ACS 1984 National Award Winners Announced

Following are the 1984 recipients of awards administered by ACS. All will receive their awards at the 187th ACS National Meeting in St. Louis next April, except Albert Eschenmoser, who will receive the Arthur C. Cope Award on Aug. 28, 1984, from the Division of Organic Chemistry at the ACS National Meeting in Philadelphia. A vignette of Linus Pauling, winner of the 1984 Priestley Medal, appeared in C&EN, July 11, page 20.

ACS Award in Chemical Education

sponsored by Union Carbide Corp.

In 1979 **ARTHUR W. ADAMSON** received the ACS Award in Colloid or Surface Chemistry. In 1982 he was given the ACS Award for Distinguished Service in the Advancement of Inorganic Chemistry. Thus he has been recognized for outstanding work in both of his areas of research.

But a brilliant research worker is not necessarily a good communicator of his or her ideas or a good teacher. Adamson is—as this award indicates. Aside from a long list of technical papers, Adamson's books—"A Textbook of Physical Chemistry," "Understanding Physical Chemistry," and "Physical Chemistry of Surfaces" (now in its fourth edition)—are testimony to his skills in communication. He has been a frequent contributor to the *Journal of Chemical Education*. The number of Ph.D. and postdoctoral students who have gone on to outstanding careers attests to his abilities as an educator.

The University of Southern California professor takes a very personal interest in his graduate students, especially those from other countries. He meets with them at least weekly and even when traveling—which he has done extensively—he keeps up with them by means of tape recordings.

Adamson was born in Shanghai, China, and his family traveled widely. He received a B.S. in chemistry (with honors) from the University of California, Berkeley, in 1940 and a Ph.D. in physical chemistry from the University of Chicago in 1944. He did plutonium research for the Manhattan Project at Chicago and at Oak Ridge from 1942 to 1946 when he joined the USC faculty. He was named to his present position in 1953. Adamson received the ACS Southern California Section's Tolman Medal in 1967; he was chairman of the section in 1964. He served as chairman of the Division of Colloid & Surface Chemistry in 1970.

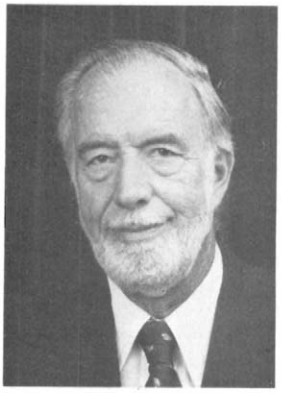
ACS Award in Polymer Chemistry

sponsored by Mobil Chemical Co.

HARRY R. ALLCOCK, professor of chemistry at Pennsylvania State University, has the distinction of being the discoverer and principal explorer of an important new area of polymer chemistry. His pioneering research on the synthesis of new polymer systems that contain inorganic elements in the backbone, and especially his discoveries in polyphosphazene chemistry, have won him this award.

Before 1965, the only useful inorganic-organic polymers were those derived from polysiloxanes. A few investigators had worked briefly with the polyphosphazene system, but none had been able to synthesize hydrolytically stable, useful polymers. Allcock's first breakthrough was his discovery of a method for synthesizing heretofore unknown soluble, uncross-linked poly(dichlorophosphazene). He used this as a reaction intermediate for the nucleophilic introduction of organic side groups in place of the chlorine atoms.

This is an unusual approach to the synthesis of an extremely broad series of unusual new high polymers. More than 140 papers on the synthesis and properties of phosphazene oligomers and high polymers have been published by Allcock's research group. These papers form the springboard from which all the subsequent fundamental, medical, and technological developments in this area have been derived.



Adamson

Allcock

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In recent years Allcock has extended the general principles of polyphosphazene synthesis to include macromolecules that are biologically active or biocompatible. Polyphosphazenes that function as carriers for heme, platinum antitumor drugs, steroids, sulfa drugs, local anesthetics, catecholamines, and heparin were first synthesized in his lab, as well as polymers that degrade at body pH to harmless, metabolizable products, such as amino acids and phosphate.

Allcock did his undergraduate and graduate studies at the University of London, where he received his Ph.D. in chemistry in 1956. He was a research chemist at American Cyanamid Co. (1961 to 1966) before joining Pennsylvania State University.

Claude S. Hudson Award in Carbohydrate Chemistry

sponsored by Merck Sharp & Dohme Research Laboratories and Kelco, divisions of Merck & Co.

LAURENS ANDERSON, professor of biochemistry at the University of Wisconsin, Madison, an authority on carbohydrate chemistry, has made innovative, elegant, and continuous contributions to carbohydrate research since the late 1940s.

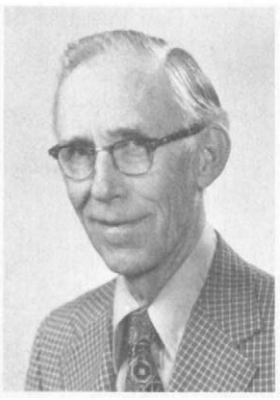
Some of Anderson's specific accomplishments include the following: He did the definitive proof of the all-trans configuration of the streptamine moiety of the important antibiotics streptomycin and bluensomycin; he synthesized and proved the configuration of several monoamino monodeoxy inositols, and his data were the basis for the characterization of the recently discovered antibiotic minosaminomicin; he established the correct stereochemical formula for bluensomycin; he determined the absolute configuration of all of the *myo*-inositol monomethyl ethers—a classic series of investigations.

Anderson's pioneering, painstaking research on the determination of the absolute configuration of the *myo*-inositol methyl ethers and subsequently the synthesis of ^{14}C-labelled *myo*-inositol made possible the early elucidation of the catabolism of this compound. His studies on the tautomerization kinetics of 2-deoxyribose and D-galactose describing their mutarotations are unparalleled.

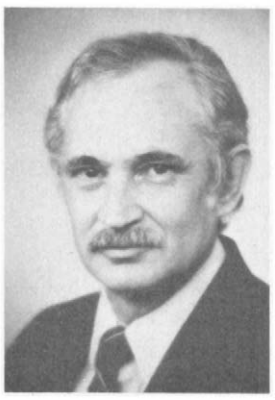
His research has extended into cyanogenic glycosides in sorghum, the chemistry of phosphoproteins, and the properties of some hydrolytic enzymes. His present major research interest is the synthetic chemistry of sugars, particularly the chemical synthesis of oligosaccharides.

He has devised syntheses of numerous "building block" derivatives of D-galactose and D-glucosamine, and assembled these into tri- and tetrasaccharides related to the human blood group determinants. More recently, he developed synthetic approaches to the lipid A component of antigenic bacterial lipopolysaccharides.

Anderson obtained his Ph.D. from the University of Wisconsin in 1950, then joined the faculty and has spent his entire professional career there. He was named Steenbock Professor of Biomolecular Structure in 1981.



Anderson



Bard

ACS Award in Analytical Chemistry

sponsored by Fisher Scientific Co.

ALLEN J. BARD is "an analytical chemist with exceptional proven performance in physical, organic, and solid-state chemistry," so comments a contemporary admirer.

After obtaining his Ph.D. from Harvard University in 1958, Bard joined the University of Texas, Austin, where he steadily moved up the ladder, and where he is presently Norman Hackerman Professor of Chemistry. In his own view, "one should do the best science possible in whatever area the analytical research leads," and he has followed this route with much success.

From the beginning, Bard's analytical studies involved careful probing of the underlying principles and mechanisms of reactions. Turning his electroanalytical investigations toward organic electrochemistry, he led his group in developing the field of coulometry as applied to understanding organic electrode mechanisms. His work in electron spin resonance went beyond simply characterizing radical ions in electrochemical processes—his research contributed to basic understandings of radical interactions and the quantum chemistry of such systems. Bard's lab contributed greatly to the fundamental studies of electrohydrodimerization.

In 1970, Bard turned his research to semiconductor electrodes and photoelectrochemical investigations. Today his laboratory leads the world in many aspects of solid-state electrochemistry. Particularly notable are the ongoing studies of photoreactions at semiconductor electrodes with their obvious interest for energy conversion devices.

A first-rate teacher at all levels, Bard's book, "Chemical Equilibrium," is a highly useful tool for undergraduate teaching in analytical chemistry. At the graduate level, "Electrochemical Methods—Fundamentals and Applications" written with Larry Faulkner, is already a "bible" in most electroanalytical labs.

Bard is the editor of the *Journal of the American Chemical Society.*

ACS Award in Separations Science and Technology

sponsored by Rohm & Haas Co.

DONALD B. BROUGHTON, senior engineering R&D associate at UOP's process division in Des Plaines, Ill., is an extraordinarily creative engineer whose work epitomizes the industrial chemist/engineer.

Broughton's major accomplishment has been the development of widely used separation processes in the fields of liquid-liquid extraction and adsorption. His principal contributions are in two major areas of separation technology—(1) the Udex and Sulfolane processes for selective extraction of aromatic hydrocarbons, and (2) the Sorbex family of processes for separating a host of organic intermediates and products.

Prior to and through World War II, the chemical industry obtained benzene, toluene, and xylenes as by-products from coke and coal tar operations. The volumes and purities proved inadequate, however, as the industry expanded in the early 1950s. UOP's new Platforming process provided plenty of mixed aromatics by reforming naphtha, but improved separation processes were needed to benefit from this bountiful source.

The answer came when Broughton coupled two well-known separation processes—liquid-liquid extraction systems, and extractive stripping.

In Broughton's Sorbex separation processes the goal was to accomplish large-scale, liquid-solid adsorptive separation continuously in a countercurrent fashion. Success was achieved by a simulated moving-bed operation, wherein an ingenious rotary valve fools the molecules into thinking they are in a continuous countercurrent operation. This is the heart of Sorbex technology—directing the flow of the desorbent, extract, feed, and raffinate streams to the right zones in the right sequence.

More than 150 commercial liquid-liquid extraction plants and 60 Sorbex plants using Broughton's principles have been licensed.

Broughton holds more than 50 U.S. patents. He is a fellow of the American Institute of Chemical Engineers and the National Academy of Engineering. An Englishman by birth, Broughton received his education at Pennsylvania State College and at Massachusetts Institute of Technology, obtaining his doctorate in chemical engineering at the latter in 1943.

Broughton

Cerny

ACS Award for Nuclear Chemistry

sponsored by EG&G ORTEC

JOSEPH CERNY's pioneering studies of the stability limits in light nuclei have established him as a leading authority on the subject worldwide. One colleague states, "Joe Cerny's experiments searching for exotic nuclear species have generally pushed the existing technology."

Cerny was born in 1936 in Montgomery, Ala., received a B.S. in chemical engineering at the University of Mississippi in 1957, and graduated with a Ph.D. in nuclear chemistry from the University of California, Berkeley, in 1961. He also went to the University of Manchester in the U.K. as a Fulbright scholar in 1957–58. He began teaching at the University of California, Berkeley, in 1961 as an assistant professor of chemistry, became associate professor in 1967, full professor in 1971, and chairman of the chemistry department from 1975 to 1979. Today he is head of the nuclear science division and associate director at Lawrence Berkeley Laboratory, Berkeley, Calif., but still holds a position as professor in the chemistry department at the university.

Early in his career, Cerny recognized the potential importance of multinucleon transfer reactions for nuclear spectroscopic purposes and the investigation of high isospin multiplets. He developed a novel particle identifier for mass analysis of very-low-yield nuclear reaction products. Subsequent research led to the observation of decay channels that provided new tests of isobaric spin conservation, and to the discovery of many exotic light nuclei on the limits of stability.

Cerny also discovered proton decay, which added a fourth mode of radioactive decay to the three previously known—alpha decay, beta decay, and spontaneous fission. His most recent discovery, hailed as "exciting" by a colleague, is of two-proton emission following beta particle decay for the new isotopes ^{22}Al and ^{26}P. This decay process had been predicted theoretically but never observed experimentally.

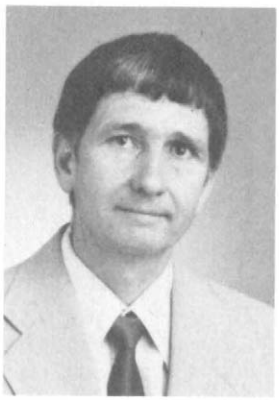
Author of more than 120 research papers, Cerny also has distinguished himself as a member of the Nuclear Science Advisory Committee for the Department of Energy/National Science Foundation. He received the E. O. Lawrence Award of the Atomic Energy Commission in 1974.

ACS Award in Colloid or Surface Chemistry

sponsored by Kendall Co.

Research that has had an impact on fuel-cell and electrolyzer development and has advanced the understanding of the electrode processes involved in the chlorine-caustic industry brings this recognition to

Conway



Corriu

Dewar

BRIAN E. CONWAY, professor of chemistry at the University of Ottawa.

The London-born chemist's work falls into four main areas: treatment of kinetic, thermodynamic, and adsorption behavior of adatoms at sensitivities that cannot be approached in other techniques; evaluation of the role of submonolayer oxidation and Cl^- ion coadsorption in anodic Cl_2 evolution mechanisms; theoretical treatments of isotherms for adsorption of neutral and partially charged adatoms and the derivative quantity that gives rise to high-resolution measurements on states of adsorption; and the relation of individual ionic hydration behavior to ion adsorption and solvent orientation at electrode surfaces.

Among his achievements are development of the theory and technique of pre-electrolysis, discovery of one of the first chemically modified electrode systems and of the anodic H desorption effect, and development of a pyrodistillation system for ultrapurification of water for surface electrochemistry work. Also recognized are his contributions to theoretical electrochemistry.

Conway received his B.Sc. in 1946, Ph.D. in 1949, and D.Sc. in 1961 from Imperial College, University of London. He was with the University of London's Chester Beatty Research Institute in 1949–54 and taught at the University of Pennsylvania before joining the Ottawa faculty in 1956. He was named professor of chemistry in 1961.

He received the Chemical Institute of Canada's Noranda Award in 1964 and its Palladium Medal in 1975. He was elected a fellow of the Royal Institute of Chemistry in 1959 and a fellow of the Royal Society of Canada in 1968. He has just been awarded the Killam senior research fellowship of the Canada Council for 1983–84.

Conway has written three books, coedited 13 others, and authored more than 266 papers. He has been a consultant to Brookhaven National Laboratories and several industries and is an active member of the Electrochemical Society.

Frederic Stanley Kipping Award in Organosilicon Chemistry

sponsored by Dow Corning Corp.

ROBERT J. P. CORRIU, professor and director of the Laboratory of Organometallic Chemistry, University of Science & Technology of Languedoc, Montpellier, France, has an impressive list of contributions to organosilicon chemistry. These accomplishments fall into four general areas: stereochemistry, chemistry of compounds with transition metal-silicon bonds, electrochemistry, and application of organic syntheses.

In stereochemistry, Corriu has studied the relation of the silicenium ion to the stereochemistry of halosilanes. He also has investigated the stereochemistry of silicon, and proposed some new mechanisms, and he has found a new type of process in nucleophilic substitution for some HMPA-activated hydrolysis and alcoholysis.

He has studied extensively the formation of silicon and germanium compounds bound to transition metals, including those with optically active silicon and germanium centers. Research into the relation of the chemistry of silicon and germanium to transition metal bonds has led to important new reactions. And he has developed the use of optically active germanium for the resolution of new chiral metal centers.

Corriu has re-examined the electrochemical reduction of both halosilanes and halogermanes and has found that many incorrect statements have been published previously. The reduction is actually a very difficult process taking place only at high potential through two phases of electron transfer. He has developed a new approach to preparing anions of silicon, germanium, and tin that allows a clean preparation of anions without salts and in good yields.

Recently organosilicon compounds have been used as versatile reagents in organic syntheses. Among Corriu's contributions in this field are highly selective reduction of carbonyl groups under heterogeneous conditions at the surface of salts by activation with hydrosilanes, activation of the Si—N bond of *N,N*-disilylated enamines in the reaction with carbonyl compounds to give heterodienes, and syntheses of allyl vinyl and dienyl silane.

Born in Port-Vendres, France, he obtained a Diplôme d'Etudes Supérieures from the Laboratory of Organic & Industrial Chemistry in 1958. He was honored with Lauréat of the Faculty of Sciences of Montpellier and received a D.Sc. there in 1961. In 1964 he joined the Faculty of Science at Poitiers, and in 1969 he came to Montpellier.

James Flack Norris Award in Physical Organic Chemistry

sponsored by the ACS Northeastern Section

MICHAEL J. S. DEWAR, Robert A. Welch Professor of Chemistry at the University of Texas, Austin, since 1963, is an outstanding leader in the field of physical organic chemistry. He has been very influential in developing the theory of organic chemistry, and is an exponent of the unified theoretical/experimental approach to organic chemistry. To place Dewar's contributions into

proper perspective, it is necessary to set the scene a bit.

Physical organic chemistry experienced pioneering growth beginning in the late 1930s under strong influence of the British school, particularly C. K. Ingold. It expanded rapidly in the U.S., after World War II, when the emphasis was on kinetics and reaction mechanisms. In the late 1950s, theoretical insights led to the recognition and syntheses of stable aromatic structures; noteworthy in pioneering this new development was Dewar, among others. Still another major impetus came in 1965, when the concept of pericyclic reactions was formalized and popularized. Most recently, the use of computers and convenient programs for executing MO and other calculations has added major stimulus to the theoretical component of physical organic chemistry.

Dewar has contributed in a major and lasting way to each of the various subdomains of organic chemistry, spanning almost all its entire history.

In the pericyclic era of physical organic chemistry, Dewar contributed to an understanding of the weaknesses of the orbital symmetry concept and helped develop an alternate (and superior) theory which stresses aromatic/antiaromatic transition states.

Dewar developed MINDO/3 and MNDO. The dissemination and use of his programs, although already extensive, have only just begun, and their influence will continue to grow.

Born in India, Dewar studied at Oxford. He was head of the chemistry department at Queen Mary College and the University of London before coming to the U.S. in 1959. He was professor of chemistry at the University of Chicago from 1959 to 1963, before joining the University of Texas.

Arthur C. Cope Award

ALBERT ESCHENMOSER, professor of organic chemistry at the Swiss Federal Institute of Technology, Zurich, is one of the leading figures of contemporary organic chemistry. "All of his work emanates from a deep intuition concerning the factors which influence the reactivity of organic compounds, and bears the mark of prime originality, intellectual rigor, and outstanding experimental ingenuity," says an admiring colleague.

Eschenmoser's early contributions on acid-catalyzed cyclizations of aliphatic polyenes served as guidelines for deriving new and critical re-examination of old structural assignments of many terpenes; the subsequent stereochemical elaboration of these ideas eventually provided the main impetus for development of the final version of the biogenetic isoprene rule.

Eschenmoser is perhaps best known for his accomplishments in organic synthesis. His mastery of strategy and tactics became very evident in the course of the long and laborious work, carried out in part as a joint venture with the late R. B. Woodward, leading to the total synthesis of vitamin B_{12}. This synthesis has been referred to as the most ambitious project ever undertaken in organic chemistry; its successful completion gives witness to the power of present-day synthetic chemistry. Along the way, Eschenmoser developed a variety of synthetic approaches to corrin derivatives; this has made possible systematic investigations of the properties of an important, heretofore inaccessible class of complexing agents.

Eschenmoser was born in 1925 in Erstfeld, Switzerland. He studied at the Swiss Federal Institute of Technology, receiving the diplôme degree in 1949. Two years later he completed his doctoral research under Leopold Ruzicka and H. Schinz. Eschenmoser joined the faculty of the institute in 1956; he has been full professor since 1965.

Eschenmoser has received many awards, some of which are: the Marcel Benoist Prize (the highest scientific award of the Swiss government), A. W. von Hofmann Medal of the Gesellschaft Deutscher Chemiker, Davy Medal of the Royal Society, Werner Prize (Swiss Chemical Society in 1956), and the ACS Ernest Guenther Award in 1966.

E. V. Murphree Award in Industrial & Engineering Chemistry

sponsored by Exxon Research & Engineering Co.

ROBERT K. GRASSELLI, science fellow at Standard Oil Co. (Ohio), Cleveland, has made outstanding contributions to the theory and commercial practice of allyic oxidation and ammoxidation over heterogeneous catalysts. While conducting theoretical studies in this field, he has played a key role in the discovery of the Sohio one-step acrylonitrile process, and participated in the development and commercialization of a series of important and highly successful catalysts for the production of acrylonitrile and acrylic acid.

Grasselli provided major input into the early breakthrough in this field by developing a hypothesis that active sites must be isolated, and that a metal-oxygen bond of appropriate strength is necessary for a facile redox system.

Grasselli also played a major role in

Eschenmoser

Grasselli

the development of the first commercial uranium-antimony oxidation system. He was responsible for the detailed studies of this complex system, an accomplishment of both practical and scientific importance. "This elegant work has been a model for the interpretation of reactions at surfaces and reflects Grasselli's outstanding contribution to science and technology as an industrial chemist," says an admirer commenting on Grasselli's pioneering research.

These key discoveries led further breakthroughs in complex antimonate and bismuth molybdates to the design of highly active and selective late generation industrial systems presently in commercial use in 23 countries throughout the world.

More recently, Grasselli has focused on a fundamental understanding of solid state structural and redox properties and the mechanistic aspects of selective oxidation and ammoxidation over heterogeneous catalysts. These investigations have resulted in a deeper understanding of the fundamental process of redox behavior of catalysts and its relationship to solid state structure, including the importance of shear domains.

Grasselli was born in Calje, Yugoslavia, in 1930. He studied at the University of Graz, Austria, before receiving his A.B. from Harvard (1952), and his M.S. (1955) and Ph.D. (1959) from Case Western Reserve University. His entire professional career has been with Sohio, where he is now head of the corporate catalysis and solid state science group, and holds the title of science fellow—the highest technical rank in the company.

ACS Award for Distinguished Service in the Advancement of Inorganic Chemistry

sponsored by Mallinckrodt Inc.

"Inorganic chemistry is deeply indebted to Harry for the vigor, life, and humor he has brought to it—inorganic chemistry not only beomes a truly great and interesting subject but a fun subject as well." This is the way one colleague sums up **HARRY B. GRAY,** Arnold O. Beckman Professor of Chemistry and chairman of the division of chemistry and chemical engineering at California Institute of Technology, and his important contributions to inorganic chemistry.

Gray's distinguished career spans more than two decades, and though he has contributed to nearly every field of chemistry, his primary interests currently lie in the areas of inorganic photochemistry and bioinorganic chemistry.

A long-term goal in organic photochemistry is to develop inorganic photoreagents that can harness solar photons to drive important energy storage reactions. These reactions typically involve multielectron transfer processes, and Gray presently is investigating a number of polynuclear transition metal species that, with the impetus of a single photon, might participate in such chemical transformations. Among the most promising of these is a series of metal halide clusters.

The efforts of Gray and his research group in bioinorganic chemistry have focused on the electron transfer mechanisms of metalloproteins. His prominence as a leading innovator in this field is manifested by his recent development of a number of synthetic multisite metalloproteins. Gray has used a synthetic ruthenium derivative of cytochrome c to observe directly for the first time an intramolecular electron transfer reaction between two metal centers at a known and fixed separation in a protein.

Gray is a native of Kentucky. He received his B.S. in 1957 from Western Kentucky University, his Ph.D. in 1960 from Northwestern University. After spending a year (1960-61) as a National Science Foundation postdoctoral fellow at the University of Copenhagen, he joined the faculty of Columbia University where he was professor of chemistry when he moved to Caltech in 1966.

Gray

Green

ACS Award in Inorganic Chemistry

sponsored by Monsanto Co.

MALCOLM GREEN of the inorganic chemistry laboratory at Oxford University, England, derived his abiding interest in organo-transition metal chemistry during the years he spent in the Imperial College of Science and Technology in London as graduate student of Sir Geoffrey Wilkinson.

Green has contributed to inorganic chemistry in many ways. He has adopted an exploratory synthetic approach and has synthesized a large number of compounds of intrinsic interest; he has developed new synthetic routes and techniques including metal vapor synthesis apparatus. His research has increased understanding of fundamental aspects of transition metal catalysis of hydrocarbon reactions. In particular he has studied the role of transition metal catalysts and the role of transition metals in the modification of the functional group properties of coordinated hydrocarbon ligands. This is exemplified by his studies on the β-effect, 1,2-hydrogen shifts, and C-H bond activation.

Green has made the metal atom synthesis method widely available to synthetic chemists. He has used atom synthesis to prepare the first examples of zero valent derivatives of Nb,

Ta, Ti, Zr, and Hf as bis-η-arene compounds, thereby showing that the early transition metals have a viable and low-valent chemistry. Green was the first to use metal atoms in the synthesis of catalyst precursors for olefin polymerization and industrial research groups are actively pursuing this area.

Green received his B.Sc. (Hons) from Acton Technical College, University of London in 1956, and his Ph.D. from the Imperial College of Science and Technology in 1959. He has published more than 200 research papers as well as books, book chapters, and review articles. His book Organometallic Compounds, Volume 11, "The Transition Elements" has been well known for over a decade.

Gudeman

Woods

Halsted

Nobel Laureate Signature Award for Graduate Education in Chemistry

sponsored by J. T. Baker Chemical Co.

"I cannot be anything but awed by the quantity, quality, and imaginative brilliance" of the work of **CHRISTOPHER S. GUDEMAN.** These words by a molecular spectroscopist echo other admiring colleagues who think Gudeman's work represents a truly unique level of scientific contribution.

Gudeman and his preceptor, **R. CLAUDE WOODS,** discovered the microwave spectrum of the HOC^+ ion using a laboratory spectrometer. This, in turn, led to the observation of the HOC^+ ion in the interstellar medium by Woods, Gudeman, and a group of radioastronomers early in 1982.

Woods, professor of chemistry at the University of Wisconsin, Madison, opened up the entire field of high-resolution spectroscopy of molecular ions during the years 1974–77. He and his group, studying CO^+, HCO^+, and HNN^+ in glow discharges, realized that there would have to be dramatic innovations in microwave technology before microwave spectroscopy actually would become a powerful, general tool for investigating charged molecules.

Under the guidance of Woods, Gudeman conceived, designed, constructed, and perfected just such a technological revolution at the University of Wisconsin. He completely rebuilt the Wisconsin microwave spectrometer to state-of-the-art capabilities. His innovations, using electronics technology, resulted in a new microwave spectrometer with better sensitivity, better frequency resolution and accuracy, and dramatically enhanced operating convenience.

Gudeman received a B.A. from Augustana College, Rock Island, Ill., with a double major in chemistry and physics. He obtained a Ph.D. from the University of Wisconsin, Madison, in 1982 on the basis of his thesis, "Microwave Spectroscopy of the Formyl Ion, the Isoformyl Ion, and Hydrogen Cyanide."

Gudeman's thesis led to the award of a prestigious IBM postdoctoral fellowship, which he is using to carry out research on infrared spectroscopy of molecular ions. He is conducting this research at the University of California, Berkeley.

Woods graduated from Georgia Institute of Technology in 1961 with a B.S. degree. He received the A.M. and Ph.D. degrees in physical chemistry from Harvard in 1962 and 1965, respectively. After serving as an instructor at the U.S. Naval Academy during his military service, he began teaching physical chemistry at the University of Wisconsin, Madison, in 1967 as an assistant professor.

Woods was promoted to professor in 1977, and has lectured extensively in the U.S., Europe, Australia, and Japan.

James Bryant Conant Award in High School Chemistry Teaching

sponsored by Ethyl Corp.

DOUGLAS A. HALSTED, chemistry teacher at Evanston Township High School, Evanston, Ill., thinks it is important that students end the year with pleasant thoughts about chemistry. On the last day of class, Halsted dons a gas mask and serves soft drinks, dramatically trailing puffs of white smoke produced by dry ice.

Each student in his class is a chemist. Halsted believes that his role as a teacher is to involve each student in discovering concepts on his or her own in the laboratory. His chemistry courses are laboratory oriented for all topics. Students first balance equations by constructing space-filling molecular models in the lab. They study stereochemistry—tangent sphere model, orbital, and hybridized orbital theories—by constructing models. In addition to their written work, students complete one chemistry experiment and one physics experiment each week of the school year.

Many of his students have placed in the top 40 in the Westinghouse Science Talent Search, and several have taken part in summer research projects sponsored by the American Cancer Society.

Each year Halsted nominates his two best chemistry students to compete on a chemistry scholarship examination sponsored by the Chicago Section of the American Chemical Society. His students have won scholarships in 1963, 1964, 1968, and 1970.

Heicklen

Hitchings

Halsted received a B.A. in 1958 at Hastings College, Nebraska, and an M.A. in educational guidance and Ph.D. in science education at Northwestern University in 1961 and 1973, respectively. He has pursued his interest in chemistry with additional studies at the University of Colorado, Illinois Institute of Technology, and San Diego State University, among others.

In addition to his teaching, Halsted designs and distributes model material through his own company, Halsteducate Co. He also acts as consultant and lecturer and conducts workshops on molecular models for high school and college chemistry teachers. He received the 1980 Chemical Manufacturers Association National Catalyst Award for High School Chemistry Teachers.

ACS Award for Creative Advances in Environmental Science and Technology

sponsored by Air Products & Chemicals Inc.

JULIAN HEICKLEN, professor of chemistry at Pennsylvania State University, has made numerous contributions to understanding the chemistry of both the upper and lower atmosphere, particularly with regard to the effect of pollutants. He is well known nationally and internationally for his efforts in the environmental field.

Perhaps his most important work deals with the study of photochemical smog. Heicklen and his coworkers were the first to point out that photochemical smog occurs through a free-radical chain mechanism involving hydroxy radicals. That mechanism is the basis for all modeling programs of photochemical smog that are used to determine pollutant levels and the degree of control needed. It has become the basic building block on which emission control strategies are based.

Heicklen elucidated the role of carbon monoxide in the hydroxy radical chain reaction. From rate coefficient data he predicted how large the CO effect should be, and subsequent experiments in other laboratories confirmed his predictions. The awardee showed that the CO effect contributes significantly to photochemical smog production.

Heicklen and his research group were the first to measure the rate coefficients for other free radical reactions important in photochemical smog development. They were the first to show that the peroxide radical reacts with nitrogen dioxide to produce pernitric acid. Current research in Heicklen's laboratory has dealt with the elucidation of the primary photochemical processes in aldehyde photolysis, processes that are the source of free radicals in the photochemical smog cycle.

Heicklen and his group have shown that phosgene and other acid halides are produced in the oxidation of the chlorethylenes by ozone, oxygen atoms, and free radicals. They also have pointed out the possible dangers.

Heicklen received his B.Ch.E. from Cornell University in 1954, and his Ph.D. (in chemistry) from the University of Rochester in 1958. He has published 210 research papers, and a total of 24 review articles, books, and book reviews. His book "Atmospheric Chemistry" is used in many universities as a reference and text for teaching this subject.

Alfred Burger Award in Medicinal Chemistry

sponsored by SmithKline Beckman Corp.

"Seldom in history has one person contributed so singularly and so profoundly to the improvement of human health" is the comment of a colleague of **GEORGE H. HITCHINGS.**

Hitchings, a scientist emeritus for Burroughs Wellcome, is a world-renowned medicinal chemist whose contributions to medicine and therapeutics have been extraordinary and without precedent. His areas of research interest include chemotherapy, antimetabolites, organic chemistry of heterocycles, nucleic acids, and antitumor, antimalarial, and antibacterial drugs.

Hitchings' research programs have not only provided new strategies for chemotherapy but also for probing and defining biochemical events. His concept of inhibitor binding analysis brought out clearly striking differences in isofunctional enzymes that escaped detection by kinetic measurements. His antimetabolites have found application to basic research in diverse fields. Experiments involving allopurinol provided novel insights into purine metabolism.

The award winner's basic studies in biochemistry have led to the development of several valuable chemotherapeutic agents. These novel agents include the antimalarial compounds, pyrimethamine (Daraprim); the antileukemic agents, 6-mercaptopurine (6-MP) and thioguanine; the immunosuppressant, Imuran, which has made renal transplantation possible; the xanthine oxidase inhibitor, allopurinol, for the treatment of gout; and the antibacterial drug, trimethoprim.

Hitchings received his B.S. (in chemistry) from the University of Washington in 1927, and his Ph.D. (in biochemistry) from Harvard University in 1933. During his prolific career he has published 38 book chapters, 201 research papers, and a

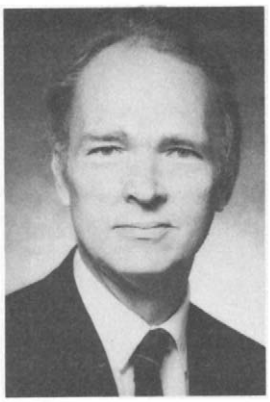
total of 85 abstracts, letters, and reviews. He is the recipient of numerous medals, honors, and awards, and holds 83 U.S. patents.

He is a member of the National Academy of Sciences and a distinguished member (foreign) of the Royal Society.

Garvan Medal

sponsored by Olin Corp.

Ludwig



Lyon

MARTHA L. LUDWIG, professor of biological chemistry and acting chairman of the biophysics research division at the University of Michigan, Ann Arbor, has made major contributions to the structure and function of flavodoxins, and to the structure analysis of iron superoxide dismutase. Ludwig's research has focused on structure and action of electron transport proteins. Her determinations of protein structure has emphasized protein-substrate and protein-prosthestic group interactions.

Ludwig's determination of the structure of flavodoxins in its three oxidation states—oxidized, semiquinone, and fully reduced—is of enormous importance in flavin enzymology. Working with clostridial flavodoxin, Ludwig overcame many of the problems in deducing the change in structure that accompanies the change in oxidation state. Not content with knowing only the structure, Ludwig, in collaboration with others, explored the electronic and spectroscopic properties of flavodoxins.

By studying the changes of structure with oxidation state, and by comparing flavodoxins from different organisms, Ludwig has developed a mechanism explaining how the mutual interaction of flavin and apoprotein controls the oxidation-reduction potential of the bound flavin. In the past, discussion of the reasons for the very different properties exhibited by different classes of flavoproteins was largely a matter of conjecture. Beginning with Ludwig's determination of these structures, firm reference points were established.

Recently, Ludwig and colleagues have determined the structure of an iron-containing superoxide dismutase. The polypeptide fold of the structure is entirely different from the fold found in the copper-zinc dismutase from red blood cells. It is possible that the x-ray structure will provide essential clues about the enzymology of the superoxide dismutases.

A native of Pittsburgh, Ludwig received her B.A. in chemistry from Cornell, her M.A. from Berkeley, and in 1956 her Ph.D. in biochemistry from Cornell. She joined the faculty at the medical school of the University of Michigan in 1967. After her appointment at Michigan, Ludwig established an independent program in protein crystallography. "She serves as an inspiring example of simultaneous excellence in teaching participation in an academic department, and leadership in a research institute," states an admiring colleague.

ACS Award in the Chemistry of Contemporary Technological Problems

sponsored by Mobay Chemical Corp.

The discovery of a new and commercially significant chemical reaction has earned this award for **RICHARD K. LYON,** scientific adviser at Exxon Research & Engineering Co. The reaction is the selective noncatalytic reduction of nitric oxide by ammonia in the presence of oxygen. It led to the development of Exxon's Thermal DeNo$_x$ process, used to control the nitric oxide emissions of boilers and furnaces.

A physical chemist specializing in gas-phase kinetics, Lyon has focused much of his research efforts on air pollution control processes since joining Exxon in 1960. His application of chemical kinetics to problems of industrial interest ultimately led him to the discovery that in a narrow temperature range ammonia will selectively reduce nitric oxide to nitrogen and water in the presence of excess oxygen. It had been believed that adding ammonia to any normal combustion process would increase NO_x emissions. Lyon's discovery has cast new light on the chemistry of ammonia in high-temperature systems.

The award winner also has defined the mechanism of selective reduction of nitric oxide by ammonia, shown that hydrogen and hydrogen-methane mixtures give the best control of ammonia reactivity, and found that ammonia reduction of nitric oxide doesn't create unacceptable byproducts.

Lyon's accomplishments haven't been limited to the lab. He has played a key role in evaluating, developing, and commercializing the Thermal DeNO$_x$ process. He traveled to Japan to help coordinate the transfer of this technology from Exxon to a power plant boiler in a Kawasaki refinery, which was the first to use it. It also is being used in other installations in Japan as well as in the U.S.

Lyon obtained his B.S. in chemistry from William and Mary College in 1955 and his Ph.D. from Harvard University in 1960; the adviser for his thesis on gaseous detonations was George B. Kistiakowsky. Upon graduation, he joined Exxon Research & Engineering's process research division. From 1976 to 1980, he headed the combustion science

group in the engineering sciences lab. In 1980 in recognition of his creative contributions he was named a scientific adviser.

For relaxation, Lyon writes science fiction and has had four novels published.

Earle B. Barnes Award for Leadership in Chemical Research Management

sponsored by Dow Chemical Co.

JAMES F. MATHIS' contributions to the development of an effective chemical research organization within Exxon Corp. and his leadership in groups such as the Chemical Industry Institute of Toxicology (CIIT) and the Council of Chemical Research (CCR) has led to his selection for this award.

Mathis, who is vice president of science and technology at Exxon, started up Exxon Chemical's technology department in 1972 when it was formed as a separate activity from the rest of Exxon R&D. Under his guidance, the department contributed a number of proprietary process and product developments beneficial to Exxon Chemical.

He was one of the organizers of CIIT, which carries out independent research on chemical toxicology. He has served as director and treasurer of the institute and is currently chairman of the board.

Responding to a growing concern over the future of universities in the U.S. that are faced with escalating costs, Mathis joined other industry leaders and university representatives to form CCR. CCR is obtaining support from industry to fund a significant increase in industry's contribution to university research through award of unrestricted research grants. The award winner served for a year as treasurer and fund raiser during this group's formative stages.

Mathis is continuing an active program of speeches and publications aimed at explaining the advantages, problems, and future opportunities to society for an oil and chemical business such as Exxon.

Born in Dallas, Mathis served in the Navy Air Corps in 1944 and 1945. He completed his bachelor's degree in chemical engineering at Texas A&M in 1946, and received his doctorate in chemical engineering from the University of Wisconsin in 1953. He joined Exxon at its Baytown, Tex., refinery in 1946 as an assistant research chemist and returned to Baytown as a research chemist in 1953 after receiving his Ph.D.

He holds several patents, including one as coinventor of a method of reforming hydrocarbons for enhanced yields and another as the sole inventor of a method of activating platinum reforming catalysts.

Ernest Guenther Award in the Chemistry of Essential Oils and Related Products

sponsored by Fritzsche Dodge & Olcott

JERROLD MEINWALD, Goldwin Smith Professor of Chemistry at Cornell University, has a distinguished record of achievement in organic chemistry and chemical ecology.

Early in his career, Meinwald solved an unusually wide range of problems dealing with molecular rearrangements (of terpenes, morphine alkaloids, and tropane alkaloids) and with the structure and stereochemistry of natural products. He later carried out intensive studies on photochemistry, and on the chemistry of highly strained ring systems, demonstrating the geometrical requirements for long-range spin-spin coupling.

Perhaps the most important aspect of Meinwald's contributions, however, has been his elucidation of the fascinating roles played by secondary metabolites, such as terpenes and alkaloids, in the chemical interactions between organisms. His chemical work, the biological inspiration for which most often comes from his close friend and Cornell colleague, Thomas Eisner, has increased awareness of the adaptive significance of secondary metabolites for the organisms which produce them, and has thereby stimulated interest in the new discipline of chemical ecology.

Meinwald's research on arthropod defenses has revealed a surprisingly wide spectrum of biosynthetic capabilities. His discoveries of the lucibufagins, cardiotonic steroids in fireflies, and of novel terpenes in carrion beetles have given new impetus to the study of insect chemical defenses. His early work with Yvonne C. Meinwald on insect chemical communication led to the characterization of danaidone, an aphrodisiac pheromone from male danaid butterflies. Collaborative studies with Eisner and D. Schneider correlated the behavior and electrophysiology of these insects with their chemistry, providing what is probably the best understood example of chemical communication among animals.

Meinwald obtained his Ph.D. from the University of Chicago and did his graduate work, directed by R. B. Woodward, at Harvard University. In 1952 he joined Cornell University.

Meinwald served as one of the founding research directors of the International Centre of Insect Physiology and Ecology in Nairobi, Kenya (1970–77).

Mathis

Meinwald

ACS Award in Pure Chemistry

sponsored by Alpha Chi Sigma Fraternity

ERIC OLDFIELD was born in London, England, and received B.Sc. (1969) and D.Sc. (1982) degrees from Bristol University and a Ph.D. (1972) from the University of Sheffield, working with Dennis Chapman. He was then an EMBO fellow (1972–74) with Adam Allerhand at Indiana University, and a visiting scientist with John S. Waugh at MIT (1974–75). In 1975 he joined the faculty at the University of Illinois, Urbana-Champaign, where he is currently a professor of chemistry.

Oldfield's contributions to chemistry cover a broad range of topics in physical, biological, inorganic, and geochemistry using nuclear magnetic resonance (NMR) spectroscopy.

Early work at Indiana involved development and application of the first instrumentation capable of detecting resolved single carbon atom sites of proteins in solution, and subsequent research at Illinois led to further sensitivity improvements by use of the first "sideways-spinning" NMR sample probe, for superconducting magnet geometries. After this, Oldfield investigated membrane and protein structure using deuterium NMR and devised new detailed models of protein-lipid interaction, membrane protein dynamic structure, and a new technique for high-resolution NMR of protein crystals using magnetic ordering.

Oldfield's work in inorganic and geochemistry has involved development of new methods for obtaining high-resolution solid-state NMR spectra of nonintegral spin quadrupolar nuclei, such as oxygen-17, permitting study of the structures of numerous mineral phases, glasses, and heterogeneous catalysts that are often not amenable to analysis using diffraction methods but that have enormous importance in both pure and applied science.

A member of ACS, Oldfield's previous awards include the Royal Society of Chemistry's Meldola Medal and Prize (1977), the American Heart Association's Louis N. Katz Basic Science Research Prize (1980), and the Colworth Medal of the Biochemical Society (1983).

Oldfield

Paquette

Paul

ACS Award for Creative Work in Synthetic Organic Chemistry

sponsored by Aldrich Chemical Co. Inc.

LEO A. PAQUETTE is one of the most creative and productive scientists in the field of synthetic organic chemistry today. His synthesis of dodecahedrane in 1982, an achievement of great theoretical and potential practical significance, made headlines around the world; it may well be the crowning achievement in his career to date.

In addition to his successful acquisition of dodecahedrane, Paquette has made outstanding contributions to organic synthesis in many other areas. His work on methodology—typically broad in scope—has ranged from highly useful applications of organosulfur (Ramberg-Bäcklund rearrangement, phenylvinyl sulfones as ethylene and acetylene synthons) and organosilicon reagents (cyclopentenone annulation, carbonyl transposition, asymmetric transfer, vinylsilane and cyclopropylsilane mediated reactions) to the applications of heterocycles and transition metal catalysis.

Paquette is equally well known for his target-oriented approach to problems, which has led to the acquisition of many new and unusual nonnatural molecules (azasemibullvalene, azabullvalene, triquinacene, geminanes, [4]peristylane, stable cyclooctatetraene bond shift isomers—to name a few) and, more recently, to natural products (gymnomitrol, isocomene, prostaglandins, modhephene, multifidene, capnellene, pentalenolactone E methyl ester, pentalenene, and silphinene). He also is engaged in applying electronic control to achieve reaction stereoselectivity, in elucidating the level of regiocontrol which various substituents can exert from their excited states, and in developing new synthetic methodology.

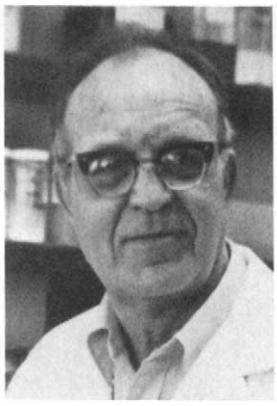
Paquette was born in Worcester, Mass. He graduated magna cum laude from Holy Cross College in 1956, and obtained his Ph.D. in organic chemistry from Massachusetts Institute of Technology in 1959. After serving for four years as a research associate at Upjohn Co., he joined the faculty of Ohio State University in 1963. He was professor of chemistry from 1969 to 1981; since 1981 he has held the title of Kimberly Professor of Chemistry. He has published more than 525 papers.

ACS Award in Applied Polymer Science

sponsored by Phillips Petroleum Co.

DONALD R. PAUL, the T. Brockett Hudson Professor and chairman of the department of chemical engineering at the University of Texas, Austin, is currently one of the leading experts in the rapidly expanding area of polymers blends. For a decade, he has led a comprehensive research effort focused on phase behavior and property relationships in polymer-polymer mixtures and has published extensively on these topics.

The most continuous thread in the research interests of Paul has been transport in polymers and the use of these ideas in membranes. In the



Plueddemann

Rabinovitch

early 1970s, he developed quantitative models for the mechanism of pressure-driven liquid transport through swollen polymer membranes that aid in the description and understanding of reverse osmosis.

More recently, Paul's interest in transport has turned to the behavior of gases in glassy polymers. This work has been applied to the development of barrier materials for packaging, and membranes for gas separations. Through consultation and collaboration with both industry and government, he has helped translate research into practice in the areas of fiber formation, polymer processing, membrane technology, transport phenomena in polymers, polymer blends, and the use of polymers in concrete.

Paul was born in North Carolina in 1939 and attended North Carolina State University to obtain a B.S. in chemical engineering in 1961. He received an M.S. (1963) and Ph.D. (1965) from the University of Wisconsin. After graduation, and stints as an instructor at the University of Wisconsin and in research at Chemstrand Research Center, Durham, N.C., Paul was appointed assistant professor of chemical engineering at the University of Texas, Austin, in 1967, and moved up to become head of the department and director of the Center for Polymer Research.

In addition to his research and teaching, Paul is an active member of several professional organizations and editorial boards of journals. He received the ACS Arthur K. Doolittle Award in 1973 and the Society of Plastics Engineers Award for Outstanding Achievements in Research in 1982.

ACS Award for Creative Invention

sponsored by Corporation Associates

EDWIN P. PLUEDDEMANN's contributions to the science and technology of adhesion have been the basis for developing and commercializing reinforced plastics. His creation of silane coupling agents has earned him recognition worldwide.

Born in 1916 in Galion, Ohio, Plueddemann's higher education was completed at Baldwin-Wallace College in Ohio, where he received a B.S. in chemistry cum laude in 1938, and at Ohio State University, where he completed a Ph.D., also in chemistry, in 1942. From Ohio State, Plueddemann went to work as a research chemist at Westvaco Chlorine Products in New Jersey until 1947, when he moved back to Ohio to become a senior research chemist at Libby Owens Ford.

It was there he initiated what was to become a lifelong scientific endeavor—the research and development of organosilicon compounds, and the application of these materials to adhesive problems.

Plueddemann left Libby Owens Ford in 1955 to join Dow Corning in Midland, Mich., for his present position. During his 28 years at Dow Corning he has been concentrating his research on organosilicon chemistry, particularly silane coupling agents—materials that provide a mechanism for bonding two dissimilar materials—on which he holds numerous patents.

Plueddemann found that the effectiveness of the silane as a coupling agent paralleled the reactivity of its organofunctional group with the resin. The silanol-functional portion of the molecule was believed to intereact with the hydrophilic glass surface. These results, first published in 1962, were the beginning of many inventions that eventually led to major commercial improvements in reinforced plastics.

In addition to his patents, journal articles, and chapters in books, Plueddemann has authored the book "Silane Coupling Agents" (1982), and is a frequent lecturer and consultant both in the U.S. and abroad. In 1971, he received the Society of the Plastics Industry's man of the year award.

Peter Debye Award in Physical Chemistry

sponsored by Du Pont Co.

"Before the research contributions of **B. S. RABINOVITCH,** unimolecular reaction kinetics was not thoroughly understood," a colleague of the University of Washington chemistry professor remarks.

Rabinovitch and his students demonstrated the validity of the statistical approach for gross thermal reactions and for specific monoenergetic rate constants. Their discovery of the inverse kinetic isotope effect and development of the theory of centrifugal effects have helped make unimolecular reaction kinetics a precise science.

His now classic studies on intra- and intermolecular energy transfer were ahead of their time and almost all have been confirmed by recent experiments using more sophisticated techniques.

Rabinovitch received a B.Sc. in 1939 and Ph.D. in 1942 from McGill University. He served as a captain in the Canadian Army from 1942-46, and spent two years at Harvard University before joining the University of Washington faculty in 1948. He was named professor of chemistry in 1957.

He has served as an officer or on committees of ACS, National Academy of Sciences, National Science Foundation, National Bureau of Standards, and American Physical Society. He was chairman of the ACS Puget Sound Section in 1958 and of

the Division of Physical Chemistry in 1968–69. A lengthy list of his visiting professorships and lectureships includes countries from Belgium to Wales with stops in Japan, Israel, Chile, and Crete.

Rabinovitch is a member of ACS; the Royal Society of Chemistry, whose Faraday Division recently has named him to receive the 1984 Michael Polanyi Medal; and a fellow of the American Physical Society.

James T. Grady Award for Interpreting Chemistry for the Public

Presenting scientific developments to the lay public in a clear and interesting manner is difficult, but to do so consistently within the limited space and time demanded by a daily newspaper is a Herculean task. **CRISTINE RUSSELL** of the *Washington Post* has earned a reputation as a thorough, well-balanced reporter who covers in depth not only the achievements of science but their applications and impacts.

The 1971 Mills College graduate (B.A. with honors in biology) began her writing career as a public affairs scholar at the Washington (D.C.) Journalism Center. Her story on "The Politics of Cancer" appeared in the *Post*. She joined the San Francisco staff of *Saturday Review of the Sciences* as an associate editor and when the magazine ceased publishing did free-lance writing for Sunset Books, where she coauthored the book "Attracting Birds to Your Garden."

Russell returned to Washington and worked as assistant editor on *Smithsonian* magazine (1973–74) and as features editor for *Bio-Science* magazine (1974–75). She joined the *Washington Star* as national medicine and science reporter in 1975. When the paper folded she joined the *Post* in the same capacity. Highlights of her journalism career include series on marijuana, interferon, science in China, Laetrile, life on Mars, cancer, and the brain.

She received the Claude Bernard Science Journalism Award (1976) for a series on environmental cancer, the 1980 National Association of Science Writers' Science in Society Award for a series entitled "Choices in Childbirth," three awards from the American Medical Writers Association, and is a 1983 winner of the American Psychological Association's National Media Awards. Russell has been a panelist on several TV shows—PBS's "Washington Week in Review," CBS's "Face the Nation," and NBC's "Meet the Press."

Joel Henry Hildebrand Award in the Theoretical and Experimental Chemistry of Liquids

sponsored by Shell Companies Foundation Inc.

ROBERT L. SCOTT, professor of chemistry at the University of California, Los Angeles, is an outstanding scholar and researcher in the physical chemistry of liquids. In particular, his experimental and theoretical contributions to the subject of solubility and solutions are known and respected by his colleagues all over the world. There is probably no one whose influence and example have done more to determine the present course of the subject. He ranks with his former collaborator, J. H. Hildebrand, as one of the world leaders in the field.

In 1953, Scott proposed that heat capacity was singular at a critical point, an idea that was confirmed a dozen years later and that plays an essential role in the modern theory of critical phenomena. In 1956 Scott published a landmark paper that explored corresponding states theories. In 1965 Scott developed a mean-field theory of liquid sulfur and later performed the experiments to test the theory. In addition to its original impact, this work has more recently received great attention because of its relation to tricritical phenomena.

Tricritical points first were predicted in 1912, and were discovered experimentally by Soviet workers in the 1960s who had little understanding of what it was they had found. It is to Scott and Charles Knobler at UCLA and to B. Widom at Cornell that we owe almost entirely our experimental knowledge of this fascinating topic that has aroused so much interest among theoretical chemists.

Scott was born in Santa Rosa, Calif. He received a B.S., magna cum laude, in chemistry from Harvard in 1942 and did his graduate work in physical chemistry at Princeton, where he was awarded an M.A. and Ph.D. in 1945.

Scott's thesis research, which was supervised by Michael Maget, was concerned with the thermodynamics of polymer solutions. Scott worked on the Manhattan Project at Princeton and Los Alamos from 1944 to 1946 and then went to the University of California, Berkeley. He joined the department of chemistry at UCLA as assistant professor in 1948.

ACS Award in Chromatography

sponsored by Supelco Inc.

LLOYD R. SNYDER has contributed significantly to the theory and practice of modern liquid chromatography. Over the past 25 years he has written more than 170 technical papers, patents, and review articles in this area, plus four popular books.

Russell

Scott

Snyder

A native of California, Snyder received his B.S. in chemistry (1952) and his Ph.D. in organic chemistry (1954) from the University of California, Berkeley. He then joined Shell Oil as a research chemist and subsequently moved to Union Oil. Following 14 years at Union Oil, Snyder joined Technicon Instruments in 1971. He was later vice president of research and of clinical chemistry at Technicon, and left in 1982 to form his own company: Lloyd R. Snyder Inc., a consulting firm to large industrial users of HPLC.

Snyder's pioneering work—begun at Union Oil—led to a number of major accomplishments. He was one of a small group who developed the theory and practice of high performance liquid chromatography (HPLC) in the mid-1960s and thereafter, he has contributed in a major way to modern strategies of optimizing separation (including the Snyder solvent-selectivity-triangle), and he is largely responsible for current theories of gradient elution separation and retention in liquid-solid chromatography.

Snyder earlier (1954) invented column-switching for gas chromatography and later extended it to liquid chromatography (1962) and HPLC (1969), and at Technicon he pioneered in the development of several approaches to automated sample cleanup for HPLC. More recently he has re-examined the fundamental basis of column efficiency and applied this knowledge to the development of new columns and the understanding of macromolecule separations by HPLC.

Snyder also has been active since 1970 in developing educational aids for users of HPLC. These include the standard textbook on the subject, the well-known ACS Short Course on Modern Liquid Chromatography (4500 students so far) with J. J. Kirkland, and a series of ACS audio programs in HPLC. He has received several national and international awards, including the ACS Award in Petroleum Chemistry for 1970.

ACS Award in Petroleum Chemistry

sponsored by Lubrizol Corp.

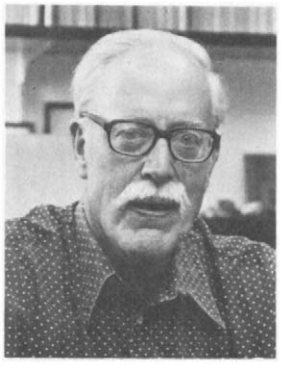
"This distinguished chemist has made many important contributions to physical organic chemistry, particularly the reactions of organic free radicals, through some 40 years of research. However, another portion of his work, bearing on the chemistry of petroleum and petrochemicals, also deserves recognition for its outstanding and innovative characteristics." So says one admiring colleague in summing up the achievements of **CHEVES WALLING,** distinguished professor of chemistry at the University of Utah.

Born in Evanston, Ill., Walling graduated from Harvard University with a B.A. in 1937. He received his Ph.D. from the University of Chicago in 1939, conducting his research under the direction of M. S. Kharasch. From 1939 to 1942 he was a research chemist at Jackson Laboratories of Du Pont and from 1943 to 1949 he held the same position at the general laboratories of U.S. Rubber Co. In 1949 he joined the research division of Lever Bros. He was appointed professor of chemistry at Columbia University in 1952, a post he held until 1970 when he came to the University of Utah.

The award winner's early noteworthy work in areas related to petroleum chemistry, carried out while he was employed in industry in 1943–49, was on the mechanisms of vinyl polymerization. His research involved copolymerization theory, the effect of structure on radical reactions, and the development of the concept of the importance of polar effects in free radical reactions.

The significance of Walling's work has been recognized widely in the oil and petrochemical industries. He received the James Flack Norris Award in 1971. From 1975 to 1981 he was editor of the *Journal of the American Chemical Society.*

He has published more than 180 papers. His book "Free Radicals in Solution" has contributed to the training of a whole generation of chemists.



Walling

Zwanzig

Irving Langmuir Award in Chemical Physics

sponsored by General Electric Foundation

ROBERT W. ZWANZIG, Distinguished Professor of Physical Science at the University of Maryland's Institute for Physical Science & Technology, possesses the much-desired ability to see the simplifying features that lead to understanding a complicated phenomenon.

His projection operator technique, introduced when he was with the National Bureau of Standards, simplifies very complicated calculations; he first used the operators to derive equations describing time-dependent processes in fluids to uncover the underlying molecular dynamics. The method then was used to construct a fundamental theory for linear transport processes in fluids.

Zwanzig's earlier work on perturbation theory applied to obtain thermodynamic properties of liquids has had a major influence on workers in equilibrium statistical mechanics. The Brooklyn-born physical chemist also has contributed to theories of dielectric relaxation, energy migration, and surface tension as well as research on polymer structure and dynamics.

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Awards

He received a B.S. from Polytechnic Institute of Brooklyn (now Polytechnic Institute of New York) in 1948, an M.S. from the University of Southern California in 1950, and a Ph.D. from California Institute of Technology in 1952. After a three-year research fellowship at Yale University he joined the staff at Johns Hopkins University as assistant professor. Zwanzig spent 1958-66 as a research chemist at NBS and joined the University of Maryland faculty in 1966. He was named to his present position in 1979.

Zwanzig received the Washington Academy of Science Award for Achievement in Physical Sciences in 1967, the ACS Peter Debye Award in Physical Chemistry in 1976, and Polytechnic Institute of New York's Distinguished Alumnus Award in 1982. He has served on the editorial boards of *Journal of Chemical Physics*, *Journal of Mathematical Physics*, and *Chemical Physics*.

The award winner is a member of ACS and the National Academy of Sciences. He is a fellow of the American Physical Society, American Academy of Arts & Sciences, and the American Association for the Advancement of Science.

ACS Awards for Outstanding Performance by Local Sections:

(Small) **Norwich**
(Medium Small) **Central North Carolina**
(Medium) **Northeast Oklahoma**
(Medium Large) **Rochester**
(Large) **Delaware**

ACS Regional Awards in High School Chemistry Teaching:

Claire A. Baker, Central
James Follensbee, Great Lakes
Thomas Szell, Middle Atlantic
Kathleen J. Dombrink, Midwest
Margaret B. Andersen, Northeast
Donald R. Norton, Northwest
Nicholas Tzimopoulos, Southeast
Mavis M. Rollins, Southwest
Paul Groves, Western