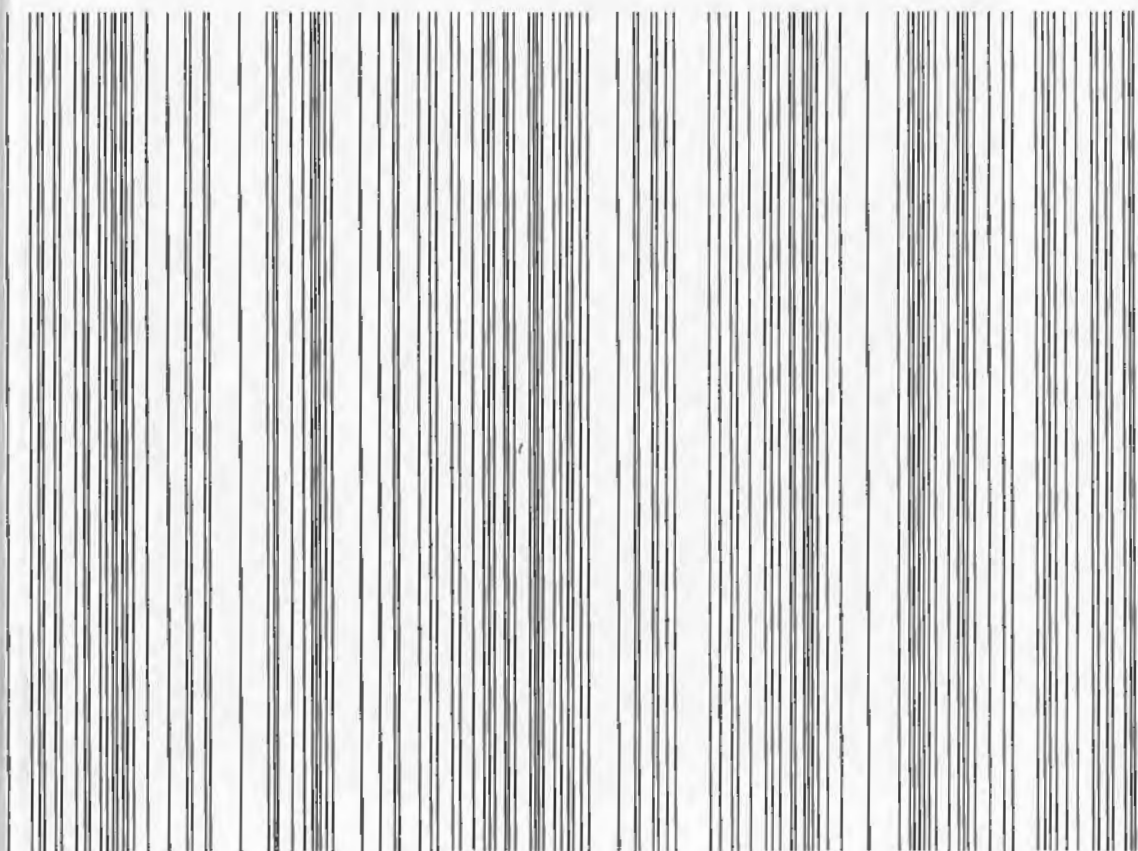

ALUMNI NEWSLETTER

SCHOOL OF CHEMICAL SCIENCES

UNIVERSITY OF ILLINOIS at Urbana-Champaign



NO. 10, WINTER 1975-76

Photo by Stanley Smith



The State of the Union

(Comments by H. S. Gutowsky, director of the school and head, Department of Chemistry)

By tradition, the luncheon for our alumni at the fall meetings of the American Chemical Society (ACS) has included a report on "The State of the Union" by the director of the school, summarizing developments during the preceding year and outlining prospects for the year ahead. Also, the school's annual report starts with a highlights section listing some of the more noteworthy aspects of the year. This sort of information may be of interest to our alumni in general so, for the third year in a row, I have put together a synopsis of such material for 1974-75 which is not covered elsewhere in the *Newsletter*. If you would like more details, let me know; I will be happy to send you a copy of the complete Annual Report.

Instructional Program

The principal change in the undergraduate offerings, effective this fall, is the separation of the laboratory portions of Chemistry 101 and 102 (our main freshman-level service course) from the lecture-discussion. The laboratory will be available in two consecutive one-hour courses or as one two-hour course. The new organization will offer greater scheduling flexibility to the student and will facilitate the coordinated but independent development of the two types of instruction. In the graduate programs, the foreign language reading requirement has been dropped for Ph.D. candidates in physical chemistry, biophysical chemistry, and chemical physics.

Overall course registrations and teaching loads, which went up sharply for two years in a row during 1972-74 (by a total of 20 percent), dropped off a bit (5 percent) in 1974-75. Student demand for courses in the new year will be about what it was last year, perhaps slightly (1 to 2 percent) less.

Twenty-nine PLATO IV terminals for computerized instruction were put in use in our Chemistry Annex facility during the year. PLATO lesson material was a required part of Chemistry 100, 103, 131, 136, 338, and 431. General chemistry students (Chemistry 101 and 103) used the system for over 4,600 hours while organic chemistry students, for whom more material is available, used it over 16,000 hours. Professor Stanley G. Smith has been responsible for most of the lesson development and use.

Students

This spring the ACS announced that in 1973-74 our school again led the nation in total number of chemistry and chemical engineering degrees conferred (243) and in total doctorates (71). We also led in chemistry bachelor's (79) and master's (46) degrees.

Undergraduate enrollments (majors) in the biochemistry programs continued to increase (now 165) and those in chemical engineering experienced a phenomenal increase, from 160 to 230. Those in chemistry remained about the same (350). Graduate enrollments continued virtually unchanged, and admissions for the fall are within the fluctuations of recent years except, perhaps, for chemical engineering, which is exceptionally low (9) after a banner season the year before (24). Biochemistry admissions, however, were up.

Charles L. Turnbough, a graduate student in biochemistry, took second prize in the annual Sigma Xi student paper competition of the local chapter.

Budgetary Problems

The combined adverse effects of inflation, austere state appropriations, and enrollment pressures were a continuing problem during 1974-75. Operating expenses exceeded the funds budgeted by \$120,000. The difference was provided from several non-recurring sources. The situation for the new year will be even more acute. Spring semester enrollments were cut back by about 200 students in the freshman and beginning organic chemistry courses for budgetary reasons, and a similar curtailment was made this fall.

Cutbacks in direct federal support of graduate students are increasingly troublesome. Fellowship and traineeship support via federal programs has dropped from a high of 127 in FY68 to fifty-six in FY75. We have tried to fill the gap by increasingly using our unrestricted, industrial grant-in-aid funds for fellowships. However, funds given us for this purpose have dropped from about \$190,000 per year in 1969-71 to \$150,000 per year in 1973-75. This drop is aggravated by the continued effects of two-digit inflation, and intensified efforts and strong support will be needed to reverse this trend, which impairs our ability to recruit the best of the applicants for graduate study.

Another area affected adversely by budget pressures is the Chemistry Library. Cuts have been made in both the total hours the library has been open (especially during holiday periods) and, more seriously, in the acquisition of books and continuation of journals. The senior staff has been polled about which journals are indispensable and which should be discontinued. An appreciable number of the less used journals, especially those available elsewhere on campus, have been dropped.

Two significant steps were taken during the year in our long range program of reviewing storeroom operations and restructuring them to improve effectiveness and reduce costs. In the summer of 1974, we completed the consolidation of the analytical and chemical engineering storerooms in Adams Laboratory. Monthly issues from the analytical storeroom had been

averaging only about \$600 per month. Therefore, after a detailed analysis of the items stocked and issued from the various storerooms, it became apparent that we should move the analytical storeroom out of 136-8 RAL into the chemical engineering storeroom in 104 and 204 RAL. The second change is the establishment of a Storeroom Committee for the school. The new committee will operate in a manner similar to the long-established Service Facilities Committee. It will be responsible for recommending overall school storeroom policies, procedures, and operating structure.

Gutowsky to Head Committee on Stratospheric Contamination

The problem of ozone reduction in the stratosphere by chlorofluoromethanes is receiving intensive study during the current academic year. Professor H. S. Gutowsky, director of the School of Chemical Sciences and head of the Department of Chemistry, was appointed in March to chair a panel to assess the extent to which such reduction might occur. The work is financed jointly by the National Aeronautics and Space Administration, the National Science Foundation, the Environmental Protection Agency, and the National Oceanic and Atmospheric Administration. The panel is functioning within the Climatic Impact Committee of the National Research Council, which is evaluating the consequences of any reductions in the protective ozone shield.

Gutowsky's panel consists of twelve people besides himself and a supporting scientific staff. Among the committee members is Professor R. A. Marcus, of the University of Illinois Department of Chemistry. It is chiefly concerned with the potential effects of stratospheric pollution, mainly chlorofluoromethanes, but also other halogen compounds and emissions from the space shuttle. Stratospheric pollution from both man-made and natural sources is being studied, the latter including contamination from such sources as sea spray and volcanoes.

The scope of the panel is very wide, encompassing a critical review of the work on this problem that has been done by others, recommendations to U.S. and international authorities on additional experimental and theoretical studies which should be undertaken, and laying the groundwork for U.S. and international policy on pollution of the upper atmosphere. Because of the international character of the problems, the panel includes three foreign members, scientists from England, West Germany and Canada.



New staff members. Left to right, rear: Gary Schuster, Eric Oldfield, T. A. Nieman. Front: T. O. Baldwin, C. A. Evans, Jr.

New Staff Members

The School of Chemical Sciences has added five new staff members this fall, and a sixth will be arriving at the beginning of the second semester. All join us as assistant professors except Dr. Evans, who comes as an associate professor.

Dr. **Charles A. Evans, Jr.**, has been on the Urbana campus since 1970 as a senior research chemist on the staff of the Materials Research Laboratory. He will continue his work there, and also will help the School of Chemical Sciences on a part-time basis (20 percent) in the analytical group.

Dr. **Gary B. Schuster** came to Illinois with a Ph.D. from Rochester, followed by a postdoctorate appointment in organic chemistry at Columbia. His research here will center on the chemical formation of electronically excited states, which is the heart of chemiluminescent and bioluminescent systems. He plans to prepare novel, potentially chemiluminescent systems and examine them to find the relationship between structure and reactivity.

Dr. **T. O. Baldwin** took his B.S. and Ph.D. degrees at the University of Texas (Austin) and spent three years as a postdoctoral research associate at Harvard before coming to Illinois. His biochemical interests lie in the area of bacterial luciferase.

Dr. **T. A. Nieman** is a graduate of Purdue (B.S., 1971) and Michigan State (Ph.D., 1975). His research involves computers and chemical instru-

mentation, analytical spectroscopy, chemiluminescence for trace analysis, and kinetics of analytically useful reagents.

Dr. **Eric Oldfield** took his undergraduate training at the University of Bristol (B.Sc., 1969) and his doctoral work at the University of Sheffield (Ph.D., 1972). Before joining the physical chemistry group at Illinois, he spent two and a half years at Indiana University and six months at M.I.T. His research interests are in the development of nuclear magnetic resonance instrumentation with which to study problems in membrane and protein structures.

Oldest Ph.D. Alumnus Dies

Colonel **Paul Edward Howe**, '06, A.M. '07, Ph.D. '10, U.S. Army Retired, Sept. 27, in Washington, D.C. He was the first secretary of the Class of 1906 and his father, Edward Gardiner Howe, was principal of the University's preparatory school in 1893-1902.

Colonel Howe, who earned his doctorate in physiological chemistry, had taught at the College of Physicians and Surgeons of Columbia University and did research at the Rockefeller Institute, Princeton, before joining the Department of Agriculture, Bureau of Animal Industry in 1924. He was chief of the animal nutrition division and assistant chief of the Bureau of Animal Industry in 1936-48. As an adviser to the Bureau of Prisons, Dr. Howe developed a nutritional accounting system which has been widely used.

Following World War II, he was concerned with nutritional needs of the civilian populations of Germany and Japan. After retiring from the Department of Agriculture in 1955, Colonel Howe lectured in Rome and represented the department at world food conferences. He had served as president of the Washington Academy of Science and of the American Physiology Society.

Leonard Receives Edgar Fahs Smith Award

Dr. **Nelson J. Leonard**, professor of chemistry and biochemistry, received the 1975 Edgar Fahs Smith Award in March of this year. The award, given annually by the Philadelphia Section of the ACS and the Department of Chemistry at the University of Pennsylvania, was in recognition of Leonard's research contributions which have been most recently concerned with the solution of problems in plant physiology, biochemistry, and molecular biology. Another recognition received by Professor Leonard this year is his service

as a "Distinguished Visiting Professor" at the University of California (Davis) in May.

All of the persons who took part in the program in Philadelphia are Illini and former members of the Leonard Research Group, and all are employees of the Rohm and Haas Company. Pictured (left to right) are Donald J. Felley (Ph.D., 1949), who was the after-dinner speaker, Mrs. Felley, Professor Leonard, Frederick H. Owens (Ph.D., 1958), Chairman of the Philadelphia Section of the ACS, Mrs. Leonard, Mrs. Owens, and William E. Goode (Ph.D., 1950), who introduced the speaker.



The research community's recognition of the value of Leonard's research did not begin with these two most recent honors. In 1963 he received the ACS Award for Creative Work in Synthetic Organic Chemistry and in 1970 the Synthetic Organic Chemical Manufacturers Association Medal. He was elected to the National Academy of Sciences in 1955 and became a fellow of the American Academy of Arts and Sciences in 1961.

He received degrees from Lehigh, Oxford, and Columbia Universities before coming to Illinois in 1943 for a postdoctoral year with Professor Adams. In addition to the title of research assistant, which he held during that first year at Illinois, Leonard has, during his subsequent years here, held the remarkable total of seven other academic titles: instructor, associate, assistant professor, associate professor, professor of organic chemistry, professor of chemistry and member, Center for Advanced Study, and professor of biochemistry. His administrative contribution to the department added the title head of the Organic Division for the period 1954-1963.

His activities in behalf of the American Chemical Society have included a term as secretary of the Division of Organic Chemistry and one as chair-

man of that body. He has served as a member of the editorial boards of the *Journal of Organic Chemistry*, *Journal of the American Chemical Society*, *Organic Syntheses*, and *Biochemistry*. Other service includes advisory committees to various U.S. government agencies and to the Alfred P. Sloan Foundation and the Educational Advisory Board of the John Simon Guggenheim Memorial Foundation.

Together with his students, he has provided many contributions to organic synthesis, including innovations in reductive cyclization, oxidative cyclization, rearrangements of aminoketones and thiaketones, transannular interactions and reactions in medium-ring heterocycles, and synthesis and reactions of enamines and their salts. More recently he has directed his skill and experience in organic chemistry toward the solution of problems in plant physiology, biochemistry, and molecular biology. Contributions of particular importance include (1) the isolation, identification, and synthesis of cytokinins, which are cell-division, cell-growth compounds in plants; (2) the development of fluorescent probes for specific coenzymes and nucleic acid components; and (3) the clarification of photolinking processes which aid in the determination of transfer ribonucleic acid tertiary structures.

It is interesting to note the flow of ideas by which his earlier research on transannular reactions and interactions has led to his present studies of the interactions between base pairs in nucleic acid models and then to the development of fluorescent modifications of biologically important molecules. While the latter studies may in this manner be said to have grown from the earlier ones it is becoming clearer all the time that more than just luck was required for Leonard to have the required experience when the time became ripe for important new contributions in a new area. He has the foresight to see new directions and the leadership to develop them.

American Chemical Society Awards to Illini

Seven of the twenty-four American Chemical Society Awards announced at the Chicago meeting of the society will go to staff members, former staff members, or alumni of the School of Chemical Sciences.



D. H. Busch



L. B. Clapp



E. J. Corey

Professor **D. H. Busch** (Ph.D., 1954), now professor of inorganic chemistry at Ohio State University, will receive the Award for Distinguished Service in the Advancement of Inorganic Chemistry, sponsored by Mallinckrodt, Inc. Under his leadership, the inorganic chemistry group at Ohio State has become one of the strongest inorganic research and teaching groups in the country. Busch and his coworkers have specialized in recent years in macrocyclic ligands and complexes of esters.

Dr. Busch has also received the Ninth Annual Edward W. Morley Medal of the Cleveland Section of the ACS. This medal is given for outstanding contributions to chemistry by people who live within 250 miles of Cleveland.

Professor **Lealyn B. Clapp** (Ph.D., 1941), now Newport Rogers Professor at Brown University, has been selected to receive the Award in Chemical Education, sponsored by the Scientific Apparatus Makers Association. He was an early leader in curriculum reform, and has lectured widely and served as an educational adviser on topics in chemical education at more than sixty colleges in the United States, and at least forty in foreign countries. In addition, he has organized and taught at thirteen National Science Foundation summer institutes for high school teachers.

Professor **E. J. Corey**, a member of our staff from 1951 until 1959, and now Sheldon Emory Professor at Harvard, will be given the Arthur C. Cope Award for his syntheses of natural products (especially the prostoglandins), his development of new synthetic reactions, and his work in the use of computer analysis for synthetic design.

Dr. **James S. Fritz** (Ph.D., 1948), professor at Iowa State University, has been chosen to receive the Award in Chromatography, sponsored by Supelco, Inc. The award is based especially on his development of methods to identify and measure parts-per-billion levels of possibly carcinogenic materials in water supplies.



J. S. Fritz



T. E. Larson

Dr. **T. E. Larson** (B.S., 1932; Ph.D., 1937), assistant chief of the Illinois State Water Survey and professor of sanitary engineering on the Urbana campus, will receive the Award for Pollution Control, sponsored by the Monsanto Company. He is an authority on water chemistry and corrosion and has published many papers on these subjects and on environmental problems in general.



H. V. Malmstadt



J. H. Sinfelt

Professor **Howard V. Malmstadt**, a staff member since 1951, is to receive the Award in Analytical Chemistry sponsored by the Fisher Scientific Company. He is being honored for his contributions to analytical instrumentation and instrumental analysis. He is widely known for his development of the "Electronics for Scientists" program. His book of that same title (written in

collaboration with Professor Chris Enke (Ph.D., 1959) is widely used as a text and reference book. His summer short course for professors and industrial scientists has attracted wide attention.

Dr. **John H. Sinfelt** (Ph.D., 1954) has been chosen to receive the Award in Petroleum Chemistry, sponsored by the Lubrizol Company. Dr. Sinfelt heads a basic research group in heterogeneous catalysis at the Exxon Research and Engineering corporate research laboratory. He is being honored especially for his development of a bimetallic catalyst which is widely used in reforming petroleum naphthas into high octane, low lead gasoline. He has worked chiefly on the mechanism and kinetics of hydrocarbon reactions on metals and bifunctional catalysts.

Awards to Faculty Members

Teaching Awards

In order to reward and stimulate superior undergraduate teaching, the University has established several award programs through which recognition is given to senior staff and graduate teaching assistants for outstanding



Roger Schmitz

teaching at the undergraduate level. Selection is made by a committee consisting of undergraduate students and faculty. Professor **Roger A. Schmitz** of the Department of Chemical Engineering was one of the four faculty members from the Urbana-Champaign campus so honored this year. He received a personal award of one thousand dollars; in addition, he was given a thousand dollars for the purchase of instructional equipment for his department.

The University has also a program of Undergraduate Instructional Awards which are based on instructional development projects conceived and submitted by faculty members, for undergraduate courses, new meth-

ods of instruction, or other innovative approaches to education at the college level. Those whose projects are selected (about twenty-five) are given their salaries for the two-month summer session to free them to develop their projects. Professor **Iain Paul** of the Department of Chemistry held such a grant in the summer of 1974 to help him develop videotapes for Chemistry 102 and, at the Teaching Awards Banquet in February of this year, he was one of three people, two from the Urbana-Champaign campus and one from Chicago Circle, chosen to receive a Special Award of one thousand dollars because of the excellence of his project. These Special Awards are sponsored by the Standard Oil (Indiana) Foundation.

Professor **William H. Pirkle** of the Department of Chemistry was given an Undergraduate Instructional Award for the Summer of 1975. His project was concerned with kinetics and how they are important to life processes.



W. H. Flygare

Flygare Wins Another Honor

Professor **W. H. Flygare** has been invited by the Chemical Society (London) to deliver a Centenary Lecture in six cities in Britain this year. The Centenary Lecture series was instituted at the time of the centenary of the Society, in order to bring distinguished chemists from abroad. It carries with it a silver medal and an honorarium. One of the lectures will be given in London, and a half-day symposium on Light Scattering in Pure Liquids and Solutions will be built around it. Dr. Flygare will spend two weeks in Britain in January.

Stanley Smith Has One-Man Show

Professor **Stanley G. Smith**, organic chemist and noted photographer, has recently exhibited a large number of his photographs in the lobby of the Levis Faculty Center. Most of these were taken in or near Urbana-Champaign, and show a wide range of subjects and photographic techniques. The show has attracted a great deal of attention and comment. Two of the photographs are reproduced on the inside covers of this issue of the *Alumni Newsletter*.

Banquet for Fuson

At the Chicago ACS meeting this fall, Dr. **R. C. Fuson** (emeritus professor) was honored by his former students at a dinner arranged in honor of his eightieth birthday, which actually occurred on June 1. Many of the 200 students who earned their degrees under his guidance attended, and contributed about \$6,000 to the R. C. Fuson fund, which now totals approximately \$26,000. The income from this fund is used to provide scholarships and to support other worthwhile departmental activities.

G. F. Smith Honored

Dr. **George Frederick Smith** (emeritus professor) is one of four alumni of the University of Michigan who has been chosen this year for an Outstanding Achievement Award.

Faculty Member and Alumni Elected to National Academies

A member of the biochemistry staff and two alumni have been elected to the National Academy of Sciences and an alumnus has been elected to the National Academy of Engineering.



G. Weber



E. T. Mertz

Professor **Gregorio Weber** has been concerned with application of optical spectroscopy — particularly fluorescence emission — to the study of biologically important molecules. Some of these molecules are naturally fluorescent. Others require attachment of fluorophore groups endowed with suitable spectroscopic properties. He has worked on both these aspects, developing some fluorescent probes which attach covalently to proteins. The physical methods of study have required development and he has contributed to methods of measurement of fluorescence yield, fluorescence polarization, and

fluorescence lifetime. Apart from general methodology, Dr. Weber has studied problems of interaction of proteins with small ligands and of molecular complexes in general, since fluorescence methods are particularly well adapted to these purposes.

Edwin T. Mertz (Ph.D., 1935), now professor of biochemistry at Purdue, is a co-discoverer of high lysine corn (1963), which greatly enhances the quality of protein in the grain. This discovery has led to a great deal of research in upgrading plant proteins by genetic methods, and to improved nutrition for people whose major staple is grain.



J. P. Collman



K. Timmerhaus

Professor **James P. Collman** (Ph.D., 1958), professor of chemistry at Stanford University, did his undergraduate research in inorganic chemistry and his graduate research in organic chemistry. He continued for a time in organic work, but then reverted to inorganic. He has done significant work in the reactions of coordinated ligands, oxidative additions, dinitrogen and dioxygen complexes, and metal-metal bonds. Currently, he is involved in organometallic compounds, so is both an organic and an inorganic chemist.

Klaus D. Timmerhaus (B.S., 1948, M.S., 1949, Ph.D., 1952), now associate dean of engineering at the University of Colorado and president-elect of the American Institute of Chemical Engineers, has been elected to the National Academy of Engineering. In addition to his administrative duties, he is involved in research in cryogenic engineering, and has published widely in that field. Work with the ultra-cold region of cryogenics has much significance for energy transmission and storage. Dean Timmerhaus is head of the section responsible for energy in the Engineering Division of the National Science Foundation.

Dr. **John H. Sinfelt** (Ph.D., 1954) has also been elected to the National Academy of Engineering. His work is mentioned in the article, "A.C.S. Awards to Alumni," as he was honored in that connection, also.

Honors to Former Staff and Alumni

Professor **C. S. Marvel** (Ph.D., 1920), a long-time member of the Urbana faculty and now professor of chemistry at the University of Arizona, is to be honored by a biennial C. S. Marvel Symposium to be held there. The first



C. S. Marvel

such symposium was held January 13 and 14, 1975, in honor of his eightieth birthday. These symposia will be co-sponsored by the Southern Arizona Section of the American Chemical Society, Beta Tau Chapter of Alpha Chi Sigma and several corporate groups. 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.

A distinguished group of internationally established polymer chemists presented talks on their research and the current status of the polymer field. These include Professor G. Smets (University of Louvain, Belgium), Professor C. G. Overberger (Ph.D., 1944) (now professor of chemistry and research vice president, University of Michigan), Professor J. K. Stille (Ph.D., 1957) (now professor at the University of Iowa), Dr. E. J. Vandenberg (research associate, Hercules, Inc.), Dr. D. G. H. Ballard (research director, I.C.I. Corporate Laboratory, U.K.), and Dr. J. P. Kennedy (University of Akron).

On Monday evening, January 13, there was a cocktail hour and a banquet in honor of Professor Marvel after which Dr. T. L. Cairns (Ph.D., 1939; director of research, Central Research Department, DuPont) reviewed Marvel's career as teacher, researcher, and consultant.

The Department of Chemistry at Arizona has also established the Marvel Fellowship, which will be awarded each year to the graduate student who

has best "demonstrated the ability to carry out independent research in chemistry in a scholarly, enthusiastic way." The choice of recipient shall be based on the student's "ability and understanding of chemistry (as demonstrated through) seminars, publications, presentations at meetings, and contact with several faculty in addition to his research director." The fellowship carries a stipend of \$3,700 and is open to students in all areas of chemistry.



H. A. Laitinen



Allen Hay



S. K. Friedlander

H. A. Laitinen, staff member from 1940 to 1974, and now professor emeritus and a member of the faculty at the University of Florida, has received the annual award of the Synthetic Organic Chemical Manufacturers Association. The award consists of a gold medal and \$1,000. The citation read, in part, he "has distinguished himself during the past five years in the promotion of environmental chemistry at the university level as a legitimate and important subdiscipline, developing and presenting many concepts and ideas basic to the chemical component of interdisciplinary environmental studies."

Dr. **Allan S. Hay** (Ph.D., 1955), manager of the Chemical Laboratory at the General Electric Research and Development Center in Schenectady, N.Y., has been selected to receive the 1975 International Award in Plastics Science and Engineering of the Society of Plastics Engineers. The award recognizes his invention of polymerization by oxidative coupling.

Sheldon K. Friedlander (Ph.D., 1954), professor of chemical engineering and environmental health engineering at California Institute of Technology, has received the Alpha Chi Sigma Award in Chemical Engineering Research.

Dr. Friedlander was cited for his research on the chemical and physical characterization of urban air pollution aerosols. In his early work, he developed a similarity theory for the uniformity in the shapes of observed aerosols. He has also published on the transport of oxygen in blood and the deposition of particles in the lung, and from these studies, has developed theories on diffusion and transport in biological systems.

Dr. Friedlander is currently chairman of the Panel on Particulate Emis-

sions of the National Research Council and a member of the Chemistry and Physics Advisory Committee of the Environmental Protection Agency.

Dr. **Dean F. Martin**, who was a member of the Inorganic Group on the Urbana campus from 1959 until 1964 and is now professor of chemistry and adjunct professor of biology at the University of South Florida, was chosen for the 1975 Florida Award by the Florida Section of the American Chemical Society. Dr. Martin was honored for his outstanding work in the study of the "Red Tide," which often infests the waters in the Gulf of Mexico.



Dean Martin



W. W. Brandt

Dr. **Corwin Hansch** (B.S., 1940), now Carnegie Professor of Chemistry at Pomona College, has received the first Smissman-Bristol Laboratories Award in Medicinal Chemistry. This award was established by the Bristol Laboratories in honor of the late Dr. Edward E. Smissman (B.S., 1948), who was professor of chemistry at the University of Kansas. The award, which is to be given biennially, is to honor a scientist "whose research, teaching or service has had a substantial impact on the intellectual and theoretical development in the field of medicinal chemistry." Hansch's research efforts have been concerned chiefly with the relationship between biological activity and chemical structure.

The 1974 Burdick and Jackson International Award in Pesticide Chemistry has been presented to Dr. **T. Roy Fukuto** (postdoctoral, 1950-51). Dr. Fukuto is professor of entomology and chemistry at the University of California, Riverside. He is chiefly interested in applying the principles of physical-organic chemistry to the biological action and metabolism of insecticides.

This award is of special interest to Illini because both O. Z. Burdick (M.S., 1929) and W. G. Jackson (Ph.D., 1945) are Illinois alumni.

Warren W. Brandt (Ph.D., 1949), has assumed the position of president of Southern Illinois University. He was previously president of Virginia Polytechnic Institute and then of Virginia Commonwealth University.

Dr. **A. O. Beckman** (B.S., 1922; M.S., 1923) has received the ACS Orange County Section's Service Through Chemistry Award and the Award

for Outstanding Achievement in Business Management from the University of Southern California. These awards honored Beckman for his contributions to the scientific and industrial communities of Southern California.

R. Byron Bird (B.S., 1947) has received the Bingham Medal of the Society of Rheology and the W. K. Lewis Award of the American Institute of Chemical Engineers for his outstanding work in chemical engineering. Dr. Bird has also recently coauthored a book entitled "Comprehending Technical Japanese."

William J. Bailey (Ph.D., 1946), professor of chemistry at the University of Maryland and 1975 president of the American Chemical Society, has been awarded the Honor Scroll of the Washington Chapter of the American Institute of Chemists in recognition of his "outstanding and noteworthy service to the profession of chemistry and chemical engineering."

Carl C. Larson (M.S., 1921) has been given the Charles Alvin Emmerson Medal by the Water Pollution Control Federation for his "outstanding performance in the Springfield District" and leadership in the Federation. Mr. Larson spent thirty-five years with the Springfield Sanitary District and was superintendent of the city's water purification plant for thirteen years.

Donald E. Woessner (Ph.D., 1957) has received the W. T. Doherty Award of the A.C.S. Dallas-Fort Worth Section in recognition of his research on the pulsed nuclear magnetic resonance spectrometer. He is a research associate at the Mobil Field Research Laboratory in Dallas.

Special Lectures

Doisy Lectures

The Doisy lectures in biochemistry were given this year by Professor Arthur Kornberg of the Stanford University Medical School and Professor Osamu Hayaishi, chairman of the Department of Medical Center at the University of Kyoto in Japan and currently President of the International Union of Pure and Applied Chemistry.

Professor Kornberg is one of the world's leading authorities on the biosynthesis of DNA. In the mid 1950s, Dr. Kornberg discovered an enzyme which was capable of synthesizing DNA. He received the Nobel Prize in 1959 for his work on this enzyme. In more recent times, his laboratory has continued to study the various aspects of DNA synthesis. He and his co-workers have recently shown that three different types of DNA synthesis can be demonstrated in procaryotic systems. Each type can be characterized by special enzyme and cofactor requirements. Current efforts at the Kornberg laboratory are directed toward elucidating the function of each of the various factors in these systems. Dr. Kornberg is the author of a great many scientific papers and books. His latest book describes various mechanisms of DNA synthesis found in different biological systems.

Among his many contributions, Dr. Hayaishi was instrumental in the early 1950s in redirecting the attention of the biochemical community to the essential synthetic role of oxygen in direct interaction in biological systems at a molecular level, reemphasizing the tradition of Warburg in the 1930s on the key role of oxygen. With the availability of oxygen isotopes, Dr. Hayaishi was able to demonstrate its direct incorporation in biosynthesis, completely reorienting research on the role of oxygen in mammalian organisms, as well as in the microbes which recycle the organic carbon of nature. The current studies which Dr. Hayaishi emphasized in his lecture here concern the role of oxygenates in several important mammalian organs and the formation from amino acids of the building blocks of muscles and other tissue and the regulatory chemicals controlling nerve and brain activities.

William Albert Noyes Lecture

The Twenty-Fifth Annual Noyes Lecture, sponsored by Phi Lambda Upsilon and the School of Chemical Sciences, was given on April 17 by Professor Charles C. Price, a member of our staff from 1936 to 1946, and now Benjamin Franklin Professor of Chemistry at the University of Pennsylvania. His topic was "Evolution and Order."

Dr. Price has been active in the American Chemical Society and was president of it in 1965. He has received three A.C.S. awards: Pure Chemistry (1946), Outstanding Public Service (1973), and Creative Invention (1974). He is a past-president of the United World Federalists and has been active in many other civic and social movements.

Bailar Lecture

The 1974-75 Bailar Lectures were given by Professor David A. Buckingham of the Research School of Chemistry, Australian National University on March 13 and 14. Professor Buckingham, who is internationally known for his work on the mechanisms of metal complex reaction, presented two lectures that summarized many important aspects of his work on the determination of reaction mechanisms. The first of these was entitled, "Intermolecular Reactions" and the second "Intramolecular Reactions."

Sherwin-Williams Lecture

We have been fortunate for several years in having internationally known scientists visit the School of Chemical Sciences under the sponsorship of the Sherwin-Williams Company. In May of this year, Professor D. Günther Wilke of the Max Planck Institute für Kohlenforschung in Mulheim, Germany, spent four days in Urbana. During this time, he presented three lectures on his fascinating work in organometallic chemistry and participated in many informal discussions with students and faculty. Dr. Wilke's lectures were entitled, " π -Allyl Transition Metal Systems," "Cyclooligomerization of Olefins and Dienes," and "Catalytic Asymmetric Syntheses."

Krug Lecture

The Krug lecture series was initiated this year under the sponsorship of our Alpha Chi Sigma local chapter. The Krug lectures are supported by a \$10,000 trust fund, established recently by Mrs. Krug, in honor of her husband. The first lecture was presented by Professor Hubert N. Alyea of Princeton University, who chose as his title, "Lucky Accidents, Great Discoveries, and the Prepared Mind."

Louis G. Krug graduated from the University of Illinois in 1918. In addition to his studies in chemistry, he was on the university swimming team, was captain of his class football team, and played in the university band. Upon graduation, he served in the Army Medical Corps for a year, then worked for the William Wrigley Company for several years. Most of his professional career was spent in the employ of the Chicago Rawhide Manufacturing Company, from which he retired in 1962. Thereafter, he and his wife lived in La Jolla, California, until his death in 1972.

Wednesday Night at the Lab

The Wednesday Night at the Lab lecture series continues this year with the following lectures now scheduled:

Dr. Paul Meakin of DuPont, "The Effects of Halocarbons on Atmospheric Ozone."

Professor A. D. Webb of the University of California, Davis, "The Chemistry of Winemaking."

Dr. Frank Colton of Searle, "The Development of the Pill."

Still other lectures, all relating chemistry to the man on the street, will follow. The WNATL series has been extremely successful, as attested by the large attendance and the interest shown in the discussion periods afterward. Each lecture is preceded by a dinner in honor of the speaker, and followed by a reception at the Alpha Chi Sigma fraternity, which sponsors the series.

Awards to Students

For the 1975-76 academic year, ten \$500 scholarships were awarded by the school to freshmen entering the University, and planning a professional career in one of the chemical sciences. Of these, four are in biochemistry, one in chemical engineering and five in chemistry with five being funded from the income of the Roger Adams Fund, one from the L. F. Audrieth Fund, and four by a grant from Monsanto. These students, and their home towns, are as follows:

Lagnado, Ronald R. (Glenview) (Adams Fund)

Maloney, Mark T. (Dolton) (Audrieth Fund)

Guth, David S. (South Holland) (Monsanto Fund)
 Kohlhase, Randall K. (Peoria) (Monsanto Fund)
 Rietveld, Jerry (Carey) (Monsanto Fund)
 Brafman, John D. (Deerfield) (Adams Fund)
 Fritz, Joseph L. (Park Ridge) (Adams Fund)
 Yednock, Ted A. (Grand Ridge) (Adams Fund)
 Mosher, Jeanette L. (Mt. Prospect) (Adams Fund)
 Albin, Christopher M. (Champaign) (Monsanto Fund)

The **Agnes Sloan Larson Awards**, in the amount of \$200 each, were presented on February 4, 1975, before the Chemistry 108 class to the five outstanding sophomore students on the basis of their work as freshmen:

Gary G. Trost, Des Plaines
 Douglas J. Krajnovich, Villa Park
 James C. Hertenstein, Morton
 Alan J. Conrad, Blackstone
 Gregory A. Gregg, East Peoria

The Agnes Sloan Larson Awards were established in 1959 by Arthur W. Sloan (B.S., 1922) in honor of his sister, Mrs. C. C. Larson, who was a chemistry major at Illinois and valedictorian of the Class of 1919. The awards are presented during the recipients' sophomore year before the freshman class of the succeeding year.

During the Spring Semester, a number of undergraduate awards based on academic excellence were announced. These are listed below:

Reynold C. Fuson Award

Robert A. Scott, Morris

Worth H. Rodebush Award

Douglas A. Lauffenburger, Des Plaines

Kendall Award

William S. Karkow, Yorkville

Elliot Ritchie Alexander Award

Alan L. Hinderliter (chemistry), Jacksonville

Mark A. Stanish (chemical engineering), Elmhurst

Merck Award

John D. Barnwell (chemistry), Marion

Jon A. Bernardi (chemical engineering), Granville

Winnie Wing-Yee Wong (biochemistry), Hong Kong

American Institute of Chemists Award

Ira S. Abrams (chemistry), Glenwood

Thomas O. Sidebottom (biochemistry), Urbana

John W. Chapman (chemical engineering), Palos Heights

Alpha Chi Sigma Plaque
Phi Lambda Upsilon Cup
Donald Eisele Memorial Award

American Institute of Chemical
Engineers Scholarship Award
Freshmen CRC Handbook Award

Lisle Abbott Rose Memorial Award

Honeywell Award

Daniel C. Duan, Quincy
Donald Hennessy, Jr., Naperville
Douglas A. Lauffenburger, Des
Plaines

Mark A. Stanish, Elmhurst
Joel Garbow, Park Forest
Thomas Tulig, Chicago

Douglas A. Lauffenberger, Des
Plaines

James L. Barbour, Homewood

James T. Avery, a graduate student in Analytical Chemistry, has been awarded a summer fellowship of \$1,000 by the A.C.S. Division of Analytical Chemistry. Six such fellowships were awarded on a nationwide basis this year.

Charles L. Turnbough, a graduate student in biochemistry, took second prize in the annual Sigma Xi student paper competition of the local chapter.

The National Organization for the Professional Advancement of Black Chemists and Chemical Engineers recently instituted a \$5,000 fellowship to be awarded annually to an outstanding black graduate student in chemistry or biochemistry. The first award under the program was announced in October and was made to **Mr. Elijah Johnson** of the Department of Chemistry. Mr. Johnson is a fifth year graduate student working in theoretical physical chemistry under the direction of Professor David Chandler.

Placement Office

The 1974-1975 year was one of ups and downs for the recruiting activities scheduled through the Placement Office. Although our fall recruiting schedule was well filled, shortly following the close of recruiting in November, a number of employers who had visited the campus notified us that their numbers of positions to be filled had been sharply cut or their hiring was "frozen." This situation most seriously affected our Ph.D. chemists. As a consequence of the worsening general economic situation, our spring recruiting period was lightly scheduled. In addition, we experienced a 23 percent rate of cancellation of confirmed schedules which left us with only sixty-one employer visits.

Nonetheless, throughout the year the employment rate for chemical engineers continued to be excellent. In several instances during both recruiting periods schedules were cancelled by employers seeking B.S. chemical engineers because of insufficient student interest. The decrease in traditional jobs

for chemical engineers in chemical companies has been overbalanced by the creation of new positions concerned with pollution control and energy sources.

Less than a dozen of those who graduated last year are still seeking professional employment. We are continuing to assist these people in various ways to find permanent employment.

Once again the Placement Office and Phi Lambda Upsilon co-sponsored two pre-recruiting workshops to acquaint students with the interview process. We were privileged to have four guest participants from various industries share their experiences and advice for the benefit of our students. We have found that our workshops held prior to the fall and spring recruiting periods greatly assist our chemical science students in preparation for interviewing.

Other regular functions of the Placement Office this past year have included the semi-monthly mailing of our "Employment Opportunities Bulletin," which contains current position listings, to interested alumni and recent graduates who are still seeking employment. This past year our listings for industrial and academic vacancies decreased significantly to 688 and 334, respectively. Also, monthly, we continued to send our "Bulletin of Available Alumni" to over 300 employers located throughout the United States. This bulletin lists mini-resumes of alumni who are available and wishing to relocate. Sixty-five out of 118 alumni who were registered with our office accepted new employment. Approximately 40 percent of these people indicated that our bulletins were responsible for providing the leads for their new positions.

This past spring, in an effort to build up our employer clientele, we sent letters and informative brochures to over 300 industrial firms that employ chemists and chemical engineers, inviting them to interview students through our office. We also indicated that we would be happy to publicize immediate openings and send resumes of students and alumni. We hope that our employer roster will continue to grow, especially in these depressed times.

In general, student interest in interviewing with employers was high during both recruiting periods except for the abundance of employers from which the B.S. chemical engineers had to choose. On several Monday mornings when new schedule sheets were released, students would be lined up at the office door. In a number of instances, employers interviewing Ph.D. chemists extended their schedules to accommodate more interviewees.

School of Chemical Sciences Funds

The alumni and friends of the School of Chemical Sciences have shown their loyalty in many ways, not the least of which has been through financial contributions to various funds which support the work of the school. Of special interest are the Roger Adams Fund, the Illini Chemists Fund, the

John and Florence Bailar Fund, the R. C. Fuson Fund, the W. H. Rodebush Fund, and the L. F. Audrieth Fund. Contributions to these funds have totalled about \$16,000 over the past year, the vast majority of which has come from alumni. We are especially pleased about the recent drive conducted by former students of Professor Fuson which added about \$6,000 to the Fuson Fund this past summer.

The purposes of these funds are many and varied but primarily involve the support of undergraduate scholarships and awards (the Adams, Fuson, Rodebush, and Audrieth Funds), the support of special lectures (the Bailar and Fuson Funds), and the publication of the annual *Newsletter* (the Illini Chemists Fund). We hope that our alumni and friends will continue to support these funds so that these projects can be continued and hopefully expanded. To aid in identifying and sending contributions, we have enclosed a form and a return envelope for your use. Checks should be made payable to the University of Illinois Foundation and sent to the School of Chemical Sciences or to the Foundation directly if you prefer. Be sure to indicate to which fund(s) you want your gift to go.

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 continually 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 efforts and in our efforts to enlist financial contributions from companies associated with the chemical industry.

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

Ph.D. Recipients in January, 1975

Campbell, John Hyde Jiri Jonas
Lawrence Livermore Laboratory, Livermore, California
"Raman and NMR Studies of the Effects of Density and Temperature on
the Molecular Dynamics in Fluids"

Graham, William Frank Organic R. M. Coates
Marshall Laboratory, Philadelphia, Pennsylvania
"Part One: Solvolysis of Norcedryl Derivatives; Part Two: Stereochemistry
of the Dissolving Metal Reductions of Epoxides"

Grazani, Kenneth Richard Chemical Engineering R. A. Schmitz
Mobil Research and Development Company, Paulsboro, New Jersey
"Oscillations in an Isothermal, Continuous-Flow, Stirred Reactor"

- Kolb, David Allen Biochemistry Gregorio Weber
 Spex Industry, Metuchen, New Jersey
 "Reciprocity of Effects and Multiple Ligand Interactions on Ligand Binding
 to Globular Proteins"
- Lipscomb, John Dewald Biochemistry I. C. Gunsalus
 Freshwater Biological Institute, University of Minnesota, Naverre, Minnesota
 "Energy Transfer and Segregation: Mixed Function Oxidation by Cyto-
 chrome P450_{CAM} and Putidaredoxin"
- Milavetz, Barry Ira Organic K. L. Rinehart
 Roswell Park Memorial Institute, Buffalo, New York
 "Biosynthesis of the Streptovaricins"
- Moehlmann, Jon Gregory Physical J. D. McDonald
 E. I. du Pont de Nemours and Company, Towanda, Pennsylvania
 "Infrared Chemiluminescence Investigation of Reactions Between Fluorine
 Atoms and Unsaturated Polyatomic Molecules"
- Sandefur, Louise Obenshain Organic R. M. Coates
 Department of Chemistry, University of Illinois, Urbana, Illinois
 "New Developments in Ketone Alkylation"
- Stine, Barbara Schreyer Analytical D. F. S. Natusch
 c/o James R. Stine, Brookhaven National Laboratories, Upton, New York
 "Gas Chromatographic Determination of Inorganic Oxyanions in the Envi-
 ronment"
- Tatterson, David Franklin Chemical Engineering T. J. Hanratty
 Organic Chemicals Division, Amoco Chemicals Corporation, Naperville,
 Illinois
 "Rates of Atomization and Drop Size in Annular Two-Phase Flow"
- Thorsness, Charles Bennett Chemical Engineering T. J. Hanratty
 Lawrence Livermore Laboratory, Livermore, California
 "Transport Phenomena Associated with Flow Over a Solid Wavy Surface"
- Vernon, Gregory Allen Inorganic G. D. Stucky
 Atomics International, Division of Rockwell International, Canoga Park,
 California
 "The Characterization of the 2p X-Ray Photoelectron Spectra of First Row
 Transition Metal Element Compounds"

Ph.D. Recipients in May, 1975

Berglund, Charles Arthur Physical H. S. Gutowsky
Department of Chemistry, University of Wisconsin, Madison, Wisconsin
"Nuclear Magnetic Relaxation in Liquid Crystals and in Some Alkali Hexafluoroniobates"

Brabson, John Samuel Biochemistry R. L. Switzer
Department of Chemistry, California Technological Institute, Pasadena, California
"Biochemical and Immunochemical Studies of *Bacillus Subtilis* Asparate Transcarbamylase"

Chabay, Ruth Wright Physical S. G. Smith
Computer-Based Educational Research Laboratory, University of Illinois, Urbana, Illinois
"The Design and Evaluation of Computer-Based Chemistry Lessons"

Chiang, Chian Chian Tang Physical I. C. Paul
Department of Chemistry, University of Illinois, Urbana, Illinois
"Part One. Structures of Some Iron Carbonyl Complexes; Part Two. Studies of Aromaticity in Some Cyclic Systems"

Fitz, Dale Edward Physical R. A. Marcus
Max-Planck Institut, Gottingen, Germany
"The Application of Semiclassical Methods to Rotational-Translational Energy Transfer Problems for Atom-Diatom Collisions"

Hartford, Steven Leopold Chemical Physics W. H. Flygare
NASA, Ames Research Laboratories, Sunnyvale, California
"Quasi-Elastic Rayleigh Laser Light Scattering from Macromolecules, Electrophoretic Light Scattering, and the Molecular Zeeman Effect and Deuterium Quadrupole Coupling Constant in Methinophosphide"

Ireland, Patrick S. Inorganic T. L. Brown
Photo Products Department, E. I. du Pont de Nemours & Company, Wilmington, Delaware
"Pulse and Double Resonance Methods in Nuclear Quadrupole Resonance Spectroscopy"

Kessler, Michael J. Biochemistry J. M. Clark
City of Hope Medical Center, Duarte, California
"Studies of the Mechanism of Biosynthesis of N⁶-(Δ^2 -Isopentenyl)-2-Thiomethyladenosine in *E. Coli* tRNA^{sutry} III⁺"

Kidd, Richard Wayne Physical P. E. Yankwich
Department of Chemistry, University of Illinois, Urbana, Illinois
"Carbon-Thirteen Kinetic Isotope Effect Modeling Studies on the Decompositions of Formic Acid, Dimethyl Ether, and Oxalic Acid"

Kuo, Pong-Kuen Analytical H. V. Malmstadt
Department of Civil Engineering, University of Illinois, Urbana, Illinois
"Application of Hollow Cathode Lamps in a Programmed High-Current Mode for Fluorescence and Adsorption Molecular Spectrometry"

Lee, Myon Ki Chemical Engineering T. J. Hanratty
Engineering Research Laboratory, U.S. Army Construction, Champaign, Illinois
"Turbulent Wall Eddy Structure and the Reynolds Stress Production in the Wall Region of a Pipe Flow"

Lowden, Lawrence John Physical D. N. Chandler
Theoretical Chemistry Institute, University of Wisconsin, Madison, Wisconsin
"Theory of the Intermolecular Pair Correlations in Molecular Liquids"

Meyer, William Paul Organic J. C. Martin
Textiles and Fibers, E. I. du Pont de Nemours & Company, Wilmington, Delaware
"The Dependence of Alpha-Substituent Effects on Carbocation Geometry"

Puckett, Sherrill Austin Organic D. Y. Curtin
Roll Coating Division, Eastman Kodak Company, Rochester, New York
"Recent Studies in Organic Solid State Chemistry"

Schubert, Karel Ralph Biochemistry R. L. Switzer
Department of Botany and Plant Pathology, Oregon State University, Corvallis, Oregon
"The Quaternary Structure and Properties of Phosphoribosylpyrophosphate Synthetase from *Salmonella Typhimurium*"

Turnbough, Charles Lee Biochemistry R. L. Switzer
Department of Chemistry, University of California, Berkeley, California
"Inactivation of Glutamine Phosphoribosylpyrophosphate Admiottransferase in *Bacillus Subtilis*"

Ph.D. Recipients in October, 1975

Allen, William Christopher Analytical Jiri Jonas
Department of Chemistry, California State University, Los Angeles, California

"Pressure-Temperature NMR Studies of Polymer and Disordered Crystalline Systems"

Atwood, Jimmy Dee Inorganic T. L. Brown
Department of Chemistry, Cornell University, Ithaca, New York

"Kinetics and Mechanisms of Substitution and Exchange Reactions of Transition Metal Carbonyl Complexes"

Balthazor, Terrell Mack Organic J. C. Martin
Monsanto Company, St. Louis, Missouri

"Stereochemical Studies of Cyclic Sulfuranes"

Beugelsdijk, Tony John Inorganic R. S. Drago
Shell Development Company, Houston, Texas

"High Pressure Thermodynamic and Spectroscopic Studies on Oxygen Stabilization and Coordination"

Bush, Charles Neal Organic D. E. Applequist
Technical Center, B. F. Goodrich Chemical Company, Avon Lake, Ohio

"Revised Structure of the Dimer of 3,3,6,6-Tetramethylcyclohexyne and the Mechanism of Its Formation"

Buske, Gary Robert Organic W. T. Ford
Dow Chemical Company, Midland, Michigan

"Additions of Cyclopentadienylmetal Compounds to Benzyne and the Stereochemistry of 7-Benzonorbornadienyl Grignard Reagents"

Byers, Blaine Harry Inorganic T. L. Brown
Department of Biochemistry, University of Illinois, Urbana, Illinois

"Kinetics and Mechanisms of Substitution Reactions in Group VII Metal Carbonyl Hydride Complexes"

Chau, Michael Ming-Kee Organic J. C. Martin
Department of Chemistry, Texas Technical University, Lubbock, Texas

"Simultaneous Participation of Multiple Neighboring Groups in Perester Decompositions"

- Cole, Douglas Leon Organic N. J. Leonard
Merck Sharp and Dohme Research Laboratories, Rahway, New Jersey
"Isolation and Structural Modification of the Cytokinins"
- Collard, Janine Clare Inorganic D. N. Hendrickson
443 Nold Avenue, Wooster, Ohio
"A Mass Spectrometric Investigation of Transition Metal Complexes and an
Electron Paramagnetic Resonance Study of Some Exchange-Interacting
Metal Metallic Dimers and Polymers"
- Conley, Jack Michael Analytical H. A. Laitinen
Union Camp, Princeton, New Jersey
"Electro-Oxidation of Silver (I) on Tin Oxide Electrodes"
- Coveleskie, Richard Albert Chemical Physics J. T. Yardley
Department of Chemistry, Indiana University, Bloomington, Indiana
"Spectroscopy and Photophysics of Methylglyoxal"
- Crooks, Robert Ferree Biochemistry W. O. McClure
Department of Chemistry, University of California, Berkeley, California
"Characterization of Materials Carried by Fast Axoplasmic Transport in
Sensory Fibers of the Rat Sciatic Nerve"
- Crowl, Daniel Albert Chemical Engineering R. A. Schmitz
St. Regis Technical Center, West Nyack, New York
"An Investigation of the Dynamics and Control of a Well-Stirred Combustor"
- Crumrine, Ann Louise Organic J. A. Katzenellenbogen
Monsanto-Agricultural Research Laboratories, St. Louis, Missouri
"Gamma Alkylolation of α,β -Unsaturated Esters and Acids"
- Dryden, Paul Craig Inorganic T. L. Brown
Hewlett Packard, Avondale, Pennsylvania
"A New Nanosecond Gated Optical Detection System: Application to Spec-
trochemical Analysis"
- Gibbons, Katherine Bond Biochemistry G. Weber
Chemistry Department, Colgate University, Hamilton, New York
"Ligand Binding by Heme Proteins"
- Gleaves, John Thompson Physical J. D. McDonald
Monsanto Company, St. Louis, Missouri
"Infrared Chemiluminescence Study of Reactions Between Oxygen Atoms
and Unsaturated Polyatomic Molecules"

- Hall, Gretchen Randolph Inorganic D. N. Hendrickson
 Mobil Oil Company, Paulsboro, New Jersey
 "Physical Studies of the Spin Equilibrium in the Ferric Dithiocarbamates
 and of the Electron Exchange in Copper Diethylenetriamine Dimers"
- Harrington, David Calvin Analytical H. V. Malmstadt
 Methods Research and Technical Services, Kodak Park, Rochester, New
 York
 "A Versatile Tunable Dye Laser for Spectrochemical Fluorescence Methods"
- Heisler, Suzanne Analytical D. F. S. Natusch
 Department of Chemistry, University of Illinois, Urbana, Illinois
 "An Analytical Approach to the Investigation of the Interaction of Toxic
 Trace Metal Species with Biological Membranes"
- Hoekstra, Marvin Simon Organic W. H. Pirkle
 Rohm and Haas Company, Spring House, Pennsylvania
 "Proton and Carbon-13 NMR Studies of Enantiomeric Solutes in the Pres-
 ence of Chiral Solvating Agents"
- Hsiung, Hansen Maxwell Organic J. A. Katzenellenbogen
 Department of Chemistry, University of Alberta, Edmonton, Alberta, Canada
 "Part One: Iodinated Estrogens-Potential Photoaffinity Labeling and Tumor
 Localizing Agents for Estrogen Responsive Tissues; Part Two: Synthesis
 of a Hexestrol Derivative for Potential Use in Affinity Chromatography to
 Purify Estrogen Receptors"
- Kluetz, Michael David Physical P. G. Schmidt
 Department of Chemistry, University of Idaho, Moscow, Idaho
 "Nuclear Magnetic Relaxation Studies of Hog Kidney Diamine Oxidase"
- Lamb, Robert Edward Analytical D. F. S. Natusch
 Department of Chemistry, Southern Methodist University, Dallas, Texas
 "The Chemical Characterization of Airborne Particles"
- Lee, Ving Jick Organic K. L. Rinehart
 Department of Chemistry, Harvard University, Cambridge, Massachusetts
 "Synthetic Studies of Analogues of Streptolydigin, Tirandamycin and Re-
 lated Compounds"
- Liesch, Jerrold Michael Organic K. L. Rinehart
 Department of Chemistry, University of Illinois, Urbana, Illinois
 "Structural Studies on the Antibiotic, Berninamycin A"

- Loh, Andrew Analytical D. F. S. Natusch
Greenfield Laboratories, Eli Lilly and Company, Greenfield, Indiana
"Some Environmental Applications of Analytical Microscopy"
- O'Keefe, Kelly Ray Analytical H. V. Malmstadt
Department of Chemistry, Colorado State University, Fort Collins, Colorado
"An Automated Spectrometer for the Investigation of Chemical Reactions
and Application to the Study of the Jaffe Reaction"
- Orosz, Gerald Michael Physical J. G. Wetmur
Union Camp Company, Princeton, New Jersey
"DNA Iodination, Provirus Isolation, Excluded Volume and Electrostatic
Effects on DNA Renaturation Rate"
- Ratzlaff, Kenneth Lloyd Analytical D. F. S. Natusch
Department of Chemistry, Northern Illinois University, DeKalb, Illinois
"Theoretical and Instrumental Development of a Dual Wavelength Spec-
trophotometric Instrument for Equilibrium Methods of Analysis"
- Renoe, Brian William Analytical H. V. Malmstadt
Barnes Hospital, Barnes Hospital Plaza, St. Louis, Missouri
"Development and Evaluation of an Automated Sample and Reagent Han-
dling System for Analytical and Clinical Applications"
- Schmalz, Thomas Gregory Chemical Physics W. H. Flygare
Department of Chemistry, University of Illinois, Urbana, Illinois
"Microwave Transient Phenomena and Magnetic Susceptibility Calcula-
tions"
- Sekutowski, Dennis Gene Inorganic G. D. Stucky
Max-Planck Institut fur Kohlenforschung, Mulheim, Germany
"Synthesis, Structural, Magnetic and Chemical Properties of Low Valent
Organometallic Titanium Compounds"
- Shively, John Ernest Biochemistry H. E. Conrad
City of Hope Medical Center, Duarte, California
"Structural Analysis of Heparins and Heparan Sulfates"
- Slatt, Barbara Jean Analytical D. F. S. Natusch
Proctor & Gamble, Cincinnati, Ohio
"Fluorometric Determination of Hydrogen Sulfide and Sulfur Dioxide in
the Atmosphere"

Smith, Jeffrey Stephen Chemical Engineering C. A. Eckert
Research and Development, Amoco Oil Company, Naperville, Illinois
"Part I. Chemical Theory and EMF Studies of Highly Solvated Liquid
Metal Systems; Part II. The Compressibility of the Chemical Reaction
Transition State"

Spillman, Robert William Analytical H. V. Malmstadt
International Division, Proctor & Gamble, Cincinnati, Ohio
"The Development and Application of an Automated Multielement Atomic
Emission/Atomic Fluorescence Flame Spectrometer"

Tang, Daniel Kwok-Lun Chemical Engineering J. L. Hudson
A. E. Staley Company, Decatur, Illinois
"Gravitation Instabilities in a Rotating Fluid"

Thorpe, Thomas Muir Analytical D. F. S. Natusch
Chemistry Department, Miami University, Oxford, Ohio
"The Determination of Trace Inorganic Species in Environmental Samples"

Tovrog, Benjamin Samuel Inorganic R. S. Drago
Department of Chemistry, Stanford University, Palo Alto, California
"Magnetic Resonance Investigations of the Structures and Reactivities of
Some Transition Metal Complexes Part One: Magnetic Resonance Studies
of Some Cobalt(II) Complexes. Part Two: ESR Analysis of Dioxygen
Adducts of Cobalt(II) Complexes. Part Three: Catalytic Oxidation of
Organic Reactions"

Turner, Walter Vernon Organic W. H. Pirkle
1675 Oxford Street, Berkeley, California
"The Chemistry of 2-Pyrones and Related Compounds"

Utawanit, Thanin Organic J. A. Katzenellenbogen
Faculty of Sciences, Prince of Songkla University, Hoodyai, Thailand
"Part One: Stereospecific Synthesis of Trisubstituted Olefins. Part Two:
Cephalotaxus Alkaloid Esters"

Wagner, Frank S. Inorganic E. K. Barefield
Strem Chemical Company, Danvers, Massachusetts
"Metal Complexes of Fourteen-Membered Macrocyclic Ligands Containing
Tertiary Amine Donors"

White, Lawrence Keith Physical R. L. Belford
Department of Chemistry, University of New Hampshire, Durham, New
Hampshire

"Electron Paramagnetic Resonance Studies of Copper(II) Complexes. Part
I: Quadrupole Coupling Constants of Square Planar Copper(II) Com-
plexes. Part II: Simulation of Electron Paramagnetic Resonance Spectra
of Powders. Part III: Effects of the Nuclear Quadrupole Interactions on
the Electron Paramagnetic Resonance Spectra of the Triplet State of
Copper(II) Dimers"

Wilson, Douglas Gray Chemical Engineering H. G. Drickamer
Organic Chemical Division, Amoco Chemicals Corporation, Naperville,
Illinois

"High Pressure Studies of Photochromic Spiroprans"

Photo by Stanley Smith

