ACS 1981 national award winners announced

Following are the 1981 recipients of awards administered by ACS. All will receive their awards at the 181st ACS National Meeting in Atlanta next March, except Nelson J. Leonard, who will receive the Roger Adams Award at the 27th National Organic Chemistry Symposium in Nashville in June 1981. A vignette of Herbert C. Brown, winner of the 1981 Priestley Medal, appeared in the July 7 issue of C&EN, page 21.

ACS Award in the Chemistry of Plastics and Coatings

sponsored by Borden Foundation Inc.

ERIC BAER has made pioneering contributions to numerous areas of polymer science and engineering, including the behavior of solid polymers under pressure, crystallization of synthetic macromolecules, and relaxation processes under cryogenic conditions.

Baer, who is dean of Case Institute of Technology of Case Western Reserve University, Cleveland, was born in Germany. He emigrated to England in 1939, and then in 1947 to the U.S., of which he became a citizen in 1953. He obtained his Ph.D. from Johns Hopkins University in 1957 in chemical engineering. Upon graduation he joined the research division of Du Pont's polychemicals department. In 1960 he was appointed to the faculty at the University of Illinois, and in 1962 he joined Case as associate professor in charge of the development of the polymer science program. Today the department of macromolecular science which he formerly chaired is one of the best of its kind.

Baer's many noteworthy achievements began with his research at Du Pont, where he developed design methods for viscoelastic materials that could be applied to a variety of plastics. He was one of the first to apply elementary plasticity theory to plastics.

In 1965 Baer and his coworkers published some of the earliest evidence that polymers can be crystallized under pressure in an extended chain morphology. They showed that mixed morphologies can be made by varying the pressure and also the pressure cycle.

In studying the mechanism of epitaxial crystallization on the surfaces of single crystals, he and his associates have found that high-energy polymorphs can be generated using the principle of lattice matching.

Baer presently is focusing his research on the epitaxial polymerization of conducting polymers with emphasis on the structure and properties of polymorphic forms of $(SN)_x$.

Baer has edited several advanced treatises on the solid state of polymers, and serves on the editorial boards of many scientific journals. Currently he has more than 100 publications to his credit.

Peter Debye Award in Physical Chemistry

sponsored by E. I. du Pont de Nemours & Co.

RICHARD B. BERNSTEIN, chairman of the department of chemistry at Columbia University, has made many outstanding contributions to physical chemistry, particularly in molecular collisions. His work on molecular dynamics by the molecular-beam scattering method has been in the forefront of the field for the past two decades.

Bernstein was the first to observe the quantum interference phenomenon in the angular distribution of elastic scattering, and one of the first to detect the rainbow structure in atom-atom scattering. His quantum treatment of the elastic scattering of heavy-particle beams pointed to the existence of oscillations in the velocity dependence of the total scattering cross section, the so-called glory undulations.

He and his coworkers detected inelastic energy transfer in a crossed-beam experiment using the velocity-change method. They were the first to carry out a velocity analysis of reactive scattering from crossed beams.

Bernstein helped clarify the role of long-range intermolecular forces in the dissociation of diatomic molecules. The research has led to an improved way to determine dissociation energies and to the first reliable experimental C_n coefficients in potential-energy expansions at larger internuclear separations.

His research at Columbia has been in state-to-state molecular reaction dynamics via molecular beam and laser techniques. Recently he and his coworkers have developed a promising new experimental technique, laser multiphoton ionization mass spectroscopy of isolated molecules.

Bernstein received his B.A. in 1943, M.A. in chemistry in 1944 from Columbia University. From 1942 to 1946 he was a researcher on the Manhattan Project at Columbia. He obtained his Ph.D. in physical chemistry from Columbia in 1948. He joined Illinois Institute of Technology in 1948 as an assistant professor of chemistry. Following stints at the University of Michigan, the University of Wisconsin, and the University of Texas, Austin, he returned to Columbia in 1977 as Higgins Professor of Natural Science, Chemistry.

Baer

Bernstein

Cooke

James T. Grady Award for Interpreting Chemistry for the Public

ROBERT W. COOKE, science editor for the *Boston Globe,* has had a broad range of experience in news writing and reporting, particularly in his main areas of interest—science, medicine, and the environment. His writing displays an excellent knowledge of his subjects, interpreted in a crisp, stimulating, entertaining, and informative style. Understanding his subject matter in depth is the key to this journalist's success in producing easily read copy.

Cooke started his writing career in California. After obtaining a B.S. in English from California State Polytechnic College, Pomona, in 1961, he received an M.S. in journalism from the University of California, Los Angeles (he was named outstanding graduate by the UCLA graduate department of journalism in 1962). In recognition of the high quality of his journalistic endeavors, the award winner was selected as one of eight fellows for the advanced science writing program of Columbia University's graduate school of journalism in 1969–70.

Cooke's journalism posts include two years as a science writer with the California Institute of Technology news bureau, five years as a writer and reporter on the Los Angeles bureau of the Associated Press, and one year as a reporter-photographer for the *Pomona Progress-Bulletin.*

In July 1973 Cooke joined the *Boston Globe* as science editor. In his capacity there he produces an average of two stories each week, plus other stories as they originate and can be handled. This often amounts to four or five science articles weekly.

Cooke has done extensive freelance writing in his major fields of interest. He also has written a book on genetic engineering, published by Quadrangle Books, entitled: "Improving on Nature: The Brave New World of Genetic Engineering." He is a member of Kappa Tau Alpha, the national journalism honor society, and the National Association of Science Writers.

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

sponsored by Fritzsche Dodge & Olcott

SAMUEL DANISHEFSKY of Yale University, New Haven, Conn., has a record of outstanding achievements as designee for the Ernest Guenther Award. His research has opened up and developed new recognition of reaction possibilities in synthesis and total synthesis.

One of Danishefsky's early interests was in new Robinson annulation and bis annulation equivalents. Danishefsky developed the chemistry of β-chloroethylvinyl ketone and demonstrated its utility in the synthesis of potential tricyclic precursors of steroids. By combining sequentially Michael addition of 2-methylcyclopentone-1,3-dione to β-chloroethylvinyl ketone and following this with Michael addition of a suitably monoalkylated di-*tert*-butylacetonedicarboxylate to the vinyl ketone, Danishefsky developed concise routes to steroids.

Danishefsky has a record of involvement in the synthesis of heterocyclic as well as alicyclic natural products. In the former category he is perhaps best known for his total synthesis of camptothecin, the pyrrolizidine alkaloids, and tazettine—all by unique methods.

The awardee has had a longstanding interest in the Diels-Alder reaction. His first work in this area resulted in a novel total synthesis of patchouli alcohol.

Danishefsky achieved the total synthesis of vernolepin by using Diels-Alder methodology. From vernolepin, he applied his new methodology to the total synthesis of prephenic acid and pentalenolactone. He followed this by providing a total synthesis of the elusive γ-carboxyglutamate in optically active form via glutamate. And more recently, he has described the first total syntheses of coriolin B and quadrone.

Danishefsky received a Ph.D. from Harvard University in 1962. He was a postdoctoral fellow for two years at Columbia University before joining the faculty at the University of Pittsburgh in 1964. He joined Yale earlier this year as professor.

ACS Award in Chemical Education

sponsored by Union Carbide Corp.

Colleagues of **DEREK DAVENPORT,** professor of chemistry at Purdue University, point to four areas in which he has excelled: in undergraduate teaching, in provoking readers of the *Journal of Chemical Education,* in sundry chemical education projects here and abroad, and in communicating chemistry to audiences "ranging from Midwest Rotarians to Punjabi refugees." More than 100,000 students have taken freshman chemistry since he came to Purdue 27 years ago and a fair fraction of these would attest not only to his skill in presenting the material but to his concern and willingness to help. Readers remember "Elevate Them Guns a Little Lower," "Silver Chloride is a Pale Green Gas," and other oddly titled articles which have had an impact disproportionate to their modest length.

Davenport helped establish an NSF summer institute program at Purdue through which 120 high school teachers received their M.S. in chemistry and he has served as an adviser on chemical education in India and Nigeria. His interests in art, literature, and history enliven his popular lectures and the "Anglo-Hoosier Bicentennial Lecture Series," first given in 1976, is still going strong. He has spoken on "Ars Longa, Bursa Brevis: Collecting Art on a Purdue Salary" and last year he organized an exhibition of 300 years of political cartooning entitled "The Pillory of the Press."

Davenport was born in Leicester, England, and received his B.Sc. in 1947 and Ph.D. in 1950 from University College, London. He joined the Purdue faculty in 1953 after postdoctoral fellowships at Reed College and Ohio State University. He became a U.S. citizen in 1965.

An ACS member, he has been chairman of the Purdue Section (1978–79) and of the Division of

Danishefsky

Davenport

Golay

Kochi

Leonard

McLafferty

Chemical Education (1979), and currently serves on the Education Commission. He received the MCA Teaching Award in 1974, was named Lecturer-of-the-Year by the Indiana Academy of Sciences in 1976, and was elected an honorary member of the Purdue chapter of Phi Beta Kappa earlier this year.

ACS Award in Chromatography

sponsored by Supelco Inc.

Without **MARCEL JULES EDOUARD GOLAY**'s pioneering work, expansion in the field of open tubular (capillary) columns would not have been possible.

Golay's involvement in gas chromatography began in 1956 with his paper, "Vapor Phase Chromatography and the Telegrapher's Equation," based entirely on mathematical considerations. Subsequent attempts to fit his theoretical treatments to experimental results led to the development of open tubular columns. Further detailed theoretical treatment led to the development of equations to describe the chromatographic process. The application of Golay's work is still growing.

Born in Neuchatel, Switzerland, Golay began his studies at the Gymnase de Neuchatel in 1920, where he obtained his Baccalaureat Scientifique. He received his Licentiate in electrical engineering in 1924 from the Technische Hochschule in Zurich, and his Ph.D. from the University of Chicago in 1931.

On graduation, Golay joined the Signal Corps Engineering Laboratories at Fort Monmouth, N.J. In 1955 he left the laboratories to serve as consultant to Philco Corp. in network and information theories, and to Perkin-Elmer Corp. in scientific instrumentation. At present Golay resides in his native Switzerland and continues to maintain his association with Perkin-Elmer.

Golay received a number of awards during his distinguished career, including the American Chemical Society Sargent Award in Chemical Instrumentation in 1961, and the Distinguished Achievement Award of the Instrument Society of America in 1962.

Although Golay's activities extend through many fields of science, he is remembered as the man who changed the course of gas chromatography.

James Flack Norris Award in Physical Organic Chemistry

sponsored by the ACS Northeastern Section

A vigorous and prolific scientist, **JAY K. KOCHI** is widely recognized as one of the world's leading authorities on free-radical and organometallic chemistry. He has brought unusual insight and brilliance to a wide range of areas of physical-organic, organic, and physical-inorganic chemistry.

Through an extensive series of contributions on the conformations and configurations of transient alkyl radicals in solution using electron spin resonance spectroscopy, Kochi made perhaps his greatest early mark in the work initiated with Paul Krusic at Du Pont and subsequently carried out at Indiana University with his students.

Kochi has been a regular contributor to the general field of homolytic mechanisms, particularly of those reactions relevant to organic syntheses. Through the years, he has added immensely to the understanding of the reactivities of various organic substrates with the different oxidation states of metals, most notably copper, cobalt, chromium, cerium, gold, silver, nickel, thallium, and lead.

In recent years, Kochi has turned his attention to the mechanisms of organometallic processes, especially as they relate to catalysis. Some of these studies, stemming as they do from Marcus electron transfer and Mulliken charge transfer theories, provide a quantitative basis for evaluating the reactivity of carbon-to-metal bonds and have led to a new understanding of various organometallic reactions.

A native of Los Angeles, Kochi obtained a B.S. from the University of California, Los Angeles, in 1949. He received his Ph.D. from Iowa State University with George Hammond in 1952. After an instructorship at Harvard University in association with Louis Fieser, he was engaged as an NIH special fellow at Cambridge University for a year with Alexander Todd on protein biosynthesis using acylnucleoside models. He joined Shell Development Co. in 1956 as a research chemist. Kochi served on the faculty of Case Western Reserve University for seven years before joining Indiana University in 1969, where today he is Earl Blough Professor of Chemistry.

Roger Adams Award in Organic Chemistry

sponsored by Organic Reactions Inc. and Organic Syntheses Inc.

His research "spans an impressive range of heterocyclic chemistry, of molecular rearrangements, and of contributions to the organic chemistry of nitrogen. In first class research extending over one third of a century [he] has woven a strong and durable part of the fabric of modern organic chemistry." This is the way one admiring associate sums up the contributions of **NELSON J. LEONARD**, professor of chemistry and biochemistry at the University of Illinois, Urbana.

The award winner's early interest in steric congestion in medium-sized ring compounds led him to examine transannular interactions of various functional groups juxtaposed because the groups were part of such a ring system. He used a variety of physical methods together with unique syntheses in these classic studies.

His syntheses of fluorescent derivatives of nucleosides, nucleotides, and coenzymes, and his illustrations of their potential uses resulted in their wide acceptance by other researchers in enzyme chemistry and nucleic acid chemistry.

Leonard's research has provided modified enzyme substrates and cofactors in which the critical distances between functional groups have been stretched by interposing a benzene ring into a fused ring system. "In this work his knowledge of biological chemistry complements his skills in

synthetic organic chemistry and his mastery of the physical-organic methodology which was developed in his earlier stereochemical studies of transannular interactions," a colleague points out.

Leonard is presently engaged in synthesizing additional "dimensional probes" of enzyme binding sites for purine substrates or cofactors.

Leonard received his Ph.D. from Columbia University in 1942. He has spent his entire career at the University of Illinois, joining its junior faculty in 1942 as a research assistant to Roger Adams. From 1954 to 1963 he headed the division of organic chemistry at Illinois. In addition to his professonial appointments, he is a member of the university's Center for Advanced Study.

His numerous honors include the ACS Award for Creative Work in Synthetic Organic Chemistry in 1963 and the Medal for Creative Research in Synthetic Organic Chemistry of the Synthetic Organic Chemical Manufacturers Association in 1970.

ACS Award in Analytical Chemistry

sponsored by Fisher Scientific Co.

"Probably his [McLafferty's] most unique contribution was in formulating mechanisms for the ion decomposition reactions occurring in the mass spectrometer, despite the belief among many groups that such reactions took place at such high energy that pathways could hardly have any relationship to chemistry . . . . In 1956 McLafferty pointed out that anomalous abundant ions present in a wide variety of spectra could be correlated by a rearrangement reaction," says a colleague of the award winner. This process came to be known as the McLafferty rearrangement.

FRED W. McLAFFERTY, professor of chemistry at Cornell University, started his work in mass spectrometry after joining Dow Chemical Co. in 1950. Until that time the analytical mass spectrometer had been used largely for quantitative analysis of volatile hydrocarbons.

It was McLafferty's paper "Broad Applicability to Chemical Research," published in *Analytical Chemistry* in 1956, that called attention to the tremendous usefulness and potential of mass spectrometry for chemical problems outside the petroleum field.

In 1964 McLafferty moved to Purdue University. The award winner's research there included a major program in computer applications and an automated method for determining the amino acid sequence in oligopeptides.

Since moving to Cornell University in 1968, McLafferty's research has developed along several new lines. The new technique of "collisional-activation" (CA) mass spectra provides direct structure determination of gaseous ions. The Cornell system for the direct coupling of the high-performance liquid chromatograph to a mass spectrometer is now available commercially. His was also one of the first laboratories to interface an on-line computer to the gas chromatograph/mass spectrometer, and to exploit the analogous technique "MS/MS" in which ionized components of a complex mixture are mass analyzed and then identified from their CA mass spectra.

McLafferty's activities in ACS include chairman of the Analytical Division in 1968. He also has served on the advisory boards of many ACS publications.

Mills

Pines

Pruett

E. V. Murphree Award in Industrial & Engineering Chemistry

sponsored by Exxon Research & Engineering Co.

"The professional career of **G. ALEXANDER MILLS** is a testament to a highly skilled scientist and research director," says one admiring colleague. Mills is well known for his research in catalysis. His contributions span the areas of transition metal, zeolitic, and amine (DABCO) catalysts. Many of the catalysts and processes which he developed currently are being used commercially worldwide for petroleum refining, petrochemicals, plastics, and synthetic fuels.

In a career spanning 40 years of scientific, technical, and administrative leadership in industrial chemistry, Mills has 62 U.S. patents and 100 publications to his credit. As assistant research director for the Bureau of Mines, beginning in 1968, he brought catalysis to the forefront by focusing attention on processes upgrading coal to provide pollution-free energy sources to replace dwindling gas and petroleum reserves. He was largely responsible for the government's role in developing the Mobil-M process for converting methanol to gasoline and for catalytic gasification of coal. Mills received the Henry W. Storch Award in 1975 for his contributions to the chemistry of coal.

Born in Saskatoon, Sask., Canada, Mills obtained his B.Sc. and M.Sc. degrees from the University of Saskatchewan, and his Ph.D. from Columbia University. He joined Houdry Process Corp. in 1940, where he became director of research in 1952. After a stint at Houdry Laboratories and the Bureau of Mines, Mills joined the Department of Energy in his current role as director of the Office of International Cooperation, Fossil Energy Division.

Mills has been a Distinguished Lecturer in catalysis at Princeton and the University of Utah under the auspices of the American Institute of Chemical Engineers, and is one of the original founders and former president of the Catalysis Society. He has been chairman of the Division of Fuel and Division of Petroleum Chemistry of the American Chemical Society, and of the Gordon Research Conferences on catalysis and coal science.

ACS Award in Petroleum Chemistry

sponsored by Lubrizol Corp.

HERMAN PINES, author of "Base-Catalyzed Reactions of Hydrocarbons and of Related Compounds," has made contributions to the field of petroleum chemistry for more than half a century.

His early discoveries of conjunct polymerization, of paraffin alkyla-

tion, and of paraffin isomerization were followed by the development of commercial processes vital to the manufacture of aviation gasoline during World War II. Those processes are still practiced today on an even larger scale for the production of unleaded gasoline.

Pines, Emeritus Professor, Northwestern University, author of more than 250 papers, and holder of 145 patents, was a pioneer in establishing the field of base-catalyzed hydrocarbon reactions. Studies on catalytic properties of aluminas and paraffin aromatization over chromia/alumina have become classics in the catalytic literature. In addition, he found in 1936 that phosphoric acid was an outstanding catalyst for the synthesis of cumene, an intermediate in the manufacture of phenol and acetone, and his fundamental studies of carbonium reactions form a mechanistic framework for the understanding of acid-catalyzed hydrocarbon reactions.

A native of Poland and a U.S. citizen since 1933, Pines received his chemical engineering degree from the École Supérieure de Chemie Industrielle, Lyons, France, and his Ph.D. from the University of Chicago.

After beginning his career as a research chemist in commercial laboratories and at Universal Oil Products Co., he began teaching at Northwestern University. There he continued his work for almost 40 years—first as an assistant professor, and finally as Vladimir Ipatieff Professor and director of the Ipatieff High Pressure & Catalytic Laboratory. He received the ACS Fritzsche Award (1956) and the ACS Midwest Award (1963).

As well as continuing as coeditor of *Advances in Catalysis,* Pines just finished his second book, "The Chemistry of Catalytic Hydrocarbon Conversion Reactions." He has been active as a visiting professor in Israel, Brazil, and the U.S. His lecture schedule has taken him to Poland, Spain, Argentina, and various universities in Western Europe.

ACS Award for Creative Invention

sponsored by Corporation Associates

"ROY PRUETT is a rare example of a scientist who has contributed significantly both to the fundamental and applied aspects of research in the field of organometallic catalysis." Pruett, inventor of the Oxo process for converting propylene to *n*-butyraldehyde, received his B.S. from Murray State University in 1944, M.S. in 1948 and Ph.D. in 1951 from the University of Tennessee.

He joined Union Carbide at Oak Ridge, transferring to the Linde division at Tonawanda, N.Y., where he did significant work in the chemistry of ferrocenes and other metallocenes. In 1958, Pruett transferred to the chemicals and plastics division's R&D department at Charleston, W.Va., where his basic research on rhodium chemistry led to development of the low-pressure Oxo process, the preferred process for making plasticizer intermediates. That process won the 1977 Kirkpatrick Chemical Engineering Achievement Award for Carbide, Davy Powergas Ltd., and Johnson Matthey Ltd., the consortium that commercialized it. "Pruett developed the chemistry, he saw the potential, and he worked closely with all aspects of process development right up to the point of commercial success," a British colleague remarks.

Pruett took early retirement in 1979 and joined the corporate research laboratories at Exxon Research & Engineering in Linden, N.J., where, as a senior research associate, he heads a team investigating the catalytic reduction of carbon monoxide by hydrogen.

Holder of more than 40 U.S. patents, Pruett received the first ACS Kanawha Valley Section Award for Scientific Achievement for his work in metallocene chemistry.

For relaxation, he enjoys golf and orchid cultivation.

ACS Award for Distinguished Service in the Advancement of Inorganic Chemistry

sponsored by Mallinckrodt Inc.

Author of more than 350 papers and 21 patents, **DIETMAR SEYFERTH** has been a dominant figure in main-group organometallic chemistry for some 20 years. He played a key role in the founding of the *Journal of Organometallic Chemistry,* which was important in establishing organometallic chemistry as an independent scientific discipline, and has been regional editor (for the Western Hemisphere and Asia) of this journal since 1963.

Professor of chemistry at Massachusetts Institute of Technology since 1965, Seyferth received his B.A. from the University of Buffalo in 1951 and his Ph.D. from Harvard University in 1955. After postdoctoral work at the Technische Hochschule in Munich and at Harvard, he joined the MIT faculty in 1957 as an instructor.

The award winner has compiled an outstanding record of accomplishment in exploratory and synthetic organometallic chemistry. His early research at MIT on unsaturated organometallics led to syntheses of allylic and vinylic lithium reagents which have found use in organic and organometallic synthesis. His extensive work in organomercury chemistry resulted in the development of halomethylmercury compounds as useful reagents for the generation of halocarbenes.

Seyferth has maintained an active interest in the organic chemistry of silicon and the other Group IV elements (the subject of his Ph.D. research with E. G. Rochow) throughout his research career. Noteworthy are the first synthesis of a silacyclopropane and the first isolation of a stable silacyclopropene.

More recently, Seyferth's research interests have extended to organotransition metal chemistry, with emphasis on transition metal cluster complexes which also contain main group atoms or groups. His investigations of the chemical transformations which $RCCo_3(CO)_9$ complexes undergo have uncovered much novel "metal-modified" chemistry of the "organic" portion of the cluster. In his current research, the chemistry of $(\mu\text{-}S_2)Fe_2(CO)_6$ and $(\mu\text{-}Se_2)Fe_2(CO)_6$, complexes which contain S—S (or Se—Se) bonds as well as Fe—Fe

Seyferth

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bonds, is being developed. These compounds are inorganic mimics of organic disulfides and diselenides.

Seyferth has received numerous honors, including the ACS Frederic Stanley Kipping Award in Organosilicon Chemistry in 1972 and election to the venerable German Academy of Scientists Leopoldina in 1977.

ACS Award in Colloid or Surface Chemistry

sponsored by Kendall Co.

GABOR A. SOMORJAI, professor of chemistry at the University of California, Berkeley, is a leading spokesman for the field of surface science. Through his research efforts he has placed chemical phenomena at surfaces on a firm structural basis by employing modern physical measurement techniques and single crystal surfaces.

Somorjai has sought to study the surface behavior of molecules of higher complexity and greater technological importance than those which are usually studied in surface physics. He has been a pioneer in bridging the gap between ultrahigh-vacuum environments of the surface physicists and high-pressure environments of the catalytic chemists. "I am always impressed by the originality inherent in Somorjai's research projects," says an admiring colleague. As an example, he cites the extension of kinetics studies on single crystals to high pressures, as well as Somorjai's studies on the nature of carbonaceous surface layers in the catalytic synthesis of hydrocarbons, as enormously important work.

In addition to his laboratory research, Somorjai has made noteworthy contributions to surface science through his lectures, reviews, and books. "More effectively than any other individual," says another colleague, "Somorjai has raised the general interest level of physicists, chemists, students, research administrators, and funding officers of research-granting foundations and agencies in the broad field of surface science.

Somorjai was born in Budapest, Hungary, in 1935. He graduated in 1956 from the University of Technical Science, in Budapest, with a B.S. in chemical engineering. He received his Ph.D. in chemistry from the University of California, Berkeley, in 1960. After graduation he worked for IBM for four years before joining the faculty at the University of California, Berkeley, as assistant professor of chemistry in 1964. He was named professor of chemistry in 1972. Along with his faculty appointment he is also a principal investigator at the materials and molecular research division of Lawrence Berkeley Laboratory.

Somorjai is the author of more than 200 scientific papers. He was elected to the National Academy of Sciences in 1979, and is a fellow of the Physical Society. In 1977 he received the Paul H. Emmett Award of the Catalysis Society, and the Kokes Award from Johns Hopkins University in 1976.

James Bryant Conant Award in High School Chemistry Teaching

sponsored by Ethyl Corp.

FLOYD F. STURTEVANT, chemistry teacher at Ames Senior High School, Ames, Iowa, uses a highly creative approach to teaching. He is an untiring worker and a constant catalyst for the improvement of science education at Ames and in the state of Iowa. The chemistry program at Ames Senior High is recognized throughout the state as being truly outstanding.

Quiet, but very personable, an important factor in Sturtevant's popularity with students is his sincere interest in conducting a rigorously instructive course, modulated with practical or entertaining aspects of chemistry. His development of laboratory experiments that challenge the student to think, and also incorporate practical economic and engineering considerations, is probably his strongest attribute.

Sturtevant's honors chemistry course, which has been his major concern for many years, is truly exemplary. The content and rigor of this course, as well as the lab and investigative activities involving the students, are comparable to most freshman college chemistry programs.

Sturtevant does not demonstrate interest in his students through classroom work only; he persistently struggles behind the scenes to appropriate the necessary funding for implementing present or planned methods of instruction. He is a frequent visitor at the local warehouses, labs, and supply houses in his area, scavenging for usable cheap materials for his chemistry lab. The award winner's dogged determination and ingenuity, with the help of his associates, have resulted in the successful acquisition of supplies and facilities found in the well-equipped chemistry labs at Ames.

"Floyd's chemistry program has always been fresh and interesting. His laboratory program is indicative of his highly creative approach to teaching," says an admiring colleague. Sturtevant also initiated the construction of a modern chemical storeroom that incorporates safety features recognized as the best for storage of all chemical materials used in the instructional program of the school district.

A native of Beaver City, Neb., Sturtevant obtained an M.S. from Northern Iowa State University in 1963. He has taught high school chemistry at Ames for more than 20 years.

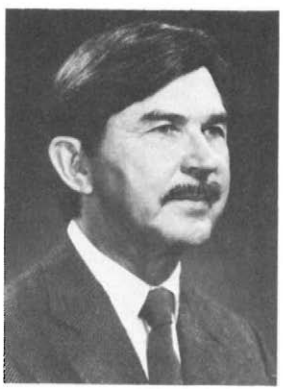
ACS Award in Inorganic Chemistry

sponsored by Monsanto Co.

HENRY TAUBE, professor of chemistry at Stanford University, is described by one of his colleagues as "clearly the leading figure throughout the world" in the field of inorganic reaction mechanisms. His pioneering work has led to the development of experimental methods and mechanistic concepts which provide the basis for understanding the dynamic behavior of inorganic compounds, particularly the transition metals. He has published more than 200 research papers and a book.

Taube is best known for his work on the mechanisms of oxidation-

Sturtevant



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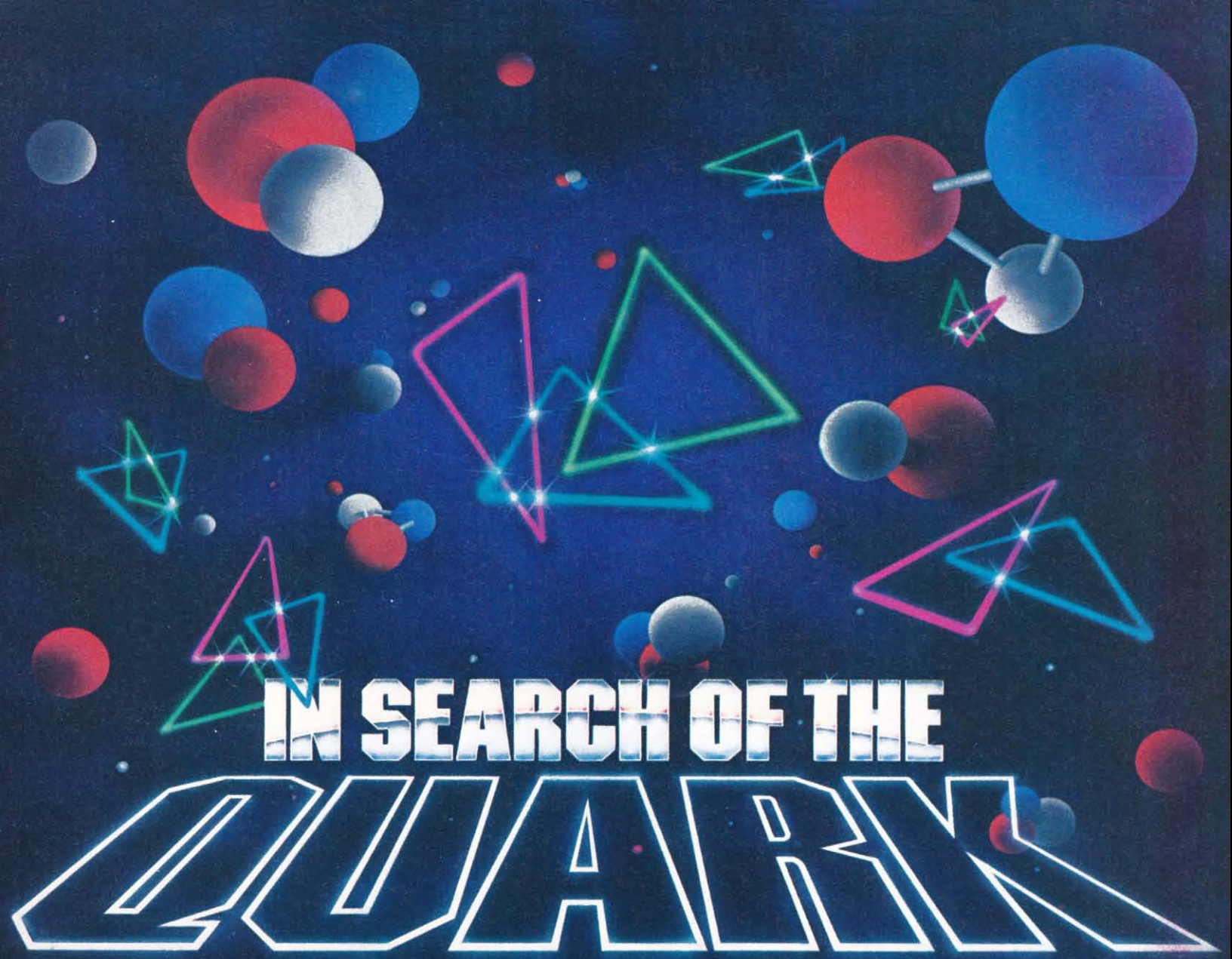

IN SEARCH OF THE QUARK

Albert Einstein spent years trying to prove his "unified field" theory. He believed that all of nature's basic forces—gravitation, electromagnetism, and the nuclear strong and weak forces—contain the minutest of particles, dubbed quarks. If they exist, quarks could constitute the building blocks of all matter.

No one has yet seen a quark, but physicists have uncovered strong evidence that supports its existence. In an experiment conducted at Fermi National Accelerator Laboratory, electrons were smashed into positrons, producing mass-energy debris. Particles resulting from the high-voltage collision were analyzed and declared to indicate the presence of a quark, an antiquark, and a gluon (believed to be the strong force binding together minuscule particles in the atomic nucleus).

To collect the debris formed in these experiments, the KODAK Chemicals scintillators, BBOT and PPO were imbedded in plastic and used as detectors.

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reduction reactions, especially those involving transition metal ions, an area of great importance in energy transfer processes throughout biology. In earlier work he was the first to measure the equilibrium between inner and outer sphere forms of complex ions and, in a classic 1952 paper, he was the first to point out the correlation between ligand substitution rates and the electronic configuration of the metal for coordination compounds of the transition metals—a concept that is still a salient feature of the reaction chemistry of coordination compounds. Part of Taube's current work is devoted to understanding the chemistry and other properties of mixed valence molecules, and to exploring the basic solution chemistry of some of the heavy transition metals.

Taube received his B.S. in 1935 and M.S. in 1937 from the University of Saskatchewan, and his Ph.D. in 1940 from the University of California, Berkeley. He was a member of the Cornell University faculty from 1941 to 1946, and a member of the University of Chicago faculty from 1946 to 1961 where he served as chairman of the chemistry department from 1956 to 1959. In 1962 he joined Stanford University as a professor and served as chairman of the chemistry department from 1972 to 1974.

His previous honors include selection as a Guggenheim Foundation fellow in 1949 and 1955, ACS Award for Nuclear Applications in Chemistry in 1955, ACS Award for Distinguished Service in the Advancement of Inorganic Chemistry in 1967, and the National Medal of Science in 1977.

ACS Award for Creative Work in Synthetic Organic Chemistry

sponsored by Aldrich Chemical Co.

BARRY M. TROST, professor of chemistry at the University of Wisconsin, Madison, is considered to be one of the most imaginative synthetic organic chemists in the world. His work covers a very broad range of organic chemistry—from total synthesis of compounds of biological interest to development of synthetic methodology to study of theoretically interesting hydrocarbons.

Not yet 40 years old, Trost has published more than 200 technical papers. One colleague observes that Trost's "achievements are truly remarkable for a man his age; they would be impressive for an entire career."

Vandenberg

Vandenbosch

Weisburger

Some of his most recent work has centered on the use of organopalladium chemistry in synthesis, in particular the reaction of π-allylpalladium complexes with nucleophiles. This new strategy has led to a variety of potent general methods for carrying out important regio-, stereo-, and enantioselective transformations.

Trost's work on sulfur compound chemistry has led to new synthetic methodology for the synthesis of a wide range of complex structures and has shown how these methods can be applied in total synthesis. As one example, he developed the use of sulfur-stabilized cyclopropyl anions to give stereocontrolled introduction of functionalized spiro rings and their cleavage to useful intermediates. He also has developed new methods for modifying oxidation levels at carbon using sulfur intermediates.

Born in 1941, Trost received his B.A. in 1962 from the University of Pennsylvania, and his Ph.D. in 1965 from Massachusetts Institute of Technology. He joined the faculty of the University of Wisconsin as an assistant professor in 1965, was named professor in 1969, and then Evan P. and Marion Helfaer Professor of Chemistry in 1976. His previous awards include being named an Alfred P. Sloan Foundation fellow 1967 to 1969, Camille and Henry Dreyfus Teacher-Scholar 1970–1975, the ACS Award in Pure Chemistry in 1977 and election to the National Academy of Sciences in 1980.

ACS Award in Polymer Chemistry

sponsored by Witco Chemical Corp. Foundation

EDWIN J. VANDENBERG, senior research associate at Hercules Research Center, Wilmington, Del., has been an outstanding polymer scientist over the past 35 years. His achievements have led to the successful production of isotactic polypropylene, elastomeric polyethers, new polymerization catalysts, and other polymers.

Vandenberg's discoveries are so numerous that it is difficult to single out specific work; he holds well over 100 patents. In 1954 he independently discovered isotactic polypropylene. From that he directed his research to the development of new catalysts and methods of producing polypropylene in high yield. His work relating to a new mixed crystal containing $TiCl_3$, which is uniquely suited for making isotactic polypropylene, led to Hercules' being the first North American producer of polypropylene and ultimately the largest producer in the world of this large-volume polymer.

In other research Vandenberg discovered new catalyst systems for polymerizing epoxides to high-molecular-weight polymers. This work led to the commercialization of the epichlorohydrin and propylene oxide elastomers. These elastomers have proved especially useful in the automotive area and are being produced in multimillion-pound quantities. The most recent polymers announced are perhaps the most theoretically and technically interesting: polymers and copolymers of the cis and trans isomers of 1,4-dichloro-2,3-epoxybutane. As yet not commercialized, these may well have a greater potential than Vandenberg's previous discoveries.

Vandenberg obtained an M.E. from Stevens Institute of Technology in 1939; he received an honorary doctorate from Stevens in 1965 for his "outstanding technical achievements." The awardee joined Hercules in 1939.

Vandenberg has served as chairman of the ACS Delaware Section (1976) and as chairman of the ACS Polymer Division (1979). He is on the advisory boards of *Journal of Polymer Science* and *Macromolecules*. He has been an invited guest lecturer at universities and technical society meetings throughout the world.

Weisshaar

West

Wrighton

ACS Award for Nuclear Chemistry

sponsored by an anonymous donor

"One of the very best nuclear chemists in the whole field of research" is the way one colleague describes **ROBERT VANDENBOSCH.** A large number of his contributions are firsts in their respective areas. His work has influenced many research workers in nuclear chemistry.

Papers coauthored by Vandenbosch, who is professor of chemistry at the University of Washington, Seattle, on measuring and interpreting nuclear isomer ratios are classical papers in the field. He has made many fundamental contributions to the field of nuclear fission. For instance, he developed a theory based on the deformation of the fission fragments near fission, which explains many results of fission in a consistent and simple way.

The award winner was the first to apply accelerator beam pulsing and coincident solid-state detector methods to discover and study fission isomers. This research helped lead to the establishment of the two-humped fission barrier and the mapping out of the structure of the barrier as a function of atomic charge and mass.

Work by Vandenbosch in heavy ion reactions has broadened understanding of resonance structure in heavy particle emission from light nuclei. Of particular note is his recent work on angular-momentum transfer in deeply inelastic scattering. He has pioneered the use of sequential fission to probe both the magnitude and the alignment of the angular momentum transferred to the heavy fragment in quasi- and deeply inelastic collisions. It has been shown that both the transferred angular momentum and its alignment increase with increasing inelasticity in the collision, and a simple model to explain this result has been developed. From this and related charge distribution measurements, it has been concluded that one-body dissipation associated with nuclear exchange is a major mechanism for energy loss in deeply inelastic collisions.

Vandenbosch received his Ph.D. in 1957 at the University of California, Berkeley; his research was carried out under the direction of Glenn T. Seaborg. After graduation, he was an assistant chemist at Argonne National Lab. In 1961 he was promoted to associate chemist. He joined the chemistry department at the University of Washington in 1963 as associate professor, became professor in 1967.

Vandenbosch is a member of ACS and a fellow of the American Physical Society. In 1977 he coauthored with John Huizenga a book on nuclear fission, described by a colleague as the best book written on this subject.

Garvan Medal

sponsored by W. R. Grace & Co.

ELIZABETH K. WEISBURGER's research in chemical carcinogenesis is held in highest esteem by those working in the cancer field. By probing the relationships of chemical structure and biological activity of chemical compounds, she has greatly enhanced and emphasized the important role of chemistry in the study of carcinogenesis. Weisburger is chief of the laboratory of carcinogen metabolism, division of cancer cause and prevention, at the National Cancer Institute in Bethesda, Md.

Weisburger's research has centered on the in-vivo metabolism and metabolic activation of chemical carcinogens, particularly of *N*-2-fluorenylacetamide and other aromatic amines. She was one of the pioneers in relating specific metabolic pathways to organ-specific carcinogenesis, and she continues to make original findings in this area. More recently she has turned her research work to the relationship between mutagenesis and carcinogenesis. This work has been particularly impressive in the mechanisms of actions of chemical carcinogens, and in the development of improved test systems for assessing cancer risks.

Weisburger was one of the first scientists to point out the potential dangers of some of the principal drugs used in clinical cancer chemotherapy, namely that these were alkylating agents and mutagens. Her studies on the cancerous properties of the drugs used in clinical cancer chemotherapy are among the most comprehensive and thorough to date.

In addition to being an extremely productive scientist—she has authored or coauthored more than 175 papers—Weisburger has served the public sector well. "There is scarcely an important national or international committee on cancer research of which she is not a member," comments a colleague. Her activities in professional and academic institutions, services to scientific journals, the U.S. Public Health Service and other governmental agencies (Food & Drug Administration, Environmental Protection Agency), as well as to the National Academy of Sciences and the American Chemical Society have advanced her into the ranks of the truly distinguished.

The Garvan medalist is from Ono, Pa. She was a cum laude graduate (B.S. in chemistry) from Lebanon Valley College in 1944, and obtained her Ph.D. in organic chemistry from the University of Cincinnati in 1947. After serving as a research associate at the University of Cincinnati for two years, she joined NIH in 1949.

Nobel Laureate Signature Award for a Graduate Student in Chemistry

sponsored by J. T. Baker Chemical Co.

JAMES C. WEISSHAAR's Ph.D. thesis on the nonradiative decay of single rotational levels of S_1 formaldehyde caused quite a stir at the University of California, Berkeley. One of his professors describes this "truly exceptional thesis" as cracking open a long-standing problem in photochemistry and radiationless transitions.

Weisshaar's work resolved difficulties earlier studies had dealing with extrapolations to zero-pressure of S_1 fluorescence decay rates, and inference of lifetimes from emission intensities. He showed that it was necessary to go to pressures lower than a millitorr in order for Stern-Volmer plots to straighten out, and also to work with light-source band-

passes narrower than a wave number in order to excite only one rotational component.

By collecting data, developing physical models, applying and extending theoretical treatments, and subjecting ideas to quantitative tests, Weisshaar established two very important characteristics of electronic relaxation processes in formaldehyde: Fast nonradiative decay occurs in the absence of collision, and nonradiative lifetimes (associated with a single vibrational level) vary as much as a factor of 60 with rotational quantum number. He then used a dc electric field to shift S_1 and S_0 levels with respect to each other. The resulting changes in lifetime gave quantitative information about the strengths of the S_1-S_0 couplings and the lifetimes against dissociation and spacings of the S_0 states.

One indication of the importance of Weisshaar's work is the publication of six articles on his findings, including a communication in the *Journal of Chemical Physics*. The thesis itself integrates the individual journal articles and has been distributed widely to other researchers.

Weisshaar was a National Science Foundation predoctoral fellow from 1974–77 at Berkeley. Now a postdoctoral fellow at the Joint Institute for Laboratory Astrophysics at the University of Colorado, Boulder, Weisshaar spent his undergraduate days at Michigan State University. He was the recipient of a National Merit Scholarship from 1970 to 1974, and is a member of the American Physical Society.

ACS Award for Creative Advances in Environmental Science and Technology

sponsored by Air Products & Chemicals Inc.

PHILIP W. WEST, Boyd Professor of Chemistry and director of the Institute for Environmental Sciences, Louisiana State University, Baton Rouge, has pioneered in recognizing the problems of environmental quality by contributing to the study of air and water analysis and treatment for more than 25 years. He is probably best known for the West-Gaeke method for determining sulfur dioxide in air. Publication of the West-Gaeke technique in the early 1950's gave air pollution researchers a method that was their own, and that could be extended to concentrations of sulfur dioxide never previously measured.

In a similar area—sulfuric acid aerosol sampling—West and his students have recently found a way of stabilizing the reactive species at the moment of collection. By utilizing a topochemical reaction, sulfuric acid is collected and inactivated before it can react with copollutants. This is accomplished by collecting samples on filters impregnated with perimidyl-ammonium bromide. Final determination of the collected sulfate is based on the pyrolysis of the $(PDA)_2SO_4$ to produce stoichiometric amounts of SO_2, and measured by the West-Gaeke procedure.

West and his students introduced the use of permeation-type passive monitors for the monitoring of organic toxins and also introduced the charcoal tube approach for collecting gaseous organic pollutants.

West also recognized the merit of the ring oven technique of Weisz for determining metals in airborne particulate samples, pioneering both its adaptation to air pollutant analysis, and spreading word of its availability. West has contributed almost 250 articles, books, reviews, and chapters to the scientific literature.

Calling attention to the "other side of the coin," West recognizes the necessity of air and water contamination, and even certain types of pollution. Dust in the atmosphere is necessary for cloud formation resulting in needed rain and thunderstorms; pure water must contain O_2, CO_2, trace metals, and even sewage for the support of aquatic life. Thus there are relatively few true pollutants—most pollutants are diluted, dispersed, and degraded, thereby becoming useful contaminants.

West is a graduate of the University of North Dakota, with a Ph.D. from the State University of Iowa. He joined the faculty of Louisiana State University in 1940. He was editor of *Analytica Chimica Acta* for 19 years. West was cofounder and former chairman of the board of Kem-Tech Laboratories (now owned and operated by Borg-Warner Inc.). He is also the cofounder and chairman of the board of West-Paine Laboratories.

ACS Award in Pure Chemistry

sponsored by Alpha Chi Sigma

The three main areas of **MARK S. WRIGHTON**'s research are photochemistry of organometallic complexes, photocatalysis, and photoelectrochemistry. In the first area, the professor of chemistry at Massachusetts Institute of Technology has discovered an important new class of photoreactions in which metal-metal bonded complexes undergo symmetrical cleavage with high chemical and quantum efficiencies when photoexcited.

In the second area, he has used thermally inert, light-sensitive organometallic compounds as catalyst precursors and achieved highly specific catalysis under milder conditions than those found with thermally activated catalysis. And in photoelectrochemistry Wrighton has pioneered in studying photon assistance of electrochemical reactions, which has led to discovery of photoanode materials that allow sustained electrolysis of water using light as the only energy input—a major advance in conversion of solar energy to chemical energy. Most recently he has demonstrated that modification of photoelectrode surfaces is a viable approach to improving efficiency and durability of optical energy conversion devices.

Wrighton received a B.S. in chemistry with honors from Florida State University in 1969 and his Ph.D. from California Institute of Technology, where he worked under George S. Hammond and Harry B. Gray, in 1972. He joined the MIT faculty that year as assistant professor and was named full professor in 1977.

He is active as a lecturer and has organized a number of conferences and symposia. Wrighton is a member of ACS, the Electrochemical Society, and the American Association for the Advancement of Science.

ACS Awards for Outstanding Performance by Local Sections are:

(Small) **Central Wisconsin, Norwich, Wilson Dam**
(Medium Small) **Central North Carolina, Savannah River**
(Medium Large) **Kalamazoo**
(Large) **St. Louis**

ACS Regional Awards in High School Chemistry Teaching are:

Peter A. Behnke, Great Lakes Region
Gene P. Buzzard, Central Region
Stephen A. Edgerton, Middle Atlantic Region
Richard Fiore, Northeast Region
Catherine H. Hamilton, Southwest Region
Joan Melcher, Northwest Region
Otto T. Salzer, Metropolitan Region
Floyd F. Sturtevant, Midwest Region
Sr. Elizabeth Worley, Southeast Region