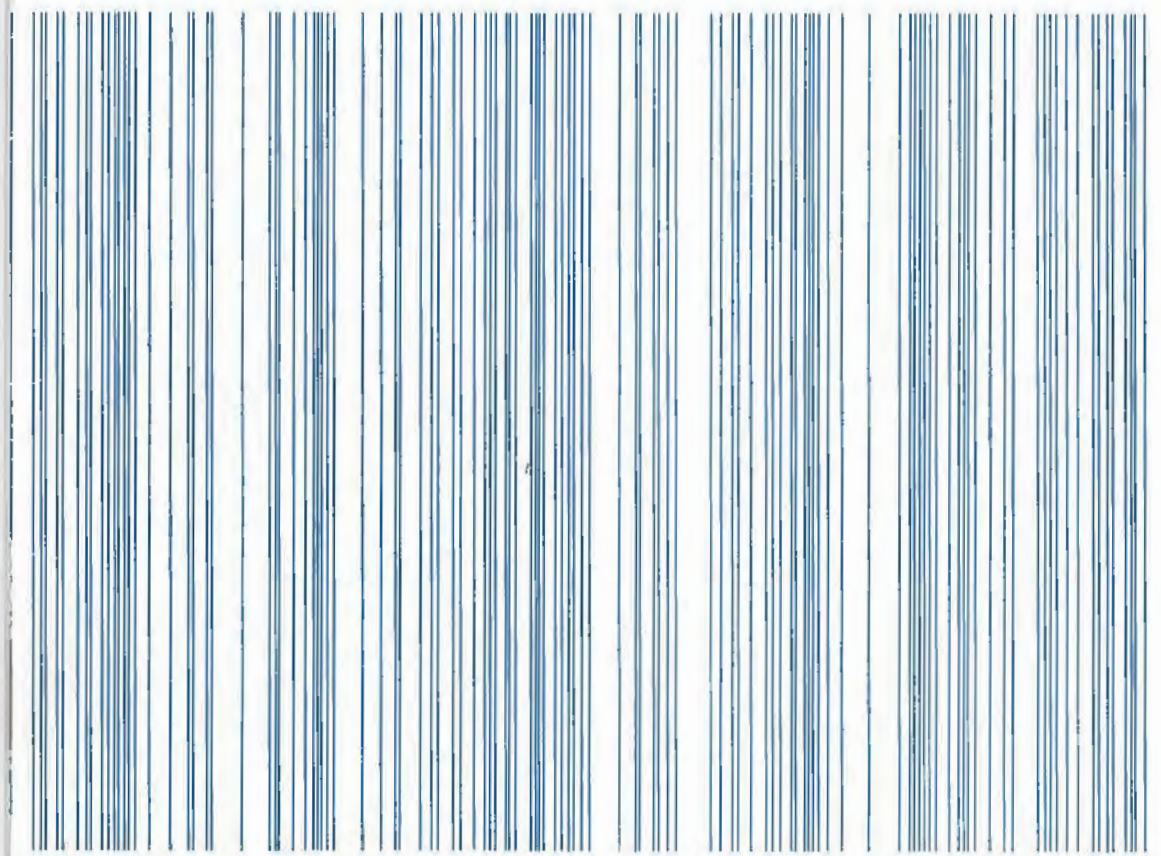
ALUMNI NEWSLETTER

Department of CHEMISTRY and CHEMICAL ENGINEERING

UNIVERSITY OF ILLINOIS at Urbana-Champaign



NO. 3, JANUARY, 1970

An Extract of 1968-69

The annual report of the department is intended as much for our faculty as it is for the Dean and Vice-Chancellor who request it. It provides a format for review and self-appraisal as plans are laid for the year ahead. Excerpts from the summary of the 1968-69 report may serve also to give you some feeling for the nature and breadth of our present concerns.

Students and Instruction

The number of Ph.D. degrees granted this year reached a high of 78, the highest since the post World War II flood of 84.

Consolidation and experimentation continues in the general chemistry program. The problems in Chemistry 100 are being worked out by Dr. Elizabeth Rogers. Televised and filmed lectures appeared in Chemistry 101 and 102 as a result of an undergraduate instructional award to Dr. Gilbert P. Haight, Jr., director of the program.

The undergraduate core laboratory, consisting of a series of three separate courses on "Structure and Synthesis," "Dynamics, Equilibrium, and Physical Methods," and "Chemical Fundamentals," went into full scale operation during the year under the guidance of Dr. T. L. Brown.

The fall orientation program for new teaching assistants has been broadened and strengthened. Teaching loads of TA's were brought down to earlier levels.

Facilities

The major remodeling of the inorganic research laboratories in Noyes Laboratory is nearing an end. A discouraging amount of badly needed remodeling of other old space in East Chemistry, Noyes Laboratory, and Chemistry Annex is in limbo due to lack of funds.

Appropriation of construction funds for the Second Addition to the East Chemistry Building moved closer but is not yet a reality. Planning money for development of preliminary and working drawings has been included in the 1969-70 budget but not yet released by the Governor.

An IBM 1800 computer has been installed in our Computer Center. Substantial amounts of auxiliary equipment have heen added and the facility, under the able and imaginative direction of Dr. D. H. Secrest, is a major improvement in the breadth and quality of our programs.

Administration

The budget crunch and the draft combined to make the administration of the department a time consuming and sometimes frustrating experience. By virtue of much effort on the part of all of us, we were able to almost but not quite hold our own on both fronts.

Shaking down of the operation of the department on a three-division basis continued. However, the faculty accepted this spring the recommendation of the Drickamer Committee that we reorganize as a School of Chemical Sciences with the three divisions as departments in it, so further shaking up is in store for us.

The Radioisotope Laboratory was transferred from the Graduate College to the Biochemistry Division for administrative purposes.

Visible results have come from our Affirmative Action Program to provide more opportunities for blacks. Eight of our 100 nonacademic employees are black, compared with one or so a year ago. Four black graduate students were recruited by the department for the coming year, compared with a previous average of less than one.

Organic Chemistry at Illinois

In a newsletter directed primarily to our alumni, it seems unnecessary to expound at length on the history of organic chemistry at Illinois. Most of you have a first-hand familiarity with at least a part of that history. A listing of names of former staff members would be one way to jog memories concerning the development of this research area over the years. The list would be lengthy. A tabulation of alumni who have achieved distinction in organic chemistry after leaving our department would be longer. The forward momentum achieved under W. A. Noyes was increased during later years through the efforts of Roger Adams and his colleagues, C. S. Marvel, R. C. Fuson, R. L. Shriner, and many others. Succeeding Dr. Marvel as Head of the Division of Organic Chemistry, Nelson J. Leonard guided the division in the years 1954-63, during which a vigorous recruiting campaign led to the addition of five members of our present staff. The decision in 1963 to make the division headship a less onerous task, by assigning it to members of the faculty on a rotating basis, was followed by two-year terms in that position by David Curtin, Douglas Applequist, and J. C. Martin. During this period a continuing decentralization of the responsibilities of the job of division head made it easier for us to adapt to the new organization of the department which combined organic, physical, inorganic, and analytical chemistry into a single administrative unit, the present Division of Chemistry.

This new administrative structure, in recognizing that the evolution of chemistry has made the traditional area designations less useful than they once were, has been effective in promoting a wider view of chemistry both in re-

search and in teaching activities. For example, the laboratory accompanying the first-semester sophomore course in organic chemistry is now a part of a three-semester core laboratory curriculum for which responsibility is shared by staff members from all areas within the Division of Chemistry. The impact of newly acquired instrumentation on these three basic laboratory courses is providing further impetus to our efforts to upgrade the advanced undergraduate courses by making research grade equipment and instrumentation accessible to students in these courses. For example, we have just acquired a Varian T-60 nmr spectrometer which will be available to students in Chemistry 338 (Qualitative Organic Analysis) making it possible for students to use the same methods of structure determination that they need in research.

Course offerings at the graduate level have continued to be reshaped to do a better job of preparing the student for research. The average graduate student takes only two one-semester courses in organic chemistry but he may audit or, less often, take for credit a special topics course offered every year by a different member of our staff or by a visiting professor. Student seminars continue to receive a major emphasis. Each student gives two "big seminars" during his stay here. The seminar abstracts, literature reviews on a wide range of topics in organic chemistry, are reproduced for use within the department and are still made available to alumni and other interested persons or libraries for a subscription fee (currently $6.50 per annum) designed to cover the costs of production and mailing.

The oral preliminary examination for the Ph.D. has been replaced, at least for organic chemists, by the requirement of a research paper describing the student's research progress. This change has derived from the continuing evolution of the belief that Ph.D. requirements should be directly related to the research-centered goals of the degree. For the past two years all organic research has been carried out in our new building. Major commitments of effort in synthetic, structural, and mechanistic organic chemistry by our present staff of twelve organic chemists provide a diverse and exciting research environment for the nearly 120 organic research workers (undergraduate, graduate, and postdoctoral) presently in the department. Research interest continues to grow in interdisciplinary areas bordering biochemistry, physical and inorganic chemistry.

John Katzenellenbogen, who joined our staff this fall after receiving his Ph.D. from Harvard, with E. J. Corey, has interests in developing new synthetic methods with application in the synthesis of biologically important substances (e.g., hormones, attractants). The synthetic efforts of Robert Coates in the area of terpenoid compounds, K. L. Rinehart in antibiotics, and H. R. Snyder in heterocyclic analogs of natural products are probably familiar to you.

Synthetic studies of Nelson J. Leonard are proceeding in a number of areas with attention being given to synthetic applications of the chemistry of small-ring charged heterocycles and medium-ring compounds, syntheses of plant growth promoters related to kinetin, and a major thrust in the direction of syntheses of models for the investigation of interaction phenomena in RNA and DNA. Studies of these model compounds, in collaboration with Gregorio Weber in biochemistry, provide one example of the increasing interaction of

organic chemists and biochemists. Peter Beak and George Schroepfer are collaborating in the synthesis and study of isotopically labelled substrates for use in studies of enzymatic stereospecificity. Many of Dr. Schroepfer's interests lie near the bio-organic interface.

Structural studies of natural products by Dr. Leonard and Dr. Rinehart serve as one basis for profitable collaboration with Iain Paul, whose crystallographic expertise and interest in organic chemistry have made an impact on the research of most of our groups. The imminent arrival of three new mass spectrometers, with associated data reduction capabilities, should provide welcome assistance in all of our structural studies, particularly to Dr. Rinehart with his major interest in mass spectrometry.

The newly installed 220 MHz nmr spectrometer also promises help in most research programs, not only for those interested in structure determination but also for those concerned with kinetic studies or studies of medium effects. W. H. Pirkle's studies of differential nmr chemical shifts found for enantiomers dissolved in optically active solvents should certainly be aided by the 220 MHz instrument. The tremendous potential of this method for studying chiral compounds is being developed in several directions.

Other studies of medium effects include those of Warren Ford on the interactions seen in solvents made up of liquid organic salts. J. C. Martin is using oxygen-18 tracer methods to study the effects of solvent structure as reflected in the importance of the solvent cage effects in the decomposition of radical initiators, in this case, diacyl peroxides. An extreme example of a medium effect is that displayed in reactions occurring in the crystalline state, in studies by David Curtin. These studies have also benefited from collaborative X-ray crystallographic studies with Iain Paul.

Various facets of organometallic chemistry are under investigation. Stanley Smith's stop-flow device for following rates of rapid reactions is being used to probe the mechanism of addition of Grignard reagents to ketones. Dr. Curtin's interest in vinyllithium stereochemistry and that of Dr. Applequist in the stereochemistry of cycloalkyl metal derivatives continue. Warren Ford has a major research program in carbanion chemistry. Dr. Katzenellenbogen's interest in the application of organometallics in the synthesis of organic compounds extends to organic derivatives of copper, aluminum, and the transition metals.

Mechanisms of reactions involving carbonium ions are under study in several groups. Dr. Smith's use of ambident-leaving groups provides a powerful probe for the importance of ion-pairing in controlling the course of substitution reactions. Dr. Coates is studying systems giving carbonium ions potentially capable of rapid degenerate rearrangements (fluctional isomerism). The Martin group has studied systems delineating the angular dependence of conjugation in cyclopropylcarbinyl cations. Dr. Beak's method for the generation of carbonium ions by decarboxylation of the acylium ions derived from chlorocarbonates on treatment with silver ion provides a new way to generate reactive carbonium ions.

The Applequist group is using relative rate and stereochemical data to provide evidence for free-radical reactivity and structure. The study of neigh-

boring group effects in reactions generating free radicals continues to provide new points of departure for further study in the Martin group.

Other reactive intermediates such as halogen ylides (Pirkle), sulfur ylides (Beak), benzyne analogs (Martin), strained alkenes and alkynes (Applequist), and photochemically generated intermediates (Beak, Pirkle) are being actively investigated.

As you can see from this partial listing of current problems, the research in organic chemistry being done at Illinois covers a broad spectrum of interests. Both students and staff find an invigorating atmosphere for research activity.

The names of staff members mentioned above in connection with research in progress have given you some idea of the areas of specialization of each man. The complete listing which follows gives the date at which each staff member joined our faculty and the school from which he received his Ph.D.: Douglas E. Applequist (1955, California Institute of Technology), Peter A. Beak (1961, Iowa State University), Robert M. Coates (1965, University of California, Berkeley), David Y. Curtin (1951, University of Illinois), Warren T. Ford (1968, University of California, Los Angeles), John A. Katzenellenbogen (1969, Harvard University), Nelson J. Leonard (1946, Columbia University), James C. Martin (1956, Harvard University), William H. Pirkle (1964, University of Rochester), Kenneth L. Rinehart, Jr. (1954, University of California, Berkeley), Stanley G. Smith (1960, University of California, Los Angeles), Harold R. Snyder (1937, Cornell University). Other staff members with strong interests in the area include: Iain C. Paul (1964, University of Glasgow), George J. Schroepfer, Jr. (1964, University of Minnesota).

Graduate Student Selection

The entering class of graduate students in chemistry is one of the best we have had for several years when measured by the various yardsticks for quality of academic achievement and promise. We feel that this reflects the quality of research being carried out by the senior staff, the advanced graduate students, and the postdoctorates, as well as the efforts we are making to provide information about the department to college faculties and potential graduate students. Major recognition for this success belongs to those of you who are teaching in college and university chemistry departments throughout the country. We feel very fortunate in having such loyal alumni, and we appreciate your efforts in providing information about Illinois to your students.

It is a little early to predict for fall, 1970. However, the number of requests for applications is running about 25 per cent ahead of previous years. For the first time in many years veterans are applying in significant numbers. The large increase in requests probably results from a combination of factors. The first letter granting admission was sent three weeks earlier than usual, which is further evidence of increased student competition for 1970 entrance into graduate study.

A new brochure describing graduate study opportunities in the chemical sciences at the University of Illinois at Urbana-Champaign is at the press and scheduled for distribution early in 1970. We plan to send the brochure to our teaching alumni and other faculty friends. If you do not receive a copy of the brochure and would like to have one, let us know and we will send one your way.

Changes in Graduate Examinations

In addition to satisfying certain course requirements, candidates for the Ph.D. degree in our department must also satisfy a foreign language requirement and pass certain special examinations (written and oral preliminary examinations and an oral final examination). The past few years have seen several changes in these requirements, particularly in those involving the foreign languages and the preliminary examinations.

For many years the foreign language requirement was the demonstration of a reading proficiency in two languages. This has recently been reduced so that only one language is now required. The language accepted varies somewhat from one area of the department to another, but it generally involves French, German, or Russian.

The preliminary examination in past years involved an extensive (three hour) written examination in the candidate's major field followed by an oral examination covering both the major and minor fields. Now, all areas in the department except chemical engineering have replaced the written preliminary examination by a series of one-hour examinations called cumulative examinations. These examinations are given monthly during the academic year and cover material presented in the courses, seminars, and current literature. To satisfy the requirement, a student must pass six of these examinations. Three of these must be in the student's major area, but the other three can be in any area of the department. This flexibility is intended to encourage students to develop greater interests in areas outside of their majors and also recognizes the interdisciplinary nature of much of the current work in chemistry. Students begin taking these examinations during either their first or second semester of residence and usually complete them during their third or fourth semester.

The oral preliminary examination is usually taken during the third year of residence after all other requirements except the thesis have been completed. The oral examination is now restricted to work in the student's major area. The purpose is to determine whether or not the student is capable of successfully completing the final stage of the graduate program, i.e., the thesis project.

As in past years, the completion of the thesis is followed by an oral examination on its contents. Although this generally is more like a discussion than an examination, it does serve as a formal last official rite before the Ph.D.

degree is conferred. And, in most cases, it also serves as a good excuse for a celebration party for students and staff alike.

The Military Draft

Congress has passed the modified draft legislation and President Nixon has put the random selection lottery into effect as of January 1, 1970. Under the new system, each selective service registrant between the ages of nineteen and twenty-six has been given a number from 1 to 366 according to his birthdate. Those with numbers 1 to 120 are most liable for call; those from 121 to 240 are moderately liable, and the last third are considered safe from induction.

We checked the selective service numbers and found that our draft age men are statistically distributed in the lottery. For those with high numbers, the heat is off and they can now continue their graduate education without worries about the draft. For the remainder, we will continue to work with draft boards to obtain teaching deferments.

The effect of the new selection process on the department is unknown at the moment. The rules for occupational deferments have not changed. However, the attitude of local and state draft boards may have. We have about twenty men who are most vulnerable and we have no experience to guide us under the changed conditions. In the past, we have been quite successful in obtaining deferments for our junior staff teachers and have hopes of equal success during the coming years. It is necessary to the department that as many as possible of our teachers receive deferments. There is a delicate balance between the number of available teachers and the job to be done.

Affirmative Action Program

Our department still leads the academic departments of the Urbana-Champaign campus with one-fifth of all the disadvantaged black employees who have been employed through the Affirmative Action Program. Almost without exception our black employees are proving to be achieving as well or better than expected.

Because we believe that the Affirmative Action Program is designed for the disadvantaged of all races, we are presently looking for a white applicant for an opening which has just become available through promotion of one of our previous "learners." This vacancy is in our storeroom promotional line. Also, we are now making a review of our expected future personnel needs with the objective of finding other places where we can hire a "learner" to mutual advantage.

Further strengthening of the University's efforts was made when Professor T. L. Brown of our department was named Chairman of the University Equal Opportunity Committee. The Committee is made up of representatives of each of the three campuses. Professor Brown has been very effective in bringing community and University equal opportunity efforts into realistic perspective. We feel that his deep conviction and his capable leadership will lead to new dimensions of success at the university level.

Financial Support by Industry

For many, many years industrial firms have given generously to support graduate students by fellowships and the academic programs by grants-in-aid. This financial help has great value to the department. As the quality of our student body goes up, the number of students who are highly qualified for fellowship support increases proportionately. This year we have gone to the bottom of the financial barrel to squeeze out every available fellowship dollar. Grant-in-aid funds have been allocated to support student research through research assistantships.

Indications are that our fellowship and grant-in-aid needs will increase on a broad front because of the increased competence of students, the acceleration of cost inflation, and the decrease in federal funding. Industrial support has long been, and is today, a major and most valuable contribution in helping us support our graduate students. We appreciate this help and look forward to a continued partnership.

The amount of industrial support received by our department has increased over the years, but during the past ten years this has occurred much more slowly than our costs have risen. The reason for this undoubtedly is the rapid rise of federal support. But now with the leveling off in federal funds, and also in state funds, we hope that industry will see fit to increase their share of the support.

Undergraduate Scholarships and Awards

The Roger Adams Fund and the Roger Adams Scholarships

The establishment of the Roger Adams Fund a little more than a year ago evidently met a need which many alumni and friends of the department had felt, for response has been generous and spontaneous. Contributions to the fund have ranged from $1.00 to more than $1,000, and the total is now over $27,000. We are grateful for all gifts, both large and small, and we hope that those alumni who have not yet contributed will do so, and that those who

have will continue their gifts on an annual basis. Contributions should be made to the University of Illinois Foundation and marked for the Roger Adams Fund. They are tax deductible. Those who are employed by companies that have a "gift incentive plan" should be sure to use it, and thus double their own contributions.

The first Roger Adams scholars, appointed in the fall of 1969, are David Mark Brown, Joliet, and David John Byers, Dolton. They received scholarships of $500 each.

Scholastic Awards

The spring, 1969, undergraduate scholastic award presentation was made in May before the Chemistry 108 lecture by Dr. Gilbert P. Haight, Jr. Seven of our outstanding students were honored.

George Patterson, Rock Island, received the $200 Reynold C. Fuson Award as the senior who had made the most outstanding academic improvement.

John B. Immele, Kansas City, Missouri, received the $200 Worth H. Rodebush Award as the most able senior who had demonstrated his intention to make a career of chemistry or chemical engineering.

Ronald L. Hennrich, Chester, senior in chemical engineering, and Jerry Walker, Robinson, senior in chemistry, both with perfect "A" records in their chemistry courses and outstanding in overall scholarship, personal integrity, and leadership, received Award Certificates from the Chicago Chapter of the American Institute of Chemists.

Paul Eschmann, Waterloo, in chemical engineering, and Terrence S. Murtaugh, Springfield, Pennsylvania, in chemistry, were selected as outstand-

Scholastic Award Winners (from left to right): Ronald L. Hennrich, Jerry Walker, Terrence S. Murtaugh, Joan B. Koval, Paul Eschmann, John D. Immele, George Patterson

ing seniors in their fields and received the Merck Index Awards, copies of the "Merck Index," a standard reference work in chemistry.

Joan B. Koval, Downers Grove, was selected as the outstanding freshman in chemistry and received the Chemical Rubber Company Science Achievement Award, a copy of the "Handbook of Chemistry and Physics."

Agnes Sloan Larson Awards

The Agnes Sloan Larson Awards were given to five sophomore students with perfect "A" records for their freshman year. The awards were presented on December 9, 1969, before the Chemistry 107 class in which they had been enrolled as freshmen. The presentations were made by Dr. Gilbert P. Haight, Jr., director of the general chemistry program.

This marks the beginning of the second decade of the Agnes Sloan Larson Award which has become a hallmark for scholastic achievement in our department. We are very proud of these young scholars and give them our warmest congratulations and full wishes for future successes.

Students who were presented the awards are: Jerome Budz, Des Plaines, Elk Grove High School in Arlington Heights; Joy L. Freidinger, Pekin, Pekin Community High School; Elaine V. Fuchs, Downers Grove, Downers Grove High School, South; Joan B. Koval, Downers Grove, Downers Grove High School, North; and Mark Minton, Paris, Tennessee, Grove High School in Paris, Tennessee.

Larson Award Winners (from left to right): Joan B. Koval, Mark Minton, Elaine V. Fuchs, Jerome Budz, Joy L. Freidinger

Dr. John C. Bailar, Jr.

In June, 1969, sixty-five of the eighty-two men and women who have received their Ph.D. training under the direction of Professor John Christian Bailar, Jr. assembled on the Urbana-Champaign campus along with many other of his friends and colleagues, to attend a symposium on Coordination Chemistry, organized in honor of Professor Bailar on the occasion of his sixty-fifth birthday. This admirable event, combining the best in science and good fellowship, was indeed a fitting tribute to the man in whose honor it was held. In the many years he has heen at Illinois, John Bailar has come to symbolize all that is best in a university professor. He has made a distinguished record as a contributer to the scientific literature through his work in inorganic chemistry. In 1964, the American Chemical Society awarded its highest honor, the Priestly medal, to Dr. Bailar, "a man of unusual talents who has made outstanding contributions to all aspects of chemistry."

In his distinguished career as scientist, he has published more than 150 research papers, edited an outstanding volume in the A.C.S. monograph series, "Chemistry of Coordination Compounds," and served as editor for a volume of Inorganic Syntheses.

John C. Bailar, Jr. with one of his students

Professor Bailar received his Ph.D. degree in organic chemistry at the University of Michigan under the direction of Moses Gomberg. However, in 1928, soon after arriving at Illinois, Professor Bailar turned his attention to the question of stereochemistry in coordination compounds of the transition metals. The concepts of stereochemistry in these systems, as first developed by Alfred Werner, were extended by Professor Bailar to considerations of the stereochemical consequences of chemical reactions of the complexes. He was the first to demonstrate an optical inversion in the reaction of dichloro-bis-ethylenediamine cobalt (III), in 1934. Since then he and his students have demonstrated the phenomenon in many different reactions of coordination compounds. For this and many other imaginative studies in coordination chemistry, Professor Bailar received the Frank Dwyer medal of the Chemical Society of New South Wales in 1965, and the Alfred Werner gold medal of the Swiss Chemical Society in 1966.

The Werner gold medal was made for the occasion of the Werner Centennial. The fact that John Bailar received this unique honor clearly demonstrates the esteem in which he is held by coordination chemists throughout the world. His tremendous reputation is not, however, restricted to inorganic chemistry, nor is it due entirely to his very considerable research accomplishments. His efforts and accomplishments on behalf of chemical education span a wide range of activities. Since his earliest days at Illinois he has been a superb teacher and has guided many thousands of students through general chemistry. At the same time, his graduate course in coordination compounds became a classic example of clarity, organization, and imaginativeness in

teaching at the highest level. The many students who worked under his direction in the course of their Ph.D. thesis research have found him an enthusiastic, sympathetic, and imaginative mentor. In recognition of his attainments as a teacher, he received the A.C.S. Award in Chemical Education sponsored by the Scientific Apparatus Makers Association in 1961, and the Award in the Teaching of Chemistry sponsored by the Manufacturing Chemist Association in 1968.

But Professor Bailar has recognized that teaching consists in more than merely lecturing in classrooms or in directing graduate thesis research. He has always found time to work in the teaching affairs of the American Chemical Society; in 1947 for example, he served as Chairman of the Division of Chemical Education. In addition, he has served on the Committee on Professional Training, and for many years he has been a member of the Board of Directors of Monmouth College.

Aside from these multiple activities, John Bailar has been a great teacher perhaps more than anything else because his door has always been open to students who have needed his help in whatever way. As head of the inorganic division at Illinois, and director of the general chemistry program for many years, he has helped countless undergraduate students and graduate teaching assistants over obstacles, both large and small. No one will ever know how many hours taken out of how many busy days were spent by John Bailar in listening to the trials and tribulations of troubled students. It is interesting to speculate how many men and women owe their careers to the help, advice, and sympathetic understanding given by John Bailar in a moment of crisis. It is surely very large.

In 1962 John Bailar became the first awardee of the John R. Kuebler Award, granted annually by the Alpha Chi Sigma fraternity in recognition of distinguished services to the fraternity and to the chemical profession. By making him the first Kuebler awardee, the fraternity recognized his almost legendary contributions to the growth and development of the Zeta chapter of the fraternity at Illinois over a period of many years. University of Illinois alumni who have been associated with Alpha Chi Sigma cherish many stories connected with his period as Chapter Adviser beginning in 1935 and continuing for eleven years. The chapter of the fraternity grew and prospered under his guidance during those depression years, and into the period of World War II. Professor Bailar has continued his close association with the fraternity to the present time, in the same spirit of unselfish giving of his time and energies which has characterized his relationships with his students and colleagues during his career.

Professor Bailar's contributions to the chemical profession on the national scene include service to the American Chemical Society as Chairman of the Division of Chemical Education, Chairman of the Division of Inorganic and Physical Chemistry, Chairman of the Division of Inorganic Chemistry, and President of the Society. He has served the Society in almost every possible capacity, from local section activities through presidency. In recent years he has been important in international activities in his role as treasurer and

member of the executive committee of the International Union of Pure and Applied Chemistry. He has led the way in bringing American chemists into closer contact with those from other countries, and has been a leading supporter and spokesman for the International Conferences on Coordination Chemistry sponsored by I.U.P.A.C.

Although many honors have come his way in recognition of a career of great service and distinguished scientific achievement, Professor Bailar is by no means resting on his laurels. His busy schedule includes teaching, direction of graduate student and postdoctoral research, lectures, consultantships, and activities on behalf of the American Chemical Society and the International Union of Pure and Applied Chemistry. His breadth of interest and imagination are exemplified by the variety of research activities in which he is presently engaged. These include studies of the mechanisms of reactions of complexes in the solid, crystalline state, and studies of catalysis of the selective hydrogenation of polyolefinic organic systems to the monoene or diene stage.

A recitation of accomplishment and recognition, while impressive enough in its own right, can not convey adequately the nature of a man such as John C. Bailar. The famous and successful are seldom so open with others, so generous with their time and energies. John Bailar is a kind man; he is open-minded, productive of new ideas. He has a good sense of humor and an engaging laugh: he knows at least a million stories and tells them all very well. He is a good man to know, as teacher, research adviser, colleague. We who are alumni, faculty, and students of Illinois can be prond of him, and happy for the privilege and experience of knowing him. We are fortunate that he has several more years of active service on our staff before his retirement from the University.

The Ada Alley Doisy Lectureship in Biochemistry

The Ada Alley Doisy Lecturership in Biochemistry has been established on our campus through the gift of $25,000 by Professor Edward A. Doisy, in honor of his mother. Mrs. Doisy was a woman who set lofty goals for her children and encouraged them in every way to reach those goals. She was a native of Illinois, and spent her entire life in this state. After her marriage, she lived successively in Hume and Newton, and finally in Champaign, where she and her husband moved to facilitate the attendance of their children at the University. Both her son and her daughter graduated from the University, and the daughter (Mrs. Roberta Doisy Rosecrans, B.S., 1925) served for several years as Assistant Dean of Women. Her son, Professor Edward A. Doisy, took an A.B. degree in 1914 and a M.S. degree in 1916. In 1920, Harvard University awarded him the Ph.D. degree. After a few years at Washington University, he became Professor of Biochemistry and Head of the Biochemistry Department at St. Louis University and held these positions

until his official retirement in 1965. He is still active in research and writing.

In 1958, the Alumni Association of the University chose Dr. Doisy for the Alumni Achievement Award, and in 1960, the University granted him an honorary Doctor of Science degree. Seven other colleges and universities have also honored him with doctorate degrees. He has received many other honors, medals, and awards, including the Nobel Prize in medicine, which he shared with Dr. Henrik Dam in 1943.

Early in his career, Dr. Doisy specialized in the development of new methods for the determination and purification of biological substances of clinical importance. After joining the staff of St. Louis University, he turned his attention to the isolation of biological materials. He was the first to isolate estrone and estradiol, and in 1939 succeeded in crystallizing both vitamin K_1 and vitamin K_2. During World War II, he worked on the isolation and testing of antibiotics, and since that time has continued his studies of the metabolism of steroids.

The Ada Alley Doisy Lectureship will bring a distinguished biochemist to the Urbana-Champaign campus each year to give a series of two or three lectures and to confer with the staff and students in biochemistry. It is hoped that this program can be started in the fall of 1970, and that Professor Doisy will he here to help initiate the series.

The department and the University will benefit greatly from the inspiration and knowledge that these lectures will bring to us, and we are most grateful to Dr. Doisy for his generosity.

Awards and Honors to Alumni and Staff

Louis K. Eilers

Dr. Louis K. Eilers Elected a Distinguished Alumnus

Presentation of the Alumni Association Achievement Award to Dr. Louis K. Eilers was one of the features of the commencement exercises in the Assembly Hall June 14, 1969. A color portrait of Dr. Eilers hangs in the Illini Union Building where pictures of thirty-seven earlier winners are also displayed.

Only three achievement awards are given each year. The awards are presented to alumni selected by an Alumni Association committee from a large number of nominees suggested by faculty, former students, and others.

Louis K. Eilers was born April 11, 1907, in Gillespie, Illinois, and studied at Blackburn College in Carlinville before enrolling at the University of Illinois where he was graduated in 1929, majoring in chemistry. He received a master's degree at the University of Virginia in 1930 and the Ph.D. at Northwestern in 1932.

Dr. Eilers' first association with Eastman Kodak came in January, 1934, when he was employed as a chemist at Kodak Park, doing research on cellulose and cellulose esters. Transferred to the roll coating department as a research chemist in 1935, he became supervisor of acetate production the following year.

Subsequent advancements carried him to administrative positions in the roll coating departments and in film manufacturing, and in 1954 he became assistant general manager of Kodak Park, the company's largest plant. The board of directors elected Dr. Eilers vice president and assistant general manager of the company in 1956, and in 1963 he was promoted to executive vice-president and director.

The advancement to president came January 1, 1967, and in 1969 he was given the added assignment of chief executive officer.

The photo-products executive is a member of Sigma Xi, honorary scientific fraternity; Phi Lambda Upsilon, chemistry honorary; Alpha Chi Sigma, professional chemical fraternity; and the American Chemical Society.

Dr. Eilers is a director of the Community Chest of Rochester, a trustee of Blackburn College, and a member of the University of Illinois Foundation. Dr. and Mrs. Eilers, the former Frances Wampler, a 1932 graduate of the University of Illinois, are the parents of five children.

Vice-Chancellor Carter Honored

Professor H. E. Carter, member and former Head of the Department and now Vice-Chancellor of the Urbana-Champaign campus, was the recipient of the Spencer Award of the Kansas City Section of the A.C.S. last summer. The Spencer Award is granted each year to an outstanding chemist in recognition of his contributions to agricultural chemistry and consists of a bronze medal and one thousand dollars. Professor Carter was given the award in recognition of his work on the chemistry of lipids, which has resulted in significant advances in our knowledge of the isolation, structure, and synthesis of some of the most important components of living tissue. He has discovered and characterized a new type of lipid from plant seeds, and has shown that the major long-chain base in plant cells is different from that in animal cells.

Professor Carter was also honored by a symposium on the Chemistry and Metabolism of Sphingolipids which his former students arranged at East Lansing, Michigan, on May 5 and 6, in his honor. Speakers for the symposium came from Japan, Israel, and several European countries, as well as from many parts of the United States. Dr. Philip Handler, President of the National Academy of Sciences and one of Professor Carter's former students (Ph.D., 1949), gave the main address at the symposium banquet.

Herbert E. Carter

Frederick T. Wall

Professor Carter was honored, also, by the invitation to give the R. C. Fuson lectures at the University of Nevada on May 1 and 2. This annual lecture series is presented in honor of Professor R. C. Fuson, long a member of our staff, and later a member of the Chemistry Department at Nevada.

F. T. Wall Becomes Executive Director of A.C.S.

Dr. Frederick T. Wall, a member of our department from 1937 to 1964 and Dean of the Graduate College from 1955 to 1963, has become the Executive Director of the American Chemical Society. In this new position, he is the top administrative officer of the Society. He will supervise and manage all staff functions, release the chairmen of several board committees of some of their operational duties, maintain fiscal control and salary coordination, resolve personnel matters of the salaried staff, be responsible for negotiations with government agencies, and implement policies and programs promulgated by the Board and the Council.

Dr. Wall has been active in the American Chemical Society for many years, serving as Councilor and member of the Board. Currently, he is Editor of the Journal of Physical Chemistry. He won the A.C.S. Award in Pure Chemistry in 1945 and the University of Minnesota's Outstanding Achievement Award in 1959. He is also a member of the National Academy of Sciences.

Professors Gutowsky and Weber Honored

Professor H. S. Gutowsky and Professor Gregorio Weber have been honored by election to the American Academy of Arts and Sciences. The American Academy was founded almost two hundred years ago by President John Adams to recognize Americans who have contributed to our country in any of the arts or sciences. Other members of our department who have been elected to the American Academy are Roger Adams, H. E. Carter, I. C. Gunsalus, and Nelson J. Leonard.

Professor Nelson J. Leonard Honored

Professor Nelson J. Leonard has been appointed a member of the Board of Editors of the Journal of the American Chemical Society. The Board, which is composed of nine outstanding research chemists, serves in an advisory capacity to the editor of the journal.

Research by Professors Wood and Rinehart Widely Acclaimed

The research of two members of our staff and their research students has been described widely in the popular and semi-popular press this fall because of its significance to the general public.

A hazard-free chemical tag for vitamins has been developed by F. Scott Kennedy, T. Buckman, and Professor J. M. Wood. Piperidine-N-oxyl reagents have been used to synthesize both covalent and coordinate complexes of vitamin B_{12}. These Co(III) derivatives are paramagnetic, and have been used to help to solve vitamin B_{12} enzyme mechanisms by using electron spin resonance. (Biochemistry, *8*, 4437 (1969).) From ESR spectra biochemists can determine whether the vitamin is free or bound in protein. These spin-labeled complexes are being used in research to detect pernicious anemia, which impairs the ability of the liver to absorb vitamin B_{12}.

Professor K. L. Rinehart, one of his graduate students, W. T. Shier, and Professor David Gottlieb of the Department of Plant Pathology have devised a novel approach to the preparation of new antibiotics. Their ingenuity is described in the Proceedings of the National Academy of Sciences *63*, 198 (1969). The fungus *Streptomyces fradiae* makes neomycin by first synthesizing four sugar-like rings and then joining them together.

A mutant fungus was developed and isolated which is unable to produce one of the four rings but is still able to synthesize neomycin if that ring is supplied in the culture medium. Moreover, if that ring is replaced in the medium by a derivative, the mutant will incorporate it into the four-ring structure instead and thereby produce the corresponding derivative of neomycin.

It will require further tests to establish whether the new antibiotics, called hybrimycins, will have any uses in medicine, but now that the method has been demonstrated it has great possibilities for making new, and hopefully superior, chemotherapeutics.

This discovery offers the possibility of developing antibiotics that will not produce side-effects such as toxicity and resistivity. Preliminary tests show that the new antibiotics must be administered in slightly larger amounts than the parent ones, but this is thought to be unimportant if the undesirable side-effects are avoided.

Professors Gunsalus and Beak Back in Urbana

Professor I. C. Gunsalus and Professor Peter Beak, both of whom held Guggenheim Fellowships last year, are again at the University. Both report that they profited greatly from their period of fellowship study, and have new ideas for their research programs.

Dr. K. Darrell Berlin Honored

Dr. K. Darrell Berlin (Ph.D., 1958), who is now a member of the faculty at Oklahoma State University, was chosen as the O.S.U. Sigma Xi Lecturer for this year. This honor, which is accorded on the basis of outstanding research, involves giving lectures at O.S.U. and at Kansas State and Wichita State universities.

Dr. Berlin has also been appointed to membership on the Medicinal Chemistry Study Section of the National Institutes of Health. The study sections are advisory to N.I.H. on matters relating to medical research.

Illinois Alumni and the Presidency of the A.C.S.

In November, 1969, the top executives of several of the leading chemical societies in the world met in London, England, to discuss their common problems and those that are international in nature. The chemical societies of Canada, France, Italy, Japan, the Netherlands, Sweden, the United States, the U.S.S.R., the United Kingdom, and West Germany were represented. The delegation from the United States consisted of Dr. Wallace Brode, President of the American Chemical Society in 1969, Dr. Byron Riegel, President in 1970, and Dr. F. T. Wall, Executive Director of the Society. (A picture of these men at the meeting appears in Chemical and Engineering News, December 15, page 36.) Of special interest to us is the fact that all of the representatives from the United States are members of the Illinois family.

Dr. Riegel is the ninth Illini to hold the presidency of the society in the last thirteen years. Both Dr. Riegel (Ph.D., 1935) and Dr. Brode (Ph.D., 1925) did their graduate studies under the direction of Professor Roger Adams, who was President of the Society in 1935. Two of Professor Adams' earlier students have also been presidents of the Society: Dr. Ernest H. Volwiler (Ph.D., 1918) occupied that position in 1950, and Dr. Clifford F. Rassweiler (Ph.D., 1924) in 1958.

Just as Brode, Riegel, Volwiler, and Rassweiler followed their teacher to the presidency of the American Chemical Society, so did William J. Sparks (Ph.D., 1936) and Charles G. Overberger (Ph.D., 1944), both of whom took their degrees with Professor C. S. Marvel (Ph.D., 1920, member of the staff, 1920-61, President of the Society in 1945).

Other presidents of the American Chemical Society who are Illinois alumni or staff members and the dates of their presidencies are: Professor Charles C. Price (1965) (Illinois staff, 1937-46), Karl A. Folkers (1962) (B.S., 1931), Albert C. Elder (1960) (Ph.D., 1928), John C. Bailar, Jr. (1959) (Illinois staff, 1928-), Edward Bartow (1936) (Illinois staff, 1905-20), and Samuel W. Parr (1928) (B.S., 1884, member of the Illinois faculty from 1891 to 1927). The first Illinois man to hold the presidency of the American Chemical Society was Professor William McMurtrie, who was president in 1900.

Illinois is unique in having among its alumni a father and son who were both presidents of the A.C.S. W. A. Noyes, who was Head of the Department of Chemistry from 1907 until 1926, was President of the Society in 1920, and his eldest son, W. Albert Noyes, Jr., in 1947. The younger Noyes did much of his undergraduate work at Urbana, but because of conditions brought on by World War I, he finished his undergraduate work at Grinnell College. The University of Illinois remedied this situation and made him an alumnus when it granted him an honorary Sc.D. degree in 1964.

New Staff Members, 1969-70

Richard C. Alkire

Karl M. Dus

Four new assistant professors have joined the staff of the department since the last issue of the Alumni Newsletter.

Dr. Richard C. Alkire is a member of the Division of Chemical Engineering. He did his undergraduate work at Lafayette College, and received master's and doctor's degrees from the University of California at Berkeley. He is chiefly interested in electrochemical systems, both solution and solid state.

Dr. Karl M. Dus is a member of the Biochemistry Division. He received the Ph.D. degree from the University of Vienna in 1958, did postdoctorate studies at Harvard Medical School and at Brandeis University, and spent

John A. Katzenellenbogen

James G. Wetmur

several years as a Research Associate at the University of California in San Diego. Dr. Dus' research interests lie in the study of the exact linear array of amino acids in polypeptide chains. This determines the physical, chemical, and biological properties of the polypeptide.

Dr. John A. Katzenellenbogen received both his undergraduate and graduate training at Harvard. As described in the article on organic chemistry at Illinois, he is chiefly interested in synthesis and in organometallic compounds.

Dr. James G. Wetmur took his Ph.D. at California Institute of Technology in 1967, but comes to us from the Army, where he spent two years in research. He is a member of the biophysical chemistry group, and is involved in research in electron microscope studies of the transfer of episomal DNA between bacteria, and in DNA renaturation kinetics.

Professor Sherlock Swann, Jr. Retires

Professor Sherlock Swann, Jr., who has been a member of the staff since 1927, retired on August 31, 1969. Following the completion of his undergraduate work at Princeton and his graduate work in organic chemistry at Johns Hopkins, he spent a year in industry before coming to Urbana as a member of the staff of the Engineering Experiment Station, assigned to Chemical Engineering. His research interests have been largely in the electrochemistry of organic substances — a field which is now assuming considerable industrial importance, largely through his efforts. He has directed thesis work, both at

Sherlock Swann, Jr.

the undergraduate and doctorate levels, and for some years he taught a course in electrochemistry. The majority of his time in recent years has been spent in the compilation and publication of annotated bibliographies on various aspects of organic electrochemistry.

Professor Swann has held many offices in the Electrochemical Society and was President of that organization in 1958-59. He is known to his friends as an authority in classical music and architecture, and as a connoisseur of fine foods.

When asked how he plans to spend his retirement, Dr. Swann replies that he can not imagine doing anything that he would enjoy more than what he has been doing. So he is still to be found in the Chemistry Library, collecting information, or in his office in East Chemistry, classifying and interpreting it.

Professor Moeller Accepts Chairmanship at Arizona State

Professor Therald Moeller resigned during the summer to assume the Chairmanship of the Chemistry Department at Arizona State University in Tempe. He joined the faculty at Illinois in 1940 as an instructor and advanced to a professorship in 1953.

Dr. Moeller is widely known for his research work on the chemistry of the lanthanides and on phosphorus compounds, as well as for his book, "Inorganic Chemistry — An Advanced Text." The publication of this text was largely responsible for the tremendous growth in the teaching of inorganic chemistry during the late forties and early fifties. He has also published textbooks in general chemistry and in qualitative analysis, as well as many research papers.

Professor Moeller was editor of Volume V of Inorganic Syntheses and was Chairman of the Division of Inorganic Chemistry of the American Chemical Society in 1961.

Memorial to Professor L. F. Audrieth

Inorganic Syntheses, Inc., has given $1,000 to the University of Illinois Foundation in memory of the late Professor L. F. Audrieth. This will be used, with other departmental funds, for undergraduate scholarships for students specializing in chemistry or chemical engineering. Each year for the next five years, a $500 undergraduate scholarship will be designated as the "Ludwig Frederick Audrieth Scholarship."

The students who did their Ph.D. theses under Professor Audrieth's direction are also planning to establish some memorial scholarships in his honor, and are now assembling a fund for that purpose. Gifts from any of his

Ludwig F. Audrieth

friends will be welcomed. Checks should be made out to the University of Illinois Foundation, clearly designated for the "L. F. Audrieth Fund."

Professor Audrieth was a member of the staff at Illinois from 1928 until his retirement in 1961. He held a National Research Council fellowship during the 1931-32 school year, which he spent with Professor Paul Walden at the University of Rostock, Germany.

From 1942-46, he was again on leave, serving first as Captain and then as Major in the U. S. Army. Most of that period was spent at Picatinny Arsenal, where he directed research on the development of new types of explosives and other war chemicals. After the war, he was sent to Europe to supervise the establishment of schools for American soldiers who were still on duty there. He returned to the University in 1946, but was again on leave from 1959 until his retirement in 1961. During that period, he served as the Scientific Attache to the U. S. Ambassador in Germany — a position which he retained until 1963, when he returned to Urbana to resume his research and consulting work.

Professor Audrieth was known as an outstanding teacher and research director. His chief research interests lay in the areas of nonaqueous solvents, explosives, and the compounds of nitrogen and phosphorus. He was the author or co-author of a large number of chemical articles, two books, and many patents. He was one of the founders of Inorganic Syntheses and was Editor-in-Chief of Volume III. He and Michael Sveda, who was one of his students, held the basic patents on the widely used sweetening agent, sodium

cyclamate. Professor Audrieth received many honors, including the Priestley Lectureship at Pennsylvania State University and the Clark Lectureship at the University of West Virginia. In 1965, the Technische Hochschule in Vienna conferred upon him the Prechtl Medal and, in 1966, he was posthumously awarded the Otto von Guericke Medal by the Arbeitsgemeinschaft Industrieller Forschungsvereinigungen. The latter medal was received for him by the U. S. Ambassador to Germany, Mr. George McGhee.

Professor Audrieth had an active interest in the honorary chemical fraternity Phi Lambda Upsilon. For some years, he was editor of the fraternity's national magazine, The Register, and was president of the national organization from 1951 to 1954.