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# ALUMNI NEWSLETTER

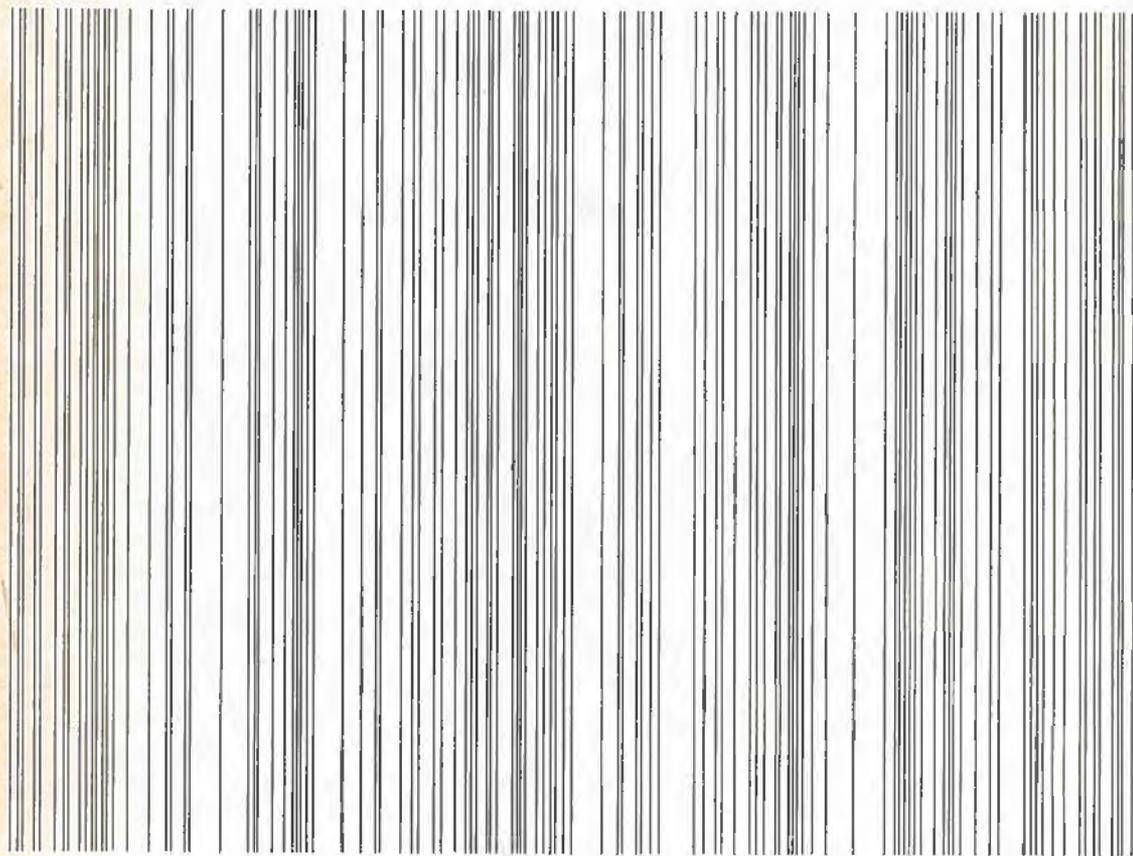
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SCHOOL OF CHEMICAL SCIENCES

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UNIVERSITY OF ILLINOIS at Urbana-Champaign

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NO. 7, WINTER 1972-73

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## A Busy Week in June

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Seldom have so many worthy events been crowded into one week as have graced the people of the School of Chemical Sciences this June 9-15, 1972. Dr. H. E. Carter's portrait was hung in the Chemistry Library along with those of Parr, Noyes, and Adams; Dr. Philip Handler was honored at commencement as a Distinguished Alumnus of the University; East Chemistry was dedicated as the Roger Adams Laboratory; and Alpha Chi Sigma held its Biennial National Conclave on our campus. Individually and in combination these celebrations brought together in Urbana students, faculty, former faculty, alumni, distinguished guests, family, and friends from far corners.

### Roger Adams Laboratory Dedicated

Several years ago, the Board of Trustees of the University ruled that campus buildings should have names that describe their function rather than names commemorating influential University people. Fortunately, however, the board modified this rule for a very special occasion last summer, and authorized the changing of the name of East Chemistry Building to the Roger Adams Laboratory. The building was dedicated with this new name on Sunday, June 11, as the opening event of the Biennial National Conclave of the professional chemistry fraternity, Alpha Chi Sigma.

Professor Gutowsky presided at the ceremony, introducing first Dr. J. W. Peltason, Chancellor of the University of Illinois at Urbana-Champaign, who paid tribute to Professor Adams and his work. Dr. Ernest Volwiler (Ph.D. 1918), who was Adams's first graduate student at Illinois and who is now retired from the presidency of Abbott Laboratories, spoke of his personal reminiscences of Professor Adams and his relationship with the graduate students. Dr. H. E. Carter (Ph.D. 1934), who succeeded Professor Adams as Head of the Department of Chemistry and who is now chairman of the National Science Board, described Professor Adams's philosophy concerning the organization and management of the Department of Chemistry.

Roger Ranz, grandson of Professor Adams and son of Professor and Mrs. W. E. Ranz of the University of Minnesota, then unveiled a bronze nameplate over the north entrance to the building. The faculty and students in the School of Chemical Sciences have almost forgotten that the building



Unveiling of the nameplate at the dedication of the Roger Adams Laboratory.

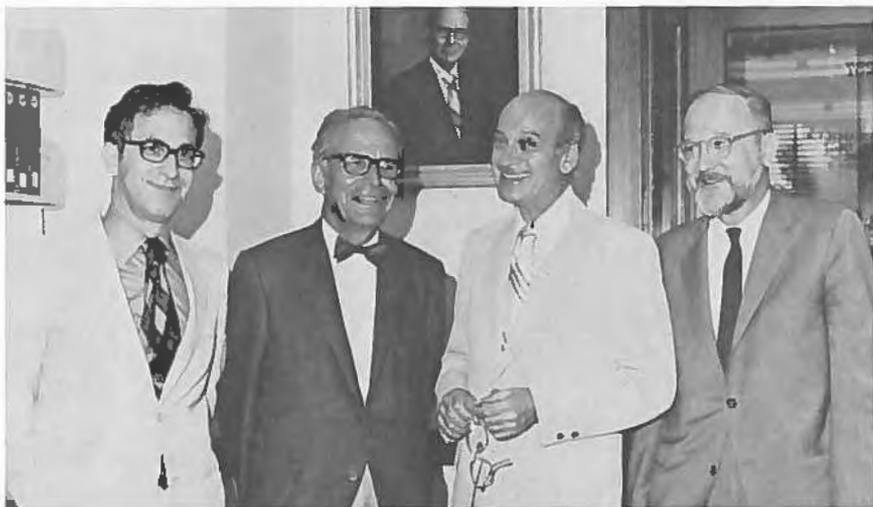
was once known as East Chemistry Building and refer to it as Adams Lab or simply RAL.

Professor Frank Gallo, from the University of Illinois Department of Art, is a sculptor nationally noted for his life-size (and lifelike) plastic nudes which have appeared on the cover of *Time* and in the apartment of Hugh Hefner (a U. of I. alumnus). We were especially pleased that he was willing to extricate himself from these pleasurable studies in polymers long enough to design the handsome bronze nameplate which now identifies Roger Adams Laboratory. The plaque itself was cast by James Leach, Professor of Mechanical and Industrial Engineering,

Mrs. W. E. Ranz, nee Lucile Adams, has given 50,000 of her father's papers to the University Archives. These range from letters and photographs to speeches and tape recordings. They are available for study about the life, times, and research of Roger Adams.

### **Carter and Handler Honored**

On Saturday afternoon, June 10, a reception was held in the Chemistry Library to honor Professor H. E. Carter (Ph.D. 1934) and Philip Handler (Ph.D. 1939). At this occasion a portrait of Professor Carter, former Head of the Department of Chemistry, was unveiled and Dr. Handler received the Alumni Achievement Award. It was appropriate to celebrate the two events



Chancellor Peltason, Professor Carter, Dr. Handler, and Professor Gutowsky at the library reception.

together because Dr. Handler, who is now President of the National Academy of Sciences, was one of Carter's early graduate students.

### Alpha Chi Sigma Conclave

Although Zeta Chapter is one of the oldest chapters of Alpha Chi Sigma (AXΣ), and has the most alumni, it had never been host to a national conclave until June 1972. In addition to the business meetings, which occupy most of the delegates' time, a diversified professional program was planned to show delegates, alumni, and visitors the people and facilities that have made Illinois chemistry what it is. The actual planning of the event was handled by a group of Zeta Chapter members who had had previous conclave experience—Randy Guschl, Dick Henderson, Dick Taubold, Paul Jennings, and Mike DeRuntz. They were advised and assisted by Professors Gutowsky, Rinehart, Bailar, and Lowstuter. Other members of the University staff aided in other ways—Chancellor Peltason spoke at the dedication of the Roger Adams Laboratory and Vice-Chancellor Briscoe welcomed the delegates to our campus.

On Monday conclave sessions and workshops were used to mix ideas about the professional activities of AXΣ. In the afternoon, the entire School of Chemical Sciences was opened for show with tours designed for all levels of background. Visitors wandered about the service labs and, in some cases, to their old research labs. To some of the alumni, the biggest change was the discovery that the Farwell Cafeteria across the street from Noyes Laboratory was closed. Especially popular were the displays presented in the service labs. J. Carter Cook (Mass Spectrometry Lab), Robert Thrift (NMR Lab), Donald O'Brien (Glass Shop), Josef Nemeth (Microanalytical Lab), and W.

Winegardner (Machine Shop) put their labs and staffs on full display, complete with interesting demonstrations. Later in the evening, Dr. Robert Lee Metcalf, head of the Department of Zoology and renowned scientist, was initiated into AXΣ and was honored at a reception. On Tuesday, the business sessions continued and the day was highlighted by a trip to Allerton Park, a favorite tourist spot.

On Wednesday, the John R. Kuebler Award was presented to Dr. Walter T. Schrenk of the University of Missouri at Rolla. Preceding this presentation there was a symposium, arranged by Professor K. L. Rinehart, to honor the four U. of I. faculty men who have received this coveted award in previous years. A former student of each of them presented a brief talk on the man and his work: Dr. John C. Bailar, Jr. (1962) was honored by Dr. Fred Basolo; Dr. R. C. Fuson (1964) by Dr. R. T. Arnold; Dr. Roger Adams (1966) by Dr. Ralph Shriner; and Dr. C. S. Marvel (1970) by Dr. J. J. Drysdale. The symposium offered an excellent opportunity for all to see how strong leadership and excellent research have led to the development of the School of Chemical Sciences. Aside from their professional leadership, these men gave freely of their time to help develop AXΣ. Dr. Shriner pointed out that Dr. Adams respected the John R. Kuebler Award above so many others "because it came from an organization of students . . . not from high power groups of his contemporaries and peers, but from the student organization. This was very important in his (Dr. Adams's) efforts to build a really good chemistry faculty with a group of good students." Later that evening, Dr. Schrenk was presented the award at the Kuebler Banquet. Speakers for the evening were Dr. H. S. Gutowsky for the School of Chemical Sciences and Dr. John C. Bailar, Jr., for the Kuebler recipients; Dr. William Webb for the University of Missouri at Rolla spoke on the life and work of Dr. Schrenk. The University of Illinois has been more than fortunate to have had four of the eleven award winners on its faculty.

The legislative work of the conclave was concluded on Thursday and Friday. At the concluding session, Zeta Chapter was named the outstanding house chapter.

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## Chemical Engineering at Illindis

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A recent study of members of the chemical engineering profession has revealed that more eminent chemical engineers received their undergraduate degrees from the University of Illinois at Urbana-Champaign than at any other school. Of the 198 who have achieved eminence (as shown, for example, by receipt of major awards or election to national academies), 14 graduated from the University of Illinois, 13 from Massachusetts Institute of Technology, 12 from Michigan, and the rest from 76 other institutions.

Among eminent chemical engineers who have been awarded Ph.D. degrees, Illinois ranks fifth.

Three chemical engineers who are alumni of the University of Illinois and are rated as eminent are now on the Urbana-Champaign campus — J. W. Westwater (B.S. 1940) and Roger A. Schmitz (B.S. 1959) of the Department of Chemical Engineering, and Thurston E. Larson (B.S. 1932; Ph.D. 1937), Assistant Chief and Head of the Chemistry Section of the Illinois State Water Survey and Professor of Sanitary Engineering in the Department of Civil Engineering.

**The Beginning.** Chemical engineering at the University of Illinois was founded by Samuel W. Parr (1891-1927), whose portrait is on display in the first-floor lobby of the Roger Adams Laboratory. Parr developed standard methods for measuring the quality of coal. One of his inventions, the Parr calorimeter for measuring the heating value of fuels, is widely known. Illinois Industrial University (named the University of Illinois in 1886) was in existence but eighteen years when Parr was appointed an instructor in 1885. In 1891 he became Professor of Applied Chemistry and Head of Industrial Chemistry. The staff size in the entire University numbered forty-three at that time.

The *University of Illinois Catalog* for 1901-02 lists a curriculum entitled, "Chemical Engineering — for the Degree of Bachelor of Science in Chemical Engineering." The curriculum has continued without interruption since 1901. Clarence H. Bean was the first recipient of the degree in 1903. Two more years elapsed before the second student received the degree. The curriculum became popular in a short time. Ten degrees were awarded in 1912, twenty in 1917, and thirty in 1920.

The first book with the words *chemical engineering* was published in 1901, a *Handbook of Chemical Engineering* by Professor George E. Davis of the Manchester Technical School in England. The following year William H. Walker used the label on a curriculum at Massachusetts Institute of Technology. Incidentally, Walker is honored today by virtue of the William H. Walker Award for excellence in contributions to chemical engineering literature. This award has been won by three of the present University of Illinois staff members (Drickamer, Hanratty, and Westwater), by two former staff members (Comings and Johnstone), and by three alumni (Bird, Gilliland, and Pigford).

In 1908 the American Institute of Chemical Engineers was founded, with 40 charter members. Today, there are more than 38,000 members. In 1908 there were no courses anywhere in unit operations, material and energy balances, process design, chemical thermodynamics, or applied kinetics. Thus the early curriculum operated with no textbooks in chemical engineering. In 1922 University of Illinois course titles were Chemistry 7, Metallurgy; Chemistry 65b, Gas Analysis; Chemistry 77, Classification and Theory of Carbonization; and Chemistry 76, Tars and Oils. Of historical significance was the publication in 1923 of *Principles of Chemical Engineering*, by Walker, Lewis, and McAdams at Massachusetts Institute of Technology. This marked the emergence of chemical engineering from chemistry.

**Accreditation.** By 1925 a procedure for accrediting curricula in chemical engineering was established by the American Institute of Chemical Engineers. Thirteen curricula were accredited that year and two more in 1926. The University of Illinois was not on the list, possibly because the ties with engineering were not strong enough and also because chemical engineering was not a sufficiently independent identity.

In 1926 Roger Adams became the Head of the Department of Chemistry and D. B. Keyes (1926-45) was hired to take charge of Division of Chemical Engineering and make the changes needed for accreditation. The book by Walker, Lewis, and McAdams was adopted promptly, and the teaching of unit operations was established.

New staff members with fresh viewpoints were brought in. F. G. Straub (1924-57) had come as a Special Research Associate in 1924, and became an Assistant Professor in 1925. F. C. Howard (1926-36) and N. W. Krase (1926-36) were other additions. Sherlock Swann (1926-68) joined the research staff in 1927 and became an Assistant Professor in 1932. H. F. Johnstone (1926-62) was appointed a member of the research staff in 1928 and became an Assistant Professor in 1931. These staff members had appointments, in part at least, in the Engineering Experiment Station of the College of Engineering.

Even today there is cooperation between the College of Engineering and the College of Liberal Arts and Sciences in matters involving chemical engineering. The present Head of the Department of Chemical Engineering has a 40 percent appointment in the College of Engineering and the rest in the College of Liberal Arts and Sciences. The other staff members are paid through their original home in L.A.S., but each has an appointment at zero pay in the College of Engineering. The Department of Chemical Engineering participates in important committees in the College of Engineering, including the Executive Committee and the Engineering Policy and Development Committee.

Under Keyes, the old Division of Applied Chemistry was given a new name, the Division of Chemical Engineering. The new curriculum received accreditation in 1933. The University of Illinois was the sixteenth school to be accredited. Today, the total number of accredited schools is 121.

During this period, the space occupied by the Division of Chemical Engineering consisted of about one-third of the basement plus one-third of the ground floor of Noyes Laboratory. In spite of the shortage of space, the number of B.S. degrees granted per year rose to a peak of sixty in 1942. The war caused the number to decrease to eight in 1945.

**Growth of Graduate Education.** From 1945 to 1955, H. F. Johnstone served as Head of the Division of Chemical Engineering. Three events of this decade merit notice. One was the planning and construction of the Roger Adams Laboratory (called the East Chemistry Building until 1972). The Division moved into the new space, with its excellent facilities, in 1950. The second event was an increase in emphasis on graduate education. The improved

space made possible a significant growth in the number of graduate students in chemical engineering. Also, the goals in the recruitment of new faculty changed completely. The old emphasis on practical experience changed to an emphasis on research and graduate teaching. In the ten years preceding Johnstone's appointment as Head, the Division produced nineteen Ph.D. degrees. In the ten years which followed, the number tripled to sixty-one.

Thirdly, an option in bioengineering was introduced into the undergraduate curriculum. This was continued from 1949 to 1959 under the supervision of R. K. Finn (1949-55) and J. C. Garver (1955-57). The option was finally dropped because of disappointing job opportunities. It is possible that the Department was about ten years ahead of the times. Bioengineering is being offered again at a half-dozen or so schools today in the hope that job opportunities may have improved.

In 1953 there was some administrative reorganization and the Department of Chemistry was renamed the Department of Chemistry and Chemical Engineering.

H. C. Drickamer was the Head of the Division of Chemical Engineering from 1955 to 1958. He then returned to his research and teaching activities and the headship passed to M. S. Peters (1951-62). Max Peters was a gifted administrator. This fact soon became widely known, and after holding the position from 1958 to 1962, Peters went to the University of Colorado as Dean of Engineering.

Meanwhile, Drickamer achieved outstanding results with his research. This resulted in numerous honors and awards. Drickamer has the rare distinction of being honored by four different technical societies: the Allan P. Colburn Award, Alpha Chi Sigma Award, and the William H. Walker Award from the American Institute of Chemical Engineers; the Ipatieff Award of the American Chemical Society; the Oliver E. Buckley Prize of the American Physical Society; and the Vincent Bendix Award of the American Society of Engineering Education. Drickamer is a member of the National Academy of Sciences and a member of the Center for Advanced Studies at the University of Illinois at Urbana-Champaign. At age fifty-three he has published 240 research articles.

In 1962 J. W. Westwater was appointed Head of the Division of Chemical Engineering. From about 1955 to 1968 a national expansion in graduate education took place, encouraged by federal funds. At the University of Illinois a peak output of eighteen Ph.D. degrees in chemical engineering was reached in 1969-70. This was the second largest output in the nation (behind Massachusetts Institute of Technology). The number of faculty rose to nine, the present number. The number of M.S. degrees reached a peak of twenty-four in 1968-69, and the total number of graduate students in residence reached seventy-two at that time. This meant that the number of graduate students was nearly triple the number of seniors.

**The Present.** By 1968 the decline in federal funding of graduate students and traineeships was under way. There are virtually no more NSF Trainee-

ships, NASA Traineeships, and NDEA Fellowships. The Department of Chemical Engineering has readjusted and now has approximately fifty graduate students.

In 1970 a significant administrative reorganization occurred. The former Department of Chemistry and Chemical Engineering became the School of Chemical Sciences, with H. S. Gutowsky as Director. The former six divisions became three departments: Chemical Engineering, Chemistry, and Biochemistry. Westwater was appointed Head of the Department of Chemical Engineering and still holds that position.

At the undergraduate level, chemical engineering has evolved steadily. Fifty years ago the curriculum included courses in forge work, metallurgy, assaying, and fuel analysis. These had all disappeared by 1950. The last twenty years has seen the disappearance of hygiene, military, physical education, engineering drawing, chemical engineering technology, mechanical engineering laboratory, strength of materials laboratory, and the inspection trip. The rhetoric requirement has been reduced by a third, the foreign language requirement has been eased, and the number of credit hours required for graduation has been reduced from 136 to 129. Chemistry, physics, and mathematics have been consistently emphasized throughout the years. Course replacements have included higher mathematics; computer science; process dynamics; kinetics; prediction of physical properties; heat, mass, and momentum transfer; social studies; and humanities.

The change in graduate courses has been even faster. Of the courses offered twenty years ago, only fluid dynamics remains (but revised completely). Gone are evaporation, drying, humidification, dehumidification; absorption and extraction; filtration and separations; distillation; and advanced plant design. Course replacements have included hydrodynamic stability, properties of liquids, interfacial phenomena, chemical engineering mathematics, reaction kinetics, advanced topics in heat and mass transfer, and a variety of research group seminars. Significant changes in the requirements for the Ph.D. degree include the reduction of two foreign languages to one. The oral preliminary examination is now concerned exclusively with the student's research.

Chemical engineering at the University of Illinois is unique in a number of respects. All of the faculty teach undergraduate courses and graduate courses and direct graduate theses. This is unusual in the United States. All of our seniors who wish to obtain graduate degrees are sent to other schools so as to broaden their experience; all of our graduate students are "imported" from outside schools. Our staff members are imports also; that is, their Ph.D. degrees were obtained elsewhere. The ratio of graduate students to faculty is maintained high. At present the average is 5.8 graduate students per professor — by far the highest in the nation. The Department of Chemical Engineering runs a tight ship. That is, it concentrates on teaching chemical engineering and leaves the service courses to the service departments. This makes possible the use of a staff of nine, which is smaller than the staffs of other well-known chemical engineering departments. As a rule, other chemical engineer-

ing departments choose to teach many of their own service courses in chemistry, mathematics, mechanics, and sometimes rhetoric. At Illinois we are fortunate in having strong service departments.

Chemical Engineering at Illinois is unique in the number of publications its faculty has and the number of awards and honors received. The publications total about thirty-five per year, or an average of about four per professor. This is far greater than for any other chemical engineering department.

**The Faculty.** Professor H. G. Drickamer, who came in 1946, is the "old timer" of the present staff. His research on the effect of high pressure on the properties of matter is internationally famous. Professor J. W. Westwater came in 1948. His research on heat transfer during boiling and condensation was acknowledged by the Institute Lecture and William H. Walker Award of the American Institute of Chemical Engineers, the Conference Award of the Eighth National Heat Transfer Conference, and a Sigma Xi Prize. He was general Chairman of the Third International Heat Transfer Conference, and he has served as a Director of the American Institute of Chemical Engineers. Professor T. J. Harratty came to Illinois in 1953. For his research in fluid mechanics he has received the Allan P. Colburn Award, William H. Walker Award, and Professional Progress Award of the American Institute of Chemical Engineers, and the Curtis W. McGraw Award of the American Society for Engineering Education. Professor R. A. Schmitz joined our faculty in 1962. He was awarded the Allan P. Colburn Award for the excellence of his research on reactor stability. The above listing of the full professors shows that all of them have received awards. No other chemical engineering department can make such a statement.

The future of the Department depends on the abilities of the younger staff members. The Associate Professors include J. L. Hudson (arrived in 1963) who does research on air pollutants; R. L. Sani (1964) who investigates fluid instabilities; and C. A. Eckert (1965) who studies the thermodynamic properties of reacting solutions. The Assistant Professors are R. C. Alkire (1969) who studies electrochemical engineering and A. A. Kozinski (1971) who has started a program of research on mass transfer in biological-biochemical systems. The prognosis for their success is excellent.

The present rests on the past. Former staff members, not discussed above, made valuable contributions to the development of chemical engineering at Illinois. These include G. M. Smith (1905-19), D. F. McFarland (1910-20), H. J. Broderick (1913-17), T. E. Layng (1920-29), S. S. Kistler (1931-35), E. W. Comings (1936-51), A. G. Deem (1938-45), Clay Lewis (1942-45), W. M. Langdon (1943-46), J. O. Hougen (1946-48), W. M. Campbell (1947-50), L. G. Alexander (1947-50), Thomas Baron (1948-51), W. E. Ranz (1951-53), W. J. Scheffy (1956-59), J. A. Quinn (1958-71), D. D. Perlmuter (1958-64), and Eric Baer (1960-62). Our alumni have been fortunate to have had such distinguished teachers, the nation has been lucky to have had such distinguished researchers, and the academic colleagues now at Illinois recognize that high standards are a long-standing tradition.



New staff members Ana Jonas, Olke Uhlenbeck, Doug McDonald, David Natusch, and John Shapley.

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## Our New Staff Members

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During the past year, five persons have joined the faculty of the School of Chemical Sciences, all as Assistant Professors.

**Ana Jonas** — Biochemistry. B.S., University of Illinois at Chicago Circle, 1966; Ph.D., University of Illinois at Urbana-Champaign, 1970. Dr. Jonas's interests lie particularly in physicochemical studies of proteins.

**J. D. McDonald** — Physical Chemistry. B.S., Rice University, 1966; Ph.D., Harvard, 1971. Dr. McDonald is doing molecular beam experiments.

**David F. S. Natusch** — Analytical Chemistry. B.Sc., University of New Zealand, 1961; M.Sc. (honors), Canterbury University, 1963; Ph.D. (Rhodes Scholar), Oxford University, 1966. Dr. Natusch is an analytical chemist with research interests in environmental chemistry. He came to Urbana as a Fulbright-Hays Traveling Scholar, and we found him so valuable that we didn't let him go back home.

**John R. Shapley** — Inorganic Chemistry. B.S., University of Kansas, 1967; Ph.D., Harvard, 1972; N.S.F. Fellow, Stanford University, 1971-72. Dr. Shapley has research interests in transition metal organometallics, homogeneous catalysis, metal carbonyl clusters, and stereochemically nonrigid structures.

**Olke Uhlenbeck** — Biochemistry and Chemistry. B.S., Michigan, 1964; Ph.D., Harvard, 1969. Dr. Uhlenbeck's research concerns the structure and function of RNA.

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## Honors and Awards to Staff Members

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### Honors to Professor Westwater

Professor **J. W. Westwater** (B.S. 1940), Head of the Department of Chemical Engineering, has received the eleventh Max Jacob Award, which is administered by the American Society of Mechanical Engineers and the American Institute of Chemical Engineers. The award is in "recognition of eminent achievement or distinguished service in the area of heat transfer." Professor Westwater has emphasized the use of photography as a research tool, and has developed techniques by which pictures can be taken at 6000 frames per



J. W. Westwater

second through a microscope with a magnification of 66. By means of such techniques he has shown that bubbles in boiling water start at microscopic pits and scratches which trap tiny bits of gas. Similar sites serve as centers for drop formation during condensation. From these and similar discoveries he has learned a great deal about the formation of bubbles and drops, interfacial velocities during melting and freezing, growth of liquid drops during emulsion formation and of bubbles following the release of pressure on a solution of a gas. These observations have led to the development of commercial surfaces with artificial nucleation sites. Westwater has also shown that the design of fins plays a major role in heat transfer.

Professor Westwater has also been elected a Fellow of the American Institute of Chemical Engineers. The grade of Fellow is awarded for professional attainment and significant accomplishments during at least twenty-five years in chemical engineering and ten years as a member of AIChE. Professor Westwater received the William H. Walker Award from AIChE in 1966.

### Professor Wood Receives Awards

In September Professor **John M. Wood** of the Department of Biochemistry received the first environmental award of the Synthetic Organic Chemical Manufacturers Association. The award consists of a gold medal and \$1,000. From 1960 until 1971, selection for the award was based on outstanding research in organic chemistry, but this year its purpose was changed "to encourage and recognize outstanding accomplishments in the application of environmental chemistry which contribute in a significant way to improving the nation's environment and the general welfare of its citizens." Professor Wood was chosen to receive the first award because of his work on the bacterial conversion of metallic mercury and inorganic mercury salts into the deadly neurotoxin poison methyl mercury.

Professor Wood has also been awarded a Guggenheim Fellowship for the 1972-73 school year. He is spending most of the year at Oxford University in England and the remainder at the Eidgenossische Technische Hochschule in Zurich, Switzerland. He is studying the mechanism of action of metallo-enzymes.



John M. Wood



Jiri Jonas

### Fellowships for the Jonases

Professor **Jiri Jonas** has been awarded a Guggenheim Fellowship and will spend the second semester in the Division of Molecular Physics of the Max Planck Institute für Medizinische Forschung in Heidelberg, Germany.

Professor **Ana Jonas** has won a NATO Fellowship, and will also be at the Max Planck Institute in Heidelberg. She will work with Theodore Wieland on peptide synthesis in the Bioinorganic Section. Her picture appears with those of the other new staff members.

### Professor Hendrickson Wins Award from Dreyfus Foundation

Professor **David Hendrickson** has been awarded a Teacher-Scholar Grant by the Camille and Henry Dreyfus Foundation, Inc. The grant consists of \$25,000 which is to be used at Professor Hendrickson's discretion to evaluate

new research ideas and develop new educational programs. The purpose of the grant is to promote the development of promising careers and to foster closer contact between faculty and students. Seventeen such grants were made this year.

Professor Hendrickson received his B.S. degree at UCLA in 1966 and his Ph.D. at the University of California (Berkeley) in 1969. He then spent one year at the California Institute of Technology with Professor Harry Gray before joining our staff.



David Hendrickson

#### **Other Honors to Staff Members**

A number of other honors have been awarded to members of the faculty of the School of Chemical Sciences during the past year.

**R. I. Gumpert** and **Olke Uhlenbeck**, of the Department of Biochemistry, have received U.S. Public Health Service Career Development Awards for the 1972-77 period.

**H. G. Drickamer** of the Department of Chemical Engineering, has been elected a Fellow of the American Academy of Arts and Sciences. He has also received the William H. Walker Award of the AIChE in recognition of the excellence of his contributions to chemical engineering literature.

**W. O. McClure** of the Department of Biochemistry and **David Chandler** and **J. T. Yardley, III**, of the Department of Chemistry have been awarded Alfred P. Sloan Research Fellowships.

**Nelson J. Leonard** was the H. J. Backer Lecturer at the University of Groningen, Groningen, Netherlands, in April.

**John C. Bailar, Jr.**, gave the Reilly Lectures at Notre Dame University during the first week of December.

**K. L. Rinehart** gave a lecture at the Symposium on the Synthesis and Biosynthesis of Natural Products in Lucknow, India, in February, and two lectures at the Eighth International Symposium in New Delhi on the Chemistry of Natural Products.

**R. A. Marcus** has been appointed a Fulbright-Hays Scholar.

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## American Chemical Society Chairmanships

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Professor Peter Yankwich has been named 1973 Chairman of the Division of Physical Chemistry of the American Chemical Society. Professor Joseph G. Cannon (B.S., University of Illinois at the Medical Center, 1951; Ph.D., University of Illinois at Urbana-Champaign, 1956) has been elected Chairman of the Division of Medicinal Chemistry. Professor T. L. Brown will be Chairman-elect in 1973 and Chairman in 1974 of the Society's Division of Inorganic Chemistry.

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## Our Alumni Win Honors, Too

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The NASA Medal for Exceptional Scientific Achievement has been presented to Dr. John H. Wolfe (Ph.D. 1960) for his research into the nature of the interplanetary medium. His work in measuring the sun's emission of charged particles from spacecraft with highly sophisticated instruments has provided techniques for obtaining advance warning of solar flares which could be dangerous to astronauts in space.

In January 1965, Dr. Wolfe announced the location of the probable source of Van Allen belt radiation, plus new understanding of the space region immediately around the earth — the magnetosphere — from findings of his experiments on board the IMP-B and OGO satellites.



John H. Wolfe



John H. Sinfelt

Dr. John H. Sinfelt (M.S. 1953; Ph.D. 1954), of Esso Research and Engineering Company, was awarded the Alpha Chi Sigma Award in Chemical Engineering Research for 1971. This award consists of a certificate and \$1,000. His major work has been in hydrogenation of hydrocarbons, as

catalyzed by metals, and in the study of bifunctional catalysts. It is of particular interest that Dr. Sinfelt did his research here under the guidance of Professor H. G. Drickamer, who was the first recipient of the Alpha Chi Sigma Award in 1966.

Professor **J. V. Quagliano** (Ph.D. 1946) of Florida State University has been granted the Florida Award for 1972 "for outstanding accomplishments as teacher, investigator, and in the advancement of the profession of chemistry."

The Florida Award was instituted in 1952, and is open to chemists who have been active in the southeastern region of the United States.



J. V. Quagliano



Robert W. Parry



Clayton F. Callis

Professor **Robert W. Parry** (Ph.D. 1946), Distinguished Professor of Chemistry at the University of Utah, received one of the three 1972 awards in the Teaching of College Chemistry, given by the Manufacturing Chemists Association. The award consists of a certificate and \$1,000. Professor Parry has taken part in many activities in the teaching of chemistry, and for several years has been Chairman of the Committee on the Teaching of Chemistry of the International Union of Pure and Applied Chemistry.

During its sixteen years this award in the teaching of chemistry has come to two Illinois staff members — Professor **R. C. Fuson** in 1960 and Professor **John C. Bailar, Jr.**, in 1968; and to seven alumni of the Department of Chemistry — **Hans B. Jonassen** (Ph.D. 1946) in 1959, **John DeVries** (Ph.D. 1933) in 1960, **Frank Havorka** (Ph.D. 1925) in 1963, **Ernest L. Eliel** (Ph.D. 1948) in 1965, **Corwin H. Hansch** (B.S. 1944) in 1969, and **Robert C. Brasted** (Ph.D. 1942) in 1971.

**Dr. Clayton F. Callis** (Ph.D. 1948), director of research and development for Monsanto Industrial Chemicals Company, was awarded the St. Louis Section Award for 1971. The award recognizes outstanding contributions to the profession of chemistry as well as demonstrated potential to further the advancement of the profession.

Upon the occasion of his retirement from active service with the **B. F. Goodrich Company**, **Carlin F. Gibbs** (M.S. 1932; Ph.D. 1935) was honored by a symposium organized in his honor. Dr. Gibbs has had a noteworthy



Dr. Carlin F. Gibbs, right, visits with colleagues gathered to honor him on retirement from the B. F. Goodrich Company. They are, from left, Professor C. S. Marvel, Professor John C. Bailar, Professor Charles G. Overberger, and Dr. Warren F. Busse, a former Goodrich researcher.

career in polymer science. Under his guidance, research workers at the Goodrich Research Center have developed two synthetic rubbers which are now in wide use. His inventions, originally conceived for the tire business, have found wide use in a great variety of chemical industries.

Three of the four speakers at the symposium are Illini — Professor C. S. Marvel (A.M. 1916; Ph.D. 1920; and a longtime member of the Illinois faculty) who directed Gibbs's thesis work, Professor C. G. Overberger (Ph.D. 1944; also one of Marvel's students; and now Vice-President of the University of Michigan) and Professor John C. Bailar, Jr., who is a consultant at Goodrich. The fourth speaker was Dr. Warren F. Busse, also a long time consultant at Goodrich.

J. P. Collman (Ph.D. 1958), Professor of Chemistry at Stanford, has received the California Award, which is given each year for outstanding chemical achievements by a scientist who is under forty years of age, and who has done outstanding chemical work in one of the thirteen western states.

As we go to press, we learn that Theodore L. Cairns (Ph.D. 1939) is to receive the coveted Perkin Medal for 1973. Ted is Director of the DuPont Central Research Department in Wilmington, Delaware.

Professor Robert C. Brasted (Ph.D. 1942) has been chosen to receive the ACS Award in Chemical Education, sponsored by the Scientific Apparatus Makers Association.

Professor Carl S. Marvel (A.M. 1916; Ph.D. 1920, and a member of the staff until 1961) will receive the ACS Award in the Chemistry of Plastics and Coatings sponsored by the Borden Foundation, Inc.

Professor **James D. Winefordner** (B.S. 1954; M.S. 1955; Ph.D. 1958) is the winner of the ACS Award in Analytical Chemistry sponsored by the Fisher Scientific Company.

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### **John C. Bailar, Jr., Retirement**

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On May 25, 1972, John Bailar presented the final lecture of the semester in Chemistry 102. He thus officially ended a teaching career marked by forty-four years of illustrious service to chemistry, the University of Illinois, and the people of the state of Illinois.

Professor Bailar joined the faculty and the Department of Chemistry at Illinois in 1928 upon completion of his Ph.D. degree work in organic chemistry at the University of Michigan, under the direction of Moses Comberg. Although Professor Bailar received his graduate training as an organic chemist, he began independent research by turning his attention to the earlier work of Alfred Werner on stereochemistry of coordination compounds of the transition metals. During the next several years he and his students made several advances in this area of research, including the first demonstration in 1934 of an optical inversion in the reaction of a six-coordinate cobalt (III) complex. Professor Bailar's many awards in recognition of his imaginative studies in coordination chemistry include the 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, given on the occasion of the Werner Centennial. Most recently, Professor Bailar has received the ACS Award for Distinguished Service in the Advancement of Inorganic Chemistry, sponsored by the Mallinckrodt Chemical Works.

Aside from his many research accomplishments, Professor Bailar's career at Illinois has been characterized by excellence in teaching and by extraordinary service to the University. He has shown over the years a strong interest in chemical education and in those being educated. In recognition of his attainments as a teacher, he received the ACS Award in Chemical Education in 1961 and the ACS Award in the Teaching of Chemistry, sponsored by the Manufacturing Chemists Association, in 1968.

John Bailar's intense interest in the welfare of students is clearly exemplified by his activities in connection with the local chapter of Alpha Chi Sigma fraternity. Over a period of three decades, he has rendered invaluable service to the Zeta Chapter, particularly in the role of chapter adviser in the critical years beginning in 1931 and extending into the late 1940s. Professor Bailar has continued his close association with the fraternity to the present time. In 1962 he became the first recipient of the John R. Kuebler Award, granted by the Alpha Chi Sigma fraternity in recognition of distinguished services to the fraternity and to the chemical profession.

Professor Bailar has lent luster to the image of chemistry at the University of Illinois through his many activities in the national organization of the

ACS and in the International Union of Pure and Applied Chemistry. He has served the society in almost every possible capacity from local section activities through presidency. In 1964 he received the Priestley Medal, the highest award which the society offers to those who have served it and the cause of chemistry. For several years, he was treasurer and a member of the executive committee of the International Union of Pure and Applied Chemistry and has played a major role in advancing the international activities of American chemists.

Those of us who are fortunate to have John Bailar as our distinguished colleague are pleased that the official status of retirement does not seem to have altered in the slightest his enthusiasm for chemistry nor his schedule of activities. He is, as usual, traveling far and wide to deliver lectures and to consult, working in his office, and pursuing an active research program in collaboration with postdoctoral research associates.

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## Lecture Series in the School of Chemical Sciences

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### Second Annual Doisy Lectures

The Second Annual Ada A. Doisy Lectures in Biochemistry were given on October 18 and 19, 1972. This lecture series was endowed by Professor E. A. Doisy in honor of his mother.

The lecture on October 18 was given by Dr. Paul Berg, Head of the Department of Biochemistry of Stanford University Medical School. Dr. Berg has made important contributions to our knowledge of protein and nucleic acid synthesis. His early work was devoted mainly to studies with bacterial systems, but recently, he has initiated work on the SV 40 virus, a small DNA virus which causes cancer in baboons. The title of his lecture was "Dissection of the SV 40 Viral Genome."

Dr. Walter Gilbert, who spoke on October 19, is Professor of Biology at Harvard. In the 1950s, Jacob and Monod, in their general theory for gene regulation, had predicted the existence of gene repressors. Repressors, according to the Jacob-Monod model, were proteins which in the absence of inducer molecules associated with chromosomal DNA and prevented gene expression. In the presence of inducers of gene function, Monod and Jacob predicted that repressors combined with the inducer and lost their affinity for chromosomal DNA. Gilbert, in a brilliant series of experiments which culminated in the isolation of the lac repressor, provided experimental verification of this model for gene regulation. The title of Professor Gilbert's lecture was "Characterization of Lac Repressor."

### Sherwin-Williams Lectures

The strong tradition of the Sherwin-Williams Lectures was continued this fall in a seminar series focusing on carbon-13 nuclear magnetic resonance

spectroscopy. Three speakers, whose work has contributed heavily to major advances in this area, gave lectures and held discussions with the staff and students of the School of Chemical Sciences. In the first seminar on October 18, Professor John D. Roberts of the California Institute of Technology surveyed the applications of carbon-13 nmr spectroscopy to organic and bio-organic chemistry. On October 25, Professor Adam Allerhand of Indiana University, a former research associate of Professor Gutowsky, discussed the advances made by the application of carbon-13 Fourier Transform nmr spectroscopy to chemistry and biology. And, on November 1, Professor Ernest Wenkert of Indiana University discussed application of the carbon-13 technique to natural products chemistry. The lectures were especially well received and are particularly appropriate as the carbon-13 nmr spectrometer in our spectroscopy laboratory has become operational.

#### **William Albert Noyes Lecture**

The William Albert Noyes Lecture, sponsored by the Illinois chapter of the Phi Lambda Upsilon honorary chemical fraternity, was given in March 1972 by Professor George Hammond of the California Institute of Technology. His topic was "The Psychological Morass of a Chemical Educator."

#### **Basolo Delivers the First John C. Bailar, Jr., Lecture**

On October 9, 1972, Professor Fred Basolo (Ph.D. 1943) of the Department of Chemistry, Northwestern University, delivered the first of the John C. Bailar, Jr., Lectures. On that occasion, Professor Basolo was awarded the first of the John C. Bailar, Jr., Medals in recognition of his having been chosen as lecturer. It is intended that the Bailar lecturer be chosen for research contributions in the area of inorganic chemistry, and that the recognition be international in character. Aside from his eminence as a research scientist, Professor Basolo is a particularly appropriate selection as the first Bailar lecturer. He carried out his graduate thesis research under Professor Bailar's tutelage, and received his Ph.D. in 1943.

The John C. Bailar lectureship is supported by funds contributed by colleagues, friends, and former students of Professor Bailar. The fund was established on the occasion of Professor Bailar's sixty-fifth birthday in 1969. Contributions to the fund are encouraged. Checks should be made payable to the University of Illinois Foundation, marked for the John C. Bailar, Jr., Fund, and sent to the foundation or to the School of Chemical Sciences.

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### **"Wednesday Night at the Lab" Series**

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Two years ago this *Alumni Newsletter* described at some length the Wednesday Night at the Lab (Relevant Chemistry) series of popular lectures on technical and timely topics. This series, held under the auspices of the

School of Chemical Sciences, continued to attract large and enthusiastic audiences last year in both the fall and spring semesters. Speakers in the fall included:

Dr. Kenneth L. Rinehart, Department of Chemistry, University of Illinois  
October 6, 1971 — "If Antibiotics Are So Damn Good, Why Am I Still Sick?"

Dr. Julius Johnson, Dow Chemical Company  
October 13, 1971 — "To Weed or Not to Weed: Herbicides and Ecology"

Dr. Alexander Shulgin (independent consultant in psychopharmacology)  
October 20, 1971 — "Doors of Perception: The Chemistry and Politics of Mind-Altering Drugs"

Dr. Robert Sinsheimer, California Institute of Technology  
October 27, 1971 — "The Dilemma of DNA: Problems in Genetic Change"

Those in the spring semester were:

Dr. Leonard T. Skeggs, Cleveland Veterans Administration Hospital  
March 1, 1972 — "Blood, Sweat, and Urine: The Automation of Clinical Chemistry"

Dr. Morton Beroza, U.S. Department of Agriculture Research Laboratory  
March 8, 1972 — "Light My Fire: Insect Attractants and Control"

Dr. Bruce Larson, Department of Dairy Science, University of Illinois  
March 15, 1972 — "How Elsie Does It: The Chemistry of Milk"

Dr. Sidney Fox, Institute of Molecular Evolution, University of Miami  
March 22, 1972 — "In the Beginning, Life Created Itself: A Model for Macromolecular and Cellular Origins"

This fall we are catching our breath for a semester, but we plan to resume the series in the spring.

A direct outgrowth of the Wednesday Night at the Lab series is a book to be published (perhaps under that name) by Harper and Row in January 1973. This paperback, edited by Bill McClure, Ted Brown, and Ken Rinehart, will present some of the more exciting or topical of these lectures in article form, including articles by Barry Commoner, Carl Djerassi, Robert Sinsheimer, Robert Metcalf, and nine others including the editors. The book aims to provide supplemental material for undergraduate chemistry courses and at the same time to tell intelligent lay readers (the "airport market") about interesting scientific topics. To attract the latter group, some new title may be required, perhaps *Contraceptives in the Drinking Water*.

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## Undergraduate Honors and Awards

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**Freshman Scholarships** of \$500 each were awarded to nine very promising students for the 1972-73 school year. These scholarships are awarded strictly on the basis of academic achievement in high school, without regard to fi-

nancial need. The recipients, therefore, represent the best in scholarship in the state of Illinois. We are most grateful to our alumni and the Monsanto Company, who have made these grants possible. The recipients and the sources of the award grant are

Julie Ann Szczepanski, Chicago — L. F. Audrieth Fund  
James M. DeLine, New Lennox — Roger Adams Fund  
Steven H. Mannell, New Lennox — Roger Adams Fund  
Carol L. Clark, Belleville — Roger Adams Fund  
Deborah E. Dobson, Woodridge — Roger Adams Fund  
Edward F. Reilly, Alton — Monsanto Company  
Allen K. Barclay, Macomb — Monsanto Company  
Jeffrey A. Wesson, Cherry Valley — Monsanto Company  
David W. Born, Normal — Monsanto Company

**Agnes Sloan Larson Awards** of \$200 each were given last fall to the six sophomores in the School of Chemical Sciences who achieved the highest grade-point averages in their freshman year. These awards are made possible by an annual grant by Dr. Alfred Sloan (B.S. 1922) in honor of his sister, Mrs. Agnes Sloan Larson (B.S. 1919), who was a chemistry major and valedictorian of her class. Normally, five awards are given, but this year, there was a tie for the fifth place. The students who won these awards are

Robert A. Conradi, Grayslake  
Michael C. Hovey, Indianapolis, Indiana  
Dominic Meldi, Wilsonville  
Debra L. Moore, Chester  
Robert J. Sauls, Wheaton  
Linda Clark, Belleville

The **Elliott Ritchie Alexander Award**, sponsored by Phi Lambda Upsilon, honorary chemical fraternity, is given to the student in chemistry or chemical engineering, who in his first two years at the University has attained the highest scholastic average. The award is a book of the student's choice. The student's name is also inscribed on a plaque which is displayed in the Chemistry Library.

This year, three students had identical averages, so Phi Lambda Upsilon gave each a book. The students so honored were Todd S. Brethauer of Downers Grove, Clifford Dijkstra of Oak Lawn, and Kevin Klotter of Des Plaines.

The **American Institute of Chemists Awards** go each year to the graduating seniors in chemistry and chemical engineering who are adjudged to be the most outstanding in scholarship, personal integrity, and leadership. The award is a certificate presented by the Chicago chapter of the Institute. This year, the winners were

Mark Minton, Jacksonville — Chemistry  
David Stamerjohn, East Peoria — Chemical Engineering

The **American Institute of Chemical Engineering Award**, which consists

of a certificate, a two-year subscription to the *AICHE Journal*, and a pin, goes to the junior in chemical engineering who has attained the highest grade-point average during his first two years. The winner this year is Todd S. Brethauer of Downers Grove.

The **Alpha Chi Sigma Plaque** is given each year by the Zeta Chapter of Alpha Chi Sigma to recognize the freshman in the curriculum of chemistry or chemical engineering who attained the highest average for the first semester of his freshman year. The name of this student is engraved on a plaque which hangs in the Chemistry Library. The name which was added this year is that of Todd Savides of Park Forest.

The **Reynold Clayton Fuson Award** went this year to Elaine Fuchs of Downers Grove. This prize is given to the student who, through the first semester of the senior year, has made the most outstanding academic improvement.

The **Worth Huff Rodebush Award** is a monetary award which is given to the most able senior who has demonstrated his intention to make a career in chemistry or chemical engineering. The winner this year is Gary McClelland of Park Ridge.

Gary McClelland was also the winner of the **Kendall Award**, which is a monetary award given by the Kendall Company to the member of Phi Lambda Upsilon who shows the greatest promise in chemistry or chemical engineering.

The **Merck Award** consists of a copy of the *Merck Index*. Two such awards are made each year — one each to two outstanding students in the chemistry and chemical engineering curricula. The 1972 awards went to Joy Freidinger of Pekin (chemistry) and John Bassett of Carterville (chemical engineering).

The **Phi Lambda Upsilon Cup** stands in a case in the hall of the Chemistry Annex. Each year, the name of the sophomore man who has the highest scholastic average among the students in the curricula of chemistry and chemical engineering is engraved on the cup. This year Dominic Meldi of Wilsonville and Robert Sauls of Wheaton had identical averages, so both names were inscribed on the cup.

The **Chemical Rubber Company Achievement Award** consists of a copy of the *Handbook of Chemistry and Physics*. It is presented each year to the outstanding student in general chemistry. In case of a tie, more than one book is given. The recipients this year are David Sizemore of East Point, Terence Lenhardt of Dolton, and Max J. Helix of Lemont.

The **Iota Sigma Pi Prize** is sponsored by the Illinois chapter of the honorary chemical sorority, and consists of a cash award of \$20. It is given to the senior woman who has the highest average, and who is majoring in chemistry. It was won this year by Elaine Fuchs of Downers Grove.

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## Graduate Enrollments

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Our graduate student enrollments have shown a slight decline from 438 students in the School of Chemical Sciences as a whole in 1968-69 to 408 last year and 415 at the present time. This mainly reflects the decreases in the sizes of the incoming classes which we have experienced during the past three years; the number of entering students dropped from 132 in 1969 to 90 this year. This decline has probably been due to a number of factors, among which are the highly publicized oversupply of chemistry Ph.D.'s, a widespread disenchantment with technology, national economic problems, and a change in the selective service deferment status of students. These factors have led to a decline in student interest in attending graduate school. To a certain extent this decrease in demand has coincided with harder times for the support of graduate student programs, but, nevertheless, it has made the competition for the good students more fierce than before. As a result, we have suffered a drop in the proportion of our offers to prospective students which have been accepted.

Most of the decline in the graduate admissions has been in chemistry, with biochemistry and chemical engineering holding their own. This fall, only 54 new students in chemistry are on board compared to a high of 95 in the entering class in chemistry in 1969. However, even though the numbers are down, the quality seems to be comparable to that of previous years; the average grade-point average of the incoming class is 4.6/5.0, which compares favorably with our best years. Recognizing that we cannot continue the downward trend in future years without seriously hurting our teaching and research programs, we plan to increase our stipend scale significantly this year in order to compete more favorably.

The following table shows how the 415 graduate students are currently distributed among the major areas in the School of Chemical Sciences.

Analytical Chemistry	36	Organic Chemistry	101
Biochemistry	69	Physical Chemistry and	
Biophysical Chemistry	7	Chemical Physics	88
Chemical Engineering	52'	Teaching of Chemistry	2
Inorganic Chemistry	59	Undecided	1

Although the distribution varies from year to year, some long-range trends are evident. Increases have been noted over the past few years in biochemistry and in the physically-oriented areas (biophysical, physical chemistry, and chemical physics). Decreases have been seen in chemical engineering and inorganic chemistry.

Closely coupled to the numbers of graduate students is the means of supporting them. The past several years have seen a continuous erosion in the number of federally and state-funded fellowships and traineeships. In 1967 we had 136 students supported by federal fellowships and traineeships and 34 by state-funded fellowships. By last year, the numbers had declined to 74

and 24. This decline is expected to continue, making the support of our outstanding students one of our most pressing problems. Fortunately, industrial donors have been loyal in maintaining their grants. Without them we would be in very dire straits.

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## **Improvement in the Employment Situation**

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The job situation for our graduating students and our alumni, which has been of great concern to us for the last two or three years, is showing a definite upturn. It is still a matter of some concern, but is causing fewer sleepless nights than before. All of the members of the class of 1972, at both the B.S. and advanced levels, are chemically employed. Many of the 1971 and 1972 Ph.D.'s are on postdoctoral appointment, which is temporary, but Mrs. Durham and her staff in the Placement Office are working with them, and we expect that they will find jobs by the time they finish their postdoctoral appointments.

The number of companies sending interviewers to the campus wasn't much greater this fall than it was last year, but those that have come were looking for an increased number of new employees — in many cases, three times as many as last year. The prospects for the class of 1973 look very good indeed. Some companies that employ chemists are anticipating that there will be a shortage of chemists in two or three years. We hope they are right.

There are sixty-one postdoctoral people working in the School of Chemical Sciences at this time. By virtue of that employment, they are Illini, too. About half of these are from other countries and will return home when they leave Illinois. Most of the remainder are hoping for academic employment, but they realize that academic openings will develop much more slowly than those in industry and most of them interviewed industrial representatives who came to Urbana this fall. Hopefully, they will be placed in colleges, universities, or industries by the end of the school year.

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## **Roger Adams Fund and School of Chemical Sciences Fund**

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The alumni and friends of the School of Chemical Sciences have shown their loyalty in many ways. In recent years, this has been shown in part by your generous contributions to the Roger Adams Fund and to the School of Chemical Sciences Educational Fund (formerly called the Illini Chemists Fund). Income from the former can be used for any purposes where there are special needs, but thus far, it has been used to support undergraduate scholarships in chemistry, chemical engineering, and biochemistry. The body of this fund now stands at a little more than \$68,000. The School of Chemi-

cal Sciences Fund is used to support this *Alumni Newsletter*. It now stands at about \$750. We urge that all alumni support these funds, and we have enclosed a form which can be used for this purpose. We shall be equally happy to have your contribution without the form. However, in that case, it will be necessary for you to indicate that your gift is intended for one of these funds.

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

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### Ph.D. Recipients in February 1972

Cady, Wayne Allen                      Physical                      R. A. Marcus  
Indiana University-Purdue University at Indianapolis, Indianapolis, Indiana  
"Theories of Translational-Vibrational Energy Transfer and Rotational Spectral Line Broadening"

Denton, M. Bonner                      Analytical                      H. V. Malmstadt  
University of Arizona, Tucson, Arizona  
"Considerations in Laser-Excited Atomic Fluorescence Spectroscopy and Related Investigations"

Frank, Curtis Woodrow                      Chemical Engineering                      H. G. Drickamer  
Sandia Laboratories, Albuquerque, New Mexico  
"The Effect of Pressure on the Electronic Structure of Twelve Ferric Beta-Diketonate Complexes"

Harvey, Peter M.                      Organic                      D. E. Applequist  
Plastics Department, Experimental Station, E. I. du Pont de Nemours and Company, Wilmington, Delaware 19898  
"(I) Precursors to *Trans*-Cyclooctene and the *Trans*-Bicyclo [6.1.0]Nonane System,  
(II) *Cis*- and *Trans*-Ethylidene-cyclopropane-2, 3-Dicarboxylic Acids"

Johnson, Eric Foster                      Inorganic                      R. S. Drago  
University of Illinois, Urbana, Illinois 61801  
"Time Correlation Function Analysis of Raman Lineshapes"

Li, Ting-I                      Inorganic                      G. D. Stucky  
Columbia University, New York, New York  
"Structural Chemistry of Cesium Trihalo Transition Metal Compounds"

Muntz, Ronald Lee                      Organic                      W. H. Pirkle  
Stauffer Chemical Company, Dobbs Ferry, New York  
"Applications of Chiral NMR Solvents"

Needham, Terence Edward      Inorganic      R. S. Drago  
Los Alamos Scientific Laboratory, Los Alamos, New Mexico  
"Structure Studies by Nuclear Magnetic Resonance"

Richardson, Brian William      Physical      H. S. Gutowsky  
Simon Fraser University, Burnaby 2, British Columbia, Canada  
"Curve Fitting in NMR Exchange Studies"

Sackett, Philip Burnam      Physical      J. T. Yardley  
Air Force Cambridge Research Laboratories, L. G. Hanscom Field, Bedford,  
Massachusetts  
"A Dynamic Study of the Electronic States of Nitrogen Dioxide using  
Tunable Organic Dye Laser Excitation"

Sasaki, Tadahiro      Organic      D. E. Applequist  
2-18-6 Kamitam-Machi, Kanagawa-Ku, Yokohama, Japan  
"The Syntheses and Deaminations of 4- and 5-Adminospirohexanes"

Stanley, Elizabeth Colelli      Analytical      H. V. Malmstadt  
Governors State University, Park Forest, Illinois  
"Analysis of Gases Utilizing Sensitive and Precise Ultraviolet Absorption  
Spectrophotometry"

Swanson, James Stanford      Inorganic      G. D. Stucky  
Georgia-Pacific Corporation, Coos Bay, Oregon 97420  
Rt. 1, Box 455, Coos Bay, Oregon  
"Physical and Chemical Investigation of Small Organic and Organo Metallic  
Molecules"

Woods, Thomas Stephen      Organic      Peter Beak  
U.S. Army, Walter Reed Hospital, Washington, D.C.  
11510 Bucknell Drive, Apt. 201, Wheaton, Maryland 20902  
"(I) The Photochemistry of the 2,3-Piperazinediones and the 1,2,5,6-Tetra-  
hydro-2-Pyrazinones, (II) Thermodynamic Studies of Equilibria of Some  
Methyltropic Nitrogen Heterocycles"

#### Ph.D. Recipients in June 1972

Assink, Roger Alyn      Physical      J. Jonas  
Sandia Corporation, Albuquerque, New Mexico  
"The Study of Molecular Rotation in Liquids by NMR at High Pressure"

Benson, Richard Charles      Physical      W. H. Flygare  
Applied Physics Laboratory, Johns Hopkins University, Baltimore, Maryland  
"Molecular Zeeman Studies of Ring Molecules and Molecular Beam-Micro-  
wave Spectrometer Development"

Bittell, James Edward                      Organic                      W. H. Firkle  
Department of Plant Physiology, University of Illinois, Urbana, Illinois 61801  
"Halonium Ylide Intermediates in the Photodecomposition of 3,5-Dialkyl-  
benzene-1,4-Diazo oxides in Alkyl and Aryl Halides"

Chapas, Richard Bernard                      Organic                      H. R. Snyder  
Eastman Kodak Company, Rochester, New York  
"The Reaction of Cyanide Ion with Aromatic Nitriles and Aromatic Hetero-  
cyclic Compounds"

Delaney, Collene Jayne                      Analytical                      H. V. Malmstadt  
University of Washington, Department of Laboratory Medicine and Depart-  
ment of Biochemistry, Seattle, Washington  
"An Automated Spectrophotometric Stopped-Flow System for Reaction-Rate  
Measurements and Application to the Rapid Quantitative Determination  
of Phosphate in Soil and Water Samples"

Secrist, John Adair III                      Organic                      N. J. Leonard  
Harvard University, Cambridge, Massachusetts 02138  
22 Robinson Street, #32, Cambridge, Massachusetts 02138  
"Bioorganic Studies Related to Coenzymes and Nucleic Acids"

Sowerby, Roger Lee                      Organic                      R. M. Coates  
Lubrizol Corporation, Wickliffe, Ohio  
"The Total Synthesis of Zizaene"

Wegner, Theodore H.                      Chemical Engineering                      T. J. Hanratty  
E. I. du Pont de Nemours and Company, Textile Fibers Department, Seaford,  
Delaware  
405 Deborah Drive, Apt. F, Salisbury, Maryland 21801  
"Flow Through Regular Arrays of Spheres"

Yano, Kazuyuki                      Organic                      R. M. Coates  
Saitama Medical University, Saitama-Ken, Japan  
"(I) Synthesis and Reactivity of Tetracyclo [3.3.0.0<sup>3,6</sup>.0<sup>2,9</sup>] Oct-4-YL Deriva-  
tives, (II) Reactivity and Degenerate Rearrangement of Tricyclonadienyl  
Derivatives"

#### Ph.D. Recipients in October 1972

Almendinger, Rosemary                      Biochemistry                      L. P. Hager  
Department of Biochemistry, University of Illinois, Urbana, Illinois 61801  
"Studies on the Role of Endonuclease I in Colicin E<sub>2</sub> Killing"

- Callen, John B. Inorganic G. D. Stucky  
 Central Research Laboratories, 3M Company, 3M Center, St. Paul, Minnesota 55101  
 5640 Phoenix Street, Golden Valley, Minnesota 55422  
 "Magnetic and Spectroscopic Investigations of the 2,2'-Mono- and Dithiobis (benzothiazole) Complexes of Some First Row Transition Metal Halides, Thiocyanates and Nitrates"
- Charbonneau, Larry Francis Organic S. G. Smith  
 General Motors Research Laboratories, GM Technical Center, Warren, Michigan  
 "Kinetics and Mechanism of Organolithium and Organomagnesium Reagent Reactions with Ketones"
- Charlson, Gary Samuel Chemical Engineering R. L. Sani  
 Atlantic Richfield Production Company, Dallas, Texas 75207  
 "Thermoconvection in a Bounded Cylindrical Fluid Layer"
- Chessmore, Ronald Burrell Analytical H. A. Laitinen  
 National Center for Atmosphere Research, Boulder, Colorado  
 1407 Venice, Longmont, Colorado  
 "Electrochemical Reduction of Lithium Metavanadate in Molten Lithium Chloride-Potassium Chloride Eutectic"
- Chiang, Robert Ling Inorganic R. S. Drago  
 Department of Biochemistry, University of Illinois, Urbana, Illinois 61801  
 "Spectroscopic Studies on Lewis Acid-Base Interactions"
- Chung, Sung Kee Organic R. M. Coates  
 Research Associate, Yale University, New Haven, Connecticut 06520  
 "Organic Chemical Model Studies on the Biogenesis of Pentacyclic Triterpenes"
- Davis, Phillip Howard Physical R. L. Belford  
 Department of Chemistry, University of Illinois, Urbana, Illinois 61801  
 "(I) Hexakis(Urea) Metal(III) Halides, (II) Metal(I) Halide-Triphenylphosphine Complexes"
- Hryhorczuk, Lew Mykola Inorganic J. C. Bailar, Jr.  
 11153 Outer Drive E., Detroit, Michigan 48224  
 "(I) Stereoselective Effects in Reactions of Cobalt Complexes Containing the Asymmetric Ligand, Phenylethylenediamine, (II) The Mass Spectra of N,N'-Bis(Salicylidene)Phenylethylene-Diamine and Its Coordination Complexes with Cobalt(II), Nickel(II) and Copper(II)"

Iracki, Edwin Stanley                      Analytical                      H. V. Malmstadt  
Rhodes Engineering Research Building, Clemson University, Clemson, South  
Carolina 29631

244 Riggs Drive, Clemson, South Carolina 29631

"A Computer-Controlled Automated Spectrophotometric System for Reaction-Rate Measurements with Application to the Quantitative Determination of Fluoride Ion"

Kuhlman, Myron Ira                      Chemical Engineering                      H. G. Drickamer  
E. I. du Pont de Nemours and Company, Seaford, Delaware 19973  
"Reactivity in Organic Materials at High Pressure"

Leung, Pak-Tong                      Organic                      D. Y. Curtin  
Department of Biochemistry, Gortner Laboratory, University of Minnesota,  
St. Paul, Minnesota 55101

"Synthetic and Conformational Studies of Some 9-Methylene-9, 10-Dihydroanthracenes"

Lien, Eric Louis                      Biochemistry                      J. M. Wood  
Research Associate, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania  
"Cobalamin Binding to Proteins of Physiological Significance"

Mabuni, Clayton Toshio                      Organic                      K. L. Rinehart  
Research Associate, University of Wisconsin, Madison, Wisconsin  
"(I) On the Relationship of a Halphen Product and the Thiothiophthens,  
(II) The Isolation and Identification of Comenic Acid (5-Hydroxy-4-OXO-4H-Pyran-2-Carboxylic Acid) from Pink Disease Bacteria"

Maynes, Gordon George                      Organic                      D. E. Applequist  
E. I. du Pont de Nemours and Company, Carothers Laboratory, Experimental Station, Wilmington, Delaware 19809  
2229 F. Prior Road, Wilmington, Delaware 19809  
"The Stereochemistry of Free Radical Ring Cleavage of Cis-1,2,3-Trimethylcyclopropane by Bromine",

McKnight, George Francis                      Inorganic                      G. P. Haight, Jr.  
University of Simon Bolivar, Department of Chemistry, A.P. 5354 Caracas, Venezuela  
"Studies of Compounds of the Octacyanomolybdate(IV) Ion"

Muirhead, Alan Ross                      Physical                      J. R. Lombardi  
Department of Chemistry, Rice University, Houston, Texas 77001  
"Electric Field Effects on Optical Spectra"

- Olander, Walter Karl                      Inorganic                      T. L. Brown  
 General Electric R & D Center, Schenectady, New York 12301  
 "Studies of Transition Metal-Cyclopropenyl Complexes"
- Playtis, Anthony John                      Organic                      N. J. Leonard  
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