ACS 1990 Award Winners

Following are vignettes of the fifth set of recipients of awards administered by ACS. They will receive their awards during the April 1990 199th ACS national meeting in Boston, with the exception of the Cope Medalist and Cope Scholars, who will receive their awards at the 200th ACS national meeting in Washington, D.C., during the Cope Symposium. The awards in Boston will be presented at a banquet on Tuesday, April 24, 1990.

Vignettes of the remaining awardees will appear in the October 23 issue of C&EN.

ACS Award for Creative Work in Fluorine Chemistry

sponsored by PCR Inc.

An active researcher in the field of fluorine chemistry for some 40 years, **JOHN COLIN TATLOW,** professor emeritus of the University of Birmingham, England, has made far-reaching contributions both to the understanding of general organofluorine chemistry and to the synthetic development of new, useful fluorine-containing compounds. In addition, his research has led to the discovery of new families of polyfluoro-compounds with many and varied functional groups.

A British citizen, Tatlow became involved in fluorine chemistry in the World War II effort to develop an atomic bomb, better known as the Manhattan Project. As a development from this work, he helped establish a school of organofluorine chemistry at Birmingham in the 1950s. He later became leader of the group, a role he held until his retirement from the university in 1982. The work this group has performed in the years following the Manhattan Project has helped to establish organofluorine chemistry's important role in today's science.

Tatlow's work has been in the forefront in such areas as transition metal fluoride fluorination and aromatic fluorine chemistry. His early research on trifluoroacetic acid and its derivatives led to the first systematic use of organofluorides as general reagents in organic chemistry. Tatlow also researched the synthetic pathways of fluorocarbon derivatives and the reactivities of functional groups in these derivatives, especially alicyclic compounds. This work was the first to use gas-liquid chromatography as a preparative technique. In addition, he was instrumental in the development of aromatic fluorocarbon chemistry including that of polycycles and heterocycles.

Tatlow received B.S. and Ph.D. degrees in chemistry from the University of Birmingham in 1943 and 1946, respectively. He was awarded a D.Sc. from the same university in 1954 and was on the staff for 36 years. He served as head of the university's chemistry department from 1974 to 1981.

Since his retirement from the university in 1982, Tatlow has served as a consultant on organofluorine chemistry and as editor and writer for a number of publications, but especially for the *Journal of Fluorine Chemistry*, which he cofounded in 1971. In 1986, Tatlow worked as coeditor and author of "Fluorine, the First 100 Years (1886–1986)," a book commemorating the centenary of the first isolation of elemental fluorine. In the same year, he was awarded a Moissan Medal for original work in fluorine chemistry.

Earle B. Barnes Award for Leadership in Chemical Research Management

sponsored by Dow Chemical

"Universally respected as an exceptional leader." "A work simplifier . . . interested in people." "Skillful day-to-day leadership." These comments by colleagues of **JOHN R. THOMAS,** retired president of Chevron Research Co. and vice president of Chevron Corp., emphasize the high regard in which Thomas has been held throughout his four decades as a scientist and chemical research manager.

Thomas was president of Chevron Research from 1971 to 1986, a challenging period for the petroleum and petrochemical R&D industries. In response to changing environmental and performance requirements, he oversaw research in alternate energy—synthetic fuels, solar energy, and energy conservation—for possible diversified business opportunities. In the burgeoning R&D area, Thomas managed projects such as basic petroleum product R&D, engine tests of fuels and lubricants, minerals processing, batteries, and refinery and oil field chemicals. In addition, his organization was responsible for process engineering, process design, and patent and licensing activities for Chevron Corp.

Among the notable projects Thomas coordinated from research to commercialization were the residuum processing complexes at El Segundo, Calif., and Pascagoula, Miss.; the Richmond lube oil project to produce high-quality lubricating oil by hydrocracking heavy crude oil; the Salt Lake City oil shale retorting demonstration plant; the Richmond semiworks plant for scaleup of Chevron's coal liquefaction process; and the development of Techroline, a patented state-of-the-art gasoline detergent now in widespread use. Thomas succeeded in managing these and other complex projects in a manner that, according to one colleague, "inspired those who worked with him and further demonstrated his unusual effectiveness in managing research and in promoting the sciences of chemistry and chemical engineering."

Thomas received a B.S. in chemistry in 1943 and a Ph.D. in 1947 from the University of California, Berkeley. He worked for General Electric and served on the staff of the U.S. Atomic Energy Commis-

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sion before beginning his 35-year career with Chevron Research. He was also a director for Cetus Corp. (1978–86) and chairman of the board and director of GA Technologies (1984–86). He retired in 1986.

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

sponsored by Fritzsche Dodge & Olcott Inc.

BARRY M. TROST, professor of chemistry, Stanford University, is an international leader in synthetic organic chemistry. "His efforts to rewrite the rules for the selectivity of organic reactions," says a colleague, "help make available increasingly sophisticated molecular structures needed in pharmaceutical and agrichemical research."

To achieve efficient synthesis of complex natural products, Trost developed new reagents and reactions that are chemo-, regio-, diasterio-, and enantioselective. Exploiting strained rings as pseudofunctional groups, Trost devised ways to use small ring fragments as reagents for selective structural modification. He created "chemists' enzymes" for selective catalysis using transition-metal templates as the active sites. By varying the metal and ligand field, he tuned the templates to impose enzymelike control of orientation of reactive molecules and allow choice of regioselectivity. The award winner's work in organosulfur chemistry has forced chemists to rethink established reactivity patterns. Thioacetals and thioketals become "super carbonyls," more reactive than carbonyl groups themselves. Sulfones become "chemical chameleons"—nucleophiles in basic solutions but electrophiles in acidic ones—greatly expanding their synthetic prowess. Such synthetic methodology forms the basis of new strategies that simplify the construction of complex natural products in ways that otherwise would not be possible. In all, Trost's concepts in synthetic methodology have led to his synthesizing 60 diverse natural products ranging from terpenoids to juvenile hormone to nucleic acids.

The award winner received a B.A. degree from the University of Pennsylvania (1962) and a Ph.D. from Massachusetts Institute of Technology (1965). He holds four patents, has more than 400 scientific publications, and has authored or coauthored five books. His numerous awards include Sloan Foundation Fellow (1967–69), Camille & Henry Dreyfus Teacher-Scholar (1970–75), ACS Award in Pure Chemistry (1977), ACS Award for Creative Work in Organic Chemistry (1981), Alexander von Humboldt Stiftung Senior Scientist Award (1984), and Arthur C. Cope Scholar Award (1989). He was elected to the National Academy of Sciences (1980) and the American Academy of Arts & Sciences (1982).

ACS Award in Applied Polymer Science

sponsored by Philips Petroleum Co.

OTTO VOGL, Herman F. Mark Professor of Polymer Science at Polytechnic University, is being recognized for his contributions to the synthesis and the characterization of polymers.

Responsible for the coining and the use of the expression "functional polymers," his research group worked intensely on polymerizable and polymeric stabilizers, especially ultraviolet stabilizers, antioxidants, and flame retardants.

During research in new and unusual polymerization techniques, he found that functionally substituted epoxides and olefins can be polymerized and copolymerized when the functional carboxy groups are properly complexed. This development opened the door to new classes of polymeric materials, ionomers based on poly(ethylene oxide) and polyolefins, but where the functional group is separated from the polymer backbone chain by a flexible spacer group.

Vogl's work on structure/property relationships of polymers has been crucial. The characterization and identification of such linkages in polymer structures can be of critical importance for the fabrication and aging of polymer structures.

After receiving a Ph.D. from the University of Vienna in 1950, Vogl remained there as instructor until 1953. Following postdoctoral work at the University of Michigan and Princeton University, in 1956 he joined Du Pont where he worked in the plastics and central research department. In 1970 he became professor of polymer science and engineering at the University of Massachusetts and was named Herman F. Mark Professor at Polytechnic University in 1983.

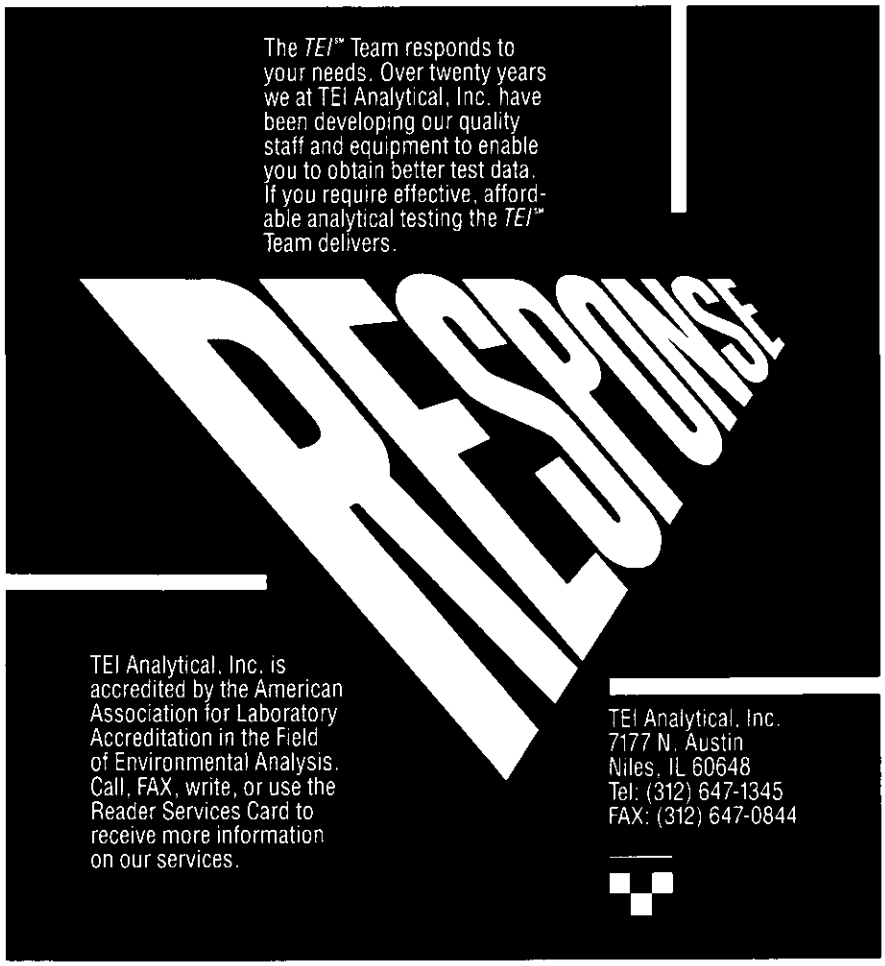
In addition to his research and lecturing accomplishments, Vogl is author and coauthor of over 300 papers, about 40 U.S. and foreign patents, and several book chapters, and has edited nine books. He also has served and is serving on the editorial and advisory boards of 15 scientific journals.

Vogl's professional activities are many and varied, encompassing consulting work for both industry and government, as well as past chairmanships of the ACS Division of Polymer Chemistry, the Connecticut Valley Section, and the Macromolecular Committee of the National Academy of Sciences. He is currently president of the Pacific Polymer Federation.

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

sponsored by Du Pont

JOHN D. WEEKS, distinguished member of the technical staff of AT&T Bell Laboratories, has contributed extensively throughout his career to the theories regarding the composition and behavior of liquids. His early collaboration with David Chandler and Hans C. Andersen led to the Weeks-Chandler-Andersen (WCA) theory of liquids—work that gives a physical perspective to the role of entropy and repulsive forces in determining the



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molecular structure of liquids. Using a simple physical picture of hard objects that express the shapes of the molecules (for example, billiard balls for monoatomic liquids or dumbbells for diatomics), they developed a quantitative understanding of the structure and thermodynamics of nonassociated liquids. The pioneering nature of this theory has been broadly acknowledged, so much so that, according to a colleague, it "has been well detailed in nearly every intermediate to advanced statistical mechanics text published in the last decade."

Tatlow

Thomas

Trost

Weeks applied this same physical picture approach in his investigation of the theory of interfaces. He developed a general and systematic procedure, starting from the partition function, to focus on long wavelength interface fluctuations, conveniently pictured in terms of the vibrations of a taut membrane such as a drumhead. Weeks used this interface Hamiltonian method to investigate a variety of interfacial phenomena including properties of the liquid-vapor interface, the capillary wave model, the development of facets on a solid-liquid interface, and wetting transitions.

Weeks, a native of Birmingham, Ala., finished his undergraduate career at Harvard College with a magna cum laude in physics in 1965. He focused his interests while at the University of Chicago, receiving a Ph.D. in chemical physics in 1969. It was while he was a postdoctoral researcher at the University of California, San Diego, in 1969–71, and, at England's Cambridge University in 1971–72, that he codeveloped the WCA theory. His current work at AT&T Bell Labs allows him to continue working on the dynamics of interfaces as well as on phase transition, crystal growth, and pattern formation. Weeks is a fellow of the American Physical Society and a member of the American Association of Arts & Sciences.

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ACS Award for Nuclear Chemistry

sponsored by Amersham Corp.

MICHAEL J. WELCH, professor of radiation chemistry, Edward Mallinckrodt Institute of Radiology, Washington University, is in the forefront of research in nuclear chemistry and nuclear techniques. Many of the results of his research are used worldwide in biology and medicine.

Born in England, Welch received a B.A. degree in natural sciences at Cambridge University in 1961, and an M.A., also at Cambridge, in 1964. He attended the University of London, where he obtained a Ph.D. in 1965. The same year, he came to the U.S. to accept a position as research associate at Brookhaven National Laboratory. In 1967 he was named assistant professor of radiation chemistry, Edward Mallinckrodt Institute of Radiology, Washington University School of Medicine. In 1969, in addition to his duties at the institute, he joined the

Vogl

Weeks

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White

university's department of chemistry, where he was made full professor in 1978.

Welch has invested the major portion of his scientific career in the labeling of chemical compounds used in biology and medicine with accelerator-produced short-lived radionuclides. The early phases of his research led to the production of simple molecules synthesized directly in the cyclotron target as a result of the nucleogenic event or with a minimum of manipulation after irradiation. Welch quickly recognized that in spite of the constraint of short half-lives, complex tracers could be synthesized using clever chemical techniques. His pioneering preparations of the labeled compounds oxygen-15, fluorine-18, and carbon-11 are employed in positron emission tomography (PET) studies. In fact, the carbon-11-labeled palmitate developed in Welch's laboratory is used extensively for the in-vivo and regional study of myocardial metabolism by PET in normal subjects and in patients with myocardial infarction.

A member of the Society of Nuclear Medicine, he has been on the board of trustees since 1980, and served as president in 1984.

ACS Award in Colloid or Surface Chemistry

sponsored by Kendall Co.

For the past 20 years **J. MICHAEL WHITE** has played a major role in the development of modern surface science and has pioneered its application to a host of surface chemical problems. And he is, according to one colleague, "a preeminent practitioner of modern surface chemistry"—focusing on the use of surface science techniques to understand the chemistry associated with solid surfaces. White is Norman Hackerman Professor of Chemistry at the University of Texas, Austin.

White received a B.S. degree from Harding College in 1960 and a Ph.D. degree from the University of Illinois in 1966. He then joined the faculty at the University of Texas as assistant professor. He assumed his present position at Texas in 1985.

White's early research at Texas focused on gas phase molecular dynamics and he made several noteworthy contributions in the areas of photodissociation; modeling of thermal, hot atom, and molecular beam reactions; and trajectory studies. Later he turned his attention to surface chemical kinetics and surface science, and was one of the first in this field to elucidate photoeffects at the gas-solid interface. More recently he discovered that several different kinds of molecules adsorbed on metal surfaces will photodissociate.

He was one of the pioneers in the application of static secondary ion mass spectrometry to the measurement of reaction rates on surfaces. He has made many important contributions in other areas of surface science chemistry, including elucidation of the interaction of coadsorbed species on transition-metal surfaces, catalyst promotion with alkali metals, and characterization of the surface chemistry of relatively large molecules such as 2,4,6-trinitrotoluene and dimethylphosphonate.

White also has been active in promoting science. He has served as a program director for the National Science Foundation and was a member of NSF's Chemistry Advisory Committee. He is a principal editor of the *Journal of Materials Research* and serves on the editorial boards of *Applied Surface Science, CRC Critical Reviews in Surface Chemistry, Surface Science,* and *Chemical Physics Letters.* White is also a consultant for Exxon and Los Alamos National Laboratory. □

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