ACS 1977 national award winners announced

Following are the 1977 recipients of awards administered by ACS. All awardees will receive their awards at the 173rd ACS National Meeting in New Orleans next March, except Dr. William S. Johnson, who will receive the Roger Adams Award in Organic Chemistry at the 25th National Organic Symposium in Morgantown, W.Va., next June. Vignettes on Dr. Henry Gilman, winner of the 1977 Priestley Medal, and on Dr. William O. Baker, recipient of the 1976 Parsons Award, were published in C&EN, July 12, page 18, and Aug. 2, page 18, respectively.

The James Flack Norris Award in Physical Organic Chemistry

sponsored by the ACS Northeastern Section

As a detailed knowledge of solvation energies develops it should be possible to have much better control over reactions in solution. It also should prove possible to bring about new chemical processes that currently are limited to the gas phase. This is the opinion which a colleague of University of Pittsburgh chemistry professor **EDWARD M. ARNETT** has expressed in explaining the practical significance of Dr. Arnett's outstanding research contributions toward elucidating the profound role of solvation in organic chemistry.

Arnett has applied classical thermodynamics to the detailed analysis of solvent effects on the rates and equilibria for organic reactions. To this end he has developed a large mass of information about the free energies, enthalpies, and entropies of solvation of molecules, ions, and transition states. As another colleague puts it, he "has produced the basic data that must serve as the foundation of theories of the solvation of ions." Also of special significance has been his development of solution calorimetry as a tool for the physical organic chemist.

Through collaboration with other workers, Arnett has been able to calculate for the first time the solvation energies of important organic ions from the gas phase to solution. As a result it is now possible to demonstrate that many reactivity orders observed in solution are dominated by solvation energies, rather than by internal energy terms and to apportion these factors.

Born in Philadelphia in 1922, Arnett was educated through high school at the Germantown Friends School. Both his undergraduate and graduate training was at the University of Pennsylvania where he received his Ph.D. in 1949. He spent the next four years as research director at a small firm in Philadelphia. He then spent two years at Western Maryland College, before moving back toward a career in basic research by working with Dr. Paul Bartlett's group at Harvard for two years. In 1957 he joined the University of Pittsburgh, where he has remained. He obtained the rank of professor in 1964.

In 1968 he established the Pittsburgh Chemical Information Center, an organization engaged in developing and testing computer-based chemical information services. He turned the directorship over to others in 1971 after the venture had proved successful.

ACS Award in Polymer Chemistry

sponsored by Witco Chemical Foundation

Active in polymer research for nearly 30 years, **DR. WILLIAM J. BAILEY** of the University of Maryland has made a number of noteworthy contributions, particularly in the field of polymer synthesis. Among the areas he has pioneered are synthesis of the first all-cis or -trans diene polymers and of the first complete ladder and spiro polymers, polypeptides with unprotected side groups, biodegradable polymers, and a new group of monomers that polymerize with zero contraction.

Bailey prepared the first all-cis diene polymer in 1948, the first all-trans diene polymer in 1953. In 1954 he and his group synthesized the first complete ladder polymers from the reaction of 2-vinylbutadiene with benzoquinone. Later he made a new type of double-chain polymer based on spiro units.

In the area of protein analog synthesis, he developed a new way to prepare polypeptides containing unprotected polar side groups via the condensation reaction of amino acid azide hydrobromides. Key to the success of this reaction is the isolation and purification of the crystalline amino acid or peptide azide hydrobromide.

Bailey and his group have made a hybrid of nylon, which isn't biodegradable, and a protein, which is biodegradable. This biodegradable polyamide could find use in medicine, agriculture, and the ecology. More recently the award winner has channeled his efforts to developing monomers that polymerize with zero shrinkage or only slight expansion. Such polymers hold promise for making strain-free precision castings, composites, adhesives, and binders.

A long-time ACS member, Bailey has been very active in ACS affairs—he was president of the society in 1975. And as president, one associate observes, "he not only fulfilled the tasks of his office in an outstanding manner but also labored tirelessly to upgrade the status of polymer science in the universities. In fact, he has acted as an effective spokesman to industry and government in the cause of stronger polymer efforts."

A graduate of the University of Illinois (Ph.D. 1946), Bailey taught at Wayne State University before coming to Maryland in 1951, where he is research professor of chemistry. He has published more than 150 technical articles, including a book, and has five patents.

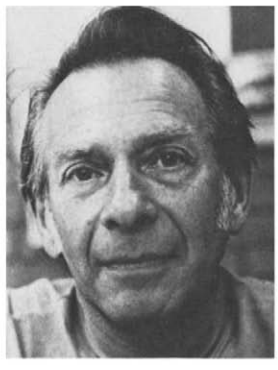
ACS Award in Petroleum Chemistry

sponsored by Lubrizol

Since receiving his Ph.D. at Harvard in 1941, **DR. SIDNEY W. BENSON** has had a striking influence on physical

Arnett

Bailey



Benson

chemistry, most notably in the field he initiated with his 1968 monograph "Thermochemical Kinetics." This research has provided an approach to evaluating and estimating thermochemical and rate data, and it has been used now for several years by industrial and academic chemists alike with particular emphasis on petroleum-related chemistry.

Now professor of chemistry at the University of Southern California, Benson began his career with a one-year stint at City College of New York, worked a year on the Manhattan Project, and then taught for 20 years at the University of Southern California. He chaired the department of kinetics and thermochemistry at Stanford Research Institute from 1963 until this year, when he returned to USC. He has won several fellowships and visiting professorships, and he has served on numerous committees and panels involved with physical chemistry. He has been editor-in-chief of *International Journal of Chemical Kinetics* since 1967.

Benson has made several key contributions to petroleum chemistry. For instance, he found a quantitative explanation of the major product-determining steps in hydrocarbon oxidation. And he developed the very-low-pressure pyrolysis (VLPP) technique, which makes possible the measurement of rate processes often obscured by secondary reactions. This technique not only yields directly measured rate constants for initiation reactions in complex systems, but it can be used to study fast bimolecular homogeneous reactions or heterogeneous processes. In addition, Benson's theory of termolecular atom recombination provides an understanding of the magnitude of their negative temperature coefficients. He pioneered the machine computation of energy transfer in molecular collisions.

Benson's unraveling of the mechanisms of iodide reactions in the gas phase and the use of HI as a radical scavenger has made it possible to measure heats of formation of many radicals. He also found that the rate data for cyclopropane pyrolysis could be described quantitatively in terms of a biradical intermediate. He since has shown that this model describes the pyrolysis data for a large number of small-ring compounds.

ACS Award in Colloid & Surface Chemistry

sponsored by Kendall Co.

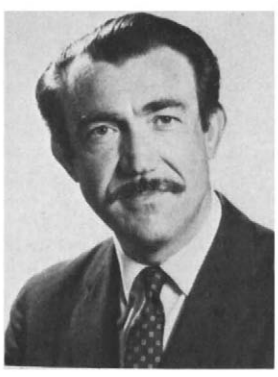
"[Boudart's work] has not been confined to a single specialty nor to a single system or tool . . . . " So remarks a colleague of **DR. MICHEL BOUDART,** chairman of the department of chemical engineering at Stanford University. Indeed this describes not only his wide-ranging interests in chemistry but his international reputation and his many lectures both here and abroad.

Boudart's particular interest has been in heterogeneous catalysis, especially in the elucidation of the structure of surface sites and the nature of binding of adsorbates to these sites. This has led to work with supported platinum catalysts, in which he used hydrogen chemisorption to measure the dispersion of surface atoms of platinum, and to research on structure sensitivity, i.e., the differences that may appear in the catalytic activity of catalysts with different crystal planes, surface defects, edges, particle size, etc. Out of this work came his system of classifying catalytic reactions as "facile" or "demanding," depending on the sensitivity of the reaction to surface structural details. He is now extending his work on structure sensitivity to oxides.

Other research has been directed to chemisorption, the application of Mössbauer spectroscopy to characterize catalytic surfaces, measurement of metal particle size on inert supports, investigation of hydrogen spillover, mechanisms of the hydrogen deuterium exchange reaction, hydrogenation of cyclopropanes, and isomerization and hydrogenolysis of neopentane.

Boudart was born in Brussels in 1924. He received his B.S. and M.S. from the University of Louvain and his Ph.D. from Princeton University in 1950. He became a U.S. citizen in 1957. He taught at Princeton and at the University of California, Berkeley, before joining the Stanford faculty in 1965. He is also a consultant for Exxon Research & Engineering and for Hoffmann-LaRoche. Boudart has been visiting professor at the universities of Louvain, Rio de Janeiro, and Tokyo. His book, "Kinetics of Chemical Processes," was published in 1968. In 1974 he cofounded Catalytica Associates Inc., a consulting company in catalysis.

He is on the editorial boards of *Journal of Catalysis, Catalysis Reviews, Advances in Catalysis, International Chemical Engineering,* and is an editor of *Journal of Molecular Catalysis.* He is coinstructor for the ACS Short Course on heterogeneous catalysis.



Boudart

Bruson

Eckert

ACS Award for Creative Invention

sponsored by the Corporation Associates

DR. HERMAN A. BRUSON is one of the most prolific chemical inventors of our time. The 75-year-old former research vice president of Olin Corp. is author of well over 300 U.S. patents, many of which have been of tremendous economic value. In reviewing Bruson's patents, says one admiring colleague, "one is simply overwhelmed by the magnitude of the man's contribution in so many areas that affect our everyday lives."

He began his career in industrial research more than 50 years ago with Goodyear in Akron, where he created Pliolite, and subsequently worked at Rohm & Haas (Philadelphia), Industrial Rayon Corp. (Cleveland), and Olin (New Haven, Conn.). Since his retirement from Olin 10 years ago, he has been serving as chemical consultant to a number of large chemical companies.

Although it's difficult to single out any one accomplishment as his most important, vying for that spot is his discovery of a flame-retardant polyurethane foam and development of the process for its manufacture (patents for these were granted in 1966). The product is marketed today by Olin Corp. under the tradename Thermolin RF-230 and is made in a new, fully computerized plant at Lake Charles, La., with an annual capacity of 30 million lb. Safety aspects of this polyurethane foam likely will expedite its replacing all or most conventional flammable foams.

Bruson's biggest-selling products are oil additives used worldwide in motor-car oil to eliminate changing from winter-grade to summer-grade lube oils. Sales of these additives have totaled more than $800 million since the patents issued in 1937 and 1938. A few of his many other discoveries are "Paraplex" nonmigratory plasticizers and elastomers for polyvinyl chloride and nitrocellulose, "Triton" nonionic surfactants (still selling in the hundreds of millions of pounds per year), a derivative of natural fatty glycerides that is one of the most widely used insecticide emulsifiers for shrubs and plants, pharmaceutical germicides and the main ingredient used in pHisoHex as a nonirritating detergent, methallyl sodium sulfonate for making Orlon-type fibers more hydrophilic and dye receptive (now used worldwide), and processes for making several petrochemicals.

He also introduced the terms "cy-

anoethylation" and "cyclialkylation" to describe new organic reactions that he discovered. These have become common tools of organic chemists.

Ipatieff Prize

DR. CHARLES A. ECKERT, professor of chemical engineering at the University of Illinois, is widely known for his contributions in molecular thermodynamics and solvent effects on chemical reactivity. The 37-year-old professor's most extensive research has been in the use of high pressure as a tool to investigate the structure and properties of reaction transition states in solution, primarily by volumes of activation as found from high-pressure kinetics. The results are useful both in delineating the chemistry of the reactions involved and in predicting the solution behavior of the transition state. The Ipatieff Prize, awarded for outstanding experimental work in catalysis or high pressure, recognizes Eckert's work in both these fields.

Since receiving his Ph.D. at the University of California, Berkeley, in 1964, Eckert has spent nearly all his career teaching and conducting research at Illinois. His work there has earned him the reputation of being, in the words of one associate, "flamboyant in personal style [which] carries over into his research. He attacks his problems with considerably more dash and verve than most of the workers in the field, and he represents a clear case of creativity."

A frequent speaker at national meetings of ACS and the American Institute of Chemical Engineers, Eckert has maintained a busy schedule of invited lectures at colleges and universities, companies, and government laboratories. He has been active on the high pressure committee of AIChE and won that organization's Allan P. Colburn Award in 1973. He has authored or coauthored about 50 papers on his research as well as several books or chapters in books. He has received several fellowships, including a Guggenheim Foundation fellowship in 1971 and a NATO postdoctoral fellowship in 1964.

ACS Award for Nuclear Applications in Chemistry

sponsored by G. D. Searle & Co.

This award is given in recognition of outstanding contributions to nuclear isotopic applications. And the record of **DR. GLEN E. GORDON,** according to a colleague, "as the leader in the field of developing multielement chemical analyses using not one, but several nuclear methods renders him the ideal person to receive this award." He is professor of chemistry at the University of Maryland.

The award winner received a B.S. in chemistry from the University of Illinois in 1956, his Ph.D. from the University of California, Berkeley, in 1960. He taught at Massachusetts Institute of Technology from 1960 to 1969, when he joined the staff at Maryland. Active in nuclear chemistry since his undergraduate days at Illinois, Gordon took part in the production of element 102 and in the study of heavy-ion-induced fission and spallation reactions at Berkeley. Since then he has carried out research on the kinetic energy release and nuclear structure and radioactive decay of nuclei.

Gordon

Guilbault

Harris

One of his outstanding contributions has been the development of instrumental techniques in nuclear work. He was the first to apply multinuclidic gamma-ray spectrum analysis using a Ge(Li) detector to the problem of determining fission ranges. He came up with a multielement instrumental neutron activation method to analyze rocks and minerals. He and his coworkers, including the National Bureau of Standards, developed instrumental photon activation analysis to make possible observation of some elements not observable by neutron irradiation. These techniques have been heavily used at Maryland to determine the sources and composition of atmospheric particles.

Gordon's most recent contribution is the development of neutron-capture prompt gamma-ray analysis for multielement analysis. This technique shows promise for use on environmental and geological samples as well as to natural waters and biological material.

The awardee has served on a number of ACS committees and has participated in many symposia on environmental matters. He has collaborated with Dr. William Zoller in writing a college textbook, "Chemistry in Modern Perspective," and has published with other faculty members at Maryland a modular high school chemistry textbook. His module is entitled "The Delicate Balance."

ACS Award in Analytical Chemistry

sponsored by Fisher Scientific

DR. GEORGE G. GUILBAULT of the University of New Orleans is being honored for, among other things, his work on enzyme electrodes and on a solid surface fluorescent monitoring system. Both represent methods for the direct assay of clinically important substances.

Guilbault, 39, has been an associate professor at New Orleans since 1966. For the previous five years he was a research chemist for the Department of Defense, serving as a section chief at Edgewood Arsenal, Md. He received his B.S. degree in chemistry from Loyola in New Orleans in 1958 and his M.S. and Ph.D. in analytical chemistry from Princeton University in 1960 and 1961, respectively.

He developed the first stable, clinically useful enzyme electrodes. As simple as pH electrodes in operation, these electrodes can be used to assay such substances as urea, 1-phenylalanine, glucose, and creatinine. They yield results quickly, in only about 30 seconds, and they need no reagent except for a buffer. They are now available commercially.

The solid fluorescent monitoring system is a new concept in instrumentation for clinical analysis. It can assay alkaline phosphatase, lipase, cholinesterase, uric acid, phosphate ion, and a host of other substances. It has several advantages over other methods. These include elimination of interferences and the use of stable reagents. In other research work, Guilbault has probed into the area of air pollution using piezoelectric crystal detectors, and into water pollution using immobilized enzymes.

In the nonresearch area, Guilbault is editor of *Analytical Letters,* an international rapid publication journal that he founded. It now ranks third in its field in the volume of papers published. He also has a number of other international activities. For instance, he has organized more than 20 national and international scientific meetings. And he spent two years in Denmark as a visiting professor of analytical chemistry.

He has had a total of 12 doctoral and M.S. students and 45 postdoctoral fellows. And he recently has been appointed to the National Research Council-National Academy of Sciences.

James Bryant Conant Award in High School Chemistry Teaching

sponsored by CHEM Study (The Chemical Education Material Study)

As a teacher and chairman of the physical science department at John Bowne High School, Flushing, N.Y., **SIDNEY P. HARRIS** has demonstrated unusual

Hoard

Horning

Ireland

ability to inspire and challenge his students to achieve a high degree of excellence. During the course of his career—he's taught in the New York City area since 1938—his influence has contributed immeasurably to the growth and development in the lives of his students and colleagues alike.

"Harris exemplifies the qualities of an outstanding teacher, an excellent chemist who is current in his scientific knowledge, and who has a strong interest in helping people," states an admiring colleague. And from another: "Sid has a profound knowledge and understanding of the content, philosophy, history, and pedagogy of so many areas of chemistry, physics, and mathematics (including electronics)."

A native New Yorker, Harris was born Dec. 20, 1916. He received his B.S. in chemistry from City College of New York in 1937, his M.S. in education in 1940, and in 1965, he received an M.S. in chemistry from Adelphi University. All of his high school teaching assignments have been in the New York City area, beginning at Stuyvesant, George Washington, Bayside, William Cullen Bryant, and, since 1965 to the present, at John Bowne. He was chief radar instructor in the U.S. Army Air Corps from 1942–45, and an electronics engineer for ITT and RCA in 1945–48.

Among the many noteworthy innovations he has brought to high school chemistry teaching in the New York City area, he organized (at Bayside in 1956) a two-year scientific research course whereby his students, through special individualized training, were able to develop outstanding achievement and excellence. Due to its success and popularity, the same course has been instituted at John Bowne. When the new chemistry syllabus of the New York State Board of Regents was introduced at John Bowne in 1968, he organized the course with a unique approach, inviting discussion and arranging for his chemistry staff to participate in it. His students consistently perform among the state's best on the state Regents examination. Under his leadership, chemistry enrollment has been maintained at a high level, despite opposing trends elsewhere in the city and in the nation. He is the coauthor of a secondary school chemistry text, "Concepts in Chemistry."

ACS Award for Distinguished Service in the Advancement of Inorganic Chemistry

sponsored by Mallinckrodt Inc.

DR. JAMES L. HOARD, emeritus professor of chemistry at Cornell University, has made key contributions to the areas of structural inorganic chemistry and metalloporphyrins during the past 40 years. He pioneered in structural studies of the now large class of inorganic complexes in which the coordination number of the metal atom exceeds 6 and each coordination number gives rise to at least two physically plausible geometries for the coordination polyhedron. His definitive studies of structure and polymorphism in elemental boron were stimulated by his recognition in 1944 that the outstanding structural feature of boron carbide is the three-dimensional linking of nearly regular B_{12} icosahedra along the quasi-fivefold axes of these subunits.

A deep understanding of structural chemistry and a capacity to infer the unusual are evident in Hoard's structural studies of metal-EDTA chelates and metalloporphyrins, in which the coordination numbers range, respectively, from 6 to 10 and 4 to 8. His ability to report research results clearly and succinctly led one colleague to remark, "Hoard . . . has never published an 'average' scientific article . . . his contributions have literally been scientific gems worthy of respect and careful examination."

Many of his graduate students and postdoctoral associates have gone on to make important contributions to structural chemistry.

Hoard received his B.S. in chemical engineering from the University of Washington in 1927 and his M.S. in chemistry in 1929. He received his Ph.D. from California Institute of Technology in 1932, working under Linus Pauling and as a special assistant to Arthur A. Noyes. He taught at Stanford University and at Ohio State University before joining the Cornell faculty in 1936. He attained full professorial rank in 1946. Hoard was the recipient of Guggenheim fellowships in 1946, 1960, and 1966.

He is a member of ACS, the American Physical Society, the American Crystallographic Association, AAAS, the National Academy of Sciences, Sigma Xi, and Phi Beta Kappa. He has published approximately 115 research papers and critical reviews.

Garvan Medal

Her "pioneering studies in the field of neonatal toxicology have disclosed vital information on the effects of established medicinal agents on the newborn human. These findings will undoubtedly lead to the development of safer drugs for the medical profession." This is the way one admirer sums up the many outstanding accomplishments of **DR. MARJORIE G. HORNING,** professor of biochemistry in the Institute for Lipid Research and the department of biochemistry at Baylor College of Medicine, Houston.

Following undergraduate work at Goucher College, Baltimore, Horning received her Ph.D. in biochemistry from the University of Michigan in 1943. She did research work at Michigan, the University of Pennsylvania, and the National Heart Institute (now National Heart & Lung Institute) before moving to Baylor in 1961.

The bulk of the award winner's early work was in organic chemistry. But it is her research in drug metabolism and toxicological effects of drug transfer to newborn babies that has led to important new concepts and new knowledge.

Her research has shown, for instance, that the "placental barrier" exists for macromolecules, but not as far as drug transfer is concerned. Horning also has demonstrated that the human neonate is able at birth to metabolize drugs and other foreign compounds. In work on the epoxide-dihydrodiol route of metabolism of various drugs, she has found that many commonly used drugs are metabolized in humans through epoxide intermediates.

Horning's more recent work is focused on the formation of hydroxyepoxides by metabolite recycling, as there are indications that such recycling is involved in the mechanism of action of carcinogenic polycyclic aromatic hydrocarbons. She also is investigating the use of saliva analysis to determine the concentration of unbound drugs in blood as an aid in therapy.

Horning is currently a councilor of the ACS Southeastern Texas Section. Her publications now number more than 150.

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

sponsored by Fritzsche Dodge & Olcott

DR. ROBERT IRELAND, professor of organic chemistry at California Institute of Technology, has made extraordinary contributions to the field of terpene synthesis in studies directed to the total synthesis of alkaloids and terpenes and the mechanism, kinetics, and stereochemistry of molecular rearrangements observed in alkaloids and terpenes. In a

series of more than 20 published experiments he has provided stereocontrolled syntheses of molecules that range from the complex (rimuene) to the very complex (total synthesis of the triterpene alnusenone). And the execution of these experiments represents a model of orderly development and has led, in many cases, to novel, highly useful solutions of stereochemically controlled synthesis.

His development of the *n*-butylthiomethylene blocking group and the reductive cleavage of vinyl and alkyl phosphorodiamidate esters are notable examples of new synthetic sequences that have found widespread use in organic synthesis. In addition, his exploitation of the Claisen rearrangement, both in terpene and prostaglandin synthesis, has pointed to the potential that this reaction holds in stereoselective synthesis. In his investigations in the synthesis of both triterpenes and resin acids, Ireland has defined the scope of many different reactions that lead to the stereoselective formation of carbon-carbon bonds.

Ireland received his A.B. from Amherst College in 1951 and his Ph.D. from the University of Wisconsin in 1954. After postdoctoral work at the University of California, Los Angeles, he taught at the University of Michigan until he joined the Caltech faculty in 1965. He is also a consultant to Richardson-Merrell and has served on panels and study sections for the National Institutes of Health.

He is a member of ACS, Phi Beta Kappa, Sigma Xi, the Chemical Society (London), and the Swiss Chemical Society. He is on the advisory board of editors of *Journal of the American Chemical Society* and *Organic Syntheses* and previously served on the advisory board of editors of *The Journal of Organic Chemistry*. He has published more than 60 papers in his field and a book, "Organic Synthesis."

Roger Adams Award in Organic Chemistry

sponsored by Organic Reactions Inc. and Organic Syntheses Inc.

DR. WILLIAM S. JOHNSON, Jackson-Wood Professor of Chemistry, Stanford University, has devoted his career to the synthesis of steroids. His work has earned him a reputation as one of the world's leading synthetic organic chemists.

He launched his career in 1936, following graduation from Amherst College, as a research chemist working summers at Eastman Kodak. In 1940 he received his Ph.D. under Dr. Louis F. Fieser from Harvard and began teaching at the University of Wisconsin. He rose to professor there before going to Stanford in 1960 as head of the department.

His list of accomplishments over the years is a long one, including the synthesis of a number of key steroids and terpenoids—estrone, testosterone, aldosterone, chlolesterol, progesterone, squalene, and juvenile hormone.

Since 1960 the award winner, along with more than 100 collaborators, has been developing the nonenzymic biomimetic cyclization of open-chain polyenes as a new approach to the synthesis of polycyclic natural products. Thus it has been possible to convert, in a single step, an achiral open-chain tetraenic substance into a tetracyclic product having seven chiral centers. The process is so stereoselective that only two of 64 possible racemates are formed. Very recently the Johnson group, using biomimetic polyene cyclization strategy, has developed a 22-step total synthesis of the medicinal, hydrocortisone acetate, in 10% overall yield from simple chemicals.

Johnson is author or coauthor of several books, some 200 scientific articles, and 14 patents. An ACS member since 1937, he has served on the executive board of *The Journal of Organic Chemistry* and the editorial advisory board of *Chemical & Engineering News*. He also has been chairman of the Wisconsin Section and the Division of Organic Chemistry.

Johnson has been the recipient of a number of major honors, including the ACS Award For Creative Work in Synthetic Organic Chemistry (1958) and the Synthetic Organic Chemical Manufacturers Award for Creative Research in Organic Chemistry (1963), the Nichols Medal (1968), and the Roussel Prize (France, 1970).

ACS Award in Chemical Education

DR. ROBERT W. PARRY, distinguished professor of chemistry, University of Utah, has made outstanding contributions to the chemical education of students both in his own university and in educational institutions throughout the world. In many important positions—as chairman of both the ACS Division of Chemical Education and the IUPAC Committee on Teaching of Chemistry, vice-chairman of the steering committee for the International Conference on Education in Chemistry, a UNESCO special representative—he has provided energetic and innovative leadership nationally and internationally.

Parry is an outstanding teacher, both in the classroom and in his personal guidance of undergraduate, graduate, and postdoctoral students. "Science is not only useful, but is one of the greatest constructs of the human mind. It is very much a creative and humanistic activity." This summarizes Parry's philosophy, and in his teaching activities, he practices these beliefs. By the example of his unusual dedication to teaching and his uncompromising insistence on quality instruction, he has greatly influenced his graduate students. More than 30 of his own doctoral students are now teaching in college or university positions.

Born in Ogden, Utah, in 1917, he received his B.S. from Utah State University in 1940. He obtained a Ph.D. from the University of Illinois in 1946, where his doctoral thesis, in the area of Werner coordination compounds, was directed by Dr. John C. Bailar Jr. He joined the faculty of the University of Michigan in 1946, where he served as head of the general chemistry program for more than 12 years. One of his most outstanding achievements there was the development of the Unified Science Program, tying together chemistry, mathematics, and physics in a way never seen before.

In recognition of his outstanding teaching, the awardee received the Manufacturing Chemists Association College Chemistry Teaching Award in 1972. In 1965 he received the ACS Award for Distinguished Service in Inorganic Chemistry. He's been an active participant in the CHEM Study program since its inception in 1960.

ACS Award in Chromatography

sponsored by Supelco Inc.

DR. RAYMOND P. W. SCOTT has invested more than 20 years of research in the study of gas and liquid chromatography. His work has covered both theory and applications. But his major contributions have been in developing chromatographic apparatus and techniques.

British-born Scott's career mostly has been in industrial laboratories—in England for Burroughs Wellcome, Benzole Producers, W. G. Pye Co., and Unilever research laboratories and, since 1969, as manager of the physical chemical department of Hoffmann-LaRoche at Nutley, N.J. Scott, 52, received his B.S. from the University of London in 1946 and his doctorate of science from the same

Johnson

Parry

Scott

institution 10 years later. In 1956 he was elected a fellow of the Royal Institute of Chemistry (U.K.).

Among many other contributions, he has helped develop the wire transport detector for liquid chromatography, now one of the most useful of liquid detectors. And he has extended the wire transport principle to on-line liquid chromatography/mass spectrometry by employing a quadrupole mass spectrometer with novel interfaces. These interfaces permit a moving wire to pass through the source of the mass spectrometer without affecting the spectrometer's performance.

Scott recently has developed a series of miscible solvents, more than 13 in number. These can be used for the gradient elution development of complex mixtures in which the polarity of the solutes can vary between that of heptane and that of water. This method is reminiscent of the use of temperature programing in gas chromatography.

Long in the forefront of gas chromatography, Scott also has done pioneer work on very-high-efficiency packed columns. In 1958 he developed a 100-foot-long column that operated at 100 psi. It had an efficiency of more than 40,000 theoretical plates, the highest so far attained for such a column. He also developed the use of various plastic capillaries for difficult separations and for separations so rapid that they could only be usefully displayed on a cathode ray tube. Under his guidance a continuous chromatographic process for recovering benzene and other aromatic hydrocarbons for coal gas was developed, also in 1958. More recently in his work on liquid chromatography he has constructed microbore columns having efficiencies of 250,000 theoretical plates.

ACS Award for Pollution Control

sponsored by Monsanto

DR. WERNER STUMM is one of the pioneer research workers in the field of water pollution control. His most significant impact, says a colleague, has been in the application of colloid chemistry theory to various problems in water and wastewater treatment.

The contributions of Stumm, who is professor of water pollution control and head of the Institute for Water Resources & Water Pollution Control at the Swiss Federal Institute of Technology in Zurich, are many and varied. For instance, he and his coworkers have shown that the double-layer model of colloid interactions is insufficient for describing the rate of coagulation of colloids with trivalent metal ions, such as Fe(III) and Al(III), and polysilicates. This research gives further evidence that hydrolysis products of these metals, and not the ions themselves, are responsible for the destabilization reactions with various colloids.

Studies by Stumm of flocculation with organic polyelectrolytes add weight to the qualitative bridging theory of polyelectrolyte flocculation. And in work with Ch. R. O'Melia, the award winner has confirmed that removal of particulate material in granular media (filtration) and coagulation are similar processes. More importantly, this work formed the basis for widespread use of contact filtration as a substitute for the conventionally used coagulation.

Stumm has made key contributions to the basic understanding of phosphorus removal from wastewaters. And in studying the chemistry of aqueous iron in water pollution problems, he and his colleagues reached the important conclusion that inhibiting microbiological activity in acid mines may reduce the magnitude of the acid drainage problem.

A graduate of the University of Zurich (Ph.D. 1952), Stumm pursued postdoctoral work at Harvard from 1954 to 1955 and at the University of North Carolina in 1959. Both a Swiss and U.S. citizen, he was a research associate at the Swiss Federal Institute of Technology from 1952 to 1956. He taught at Harvard from 1956 to 1970, when he returned to Zurich to assume his present position. Currently the award winner has more than 150 publications to his credit.

ACS Award in Pure Chemistry

sponsored by Alpha Chi Sigma Fraternity

"His achievements would be impressive for someone 10 years older," is how one colleague describes the research record of 35-year-old **DR. BARRY M. TROST**, professor of chemistry at the University of Wisconsin, Madison. "It's clear," says another, "that Trost is an extraordinarily active and productive young chemist."

Trost is well known for his proof and total synthesis of the structure of Cecropia moth juvenile hormone, which was the impetus giving birth to an industry focusing on biological control of insects. This classical discovery, announced in 1967, set the stage for chemists to devise facile, stereospecific syntheses of juvenile hormone as well as its analogs. To date, there have been almost 20 different syntheses of juvenile hormone developed and hundreds of juvenile hormone analogs synthesized, some of which show commercial promise for insect control.

Also winning him high acclaim among chemists is his imaginative use of the introduction of a spirocyclobutanone ring at the site of a carbonyl as a means of constructing chiral quaternary centers of predetermined stereochemistry. This has proved very useful in his hands in the building of a number of complex structures and also has led to new routes to lactones and cyclopentenones, which are important structural elements.

Other important research accomplishments include his use of allyl palladium complexes as intermediates in the formation of carbon-carbon bonds, and his demonstration of the utility of sulfur chemistry in adjusting the oxidation level at carbon, as illustrated by sulfoxide elimination for a net dehydrogenation.

Trost received his undergraduate education at the University of Pennsylvania and his Ph.D. in 1965 at Massachusetts Institute of Technology. That same year he joined the chemistry department at Wisconsin. Since then he has been awarded several fellowships in recognition of his work. He has been active in the chemical community with editorial appointments (including associate editor of the *Journal of the American Chemical Society*), consulting for industry, authoring two textbooks and more than 120 published papers, giving lectures at international and national meetings, serving on advisory boards at NSF and NIH, and presenting the ACS Short Course on modern synthetic methods.

E. V. Murphree Award in Industrial and Engineering Chemistry

sponsored by Exxon Research & Engineering

DR. ALEXIS VOORHIES JR., 76-year-old visiting professor of chemical engineering at Louisiana State University, Baton Rouge, is still going strong. Now into the 12th year of his *second* career, he is still inventing, teaching, and publishing at a rate which is the envy of colleagues half his age. For 34 years he worked for Esso (now Exxon) Research & Development Laboratories at Baton Rouge, including 19 years as director, where he was

Stumm

Trost

Voorhies

a key figure in bringing the technology of petroleum processing from its infancy to its present-day maturity.

Voorhies received his B.S. in chemical engineering at LSU in 1922, and his M.S. in chemistry at Loyola University (New Orleans) in 1926. Following a four-year teaching assignment there, he joined Esso in 1930. His career there saw the development of processes of far-reaching importance to the national interest—from making aviation gasoline and synthetic rubber in the pre-World War II years, to removal of sulfur from fuel oil in the 1960's—with strong input and influence by him. Loyola University awarded him an honorary Sc.D. in 1964.

A major development at Esso was the fluidized solids technique, first commercialized in the fluid catalytic cracking process. It was further perfected (and commercialized) in fluid coking and fluid hydroforming, with the aid of Voorhies' direction. Other major processes developed with the help of his general direction include: Oxo process for higher alcohols; hydrocracking (JHC) process; processes for polyolefins, chlorobutyl rubber, desulfurization of fuel oils, and others. His expertise in hydroconversion technology led him to recognize the unique properties of zeolite catalysts, the development of which he personally nurtured for the Unicracking-JHC hydrocracking process. In all these developments, he coordinated and directed the activities of several groups—design engineers, instrumentation engineers, scientists, analytical chemists, etc.—deftly filling the dual roles of scientist and manager.

After running up against mandatory retirement at Esso in 1964, he assumed his present position at LSU, where his work includes teaching, research, and consultation. His graduate courses in petroleum refining and in petrochemical production are fully subscribed, year after year. His academic career today continues productive and unabated.

James T. Grady Award for Interpreting Chemistry for the Public

"In the mid-1930's, in the midst of the Depression, E. I. du Pont de Nemours & Co., Inc., adopted a great advertising slogan. In a time when unemployment was rife, when many family budgets barely bought food and shelter and some didn't stretch that far, 'Better Living Through Chemistry' encapsulated a dream, a promise, an expectation of a brighter tomorrow. That tomorrow is now today, and the dream has faded—some would say into a nightmare." This is how **PATRICK YOUNG**, science and medical news reporter for *The National Observer* began a May 1975 story on "Chemistry Flunks 'Good Life' Litmus Test."

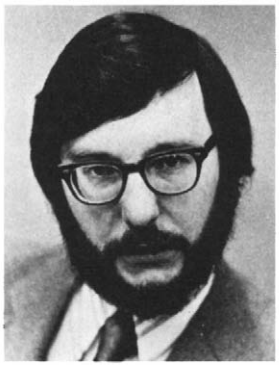
What follows in Young's article is an impartial presentation of the facts that some chemicals are causing problems—vinyl chloride, chlorofluorocarbons, etc.—and that the public must be protected from them. Examples of the differing opinions on how to do it, from research scientists, government officials, and spokesmen for environmentalists as well as the chemical industry, allow the reader to judge for himself.

Scientists often have difficulty communicating with other scientists. A layman who reports lucidly on the complexities of a scientific discipline such as chemistry, giving careful attention to the facts and presenting them in a compelling manner, shows a dedication to quality journalism that has brought Young the Grady Award.

In a story on cholesterol Young was able to explain the intricate body mechanisms involved without miring the reader in a bog of complex chemistry. An earlier piece on the first lunar science conference reported the chemical results of research on the moon rocks collected by Apollo 11, how they might be interpreted, the difficulties of the techniques involved, and the good-natured humor the lunar scientists displayed in a time of very hard work.

Young received a degree in political science from the University of Colorado in 1960. He worked in the Washington, D.C., bureau of United Press International, then served two years of active duty with the U.S. Navy before joining the *National Observer* staff in 1965. He has written two books for children, one an introduction to plate tectonics.

Young received a Howard W. Blakeslee Award in 1970 from the American Heart Association and the 1973 American Society of Abdominal Surgeons Journalism Award. In 1974 he won the American Institute of Physics-U.S. Steel Foundation Award in Physics and Astronomy. This year he also received the Russell L. Cecil Writing Award given by the Arthritis Foundation.



Young

Zisman

ACS Award in the Chemistry of Plastics and Coatings

sponsored by Borden Foundation Inc.

DR. WILLIAM A. ZISMAN has won international recognition among surface chemists for his many contributions to pure science. His fundamental and applied interdisciplinary research in surface chemistry and physics has led to numerous applications in such areas as corrosion prevention, wetting, adhesion, protective coatings, surface potentials, lubricants, friction, and wear. Specifically, the awardee is being honored for his contributions to the chemistry of wetting and spreading phenomena, his elucidation of the relation of frictional and wetting properties of polymers to their chemical constitution, and his early demonstration of the unique lubricating properties of fluoropolymers and the surface-active properties of polysiloxanes.

Born in Albany, N.Y. (1905), Zisman attended Massachusetts Institute of Technology (B.S. in physics, 1927; M.S., 1928). After obtaining his Ph.D. from Harvard in 1932, he continued there as a postdoctoral research associate, working on high pressure problems on the nature of the earth's core. He also began investigations on the electrical properties of monolayers on water and on metals. Before joining the Naval Research Laboratory in 1939, he served a year as guest scientist at the Carnegie Geophysics Laboratory. There, in collaboration with Dr. Roy W. Goranson, he developed and published the accepted theory of the electrical properties of Langmuir-Blodgett multilayers.

At NRL, he continued his research on monomolecular films, but with the onset of World War II, Zisman shifted his research emphasis to lubricants. He led the research of a large group of scientists on problems of urgent military importance, such as extreme temperature lubrication, corrosion prevention, air-sea rescue, nonflammable hydraulic fluids, and on many classified projects. After the war, his research broadened to include more general aspects of surface chemical phenomena. He was appointed superintendent of the chemistry division in 1956, and in 1969 was awarded a Chair of Science for Chemical Physics, a position he held until his retirement in 1975.

Notable among the many awards Zisman has received are the ACS Kendall Co. Award in Colloid Chemistry (1963), ACS Carbide and Carbon Award (1955), Distinguished Civilian Service Award of the Department of Defense (1964), and the Captain Robert Conrad Dexter Award of the Office of Naval Research (1968).

Continued on page 55

ACS News

Continued from page 44

ACS Regional Awards in High School Chemistry Teaching

PATRICIA I. BARROW, Southeast
CARL W. CLADER, Great Lakes
DANIEL J. KALLUS, Southwest
SAMUEL H. PERLMUTTER, Middle Atlantic
BENJAMIN A. PETERSON, Northeast
L. MYLES PHIPPS, Northwest
WILLIAM POWELL, Midwest
SHIRLEY E. RICHARDSON, Western
WILLIAM P. SCHREINER, Central

ACS Awards for Outstanding Performance by Local Sections

Four awards for different-size sections:
(Large) **DELAWARE**
(Medium Large) **LOUISIANA**
(Medium Small) **KANAWHA VALLEY**
(Small) **MISSISSIPPI**

Investment pool

The Committee on Investments has changed the requirements for entry into or exit from the Cash & Investment Pool to a quarterly system, replacing the annual system previously in effect. All organized units of ACS are eligible to participate in the Cash & Investment Pool. Officers of sections or divisions requiring more detailed information on the operations of the pool should contact the Office of the Treasurer at (202) 872-4415.

Toxicity workshop

The ACS Delaware Section is sponsoring a workshop on "Registry of Toxic Effects of Chemical Substances" to be given by the National Institute for Occupational Safety & Health. Dr. John A. Zapp and Frank D. Kover will comment on the use and implications of the registry. It will be held at Du Pont Country Club, Rockland Room, Wilmington, Del., at 7 PM on Oct. 26. For further information contact Anthony Anton, Chairman, Du Pont Co., Textile Research Lab, Chestnut Run, Wilmington, Del. 19898.

Guest Comment

Continued from page 4

cieties can explain economics to students as it relates to practical business decisions and capital needs in the resource-oriented industries.

I urge technical societies to identify among their membership those individuals who are gifted in the communications skills, and then use these people. Speakers bureaus at the local chapter level would afford such spokesmen frequent opportunities to speak on energy, resources, and economic issues. They should also make themselves readily accessible to the news media, actively initiating media contacts where necessary.

To spur ourselves to action, we need only consider the consequences of inaction.

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