding Situation

Many alumni have undoubtedly wondered how the Department is "doing" with respect to employment opportunities for its graduates, Federal grant income, etc. The answer is "fair." As of September 15, 1971 all of last year's class had been placed, although many had to accept their one and only offer. On the other hand, postdoctoral fellows have had a more difficult time finding positions, particularly if they have specialized in Theoretical chemistry.

Surprisingly, Federal grant income has not seriously decreased from its high point of several years ago. Although some faculty member's grants were not renewed as a result of the Mansfield amendment, most new members of the Department have been funded, so as to offset the former loss. The major loss, over the years, has been of industrial fellowships. Their history is best summarized by the following graphs.



A Note from the Chairman

The budgetary difficulties of the University notwithstanding, the Chemistry Department continues to be very much alive and growing in excellence. We are particularly pleased with our new faculty members, building, equipment and facilities. The new curriculum is undoubtedly an outstanding achievement. It has been primarily the contribution of our new faculty who are already distinguishing themselves as both teachers and scientists. We look forward to seeing many of you at the June 2 dedication ceremonies at which time we will very much enjoy introducing you to all of these. In the meantime, we would enjoy your reaction to this newsletter and to the news it has reported. Write and tell us what you think!