ACS 1979 national award winners announced

Following are the 1979 recipients of awards administered by ACS. All awardees will receive their awards at the 177th ACS National Meeting in Honolulu next April, except Dr. Melvin S. Newman, who will receive the Roger Adams Award in Organic Chemistry at the National Organic Symposium in June 1979.

Vignettes on Dr. Charles G. Overberger, winner of the 1978 Charles Lathrop Parsons Award, and Dr. Glenn T. Seaborg, winner of the Priestley Medal, appeared in the June 17 (page 20) and June 10 (page 30) issues, respectively, of C&EN.

ACS Award in Colloid or Surface Chemistry

sponsored by Kendall Co.

DR. ARTHUR W. ADAMSON, professor of chemistry, University of Southern California, Los Angeles, has contributed more in two important areas of surface chemistry than any other U.S. research worker.

One area is concerned with physical adsorption on molecular solids such as ice where the award winner established that adsorbate/adsorbate interactions can be stronger than adsorbate/adsorbent interactions and that restructuring of the surface can occur upon adsorption. The other area is adsorption close to saturation and the effect of adsorbed films on contact angles for nonwetting systems, in which Adamson brought the two areas of research, contact angles and adsorption isotherms, in line with each other.

One of Adamson's earliest contributions was in ion exchange, where he introduced the then (1946) novel idea that the kinetics of ion exchange are primarily diffusion controlled. At that time the rate equation was customarily written as biomolecular mass action rate expressions.

In work in the 1950's he showed clearly that adsorption isotherms of the BET type II fit a common shape in the multilayer region, independent of the nature of the adsorbent but different adsorbates.

In 1961 Adamson developed a method to determine the distribution of adsorption site energies. It consists of a procedure for deconvoluting the integral equation that is involved when adsorption occurs on a heterogeneous surface.

His current work is focused on surface autoxidation reactions. Recently he and his coworkers turned up evidence that the oxygen at the solid-gas interface is singlet oxygen-like in its reaction chemistry.

Adamson's other research field is in inorganic chemistry, mostly on the photochemistry of coordination compounds. Between the surface chemistry and the inorganic chemistry, his publications total about 180.

Adamson received his B.S. in chemistry with honors from the University of California, Berkeley, in 1940 and his Ph.D. in surface chemistry from the University of Chicago in 1944. From 1942 to 1946 he worked on the plutonium project at Chicago and Oak Ridge. He joined the faculty at the University of Southern California as an assistant professor in 1946.

He has been the recipient of numerous honors and awards, including the Richard C. Tolman Medal of the society's Southern California Section, and the Alexander von Humboldt Foundation U.S. Senior Scientist Award in 1977. His book, "The Physical Chemistry of Surfaces," is the classic in the field and has been used the world over.

ACS Award in Petroleum Chemistry

sponsored by Lubrizol Corp.

When discoverers of important advances in industrial chemistry are listed, the name **ROBERT L. BANKS** certainly will be included. In his long career at Phillips Petroleum Co., Banks' work has significantly changed many aspects of the chemical industry.

Two findings far outshine any others. In the early 1950's Banks, along with a colleague, observed that an activated chromium oxide catalyst would convert ethylene to high-density polyethylene at considerably lower pressures than the existing polyethylene process. Since its discovery, this oxide-catalyzed polymerization of ethylene has become a major industrial reaction. Worldwide, about 30% of all high-density polyethylene produced is made by the chromium oxide process.

Second, a discovery with more far-reaching implications than the first, was the finding that, under proper conditions, olefins can undergo a disproportionation reaction, a phenomenon now termed olefin metathesis. This reaction has become a valuable tool in providing new routes of synthesis for important chemicals. And, Banks and coworkers continue to make contributions to the understanding and commercial development of the metathesis reaction. His work has resulted in numerous patents and publications.

His research on this important topic has not been confined to experimental and commercial projects. He has published an interpretation of the mechanism of the olefin reaction and has used molecular orbital theory to interpret the effects of ligands in the metathesis of olefins catalyzed by tungsten trioxide on silica catalyst.

Banks was born in Piedmont, Mo. in 1921, and, received his B.S. degree in chemical engineering from the Missouri School of Mines. He received an M.S. in chemical engineering from Oklahoma A&M (Oklahoma State University) in 1953.

Banks began his professional career at the Co-op Refinery, Coffeyville, Kan., in 1944. He joined Phillips Petroleum as a research chemist in 1946, and achieved the rank of research associate in 1966. He received the Oklahoma Chemists Award in 1974 and an honorary professional degree in chemical engineering from the University of Missouri, Rolla, in 1976.

In summary, Banks has achieved something rare in this day of specialization, having been instrumental in major chemical discoveries of both practical and basic importance.

Adamson

Banks

ACS Award in Polymer Chemistry

sponsored by Witco Chemical Corporation Foundation

DR. HENRI BENOIT is "an extraordinary man . . . a distinguished researcher and scholar," in the words of an associate. His contributions to both theoretical and experimental developments in polymer science have been consistently notable over the past 30 years.

Benoit, who is the director of the Research Center for Macromolecules at Strasbourg, France, originated the method for using light scattering to measure heterogeneity in the molecular composition of polymers, their composition fluctuations, and the sizes of blocks and grafts. His work on polypeptides has provided crucial information about how they take on different forms in solution, depending on solvent and temperature. He has done significant research on such recent methods of polymer characterization as the use of gel permeation chromatography, and small angle neutron scattering.

In addition to his extensive research, he has been active in French and international scientific organizations. His publications, spanning a period from 1947 to the present, number more than 170.

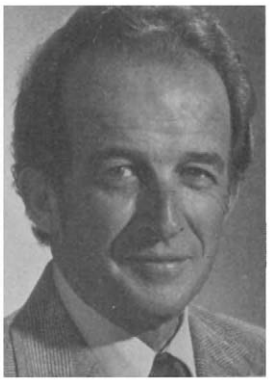
Benoit was graduated from the Ecole Normale Supérieure of Paris in 1945, received the degree of Doctor of Science from the University of Strasbourg in 1950, and was a postdoctoral fellow at Harvard in 1952–53 in the laboratory of Dr. Paul Doty. His doctoral thesis was on the Kerr effect in macromolecular solutions. He became interested in light scattering and polymer chain statistics during his work with Doty.

The awardee is an officer of the Legion of Honor and holds honorary degrees from the University of Uppsala, University of Aberdeen, and University of Lotz (Poland). Benoit received the American Physical Society Award in Polymer Physics for 1978.

Benoit has been the director of the world-famous Research Center for Macromolecules since 1967 and is a professor at Louis Pasteur University in Strasbourg.

Benoit

Davis



Fassel

ACS Award for Nuclear Applications in Chemistry

sponsored by G. D. Searle & Co.

DR. RAYMOND DAVIS JR. is best known for his pioneering work with solar neutrinos, particularly in measuring their flux from the sun. Exercising scientific enterprise and initiative, Davis set out to test what many investigators took to be a well-established solar model. The results of Davis' findings determined that the flux of energetic neutrinos from the sun was not more than one tenth of that theretofore anticipated. Davis' detection of the neutrinos was by neutrino capture reaction: Neutrino + $^{37}Cl \rightarrow {}^{37}Ar$ + negative electron.

This surprise finding has stimulated much speculation, rethinking, and calculation about phenomena occurring in the solar interior. Using his very low background counting technique, Davis was one of the first to show that antineutrinos are not identical to neutrinos. In related astrophysical areas, he has made substantial contributions in studying the following: temporal and spatial variation in cosmic rays by measuring radioactivity in meteorites; argon, radon, and tritium radioactivity in lunar soil and in the Apollo drill stems; particle fluxes of the solar wind and solar flares from lunar samples. The results of Davis' work have put realistic limits on neutrino fluxes from extraterrestrial events, such as supernovas, collapsing stars, and gravitational wave sources.

Davis was born on Oct. 14, 1914, in Washington, D.C. He obtained both his B.S. (1937) and M.S. (1940) in chemistry from the University of Maryland, and his Ph.D. (1942) in physical chemistry from Yale University. During World War II, he was an officer in the U.S. Air Force. Davis joined Brookhaven National Laboratory in 1948; he was named senior chemist in 1964, the title he holds to date.

Davis was a member of NASA's lunar sample review board 1971–73, and is a member of the radiochemistry subcommittee of the National Research Council's committee on nuclear science. Since 1973 he has been an adjunct professor of astronomy at the University of Pennsylvania.

ACS Award in Analytical Chemistry

sponsored by Fisher Scientific Co.

DR. VELMER A. FASSEL, deputy director of the Department of Energy's Ames Laboratory and professor of chemistry at Iowa State University, received his B.A. from Southeast Missouri State College in 1941, his Ph.D. from Iowa State in 1947. He joined Ames Laboratory and the university in 1947 and was named deputy director of the lab in 1969.

Fassel's research has focused on trace analysis of rare earths in complex materials; developing the techniques of flame emission, x-ray excited optical fluorescence, and spectrometric methods for determining gases in metals; studies involving measurement of flame temperatures; and application of a spectral continuum light source (xenon arc) to atomic absorption spectrometry to allow rapid analysis of several elements. He also developed the induction-coupled plasma source to make it suitable for modern instrumentation. "He has tackled some of the most complex determinations in modern analytical chemistry," one colleague notes.

The author of 155 publications, Fassel has given more than 190 invited lectures throughout the world. He received the Society for Applied Spectroscopy Medal in 1964, a special gold medal in appreciation of 13 years of service as coeditor of *Spectrochemical Acta* in 1965, the Hasler Award and the Anachem Award in 1971. In 1976 he was named Distinguished Professor of Science and Humanities at Iowa State.

He is a member of Phi Lambda Upsilon, Sigma Xi, Phi Kappa Phi, and a fellow of AAAS and the Optical Society of America. Fassel is active in ACS and in a number of scientific societies both national and international.

Garvan Medal

The research achievements of **DR. JENNY GLUSKER** include determining the mechanism of important biochemical reactions and contributing to the understanding of the mode of action of certain carcinogens. Her approach utilizes x-ray crystallographic studies on small molecules having biologic activity to formulate mechanisms of action in biological systems involving macromolecule/small molecule interactions.

The impact of this strategy has been widespread and has led to a number of collaborative studies with biochemists pursuing more conventional in vivo and in vitro programs. In most cases, these researchers have sought to work with Glusker because of her very careful and precise work and her demonstrated flair for pulling together large masses of

structural and biochemical information into a consistent, plausible general mechanism.

Glusker was born in England in 1931 and received her Ph.D. from Oxford University in 1957. She did postdoctoral research at California Institute of Technology, Pasadena, and has been associated with the Institute for Cancer Research in Philadelphia since 1956. She is presently a member of the institute. She has an affiliated appointment as research associate professor of physical biochemistry at the University of Pennsylvania.

One of her principal interests has been mechanisms of isomerase enzymes. Her "ferrous wheel" mechanism for interconversion of citrate, isocitrate, and cis-aconitate by the enzyme aconitase is widely accepted and cited in many modern biochemistry textbooks. She also has done work with citrate-utilizing enzymes, and structural studies of such enzymes are in progress.

Glusker's second great interest is structure-activity relationships for carcinogens and mutagens. She has proposed structural conformations of the possible carcinogenic metabolites of dimethylbenz[a]anthracene and benz[a]pyrene from studies of the diols and epoxides of these compounds. And she has shown, from structural studies, that intercalation between the stacked base pairs of DNA may not be the mechanism of carcinogenesis by polycyclic aromatic hydrocarbons.

Glusker's professional affiliations include ACS, The Chemical Society (London), American Crystallographic Association, and Sigma Xi, and she serves on a variety of advisory committees.

James T. Grady Award for Interpreting Chemistry for the Public

In general, the public has shown little awareness of the problems and progress brought about by advances in chemistry. As science editor of *Newsweek*, **PETER GWYNNE** reaches an estimated 18 million readers a week with articles such as the search for life on the planet Mars, the effects of large oil spills, or the consequences—good and bad—of genetic research. Through his efforts, readers have gained a clearer understanding and better perspective of the world of chemistry. His efforts also have won him the Grady Award for Interpreting Chemistry to the Public.

Gwynne was born in Leeds, England, in 1941, and received an M.A. degree in metallurgy from Oxford University. He also did research in solid-state physics at the University of Sussex. His career as a journalist has been varied. He has been assistant editor of the British magazine *Discovery*, and served as managing editor of *Technology Review*, the alumni magazine of Massachusetts Institute of Technology. Before coming to *Newsweek*, Gwynne was science editor for the *Boston Herald Traveler*.

Glusker

Gwynne

Haight

Joining the *Newsweek* staff as an associate editor in the medicine and science departments in 1969, Gwynne was appointed science editor in 1972. In 1974 he won an award from the Aviation Space Writers Association for a series of articles on Spacelab I. Since 1975, he has been general editor in charge of *Newsweek*'s science section.

Since joining *Newsweek*, Gwynne has written extensively about chemicals and their relationship to man and society, an important topic as chemicals play an ever-increasing role in our lives. He has managed to blend journalistic enterprise with scientific expertise to provide his readers with informative yet interesting reports on the most recent developments in chemistry and other sciences.

ACS Award in Chemical Education

sponsored by Union Carbide Corp.

"Gil Haight is a fantastic teacher and a warm human being. I have seen him in action both in the classroom and in one-to-one teacher/student interactions . . . .There is no one in this country any more dedicated to chemical education and to students than Gil," says an enthusiastic colleague of **DR. GILBERT P. HAIGHT JR.** As the director of the general chemistry program (more than 3000 students each semester) at the University of Illinois, his enthusiasm and skill in presenting a great variety of demonstration lectures have made him popular on the campus where he teaches, and as a guest lecturer.

Haight's primary objectives in teaching general chemistry are to instill enthusiasm for the subject and to promote a thorough understanding of fundamental principles. To cope with the problem of teaching chemistry to large numbers of nonmajors, Haight has organized and produced more than 80 videotapes, pioneering a multimedia approach to teaching the subject. The tapes employ sophisticated computer graphics, simple and elaborate chemical demonstrations, and a wide variety of miscellaneous illustrations to show the relevance of chemistry to everyday life. This teaching method employs teaching assistants for smaller student groups of about 24 instead of the usual large group lecture classrooms. The program has been very well received; students like the more personal way to learn chemistry in preference to the large lecture hall.

Haight has authored or coauthored five textbooks which are being widely used by students in general chemistry. He has been an active figure in "organized" chemical education, namely the ACS Division of Chemical Education; he served as chairman in 1976.

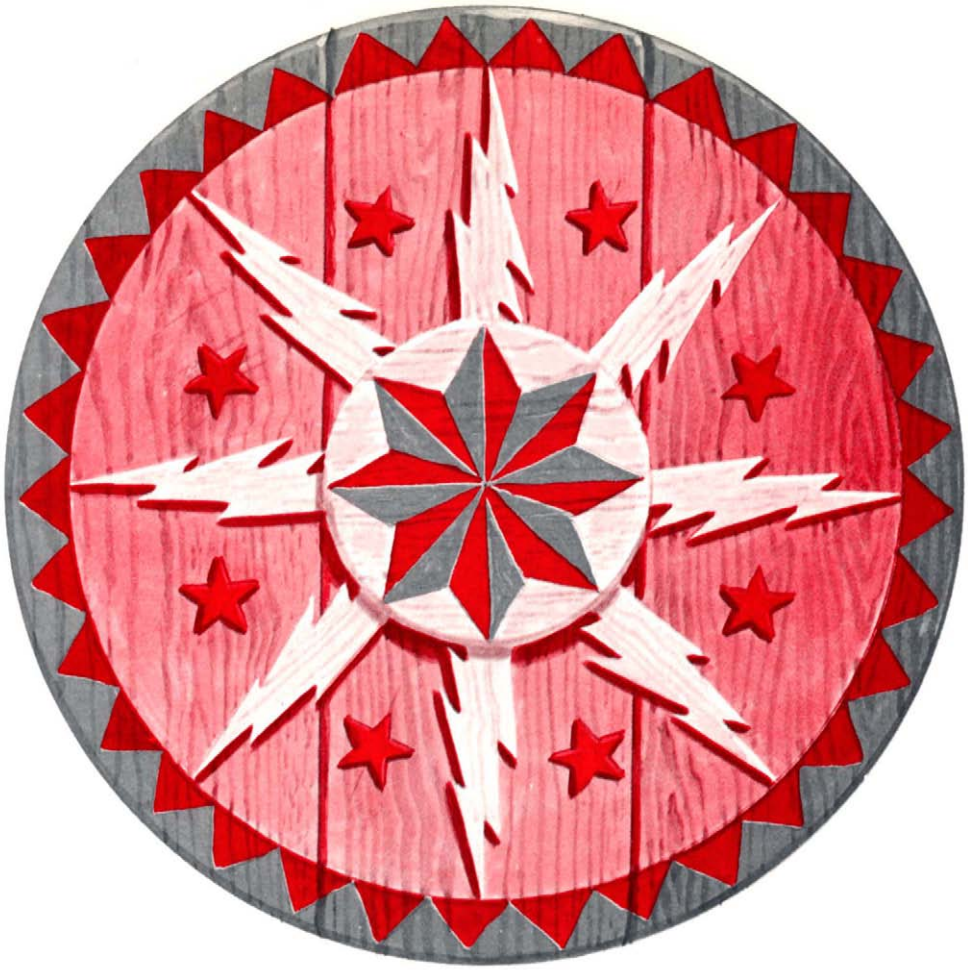
Born on June 8, 1922, in Seattle, Haight obtained an A.B. from Stanford University in 1943, and a Ph.D. in chemistry from Princeton University in 1947. He was a Rhodes Scholar at Oxford, 1947–48, and an assistant professor at the University of Hawaii (1948–49), George Washington University (1949–52), and at the University of Kansas (1952–54) before becoming an associate professor at Swarthmore College in 1954. He was professor at Texas A&M University in 1965, before joining the faculty at the University of Illinois in 1966.

ACS Award in Chromatography

sponsored by Supelco Inc.

"Walk into any of scores of laboratories engaged today in a variety of studies (drug metabolism, biochemistry, toxicology, etc.) and you will find Horning-based methods being used. . . .This is where it began" is the tribute a grateful colleague has paid to **DR. EVAN C. HORNING** for his work in gas chromatography. "Horning's work breached a barrier (psychological as well as technological) and many other scientists have followed him [Horning] through."

Gas chromatographic and gas chromatographic-mass spectrometric analyses of steroids, alkaloids, drugs, and other biologically important compounds, now commonplace in many laboratories, are based on approaches conceived by Horning, and experiments carried out under his direction and leadership. De-



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velopment in Horning's laboratory of gas chromatographic packings consisting of *a*) thin films of *b*) thermally stable stationary phases (methyl silicone polymer and other polysiloxanes) coated on *c*) deactivated supports, led to the first practical demonstration of gas chromatography of steroids and sterols. Each step—*a* through *c*—was of critical importance to the success of gas phase separations, and each represents a major advance in the field. But his work didn't stop there; Horning and his group extended their initial breakthrough by discovering new stationary phases and developing derivative techniques that are widely used today. Of particular importance are those involving trimethylsilylation, which greatly improved the analysis of compounds not amenable to gas chromatography directly.

Horning was born in Philadelphia. He received his education at the University of Pennsylvania (B.S. in 1937) and the University of Illinois (Ph.D. in 1940). He was chief of the laboratory of chemistry of natural products, National Heart Institute, Bethesda, Md. (1950–61), before joining Baylor college of medicine, Houston, in 1961, where he is professor of chemistry and director of the Institute for Lipid Research. Since 1971 he has been an adjunct professor of biochemistry at Rice University.

ACS Award in Inorganic Chemistry

sponsored by Monsanto Co.

"The very best of the structural inorganic chemists" is the way one colleague describes **DR. JAMES A. IBERS,** professor of chemistry at Northwestern University. His record is replete with examples of outstanding research.

The research of Ibers and his coworkers on small molecules bonded to metals not only has advanced fundamental understanding of the inorganic chemistry of these systems, but has been of practical use to researchers working with homogeneous catalysis. His early studies of transition metal hydrides established that the hydride ligand occupies a stereochemically active position in the coordination sphere of the transition metal.

Other research by Ibers and his associates on small molecules includes the synthesis and characterization of the bonding of dioxygen, sulfur dioxide, nitrosyl complexes, dinitrogen complexes, and ethylenes and allyl complexes.

Another noteworthy contribution by the award winner has been in hydrogen bonding. The structures determined by Ibers, his analysis of these data, and his correlation of other information on hydrogen-bonded systems are significant advances in this area. His research has included studies of vibrational spectra, solid-state magnetic resonance, and x-ray and neutron diffraction studies of hydrogen-bonded systems.

He also has been active in various areas of bioinorganic chemistry including synthetic, thermodynamic, and structural studies of metalloporphyrins and their oxygen adducts, and the synthesis and characterization of models for copper blue proteins. In addition, Ibers personally has carried out most of the crystallographic work on the models for nonheme iron proteins in collaboration with Dr. R. H. Holm.

Ibers has published more than 300 journal articles, books, and monographs. Even more remarkable than this record of productivity, however, says a colleague, is the fact that a large portion of these reports individually represents major contributions to structural inorganic chemistry.

Born in Los Angeles, Ibers received his B.S. in 1951, his Ph.D. in 1954, both from California Institute of Technology. Following postdoctoral studies he worked as a chemist for Shell Development Co. from 1955 until 1961, when he joined Brookhaven National Laboratory. He came to Northwestern University in 1965 as professor.

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

sponsored by Fritzsche Dodge & Olcott

DR. JAMES A. MARSHALL, professor of chemistry at Northwestern University, has won widespread recognition for his contributions to the chemistry of natural products, particularly in the synthesis of sesquiterpenes.

Among his major accomplishments is the total synthesis of globulol, a constituent of eucalyptus oil. An unusual feature of this synthesis is the highly stereoselective solvolysis-cyclization of the cyclodecadienyl *p*-nitrobenzoate to give the hydroazulenol with four of the requisite six chiral centers in the correct arrangement.

In the area of sesquiterpene lactone synthesis, Marshall's synthesis of (+)-4-desoxydamsin and cycloalkylidene-fused butyrolactones are of particular note. In synthesizing the desoxydamsin, he developed a completely stereoselective route to introduce the five contiguous cycloheptane chiral centers that characterize the pseudoguaianolide family of natural products. In preparing the butyrolactones, he came up with a new, efficient stereoselective scheme for converting cyclopropane-fused cycloalkylacetic acids to ring-expanded cycloalkene γ-butyrolactones under mild conditions.

More recent achievements include a synthetic route to isopropylidene alcohols via reductive decyanation, a new stereoselective synthesis of olefins via reductive dephosphorylation, and a stereoselective total synthesis of the pseudoguaianolide Confertin. The last mentioned represents the first stereo-controlled synthesis of a pseudoguaianolide sesquiterpene.

Marshall received his B.S. from the University of Wisconsin in 1957 and his Ph.D. from the University of Michigan in 1960. He was a National Institutes of Health postdoctoral fellow at Stanford University from 1960 to 1962, when he joined the faculty of Northwestern as an assistant professor.

He is a member of the advisory board of "Organic Reactions" and is executive editor of *Synthetic Communications*. To date he is the author of well over 100 papers. He is also a member of the ACS Organic Division executive committee and the NIH Medicinal Chemistry Study Section.

ACS Award for Distinguished Service in the Advancement of Inorganic Chemistry

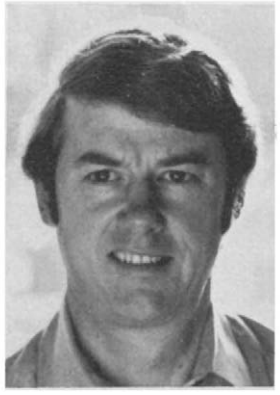
sponsored by Mallinckrodt Inc.

DR. EARL L. MUETTERTIES, professor of chemistry at Cornell University, received his B.S. from Northwestern in 1949, his A.M. in 1951 and Ph.D. in 1952 from Harvard. He joined Du Pont's central research department that year and rose to associate director in 1965. He was also adjunct professor at the University of Pennsylvania in 1969–73. He joined the Cornell faculty in 1973.

His early research on boron hydrides was characterized by a three-stage process: recognition of the significance of a subfield of research in a rudimentary state; developing original experimental

Horning

Ibers



Marshall

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approaches to develop the field; and, in its advanced stage, publishing a well-organized, easily comprehended review of the project. A colleague describes Dr. Muetterties' current research: "He is well on his way to transforming the subject of homogeneous catalysis by transition metal complexes by developing an important subarea, cluster catalysis."

Muetterties is the author of more than 200 papers and is inventor or coinventor on about 50 U.S. patents and as many foreign patents. He received the ACS Award in Inorganic Chemistry in 1965 and U.S. Senior Scientist Award from the Alexander Von Humboldt Foundation in 1975.

He has held numerous visiting professorships and lectureships and has been on the editorial boards of many of the leading journals of inorganic chemistry. He is a member of the American Chemical Society, National Academy of Sciences, American Academy of Arts and Sciences, American Physical Society, and The Chemical Society (London).

Muetterties

Newman

Olah

Roger Adams Award in Organic Chemistry

sponsored by Organic Reactions Inc., and Organic Synthesis Inc.

DR. MELVIN S. NEWMAN, regents professor of chemistry at Ohio State University, has led a long and most fruitful career as a chemist. His publications total almost 350 papers, and include two books. He has guided more than 100 graduate and postgraduate students over the years, collaborating on a variety of research projects.

Perhaps the best known of Newman's far-reaching researches is in steric effects, specifically in elucidation of the modified reactivity associated with sterically hindered molecules. Contributions to synthetic methodology in the areas of hexahelicene chemistry, generation and capture of unsaturated carbenes, the carcinogenicity of polybenzenoid hydrocarbons, especially arene oxide intermediates, have also received international acclaim.

As an educator, Newman's teaching techniques have been accepted by chemistry departments all over the world, and he has developed a series of organic laboratory courses that cover all levels. An especially well-known item is the Newman Projection formula for depicting acyclic stereochemistry.

A native of New York City, Newman graduated magna cum laude from Yale in 1929, and took his Ph.D. there in 1932. Completing postdoctoral fellowships at Yale, Columbia, and Harvard, Newman began as an instructor at Ohio State University in 1936. And, except for two three-month periods in 1957 and 1967 when he was a Fulbright lecturer at the University of Glasgow, Scotland, he continued his career at Ohio State.

Newman's awards and honors are numerous. He was a Guggenheim fellow in 1947 and 1951, elected to the National Academy of Sciences in 1956, received the ACS Award for Creative Research in Organic Chemistry in 1961, was presented the first Columbus Section award in 1976, received the Sullivant Medal of Ohio State University in 1976, and others. Newman has served on editorial boards of the *Journal of the American Chemical Society, The Journal of Organic Chemistry* and *Organic Synthesis.* He has been adviser to the National Science Foundation, the Petroleum Research Fund, and several government agencies.

Aside from his professional activities, Newman has a personal program, which he has maintained for 25 years, of working with two or three high school students each summer to encourage their interest in science. This program shows Newman to be a man of compassion as well as of science. His accomplishments are unquestionably of award-winning caliber and scope.

ACS Award for Creative Work in Synthetic Organic Chemistry

sponsored by Aldrich Chemical Co.

DR. GEORGE A. OLAH's contributions to organic chemistry cover the wide range of electrophilic organic reactions (particularly carbocations), Friedel-Crafts chemistry, aliphatic and aromatic substitutions, and hydrocarbon chemistry. His career has been marked by several hundred research papers, a dozen books, and more than 60 patents. A colleague has remarked, "His contributions to synthetic, structural, and reaction chemistry have far-reaching implications for the development of the entire discipline. On the synthetic side alone, the preparation of stable cations, which themselves are reagents for the selected synthesis of other materials, has been significant."

Olah's research contributions cover pioneering work in new techniques and solvent systems to study reactive intermediates as long-lived stable species in solutions, and their application to electrophilic reactions. He has made great advances in application of physical methods such as NMR and ESCA spectroscopy to the study of these systems.

He also has done a wide array of mechanistic and structural studies, including new catalyst systems, new reactions, and selective substitution methods such as new reactions of alkanes. He has initiated new approaches in petroleum chemistry, particularly relating to the superacid catalyzed processes of saturated hydrocarbons. And he has studied organofluorine and phosphorus compounds as well as organometallic chemistry.

Born in Budapest in 1927, Olah received his Ph.D. at the Technical University there in 1949. He came to the U.S. in 1964, and became a U.S. citizen in 1970. He was Charles F. Mabery Distinguished Professor of Research in Chemistry at Case Western Reserve University, Cleveland, until moving to the University of Southern California, Los Angeles, this past year. Olah is a member of the American, British, German, Dutch, and Swiss chemical societies, is a fellow of the Chemical Institute of Canada and the National Academy of Sciences. He serves on the editorial boards of several publications and holds visiting professorships both in this country and in Europe. He has won the ACS Award for Petroleum Chemistry, the Baekeland Award, the Morley Medal, and was a fellow of the J. S. Guggenheim Foundation.

ACS Award in the Chemistry of Plastics and Coatings

sponsored by Borden Foundation Inc.

A lengthy list of outstanding accomplishments in polymer preparation, processing, and characterization have earned this award for **DR. ROGER S. PORTER,** professor of polymer science and engineering at the University of Massachusetts.

In the field of polymer stability, Porter's studies on thermal analysis were among the first to define the temperature conditions and products of pyrolysis, with and without additives. His sonic irradiation work provided a basis for establishing a stability scale for polymers based on mechanical deformation.

His research in polymer separation has

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been cited as the principal reference in three distinct areas—fractionation, column chromatography, and gel permeation chromatography. He also helped develop a novel, multicolumn chromatographic apparatus for fractionating polymers on a large scale. His efforts in gel permeation chromatography have provided calibration methods that include studies of sample size effect, changes in elution time with temperature and polymer type, calibrations based on whole polymers, and new ways of predicting elution volumes.

Porter has refined and applied a variety of additional techniques to analyzing polymers, including proton magnetic resonance, infrared, and thermal analysis.

After obtaining his Ph.D. in chemistry from the University of Washington, Seattle, in 1956, Porter went to work for Chevron Research Co. He left Chevron in 1966 to accept an appointment at the University of Massachusetts. He was named professor in 1968.

In 1976 he was guest lecturer in Moscow, Leningrad, and Riga for the Soviet Academy of Sciences, and he was visiting professor at Kyoto University in Japan. Last year he received the Society of Plastics Engineers award for contributions to polyolefins and other thermoplastics.

The award winner has published more than 180 papers in the fields of analysis, characterization, calorimetry, and rheology of hydrocarbons, polymers, and liquid crystals. Since 1969 he has been editor of the journal, *Polymer Engineering and Science.*

E. V. Murphree Award in Industrial & Engineering Chemistry

sponsored by Exxon Research & Engineering Co.

DR. JOHN M. PRAUSNITZ, professor of chemical engineering, University of California, Berkeley, is an authority in chemical engineering thermodynamics. "My main professional function has been to translate, extend, and develop research results from physical chemistry toward application in chemical engineering process design," states the awardee in describing his own goals and methods in achieving them.

Perhaps one of Prausnitz' greatest accomplishments was in placing the prediction and analysis of phase equilibrium data on a firm basis of sound and respected molecular science, and at the same time revolutionizing methods for handling phase-equilibrium properties in industrial process design and analysis. His textbook "Molecular Thermodynamics of Fluid-Phase Equilibria" is used throughout the world.

The list of Prausnitz' significant contributions is extensive: Devolatilization of polymers—removing residual monomers or solvents from polymeric products; solubility limits for solid solutes (notably benzene) in liquefied natural gas at low temperatures; calculation of high-pressure vapor-liquid equilibria for petroleum refining; prediction of hydrate formation in moist natural-gas flow lines; formulation of solvents for paints and varnishes; removal of volatile electrolytes from wastewaters by distillation; estimation of liquid-phase activity coefficients from molecular-group contributions.

Prausnitz obtained a B.Ch.E. from Cornell University in 1950, an M.S. from the University of Rochester in 1951, and a Ph.D. from Princeton University in 1955. He joined the faculty of chemical engineering at the University of California, Berkeley, in 1955; he was named professor in 1963. He has served as consultant to the National Bureau of Standards, and to several companies in the cryogenic, petrochemicals, and polymer industries. He is the author or coauthor of more than 260 technical publications.

An admiring colleague, Dr. Joel H. Hildebrand, in defining chemistry, states that there are many definitions, "but my favorite one is: 'Chemistry is what the builders of chemistry do and how they do it.' I assert now that chemical engineering is what John Prausnitz does and how he does it."

James Bryant Conant Award in High School Chemistry Teaching

sponsored by CHEM Study (Chemical Education Material Study)

SHIRLEY E. RICHARDSON, chemistry teacher at Torrey Pines High School, Del Mar, Calif., is an outstanding teacher who provides superior leadership in her classroom, her department, and throughout the community in which she works. The "totality of the education process for students" is of the utmost concern to her, and she demonstrates this concern by her dedicated involvement with her students, the faculty, and community members as a whole.

Richardson's teaching career spans 25 years, 17 of which have been in the San Dieguito High School District. Through the years she has served her community in many capacities: She helped reorganize the District Curriculum Council by writing policies for its procedure and membership; helped establish a multimedia summer workshop to train teachers in the use of modern technological equipment and assisted other teachers in creating their own supplementary visual aids; organized a program for gifted students; helped plan the science wing of the new Torrey Pines High School; and established a program called "Seminar"—a forum bringing together community members, students, and faculty to discuss topics relating to education.

While continuing to carry a full teaching load, Richardson has been district science chairman for almost 12 years, and in this capacity she has encouraged the adoption of many new science teaching projects developed under the National Science Foundation. Richardson is currently chairman of the new science department at Torrey Pines.

"Over the years," says the awardee, "the focus in my classroom has turned from the subject matter to the student. It seems more important to me now 'HOW' I teach rather than 'WHAT' I teach." The quality of Richardson's teaching is apparent—in the annual high school chemistry contest sponsored by the ACS San Diego Section, her high school team has placed first eight times in the past 12 years, and many of her students have earned advanced placement in chemistry upon entering college.

The James Flack Norris Award in Physical Organic Chemistry

sponsored by the ACS Northeastern Section

DR. JOHN D. ROBERTS, Institute Professor of Chemistry at California Institute of Technology, is one of the truly great leaders and innovators in physical organic chemistry. His impressive scientific contributions, spanning almost four decades, range from elucidation of fundamental reaction mechanisms in aromatic and small-ring compounds and the applications of quantum mechanics to organic chemistry, to the development of

Porter

Prausnitz

Richardson

nuclear magnetic resonance as a practical tool for organic chemistry.

Significant contributions were made in Roberts' early work in studies of small-ring compounds and the carbocations derived from them. During this period, he also developed use of the Hammett equation for understanding substituent effects. He was the first to establish a program of measuring new Hammett σ constants and his study of the reactivities of 4-substituted bicyclo[2.2.2]octane-1-carboxylic acids made an important step in the disentanglement of inductive and resonance effects.

In 1953, Roberts proposed the benzyne mechanism for rearrangements in nucleophilic substitution reactions of nonactivated aromatic halides. These reactions had previously presented a baffling pattern of orientation effects. Benzyne, itself, was shown by Roberts' work to be involved in the large-scale synthesis of phenol from chlorobenzene. The present importance of benzyne chemistry in synthetic organic studies is a monument to Roberts' perception and imagination.

Roberts is universally known for his work in the application of NMR methods to organic chemistry, which, according to a colleague, "helped to turn a phenomenon of physics into a day-to-day tool for the understanding of organic structures and mechanisms."

Recently, carbon-13 and nitrogen-15 magnetic resonance has become a powerful investigative tool for practicing organic chemists, and Roberts has devoted a major part of his research effort in recent years to the use of these nuclei at the natural-abundance levels. He, perhaps more than any other organic chemist, has developed these fields to their present state.

Roberts has also made important contributions to chemical education, most notably through his textbooks "Basic Principles of Organic Chemistry" (with M. C. Caserio as coauthor), "Molecular Orbital Calculations," and "Nuclear Magnetic Resonance." Roberts received the ACS Award in Pure Chemistry in 1954, the Roger Adams Award in 1967, the Richard C. Tolman Award in 1975, and the Michelson-Morley Award in 1976.

ACS Award in Pure Chemistry

sponsored by Alpha Chi Sigma Fraternity

"In the short span of about one decade, and by the early age of 33, he has established himself as the most visible and prolific researcher in modern quantum chemistry, and certainly one of the most important contributors in this field today." This is the way one colleague sums up the accomplishments of **DR. HENRY F. SCHAEFER III,** professor of chemistry at the University of California, Berkeley. Says another associate: "He has had more impact in chemistry than any other young theorist."

The high quality of the award winner's theoretical treatments and his confidence in them have been such that when the results conflict with the accepted interpretation of experimental data, he has strongly defended the reliability of his results—and in nearly every case he has been proved correct. A prime example is his calculation of the bond angles and bond distances associated with triplet methylene, proving that experimental uncertainties in earlier work by other researchers had led to the wrong conclusions.

In another controversial work, Schaefer and his coworkers predicted in 1972 that the vertical $\pi\pi$ singlet state of ethylene is intermediate in character between valence and Rydberg (diffuse) spatial extent. This has major implications for all of conjugated molecule π electron theory, but has come under heavy fire from both theorists and experimentalists. More recently, Schaefer has taken an even more thorough look at this problem and again has concluded that ethylene is a mixed state.

Schaefer has made very substantial methodological contributions to electronic structure theory—for instance, formulation of a first-order wave function for the oxygen molecule. And he has been a pioneer in using the minicomputer as a tool for large-scale theoretical chemistry.

Schaefer has an extensive list of publications (about 175) to his credit. His book, "The Electronic Structure of Atoms and Molecules: A Survey of Rigorous Quantum Mechanical Results," has played a critical part in the development of this new field.

He received his B.S. in chemistry from Massachusetts Institute of Technology in 1966 and his Ph.D. in chemistry from Stanford University in 1969. Shortly after graduation, he joined the faculty of the University of California.

ACS Award for Creative Invention

sponsored by the Corporation Associates

DR. LEO H. STERNBACH is internationally recognized for opening a new era in the treatment of psychological problems with his discovery of Librium and Valium. Sternbach's major accomplishments have been in the area of 1,4-benzodiazepines, introducing the medical community to an important new class of psychotherapeutic agents.

The impact of Sternbach's discoveries has stimulated research in medicinal chemistry worldwide. Presently, more than 20 1,4-benzodiazepine derivatives are being marketed; more than 1600 patents were issued worldwide (during 1972–77) on closely related derivatives—more than 12,500 publications appeared (1972–77) on their chemical, pharmacological, and medical aspects.

Although Librium and Valium have achieved wide use as antianxiety agents, they have other therapeutic applications as well. They act on the central nervous system, and have been used as hypnotics (sleeping pills) and anticonvulsants (especially in treating epilepsy); they act on skeletal muscle and have been used widely as muscle relaxants (Librium has been used widely in the treatment of alcohol withdrawal symptoms).

Sternbach was born May 7, 1908, in Austria. He obtained a Ph.D. in organic chemistry from the University of Krakow, Poland, in 1931. He was a research assistant (1931–37) at the University of Krakow, and a research fellow (1937–40) at the Swiss Federal Institute of Technology before joining Hoffmann-La Roche Inc. in Basel, Switzerland. He transferred to the Nutley, N.J., branch in 1941, where he was group chief, senior group chief, and section chief, before becoming director of medicinal chemistry in 1966. Sternbach retired in 1973, but he is still with Hoffmann-La Roche as a chemistry consultant, and very much involved in benzodiazepines.

"Sternbach's sustained and outstanding creativity in the field of medicinal chemistry has contributed significantly to the material prosperity and happiness of people all over the world," states a colleague. With Valium and Librium being the first and fourth most commonly prescribed drugs in the U.S., it is estimated that they are used by one in every 10 adults.

Roberts

Schaefer

Sternbach

ACS Regional Awards in High School Chemistry Teaching

RONALD BROWN, Middle Atlantic
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ELEANOR W. THOMAS, Southwest
DAVID W. WENTWORTH, Great Lakes

ACS Awards for Outstanding Performance by Local Sections

Four awards for different size sections:
(Large) **ROCHESTER**
(Medium Large) **LOUISIANA**
(Medium Small) **PORTLAND**
(Small) **CENTRAL WISCONSIN**

Dr. William H. **Armistead,** vice chairman, Corning Glass Works and director of technical staffs, has received the Eugene C. Sullivan Award of the ACS Corning Section. The award recognizes Armistead for his contributions to glass composition development and his leadership in industrial scientific research.

Dr. George B. **Butler,** director of the center for macromolecular science, University of Florida, has received the Herty Medal from the ACS Georgia Section. In receiving the award, Butler was cited for "remarkable and outstanding contributions to chemistry, particularly in the areas of polymerization chemistry."

Dr. Orville **Chapman,** professor of chemistry, University of California, Los Angeles, will receive the 1978 Midwest Award. The $1000 award, sponsored by the Edward Mallinckrodt Jr. Foundation and administered by the ACS St. Louis Section, will be presented during the Midwest Meeting Oct. 26–27. In receiving the award, Chapman will be honored for his distinguished contributions to low-temperature photochemistry and education.

Dr. T. Don **Luckey,** professor of biochemistry, University of Missouri school of medicine, Columbia, is the recipient of the Alexander von Humbolt Senior U.S. Scientist Award. This award is granted to "outstanding U.S. scientists in recognition of past accomplishments in research and teaching," thereby promoting scientific cooperation between institutions in the Federal Republic of Germany and in the U.S. The award will allow Luckey and his wife to reside for eight months at Saarland University, where he will research endocrine functions for thymic hormones.