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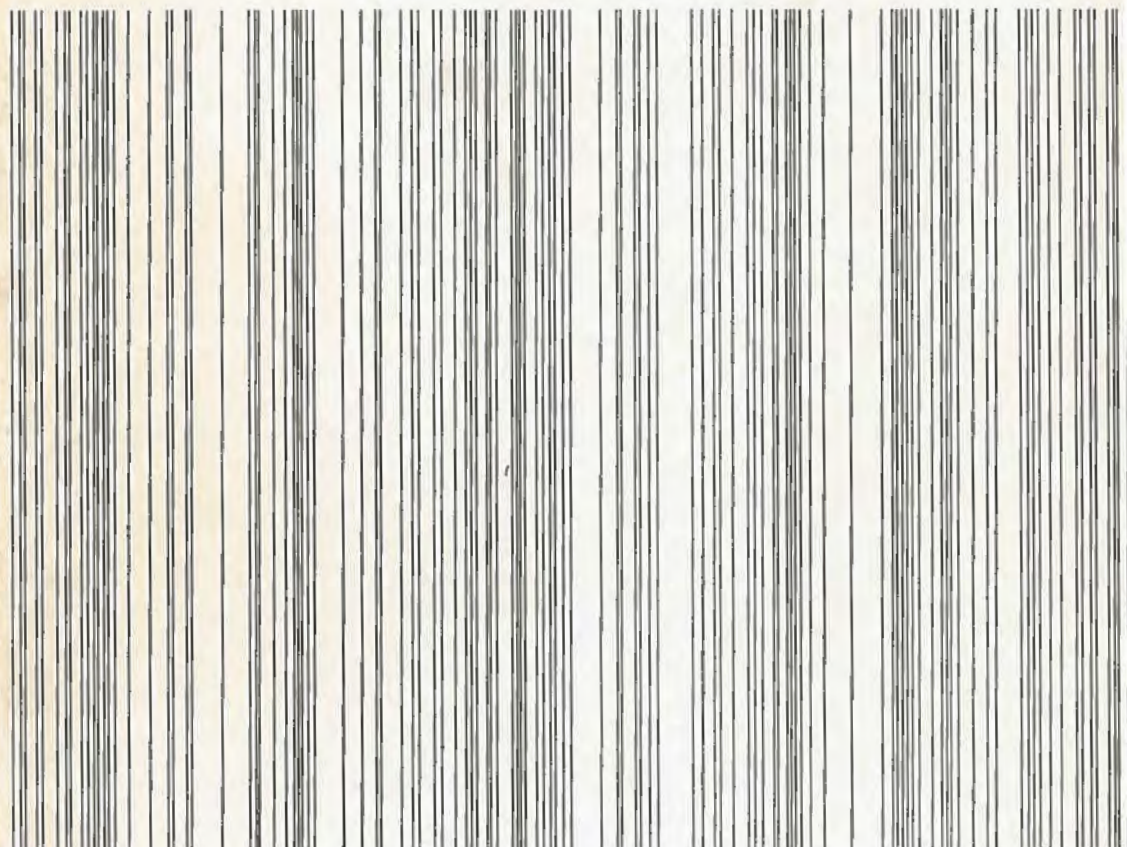
# ALUMNI NEWSLETTER

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SCHOOL OF CHEMICAL SCIENCES

UNIVERSITY OF ILLINOIS at Urbana-Champaign

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NO. 9, WINTER 1974-75

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## The State of the Union

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(Comments by the director of the School of Chemical Sciences, Professor H. S. Gutowsky)

The *Alumni Newsletter* is published yearly by the School of Chemical Sciences to provide our alumni and friends with a report on the highlights of our recent activities and also those of our alumni. Traditionally, this has involved articles dealing with the awards and honors received by our faculty, alumni, and students, a report on our new faculty members, a listing of the recent Ph.D. recipients and their thesis titles, and a feature article or two concerning some particular area of the school or about one of our leading faculty members. In addition to these, a new section was instituted last year (The State of the Union) in which the director comments on other activities of interest and also on some of the problems currently facing the school.

### Instructional Program

Our total enrollments this fall are virtually unchanged from those of last year. However, in the two preceding years we experienced 10 percent increases each year so we are currently faced with an instructional load that is about 20 percent above the 1971-72 level. Some of this increase is due to overall increases in the student population on campus, but most of it is attributable to major shifts in enrollment patterns associated largely with increased student interest in preprofessional curricula. The main foci of these increases have been the general chemistry program, the sophomore-level organic chemistry courses, and the introductory biochemistry courses. We are currently pushed to the limit in the number of students we can accommodate in these areas.

There are 415 graduate students enrolled in the school this fall which is down slightly from the 421 here in 1973-74. Although the total number of graduate students has remained fairly static over the last several years, there have been some significant shifts in enrollments within the school. The most dramatic have been a 50 percent increase in the number of analytical students and a 20 percent increase in the number of biochemistry students. These have been balanced by decreases in organic and physical chemistry. The increase in analytical chemistry appears to be largely related to an increased interest in environmentally related aspects of chemistry; the increase

in biochemistry is due mainly to students who are taking master's degrees to improve their chances for admission to medical school.

The number of Ph.D. degrees awarded last year was seventy-one, which is up from fifty-seven the year before and is the largest since 1969-70. The main reason for the increase is that in 1972-73 many students deferred taking their degrees because of the slowdown in the employment market.

### **Financial Support**

Unfortunately, the large increases in our undergraduate enrollments have not been accompanied by a corresponding increase in state support. The problem has been compounded by inflation, which has sharply increased our operating costs for the past four years. Thus, much effort has been devoted to accommodating the increased enrollments in chemistry while keeping the account books balanced. Besides reducing our instructional costs with alternate and smaller-scale experiments in our lab courses, we have had to transfer more of our out-of-pocket expenses associated with graduate thesis research to research grants and to deliberately reduce our storeroom inventories in order to keep from building up large deficits.

We have gone about as far as we can on these approaches, so we see no alternative in the future but to limit undergraduate enrollments unless budget increases are forthcoming. Incidentally, one change that has occurred because of inadequate state support is that the federal support of our school's programs now exceeds that received from the state.

### **Placement of Graduates**

For the third consecutive year, recruiting activity in our Chemistry Placement Office remained rather light during 1973-74, but it continued an upward trend. Those industries which did interview our students had actual positions to fill. Increased industrial interest was particularly noticeable at all degree levels of chemical engineering, and at the Ph.D. level of chemistry. Fifteen B.S. chemists were still seeking employment when they left the campus at graduation time. Of this group, four had majored in the chemistry curriculum, two in the sciences and letters curriculum with a chemistry major, and nine in sciences and letters with a biochemistry major. The Placement Office will continue to assist these graduates in finding positions.

For the fourth year, our Placement Office mailed to approximately 300 companies and governmental organizations a monthly bulletin containing summaries of the qualifications of alumni wishing to relocate. A total of 194 alumni were registered during the year. About 50 percent of these people were employed on some sort of nonpermanent basis, such as postdoctoral work which would terminate within a given time, in the military service and anticipating discharge, or graduate work elsewhere, or wished to change employment or suspected that their employment might be terminated. The rest were unemployed. Sixty-four of these people have reported that they are now employed, with over half reporting that they received their initial contacts as a result of the Placement Office bulletin.

On October 1 of this year, our long-time (sixteen years) director of the Chemistry Placement Office, Mrs. Margaret Durham, retired. Those of you that have had occasion to work with her will appreciate the challenge that her successor, Mrs. Georgean Arsons, will have in filling her shoes. Mrs. Arsons has served since 1968 as an admissions officer with the University before taking on the Placement Office directorship.

### **Affirmative Action**

Although the focus of our efforts to insure that we do not discriminate for reasons of sex or of racial and ethnic background may change from year to year, the general question continues to be one of our major concerns.

We have been relatively successful in our past efforts to recruit black graduate students, and three more blacks entered the graduate program of the school this fall, bringing the current total to eight. On the other hand, the number of women starting our graduate program has dropped a bit, the count for this fall being six out of ninety. This may reflect greater competition for women applicants. In chemistry, for example, there were only five acceptances of twenty-two admission offers made to women, an acceptance rate of 23 percent compared to an *overall* acceptance rate of 50 percent. The reason for this twofold difference is not apparent. However, an effort will be made to determine the cause and correct for it in some way during the coming year.

Our nonacademic staff has reached pretty much of a steady state with nine or ten of the ninety employees in this category being black. Turnover in the stenographic-clerical area is high and we have to continue active recruiting and a training program in order not to fall behind. The distribution by sex is about fifty-fifty, but the distribution by job classification is highly stratified. For example, we have no male stenographers or secretaries and no female machinists or storekeepers. Also, there are few women in administrative positions.

Faculty recruitment efforts have been increased severalfold in order to insure that women and minority group members are aware of our openings and are given a fair shake in the competition for them. The fraction of our applicants who are women and/or minority group members is small but it is consistent with the known composition of the national application pool (current and recent Ph.D.'s). This fact in combination with the slow turnover rate in our faculty (less than 5 percent per year) means that even modest changes in the composition of our faculty will take a decade or more.

At present, we have four women on our faculty: Ana Jonas, a regular full-time assistant professor in biochemistry; Sharon Ford, a visiting assistant professor in biochemistry; Elizabeth P. Rogers, a half-time assistant professor in the general chemistry program; and Anne T. Wood, a full-time visiting assistant professor in the general chemistry program. There are no minority group members, except for a few jokers who claim that status because they're left-handed. We do have a legitimate one-sixteenth Cherokee. Clearly, we have a long ways to go and we'll be working hard at it for a long time.



Professor J. W. Westwater, head of the Department of Chemical Engineering, with Professor Thomas J. Hanratty. Both were recently honored by election to the National Academy of Engineering.

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**James W. Westwater**  
**Professor and Head**  
**Department of Chemical Engineering**

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James W. Westwater has been head of the Department of Chemical Engineering since 1962. He is the sixth person to serve in that capacity since chemical engineering began at the University of Illinois in 1901. Three former heads are still living. Max Peters (head 1958-62) is now dean of engineering at the University of Colorado; Harry Drickamer (1956-58) is professor of chemical engineering and of chemistry and member of the Center for Advanced Study at the University of Illinois; and D. B. Keyes (1926-45) lives in retirement in New York City.

Professor Westwater was born in Danville, Illinois, in 1919, the son of an emigrant from Scotland. At Danville High School he took all of the science

and math courses and participated in wrestling and swimming as extracurricular activities. Upon graduation, he was advised by the high school counselor that the science and math background would make a good basis for chemical engineering, so he enrolled in that curriculum at the University of Illinois in 1937. The faculty at that time consisted of four full-time members, D. B. Keyes, E. W. Comings, A. G. Deem, and H. F. Johnstone. Westwater took courses under all four and also was in close contact with the graduate teaching assistants, S. W. Briggs and W. M. Langdon. He also got to know one of the graduate students, R. L. Pigford. In later years during World War II, Keyes served on the War Production Board in Washington, Comings became dean of engineering at the University of Delaware, Johnstone served as head of chemical engineering at the University of Illinois from 1945 to 1955, Briggs became a professor at Purdue, and Langdon became a professor at Illinois Institute of Technology.

In the spring of 1941, Keyes invited a half-dozen or so seniors into his office to suggest that they continue their education beyond the B.S. degree. He named one graduate school for each student. For Westwater it was the University of Delaware, at that time relatively unknown. Chemical engineering had started two years earlier at Delaware, and A. P. Colburn had just been appointed as head of the department.

Young Mr. Westwater profited enormously by being in close contact with this brilliant man. From Colburn he learned that good research requires both scholarship and drive. Colburn was a powerful inspiration to those who knew him. He proved that doing good research can be an adventure and fun. Before many years, Colburn became the vice-president in charge of research at Delaware, and R. L. Pigford came in from the DuPont Company to replace him as head of the department.

The first Ph.D. degree granted by the University of Delaware was given in 1948 to Dr. Westwater. By this time he had published the first three of his eighty-odd papers. He had learned the fundamentals of photography and microscopy, powerful research tools which were to be utilized later. He had worked for several years as a graduate assistant on a Navy project concerned with the evaluation of fins used on piston-type aircraft engines. He had participated in research on condensation, and he had seen nucleate boiling and film boiling occurring in a glass boiler.

Dr. Westwater joined the University of Illinois as an assistant professor in 1948. The only holdovers from the 1941 staff were Johnstone (head) and Comings. Newcomers on the staff were H. G. Drickamer, W. M. Campbell, L. G. Alexander, and Thomas Baron. Campbell today holds a high-level position in Atomic-Energy of Canada, Ltd., Alexander (deceased) had a successful scientific career with the U.S. Atomic Energy Commission, and Tom Baron is now president of Shell Development Company.

Westwater advanced through the ranks and became head in 1962. He has had the interesting experience of being in charge during part of the boom times for higher education, that is, a period up to 1968, when funding was good and universities were well liked by the general public. Even more

interesting in some ways is the period after 1968 when funding shrank and political figures built careers by attacking the universities. According to Westwater, the most difficult feat to achieve during these two periods was the control of quality. He is very proud that a recent study, published by authors at another university, showed that more eminent chemical engineers received their undergraduate degrees from the University of Illinois than from any other school. An independent study of graduate education, the Roosevelt-Anderson report, ranked Illinois sixth among 130 schools offering advanced degrees in chemical engineering. A third measure of quality is the recognition bestowed on individual staff members. Each of the five full professors at Illinois (H. G. Drickamer, C. A. Eckert, T. J. Hanratty, R. A. Schmitz, and J. W. Westwater) has received awards from one or more of the national engineering societies. No other chemical engineering department can match this achievement. Westwater feels confident that a number of the younger staff members, Associate Professors J. L. Hudson and R. L. Sani, Assistant Professor R. C. Alkire, and Visiting Professor C. J. D. Fell will also receive high recognition in due time.

In the era of his twenty-six years on the faculty at the University of Illinois, Dr. Westwater has taught the usual undergraduate courses in chemical engineering plus a graduate course on heat transfer. He continues to teach one course each semester. He has directed forty-eight M.S. theses and twenty-eight Ph.D. theses.

During the fourteen-year period 1953-71, Dr. Westwater emphasized the use of photography as a research tool. Techniques were developed for taking motion pictures at 6,000 frames per second through a microscope with a  $66\times$  magnification on the film. Such pictures proved that nucleation sites for bubbles formed during nucleate boiling are microscopic pits and scratches and certain kinds of foreign matter. The common feature is that each site is an excellent trap for microscopic bits of gas. Publication of these results has led at least three companies to the development of commercial surfaces with artificial nucleation sites.

Sites for bubble formation during electrolysis have been shown to be the same as for boiling. Sites for drop formation during dropwise condensation have been shown to be microscopic pits and scratches and specks of foreign matter which evolve heat during wetting. Foreign particles which absorb heat during wetting are inactive. On film it was demonstrated that active sites for condensation may number as high as 7,000,000 per square inch. Subsequent theoretical treatments of dropwise condensation have been modified seriously to account for this surprising fact.

Information on the growth rates of bubbles and drops was produced in profusion. Interfacial velocities during melting and freezing, the growth of liquid drops during emulsion formation, and the growth of bubbles during gas dissolution following pressure release were other phase changes examined via special photographic means. The time scales for these different phenomena are enormously unlike. They range from 0.01 second for boiling

liquids to about four hours for a melting solid. In all, nineteen different research films have been shown at technical meetings and then released for general scientific use. These have had over 600 showings.

In 1953-54 several papers on the application of fin formulas to thermocouple probes were published by Dr. Westwater. The topic of fins was brought back to life in 1962 when the fact emerged that fins might be useful for transferring heat to boiling liquids. A recent series of papers from Dr. Westwater's laboratories has shown that such fins can have a very high effectiveness, under the right conditions. The design of these fins has been put on a rational basis. The fact that the optimum fin in a boiling liquid can look like a turnip was deduced. Careful experimentation has proved the validity of the conclusions. Today the study of fins is the main research activity in Dr. Westwater's laboratories.

Dr. Westwater was the first chemical engineer to publish in several popular-science journals, *Scientific American* in 1954, *Science News* in 1954, and *American Scientist* in 1959. Eleven chapters in books have been authored or coauthored by him.

The Conference Award (best paper) for the Eighth National Heat Transfer Conference was given to Dr. Westwater and J. L. McCormick. The American Institute of Chemical Engineers named Dr. Westwater the institute lecturer in 1964, the recipient of the William H. Walker Award in 1966, and a fellow of the AIChE in 1972. He was elected to the National Academy of Engineering in 1974. Chemical engineering at Illinois has two other academy members, T. J. Hanratty (also National Academy of Engineering) and H. G. Drickamer (National Academy of Sciences), which is a remarkable number from a full-time staff of nine people.

Dr. Westwater says that the award which is most pleasing to him is the Max Jakob Award, presented in 1972. This is given jointly by the American Institute of Chemical Engineers and the American Society of Mechanical Engineers without regard to nationality or society affiliation. It is bestowed in recognition of eminent achievement in the area of heat transfer. It had been awarded previously to a German, an Englishman, a Japanese, a Russian, and six Americans.

Dr. Westwater is also an active member of the ASME, the American Chemical Society, and the American Society for Engineering Education. He has served as chairman of the AIChE Heat Transfer and Energy Conversion Division and as a director of the AIChE for three years. He was program chairman of the 1964 National Heat Transfer Conference and conference chairman of the 1966 Third International Heat Transfer Conference. He is a member of the Editorial Advisory Board for the *International Journal of Heat and Mass Transfer*, *Heat Transfer — Soviet Research*, and *Heat Transfer — Japanese Research*. He tells an interesting story concerning a recent visit to the Fifth International Heat Transfer Conference in Japan. He was invited by the head of the chemical engineering department, Professor Mizushima, to spend one day at Kyoto University. The head of mechani-



cal engineering, Professor Nishikawa, invited him to spend a day and present a lecture at Kyushu University. Nishi means *West*, and Mizu means *water*, surely a remarkable coincidence!



Professor David Natusch (right), author of the article on environmental chemistry, and Mrs. Barbara Slatt, graduate student in environmental chemistry. They were recently awarded a certificate of merit by the Division of Environmental Chemistry of the American Chemical Society for their paper on trace determination of  $H_2S$  and  $SO_2$ .

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## Environmental Chemistry at Illinois

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During the last ten years there has been a dramatic increase in awareness of the problems of environmental pollution. This has produced a marked response from many chemistry departments throughout the country who have recognized the emerging importance of environmental chemistry. In some cases this recognition has amounted to the effective introduction of a subdisciplinary program; in most, however, individual chemistry faculty members have focused their research on environmental problems with the blessing of their departments. The latter situation has occurred in the

School of Chemical Sciences at Illinois, which was among the first of the major departments to do so.

Of course, environmental chemistry is not really new. Many well-established research areas have, for many years, contributed to a basic understanding of the chemistry of our environment. Indeed, much of this basic understanding has been provided by traditional chemists who would lay few claims to the new title of environmental chemist but who may perhaps contribute more to environmental chemistry than those who do. Each one of us can undoubtedly recall individuals within the departments which now form our school who have made important advances in environmental chemistry. For example, Professor Fraser Johnstone in chemical engineering did important basic work in the control of industrial air pollutant emissions. More recently Professor John Wood in biochemistry pioneered the idea of environmental methylation of mercury. For this he was awarded the SOCMA (Synthetic Organic Chemical Manufacturers Association) Environmental Chemistry Award — a leading award in environmental chemistry.

During the late 1960s two types of activity involving environmental chemistry were evolving on the Urbana-Champaign campus. The first was initiated by H. E. Carter, then vice-chancellor for academic affairs, with the help of, among others, Professor H. A. Laitinen who, in addition to orienting some of his research towards environmental problems, helped establish the new Institute for Environmental Studies at the University of Illinois. While this is an independent institute which initiates and conducts its own interdisciplinary research projects, the very nature of these projects (studies of the environmental impact of lead and other heavy metals, coal gasification, and toxic organic substances) requires considerable chemical expertise. In this way faculty members in the School of Chemical Sciences are able to undertake both basic and applied research in environmental chemistry as part of an integrated interdisciplinary study.

The second school activity took place in the Department of Chemistry, which recognized a need to initiate an educational and research component in environmental chemistry. This recognition led to the appointment in 1971 of Dr. David Natusch as an assistant professor charged with initiating the appropriate components. Since that time two courses have been established. The first, Principles of Environmental Chemistry, is offered to advanced undergraduates and covers the basic chemical and physical principles pertinent to major environmental problems. The second, Instrumental Methods in Environmental Science, is a senior/graduate-level course dealing with state-of-the-art analytical instrumentation as applied to environmental problems.

At the time of their initiation, these courses, which now have annual enrollments of approximately sixty and fifty students respectively, were unusual on the national scene in that they were designed for advanced students as opposed to the many freshmen- and sophomore-level generalized courses offered by most universities. However, it is encouraging to find that such advanced courses are now being recognized as the most appropriate way of

both educating and training students in environmental chemistry. Indeed, approximately half the students who have taken these courses have found employment in jobs related to environmental problems.

In addition to the development of course offerings, both Professor Laitinen and Professor Natusch have developed graduate research programs in environmental chemistry. Here again some success has been achieved in that approximately six to eight high-quality graduate students enter each year for the specific purpose of undertaking research in environmental/analytical chemistry, and present indications are that this trend will continue. Most recently the Department of Chemistry has appointed Dr. John Birks as an assistant professor who will undertake research which is closely related to environmental problems.

On the national scene there seems little doubt that the activities in environmental chemistry in the school are achieving recognition even though no formal program as such exists in environmental chemistry.

It should be recognized, however, that environmental chemistry as practiced at Illinois is strongly weighted towards related basic research rather than towards the highly applied survey work so prevalent today. Thus, while by its very nature environmental chemistry is an applied area, both the faculty at large and individual exponents of environmental chemistry subscribe to the view that the school should foster fundamentally related research and the education of advanced chemistry students in this new area.

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## New Degree in Chemistry

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The granting of the degree of Doctor of Arts in Chemistry has been approved by the faculty and endorsed by the Board of Trustees. It awaits approval by the state Board of Higher Education. The degree is designed for students who are preparing for positions which require education beyond the master's degree, but not the strong emphasis on research which is inherent in the Ph.D. program. The curriculum leading to the new degree will require a broad range of courses, a reading knowledge of German, French, or Russian, an internship as a teaching assistant, some experience in basic research, and a nontraditional thesis related to the candidate's career objectives.



New staff members John W. Birks, David J. Shapiro, and Michael Glaser.

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## Our New Staff Members

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During the past year, three persons have joined the professorial ranks of the School of Chemical Sciences, all as assistant professors. The following paragraphs summarize some background information about these new staff members.

**John W. Birks** — Chemistry. B.S., University of Arkansas, 1968; Ph.D., University of California at Berkeley, 1974. Professor Birks is associated with the program in analytical chemistry. His research interests mainly involve kinetic studies of reactions of environmental importance, especially those associated with the upper atmosphere.

**Michael Glaser** — Biochemistry. B.S., University of California at Los Angeles, 1966; Ph.D., University of California at San Diego, 1971. Dr. Glaser's interests lie in the general field of bacterial and animal cell membranes. Before joining the staff here, he served as a postdoctoral fellow for three years at the Washington University School of Medicine at St. Louis where he did research in the area of membrane structure, function, and biogenesis.

**David J. Shapiro** — Biochemistry. B.S., Brooklyn College of CUNY, 1967; Ph.D., Purdue University, 1972. Before joining the faculty here, Dr. Shapiro did postdoctorate work in the Department of Biological Sciences and Pharmacology at Stanford University. His research interests involve the regulation and control of metabolism in animal cells.

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## American Chemical Society Awards

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It was announced at the meeting of the American Chemical Society in Atlantic City this fall that one member of the faculty of the School of Chemical Sciences and five Ph.D. alumni have been selected as recipients of American Chemical Society Awards to be presented at the spring meeting.

H. S. Gutowsky, professor of Chemistry and director of the School of Chemical Sciences, will receive the Peter Debye Award in Physical Chemistry, sponsored by Exxon Chemical Company, U.S.A. This award recognizes Gutowsky's many scientific contributions, perhaps the most important of which is the recognition of the chemical importance of nuclear magnetic resonance to chemistry.



H. S. Gutowsky



Fred Basolo



James Collman

**Fred Basolo** (Ph.D., 1943), now professor of chemistry at Northwestern University, has been selected for the ACS Award for Distinguished Service in the Advancement of Inorganic Chemistry, sponsored by Mallinckrodt, Inc. He has been a leader in explaining reaction mechanisms, and his book on that subject (with Ralph Pearson) is the classic in the field. With one of his former students, Dr. Ronald C. Johnson, he has also written a textbook entitled *Coordination Chemistry*. This has been translated into eight languages. Students in many countries have used it, not only to learn chemistry, but also to learn to read scientific English.

**James Collman** (Ph.D., 1958) has been chosen for the ACS Award in Inorganic Chemistry, sponsored by Texas Instruments. His research, like that of Basolo, has been concerned largely with coordination compounds. He has made some highly exciting and important advances in the areas of complexes of elementary nitrogen, homogeneous catalysts bound to insoluble polymer supports, and the demonstration that complexes of acetylacetonate have aromatic properties and oxygen bonding sites in heme proteins. Dr. Collman is professor of chemistry at Stanford University.

**Herbert O. House** (Ph.D., 1953), professor of chemistry at the Georgia Institute of Technology, is to receive the ACS Award for Creative Work in Synthetic Organic Chemistry, sponsored by the Synthetic Organic Chemicals Manufacturers Association. He is being honored chiefly for his research work on the use of metal enolates in synthesis. This has included work on lithium dialkyl and diaryl cuprates for conjugate additions and for specific enolate anions. He has also done significant work on carbanions, stereochemistry, molecular rearrangements, and electron transfer.



**Herbert O. House**



**John R. Huizenga**



**J. Franklin Hyde**

**John R. Huizenga** (Ph.D., 1949) has been chosen for the ACS Award for Nuclear Applications in Chemistry, sponsored by G. D. Searle and Company. He is professor of chemistry at the University of Rochester. He has contributed greatly to our understanding of atomic fission, and has made important contributions to our knowledge of nuclear-level densities as a function of nuclear excitation energy. In addition to publishing a large number of research papers, Huizenga has recently coauthored, with Dr. Robert Vandenbosch, a book on nuclear fission.

**J. Franklin Hyde** (Ph.D., 1928) has received the Thomas Midgley Award of the American Chemical Society for his outstanding contributions in the development of silicones. Dr. Hyde is a senior research scientist for organosilicon chemistry for the Dow Chemical Company in Midland, Michigan, with which he became affiliated in 1951. He was the inventor of an organosilicon resin which replaced organic varnishes in the electrical industry. This invention led to several hundred widely used products. Dr. Hyde holds more patents in the field of silicone chemistry (ninety-five) than anyone else. He received the Perkin Medal in 1971.

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## National Academies Elect New Members

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Professor **Willis H. Flygare** has been elected to the National Academy of Sciences and to the American Academy of Arts and Sciences. Both of these organizations choose only the most distinguished scholars in their fields, and election to either one is a great honor. Dr. Flygare joined the staff in Urbana in 1961, and has worked on the theoretical and experimental aspects of molecular structure and in the field of radioastronomy. He was one of a team at the Urbana-Champaign campus that discovered the first molecule in space (formamide) which contains four chemical elements.



W. H. Flygare

Four other members of the Urbana-Champaign faculty were also elected to the National Academy of Sciences last spring. This brings to twenty-five the total number of Urbana-Champaign faculty who are members (eleven are chemists). The Urbana-Champaign campus now has seventeen members in the American Academy of Arts and Sciences, eight of whom are chemists.

Professor **J. W. Westwater** (B.S., 1941) and Professor **Thomas J. Hanratty** of the Department of Chemical Engineering were elected to the National Academy of Engineering, which is a parallel and equally prestigious organization to the National Academy of Sciences. Westwater is well known for his work on boiling heat transfer and Hanratty was recognized for his work in fluid mechanics. This brings the total representation from the Urbana-Champaign campus in this academy to seventeen.

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## Other Honors and Awards to Faculty Members

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Professor **J. W. Westwater** (B.S., 1941), head of the Department of Chemical Engineering, has been awarded the Vincent Bendix Award of the American Society for Engineering Education for 1974 in recognition of his "outstanding research contributions." This is the highest award given by the ASEE. The University of Illinois Department of Chemical Engineering, although it is relatively small as compared with other engineering departments across the country, is the only department that has won this distinction more than once (Harry Drickamer won it in 1968), and the University of Illinois is the only university that has won it as many as four times (Professor N. M. Newmark of the Department of Civil Engineering and Professor John Bardeen of the Departments of Electrical Engineering and Physics won the Bendix Award in 1961 and 1964, respectively).

In addition to being chosen for the Peter Debye Award, Dr. **H. S. Gutowsky** has also been honored during the past year by receiving the Midwest Award, administered by the St. Louis Section of the American Chemical Society, and the Award of the International Society of Magnetic Resonance. To receive the latter, Professor Gutowsky went to Bombay, India, where the society was holding its annual meeting.

Professor **H. G. Drickamer** gave the dedicatory address for the new Chemistry and Chemical Engineering Building at the University of Missouri at Rolla on April 26, 1974.

Professor **G. P. Haight** was granted the visiting Scientist Award of the Western Connecticut Section of the American Chemical Society.

Professor **John C. Bailar, Jr.**, has been made one of the twenty honorary fellows of the Indian Chemical Society.

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## Professor Laitinen "Retires"

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Professor **H. A. Laitinen**, who has been a member of the staff of the Department of Chemistry since 1940, retired from the University on October 1 to accept a part-time position at the University of Florida in Gainesville. From 1940 until 1947, he was a member of the inorganic division at Illinois and taught nearly all of the courses in inorganic chemistry. He was then transferred to the analytical division, and became head of it in 1953. His research interests have been centered largely on electrochemistry, but in recent years he has also had a great interest in environmental problems. In addition to his work in the Department of Chemistry, since 1971 he was project director for the NSF-RANN Interdisciplinary Study of Environmental Pollution on



our campus. At Florida, he will carry the title "graduate research professor in chemistry and environmental engineering sciences." He will direct the research of postdoctoral students, teach courses on special topics in analytical chemistry, and continue his work with *Analytical Chemistry*, of which he has been editor since 1966.



H. A. Laitinen

During his career at Illinois, Professor Laitinen has held Guggenheim fellowships twice, was the 1961 recipient of the ACS Award in Analytical Chemistry sponsored by the Fisher Scientific Company, and in 1964 was honored by the University of Minnesota with its Alumni Achievement Award. He has recently been elected to be a foreign member of the Finnish Academy of Science and Letters.

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### Former Faculty Receive Recognition

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At the May commencement exercises in Urbana, Herbert E. Carter (Ph.D., 1934) was granted the honorary degree of Doctor of Science. After finishing his graduate work (under the guidance of Professor C. S. Marvel), Carter stayed on at Illinois as a member of the staff in biochemistry. He was promoted rapidly, and upon the retirement of Professor Roger Adams from the headship of the department in 1956, Carter was chosen to be his successor. He held this position until 1967, and served also as acting dean of the Graduate College from 1963 to 1965. In 1967, he became vice-chancellor of the Urbana-Champaign campus. In 1971, he retired from the University of Illinois to accept the position of coordinator of interdisciplinary programs at the University of Arizona.

Dr. Carter has received the Lilly Award, the Nicholls Medal, the Kenneth A. Spencer Award, the Alton E. Bailey Award, and the Award of the American Oil Chemists Society for his research, and was granted an honorary Doctor of Science degree by his alma mater, DePauw University, in 1951. He

is a member of the National Academy of Sciences and of the National Science Board, of which he served as chairman from 1970 to 1972.

A ridge in Antarctica has been recently named in honor of Professor Carter. This ridge is twelve miles long and rises 8,300 feet above sea level in the Victory Mountains of North Victoria Land. It is covered with ice and snow and is bordered on three sides by glaciers.

E. J. Corey, a former member of the faculty at Urbana and now Sheldon Emory Professor of Chemistry at Harvard, has received two awards during the past year. Carnegie-Mellon University has awarded him the \$10,000 Dickson Prize "in recognition of his leading contributions to the theory and practice of organic synthesis, the art of making valuable natural products from cheap and abundant raw materials." Dr. Corey also received the 1973 Linus Pauling Award of the ACS Oregon and Puget Sound sections "for his approach to the problem of synthesizing complex organic compounds from simple, plentiful basic elements."

A special symposium was scheduled to be held at the University of Arizona January 13 and 14, 1975, in honor of Professor Carl S. Marvel on his eightieth birthday. Professor Marvel developed his pioneering and leading reputation in the field of polymer science during his forty years at the University of Illinois. Since joining the staff at the University of Arizona in 1961 as professor of chemistry, he has continued his exceptionally creative and productive research program, particularly in the area of heat stable polymers.

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## Illinois Alumni Elected by the American Chemical Society

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Serving as president of the American Chemical Society in 1974 is Dr. Bernard S. Friedman (B.S., 1930; Ph.D., 1936) of the University of Chicago. He did his doctorate thesis under the direction of Professor Roger Adams, who was the president of the society in 1935.

The president-elect of the society is William S. Bailey (Ph.D., 1946) of the Department of Chemistry at the University of Maryland. He will serve as president during 1975. His thesis was done under the guidance of Professor C. S. Marvel, who served as president of the society in 1945.

A total of nineteen alumni or faculty members of the Urbana department will have been presidents of the society in the first seventy-five years of this century.

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## Other Awards and Honors to Our Alumni

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**Dr. A. O. Beckman** (B.S., 1922; M.S., 1923) has received the 1974 SAMA Award from the Scientific Apparatus Makers Association for his contributions to measurement technology and the scientific instruments industry.

**Robert W. Holley** (B.S., 1942) has been selected as one of three alumni to be selected for the Illini Achievement Award for 1974. Dr. Holley was born in Urbana and went through the Urbana public school system. After receiving the bachelor's degree at the Urbana-Champaign campus, he did graduate work at Cornell, receiving the doctorate in 1947. Thereafter, he was connected with Cornell University for twenty-two years. He still retains a connection there, but is also on the permanent staff of the Salk Institute in La Jolla, California. He shared the 1968 Nobel Prize in Medicine for interpreting the genetic code and its function in the making of proteins.

**Robert L. Pigford** (Ph.D., 1942), professor of chemical engineering at the University of California at Berkeley, has received the Founders Award of the American Institute of Chemical Engineers in recognition of his contributions, which have had a great impact on chemical engineering and the advancement of the profession.

**R. Byron Bird** (B.S., 1947) gave the Debye lectures at the Chemistry Department of Cornell University last fall and the W. N. Lacey Lectures in Chemical Engineering at the California Institute of Technology during the winter.

On November 17, **A. J. Speziale** (Ph.D., 1948) was awarded the fourth St. Louis Section Award of the American Chemical Society. He is director of agricultural research for the Monsanto Company. His research has covered a variety of organic chemical areas, including the use of organophosphorus compounds as ylid reagents, the Darzens reactions, and the chemistry of substituted amides. His work on some of the amides has produced extremely important agricultural chemicals.

**Horace A. DeWald** (Ph.D., 1950), senior research scientist at Parke, Davis and Co., has received an Award for Excellence in Industrial Research from the University of Michigan Section of the American Chemical Society for his research on pyrazolodiazepines.

**Dr. Roy H. Bible, Jr.** (Ph.D., 1952) has been awarded the 1974 Honor Scroll Award by the Chicago Chapter of the Illinois Institute of Chemists. He was cited "in recognition of his service to the profession of chemistry . . . , his contributions to the stature of chemists . . . , and his able direction to the technical societies with which he is associated."

**David R. Kearns** (B.S., 1956), professor of chemistry at the University of California at Riverside, has received the Gold Medal Award of the ACS California Section in recognition of his pioneering work on the structures of transfer ribonucleic acid and 5 S-ribonucleic acid.

Robert E. Sievers (Ph.D., 1960) has received the Distinguished Alumni Award from his undergraduate alma mater, the University of Tulsa. He was cited particularly for his work with metal derivatives of diketones.

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## Illini Gatherings at National ACS Meetings

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For many years, it was traditional to have an Illinois luncheon on Tuesday at the national ACS meetings in the spring as well as the fall. Indeed, many of us recall with nostalgia Roger Adams, the "Chief," giving his "State of the Union" addresses on such occasions. Recently, we have been experimenting with a social hour at the spring meeting, also on Tuesday, but starting at 5:30 p.m.

The informality of the social hour enables one to visit with a larger number of old friends and new than is possible at a sit-down luncheon. Also, the availability of drinks makes for a more convivial occasion. The word seems to have spread about the spring social hour; at least, the last one at Los Angeles was the best ever, once the room and bar got set up. Over 125 alumni attended, as well as a number of passers-by who were attracted by our midwestern hospitality.

A free buffet has been provided at the social hour. Also, as inflation has raised luncheon costs to \$7 or \$8, we've subsidized the luncheon at the fall meeting by \$2 to \$3. Funds for the purpose come from our Alumni Constituents Association, the latter receiving an allocation from dues paid by graduates of the school who are members of the University of Illinois Alumni Association.

Income from this source can be used only for alumni-related activities. The spring social hour and the fall luncheon seem to us to be two of the best uses we've found so far for the funds. We'd welcome other suggestions. In the meantime we plan to continue our social hour with free buffet at the spring meeting and a subsidized luncheon in the fall.

*We'll look for you next at our social hour, 5:30 p.m. on Tuesday, April 8, at Philadelphia.*

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## Honors to Our Graduate Students

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The Division of Analytical Chemistry of the American Chemical Society has announced the awarding of summer fellowships to five graduate students, two of whom are attending the University of Illinois at Urbana-Champaign. These are Brian W. Renoe and Terry A. Woodruff. Renoe's scholarship is sponsored by the Olin Corporation Charitable Trust and

Woodruff's by the analytical division itself. Each carried a stipend of \$800.

At the Los Angeles meeting of the American Chemical Society, the Division of Environmental Chemistry presented Certificates of Merit to Professor David Natusch and Mrs. Barbara J. Slatt for their paper entitled "Fluorescence Determination of Atmospheric H<sub>2</sub>S and SO<sub>2</sub> at the Parts per Trillion Level." The paper was presented by Mrs. Slatt, who is a graduate student in analytical chemistry, working under the guidance of Professor Natusch.

Graham C. Walker, who is a graduate student in organic chemistry, has won the first prize in the University of Illinois Sigma Xi student paper competition this year.

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### School of Chemical Sciences Funds

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The alumni and friends of the School of Chemical Sciences have shown their loyalty in many ways. In recent years, this has been shown in part by your generous contributions to the Roger Adams Fund, the Illini Chemists Fund, and the John C. Bailar Lectureship Fund. Income from the Roger Adams Fund can be used for any purposes where there are special needs, but thus far it has been used primarily to support undergraduate scholarships in chemistry, chemical engineering, and biochemistry. The body of this fund now stands at a little more than \$85,000. The Illini Chemists Fund is used to support this *Alumni Newsletter*. It now stands at about \$2,500. The annual John C. Bailar lectureship is supported by funds contributed by colleagues, friends, and former students of Professor Bailar. The fund was established on the occasion of Professor Bailar's sixty-fifth birthday in 1969 and now totals about \$12,000.

We hope that our alumni will continue to support these funds, and we have enclosed a form and a return envelope which can be used for this purpose. We shall be equally happy to have your contribution without the form. In that case, however, it will be necessary for you to indicate that your gift is intended for one of these funds. Checks should be made payable to the University of Illinois Foundation, and sent to the foundation or to the School of Chemical Sciences.

The form also has space on it that can be used to report address changes or to provide comments on your reactions to the *Alumni Newsletter* or about your professional activities. We are currently in the process of updating our lists of company and university affiliations and we would be particularly interested in learning about the current positions and employers of our graduates. This is particularly useful to us in our graduate student recruiting effort and in our efforts to enlist financial contributions from companies associated with the chemical industry.

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## New Ph.D.'s from the School of Chemical Sciences

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### Ph.D. Recipients in January 1974

Bowlus, Stephen Byron                      Organic                      J. A. Katzenellenbogen  
Department of Entomology, University of Illinois, Urbana, Illinois  
"Studies on Stereoselective Methods of Synthesis"

Ford, Sharon Tenney                      Biochemistry                      R. L. Switzer  
Department of Biochemistry, University of Illinois, Urbana, Illinois  
"Effects of Low Concentrations of Chloramphenicol on Bacterial Metabolism"

Harris, Bruce Richard                      Organic                      Peter Beak  
E. I. du Pont de Nemours & Company, Wilmington, Delaware  
"Bridgehead Reactivity in Some Bicyclic and Tricyclic Systems"

Hart, Donald John                      Organic                      W. T. Ford  
General Motors Research Laboratory, General Motors Technical Center,  
Warren, Michigan  
"Synthesis and Characterization of Tetraalkylammonium Tetraalkylborides"

Kaley, Robert George, II                      Analytical                      H. V. Malmstadt  
Monsanto Industrial Chemical Company, St. Louis, Missouri  
"An Atom Reservoir for Automated Flame Atomic Fluorescence Spectrometry"

Keller, Joseph Herbert                      Physical                      P. E. Yankwich  
Department of Chemistry, University of Tennessee, Knoxville, Tennessee  
"Barrier Curvature and Medium Interaction Effects on Carbon-Thirteen Kinetic Isotope Effects"

Lee, Thomas Tah-Shing                      Biochemistry                      L. P. Hager  
4433 Prospect Avenue, Apartment 3, Los Angeles, California  
"Active Site Studies on Chloroperoxidase"

Lee, Yunko                      Analytical                      Jiri Jonas  
Department of Chemistry, University of Waterloo, Waterloo, Ontario,  
Canada  
"High Pressure Nuclear Magnetic Resonance Studies of Hydrogen-Bonded Systems"

Perozzi, Edmund Frank                      Organic                      J. C. Martin  
Department of Chemistry, University of Michigan, Ann Arbor, Michigan  
"The Synthesis, Structure, and Chemistry of Sulfuranes and Sulfurane  
Oxides"

Schultz, Emeric                      Biochemistry                      J. M. Wood  
Department of Biochemistry, University of Wisconsin, Madison, Wisconsin  
"Studies in the Bacterial Degradation of Flavonoids"

Waindle, Louise Marie                      Biochemistry                      R. L. Switzer  
Department of Biochemistry, St. Louis University, St. Louis, Missouri  
"Inactivation of Aspartic Transcarbamylase in Sporulating *Bacillus subtilis*"

Walker, Graham Charles                      Organic                      N. J. Leonard  
Department of Chemistry, University of California, Berkeley, California  
"The Synthesis of Oligoribonucleotides and the Synthesis and Biological  
Activity of Alkylated Nucleic Acid Components"

#### Ph.D. Recipients in May 1974

Abell, Steven                      Chemical Engineering                      J. L. Hudson  
Monsanto Industrial Chemicals Company, St. Louis, Missouri  
"Thermal Convection in Rotating Fluids"

Boyer, Kenneth Wayne                      Analytical                      H. A. Laitinen  
Federal Building 8, Room 4803, 200 C Street S.W., Washington, D.C.  
"Analysis of Automobile Exhaust Particulates"

Elias, Joel Howard                      Inorganic                      R. S. Drago  
Photo Products Department, E. I. du Pont de Nemours & Company, Wil-  
mington, Delaware  
"Studies of Polynuclear Transition Metal Ion Complexes"

Fry, Frederick Steele, Jr.                      Organic                      Peter Beak  
Department of Chemistry, University of Illinois, Urbana, Illinois  
"The Determination of the Tautomeric Equilibrium Constant for 2-pyri-  
done-2 Hydroxypyridine in the Vapor Phase and Attempted Synthetic  
Routes to the Thiolcarboxo Group, a New Functionality"

Fuller, William Craig                      Analytical                      H. V. Malmstadt  
Monsanto Triangle Park Development Center, Durham, North Carolina  
"The Application of Fourier Transform Techniques to Multielement Atomic  
Fluorescence Determinations"

- Guidry, Richard Martin                      Inorganic                      R. S. Drago  
Seiler Research Laboratory, U.S. Air Force Academy, Colorado Springs,  
Colorado  
"Calorimetric Investigations of Lewis Acid-Base Interactions"
- Hasty, Elvira Fernandez                      Inorganic                      D. H. Hendrickson  
154 Bright Oaks, Chicago, Illinois  
"Magnetic Exchange Interactions in Dimeric and Polymeric Transition  
Metal Complexes"
- McMillan, Moses William                      Organic                      K. L. Rinehart  
Eli Lilly and Company, Indianapolis, Indiana  
"Studies on the Antibiotic Geldanamycin and Biologically Active Derivatives  
and Analogues"
- Moje, Steven William                      Organic                      Peter Beak  
Department of Biochemicals, E. I. du Pont de Nemours & Company, Experi-  
mental Station, Wilmington, Delaware  
"The Reactions of 1,3,4-Thiadiazolidine-2,5-Dione and Its Derivatives"
- Moon, Sang Heup                      Chemical Engineering                      H. G. Drickamer  
Korea Institute of Science and Technology, Cheongryang, Seoul, Korea  
"High-Pressure Studies on Hydrogen Bonding in Solids"
- Myers, Harvey Nathaniel                      Organic                      J. A. Katzenellenbogen  
Department of Physical Sciences, Chicago State University, Chicago, Illinois  
"Photoaffinity Labeling of the Estrogen Binding Protein from Immature Rat  
Uterus"
- Nodelman, Neil H.                      Organic                      J. C. Martin  
Department of Chemistry, University of Illinois, Urbana, Illinois  
"Solvent Effects on the Radical Cage Reaction"
- O'Bryan, Nelson Boyd                      Inorganic                      R. S. Drago  
Central Research, 3M Company, St. Paul, Minnesota  
"Binuclear Cobalt(II) Complexes and Catalysis Studies on Cobalt(II)  
Oxygen Carriers and Charcoal-Supported Palladium"
- Ollinger, Janet                      Organic                      R. M. Coates  
Rohm & Haas Company, Spring House, Pennsylvania  
"Synthetic Applications of Sulfur-Stabilized Carbanions"
- Place, Barry George                      Chemical Engineering                      R. C. Alkire  
Research Center Building H, J. S. Steel Corporation, Monroeville, Pennsyl-  
vania  
"Transient Behavior in Porous Electrodes during Reactant Depletion"



Siegel, Brock Martin                      Organic                      Peter Beak  
Department of Chemistry, Columbia University, New York, N.Y.  
"Mechanistic Studies of the Decarboxylation Reaction of 1,3-Dimethylorotic  
Acid: A Possible Mechanism for Orotate Decarboxylase"

Timmer, Richard Burnard              Analytical                      H. V. Malmstadt  
E. I. du Pont de Nemours & Company, Kingston, North Carolina  
"Wavelength Modulation and Noise Reduction using a Minicomputer-con-  
trolled UV-VIS-NIR Recording Spectrophotometer"

Wang, Andrew Hwei-Jiung              Physical                      I. C. Paul  
Department of Biology, Massachusetts Institute of Technology, Cambridge,  
Massachusetts  
"Structural Investigations of High Molecular Weight Antibiotics and of  
Nucleosides"

Weeks, Gregory Paul                      Physical                      J. T. Yardley  
DuPont "Lycra" Research and Development Laboratory, Waynesboro,  
Virginia  
"Vibrational Relaxation in Nitric Oxide-Carbon Monoxide Binary  
Mixtures"

White, Robert Harned                      Biochemistry                      L. P. Hager  
Department of Chemistry, University of California, San Diego, California  
"Analyses of Organic Halogen Compounds in Marine Organisms"

#### Ph.D. Recipients in October 1974

Beard, Carol Bowers                      Physical                      P. G. Schmidt  
Department of Chemistry, University of Illinois, Urbana, Illinois  
"Aspartate Transcarbamylase-Succinate Complexes: A Nuclear Magnetic  
Relaxation Study"

Chang, Chiang-Tung                      Physical                      J. G. Wetmur  
Cardiovascular Research Institute, University of California, San Francisco,  
California  
"Optical Stark Effect of Indole; Optical and Viscometric Studies of Modi-  
fied, Complexed, and Naturally Occurring DNA"

Cheng, Huai Nan                      Physical                      H. S. Gutowsky  
Bell Laboratories, Murray Hill, New Jersey  
"Kinetic and Mechanistic Studies of NMR Shift Reagents"

Convers, Ronald John                      Organic                      W. H. Pirkle  
Department of Chemistry, University of Illinois, Urbana, Illinois  
"Preparation of Optically Active 2,4-Diphenyl-2,3-Pentadiene from 1-Pyrazolines"

Crane, Ronald William                      Analytical                      H. V. Malmstadt  
Union Carbide, Bound Brook, New Jersey  
"An Automated Molecular Fluorescence/Absorption Sequential Analyzer with Laser Source"

DeZwaan, Jack                      Physical                      Jiri Jonas  
Department of Chemistry, University of North Carolina, Chapel Hill, North Carolina  
"Determination of the Effects of Density and Temperature on Molecular Motions in Dense Fluids using High Pressure NMR"

Duggan, David Michael                      Inorganic                      D. N. Hendrickson  
California Institute of Technology, Pasadena, California  
"Magnetic and Electronic Properties of Transition Metal Systems: Binuclear Complexes, the Ferricenium Ion"

Fanselow, Dan Lake                      Chemical Engineering                      H. G. Drickamer  
Central Research Laboratory, 3M Company, St. Paul, Minnesota  
"The Effect of High Pressure on a Series of Photochromic, Thermochromic, and Piezochromic Bianthrones"

Farney, Robert Francis                      Organic                      Peter Beak  
E. I. du Pont de Nemours & Company, Wilmington, Delaware  
"Dipole-Stabilized Carbanions from a Methylamide and a Methyl Thioester"

Franz, James Alan                      Organic                      J. C. Martin  
Battelle Northwest Laboratories, Richland, Washington  
"Reactions of Diaryldialkoxysulfuranes with Active Hydrogen Compounds"

Gibbons, David Louis                      Physical                      R. L. Belford  
Department of Chemistry, Colgate University, Hamilton, New York  
"Some Problems of Spectral Anisotropy in Transition Metal Complexes"

Gierke, Timothy Dee                      Physical                      W. H. Flygare  
E. I. du Pont de Nemours & Company, Experimental Station, Wilmington, Delaware  
"Depolarized Rayleigh Light Scattering Studies of Orientational Pair Correlations in a Nematic Liquid Crystal, the Coupled Translational-Rotational Diffusion of Rod-Like Macromolecules and the Method of Atom Dipoles"

Glorvigen, Bradley William      Organic      D. Y. Curtin  
Department of Chemistry, University of Illinois, Urbana, Illinois  
"Nucleophilic Displacements on Azomethine Nitrogen"

Green, Larry Arthur      Analytical      H. V. Malmstadt  
Mobil Oil Company, Paulsboro Laboratories, Paulsboro, New Jersey  
"The Application of Quadrupole Mass Spectrometry to Nitrogen Isotope  
Analysis"

Greenfield, John Charles      Organic      N. J. Leonard  
Eidgenossische Technische Hochschule, Universitatstrasse 16, Zurich, Swit-  
zerland  
"Preparation of Light-Responsive Compounds for the Examination of Bio-  
logical and Biochemical Systems"

Johnson, Howard James, Jr.      Analytical      J. A. Katzenellenbogen  
Department of Obstetrics/Gynecology, Baylor College of Medicine, Houston,  
Texas  
"Aryl Azides as Photoaffinity Labels for Estrogen Binding Proteins in the  
Rat Uterus"

Johnston, Ralph Oney, Jr.      Analytical      H. A. Laitinen  
Bettis Atomic Power Laboratory, West Mifflin, Pennsylvania  
"Electrochemical Studies of Selected Tungsten Compounds in Molten  
Lithium Chloride-Potassium Chloride Eutectic"

Liu, Nan-I      Analytical      Jiri Jonas  
Department of Chemistry, Carnegie-Mellon University, Pittsburgh, Pennsyl-  
vania  
"High Pressure NMR Studies of Disordered Solids and Polymers"

Lowry, James Douglas      Analytical      H. V. Malmstadt  
University Hospital, University of Washington, Seattle, Washington  
"An Automated Approach to Some Basic Sample Handling Concepts"

McConaghy, George Aloysius      Chemical Engineering      T. J. Hanratty  
Amoco Chemicals, Naperville, Illinois  
"The Effect of Drag-Reducing Polymers on Turbulent Mass Transfer"

McKenzie, Lee Frederick      Organic      D. E. Applequist  
Monsanto Company, Akron, Ohio  
"Substituent Effects in Free-Radical Halogenolysis of Substituted Phenylcy-  
clopropanes"

- Mahoney, Dennis Friend      Inorganic      J. D. Beattie  
 Rohm and Haas Company, Philadelphia, Pennsylvania  
 "Oxidative Dehydrogenation and Kinetics of Ruthenium(II) Ethylenediamine Complexes"
- Miller, Stephen Joseph      Physical      J. G. Wetmur  
 Chevron Research Company, Richmond, California  
 "Optical and Electro-Optical Studies of Nucleic Acid Orientation in Solution"
- Mocella, Michael T.      Inorganic      E. K. Barefield  
 Department of Chemistry, Cornell University, Ithaca, New York  
 "Studies of Nickel(II) and Nickel(III) Macrocyclic Amine Complexes and of Iron(0) Cyclooctatetraene Complexes"
- Morrice, Alan George      Organic      N. J. Leonard  
 Department of Chemistry, University of Illinois, Urbana, Illinois  
 "The Benzoadenines: The Synthesis of Stretched-Out Analogs of Adenine"
- Morrison, William Harvey      Inorganic      D. N. Hendrickson  
 E. I. du Pont de Nemours & Company, Experimental Station, Wilmington, Delaware  
 "Studies on Some Metal-Mercury Bonded Metallocenes and Binuclear Iron Mixed-Valence Metallocenes"
- Oh, Se Hyuck      Chemical Engineering      R. A. Schmitz  
 Department of Chemical Engineering, University of Toronto, Toronto, Ontario, Canada  
 "A Study of the Behavior of Controlled Recycle Reactors"
- Okamoto, Byron Yoshiharu      Chemical Engineering      H. G. Drickamer  
 #8 Grand Hall, English Village, Newark, Delaware  
 "The Effect of Pressure on the Electronic Structure of Some Purines, Pyrimidines, and Aromatic Hydrocarbons"
- Okamoto, Martha Statton      Inorganic      E. K. Barefield  
 E. I. du Pont de Nemours & Company, Textile Research Laboratory, Wilmington, Delaware  
 "The Synthesis, Stereochemistry, and Reactions of Cobalt(III) Complexes with Amino Alcohol Ligands"
- Parkhurst, Hugh Johnson      Physical      Jiri Jonas  
 Department of Chemistry, New York University, New York, New York  
 "High-Pressure Nuclear Magnetic Resonance Studies of Self-Diffusion in Liquids"

Paulson, James Carsten                      Biochemistry                      W. O. McClure  
Department of Biochemistry, Duke University Medical Center, Durham,  
North Carolina

"Detection and Quantitation of Drug-Induced Inhibition of Rapid Axo-  
plasmic Transport: Microtubules and Axoplasmic Transport"

Pocius, Alphonsus Vytiutas                      Physical                      J. T. Yardley  
Building 236, 3M Center, St. Paul, Minnesota

"Spectroscopy and Laser-Excited Photo-Physical Processes of the 4-R-1,2,4-  
Triazoline-3,5-Diones"

Pribula, Alan Joseph                      Inorganic                      R. S. Drago  
Department of Chemistry, Princeton University, Princeton, New Jersey

"Thermodynamic and Spectroscopic Studies on Some Transition-Metal  
Organometallic Systems"

Schlichter, Doris Joanne                      Biochemistry                      W. O. McClure  
Department of Research, Hoffmann-LaRoche, 4002 Vasle, Switzerland

"Dynamics of Rapid Axoplasmic Transport in the Optic System of the Rat"

Stine, James Ronald                      Physical                      R. A. Marcus  
Brookhaven National Laboratory, Upton, Long Island, New York

"The Application of the Semiclassical Theory to the Nonreactive and Re-  
active Collinear Collision"

Swart, Daniel J.                      Organic                      D. E. Applequist  
Dow Chemical Company, E. C. Britton Laboratory, Midland, Michigan

"The Syntheses and Photocyclization of DI-9-Anthrylmethanes"

Thayer, Chester Arthur, II                      Physical                      J. T. Yardley  
E. I. du Pont de Nemours & Company, Victoria, Texas

"The Photophysics of Electronically Excited Propynal"

Tolman, Glen Lewis                      Organic                      N. J. Leonard  
California Institute of Technology, Pasadena, California

"Fluorescent Modification of Dinucleoside Phosphates, Related Coenzymes,  
and Transfer Ribonucleic Acid"

Truitt, Sharon Gael                      Organic                      K. L. Rinehart  
Department of Chemistry, University of Illinois, Urbana, Illinois

"Carbon and Proton Magnetic Resonance and Mass Spectral Investigations  
of Neomycin B, Its Aminocyclitol and Aminosugar Subunits, and Related  
Compounds"

Walczak, Michael Robert                      Inorganic                      G. D. Stucky  
Department of Chemistry, Northwestern University, Evanston, Illinois  
"Structural, Bonding, and Reactivity Studies of Unsaturated Organolithium  
Compounds"

Wallace, John Raymond                      Analytical                      D. F. S. Natusch  
Lawrence Berkeley Radiation Laboratory, University of California, Berkeley,  
California  
"The Chemical and Physical Characterization of Airborne Particulate  
Matter"

Wei, Guang-Jong                      Physical                      P. E. Yankwich  
Department of Biochemistry, Michigan State University, East Lansing,  
Michigan  
"Chemical Kinetics"

Wheeler, James Walter                      Organic                      D. E. Applequist  
E. I. du Pont de Nemours & Company, Photo Products, Rochester, New  
York  
"Synthesis of 1,3-Bicyclo 1.1.1 Pentanedicarboxylic Acid"

Wilbur, David James                      Analytical                      Jiri Jonas  
Department of Chemistry, Indiana University, Bloomington, Indiana  
"Fourier Transform NMR in Liquids at High Pressure"

Yamamoto, Jiro                      Organic                      Peter Beak  
Sanyo Chemical Industry, Ltd., Nigashiyama, Kyoto, Japan  
"Heterophilic Additions to Imines, Carbonyls, and Thiocarbonyls"