ACS 1985 Award Winners

Following are vignettes of the first six recipients of awards administered by ACS. All will receive their awards on April 20, 1985, during the 189th ACS National Meeting in Miami Beach, except Donald J. Cram, who will receive the Roger Adams Award in Organic Chemistry during the 29th National Organic Symposium, to be held June 16-20, 1985, at the University of Delaware. The awards will be presented during an awards banquet, at which time Henry Taube will give the Priestley Medal Address. Vignettes of the remaining awardees will appear in successive October issues of C&EN.

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

sponsored by Shell Companies Foundation Inc.

"Nowadays it has become routine to contemplate and execute molecular dynamics studies of very complex liquids, including metals, fused salts, water and aqueous solutions, and molten polymers. **BERNI ALDER** will always be remembered as the pioneering initiator of this revolutionary trend," comments an admirer of the awardee. Alder is group leader at Lawrence Livermore National Laboratory in Livermore, Calif.

The principal theme running through Alder's work is his innovative use of computers as instruments for molecular simulation. One of his remarkable discoveries demonstrated that the Stokes-Einstein relation with slip boundary conditions is valid on the molecular level. The impact of this discovery led to numerous studies by various groups correlating measurements of viscosity with both rotational and translational diffusion constants in nonassociated liquids.

In another important study, Alder and his group determined the persistence of velocity correlations in hard sphere fluids, discovering for the first time that these velocity correlations in fluids do not relax exponentially in time, but rather with a power law, $t^{-d/2}$ where d is the dimensionality of the fluid.

Both of these findings were met with resistance in the scientific community. However, they are now accepted as gospel, and serve as important topics for continuing theoretical research in the liquid state.

These contributions to knowledge of the structure and dynamics of fluids represent only a fraction of Alder's total work. He and his group have written fundamental papers in a variety of areas ranging from the properties of condensed matter under severe pressures, to the thermodynamics of mixtures, the dielectric properties of fluids, and, most recently, the correlation problem of electronic structure. "All, including myself, have benefited from our interactions with this man, and the enormity of his total work separates Alder from his collaborators," states a colleague.

Alder received his B.S. and M.S. from the University of California, Berkeley. He received his Ph.D. in chemical physics in 1951 from California Institute of Technology. From 1951 to 1954 he worked as an instructor at the University of California. He joined Lawrence Livermore lab in 1955. Alder is editor of the *Journal of Computational Physics.*

James T. Grady-James H. Stack Award for Interpreting Chemistry for the Public

In his relatively short career, freelance science writer **JOSEPH W. ALPER** has distinguished himself with his ability to make chemistry understandable and interesting to a wide audience. By combining his extensive training in chemistry and biochemistry with his writing skills, Alper is able to explain complex chemical topics to the general public.

A native of Chicago, Alper received his B.S. in chemistry from the University of Illinois. He received an M.S. in biochemistry in 1978, and an M.S. in agricultural journalism in 1980, both from the University of Wisconsin.

Alper joined the American Chemical Society in May 1980, as writer/producer of the radio program, "Man and Molecules" (since renamed "Dimensions in Science"). He coauthored the ACS audio special, "DNA: Architect of Life," which received a special commendation in the Alfred I. DuPont-Columbia University Awards competition. After leaving ACS and before becoming a free-lance writer, Alper worked for *Chemical Week* as research editor.

The scope of Alper's writing is evidenced by such articles as "The Stradivarius Formula—Better Music Through Chemistry," which appeared in the March 1984 edition of *Science;* it describes the unusual and exciting research on Renaissance violins by Joseph Nagyvary, a biochemist at Texas A&M University. "Biology and Mental Illness," *Atlantic Monthly,* December 1983, is a comprehensive review of research into understanding the mechanisms of depression, manic depression, and schizophrenias. "Vaccine Research Gets New Boost," deals with the safer, wider-ranging vaccines used today; "Peptides: A Medical Rediscovery," discusses the apparently key roles these chemicals play in human health; "Better Weapons for Antibiotic Warfare"—all appeared in *High Technology,* in the April, September, and December 1983 issues, respectively.

In 1982 Alper assumed responsibility for researching and writing

all of the stories appearing in "What's Happening in Chemistry" —the ACS annual digest of developments in the chemical sciences. As a result of his efforts, the publication has improved markedly and is being used more extensively. Alper's work has been reprinted in the West German magazines *Der Stern* and *Der Spiegel*. Alper spent this summer in Australia as a guest of the Australian government, researching stories for a number of U.S. publications.

Alder

Alper

Arnett

ACS Award in Petroleum Chemistry

sponsored by Lubrizol Corp.

For more than 20 years, **EDWARD M. ARNETT** has made important contributions to the growing body of knowledge regarding the structure-energy relationships of carbocations. His major accomplishment has been the development of thermodynamic techniques for direct comparison of the stabilities of carbocations and carbanions in superacidic and superbasic solution.

Thermodynamic comparisons of the stabilities of hydrocarbons and ionic intermediates have always been important to the petroleum industry. In the past several years, Arnett and his research group have extended the thermochemical scale of carbocation stabilities over the entire range—from the least stable members (for example, the isopropyl cation) to the most stable (and familiar) triaryl methyl cations—thus providing the first comprehensive scale of carbocation energies.

Another important development coming from Arnett's laboratory is the demonstration that ion-pairing may have a very significant influence on carbocation energies even in superacid media under so-called stable ion conditions. The behavior of carbocations has played a key role in petroleum chemistry, and is now being extended into many related areas. Arnett and his group are presently engaged in thermochemical experiments of direct relevance to catalytic processes in the fossil fuel industry and the chemistry of coal.

Arnett was born in Philadelphia. His undergraduate and doctoral training were completed at the University of Pennsylvania; he received his Ph.D. there in 1949. He spent the next four years as research director for Max Levy & Co., a Philadelphia firm. Arnett then taught two years at Western Maryland College, before joining Paul Bartlett's group at Harvard (1955–57). From Harvard, he moved to the University of Pittsburgh. In 1968 he established the Pittsburgh Chemical Information Center for the development and testing of computer-based chemical information services. In 1980 he moved to Duke University to hold the chair of R. J. Reynolds Industries Professor of Chemistry.

Arnett has served as visiting professor at the universities of Illinois, Colorado, New Hampshire, and Kent (Canterbury, U.K.). In 1977 he received the James Flack Norris Award in Physical Organic Chemistry; he received the Pittsburgh Award from the Pittsburgh Section in 1976.

E. V. Murphree Award in Industrial & Engineering Chemistry

sponsored by Exxon Research & Engineering Co.

"It is fair to say that **MICHEL BOUDART**'s work over the past 25 years has been instrumental in laying the foundation for modern theory and interpretation of heterogeneous catalysis," says a colleague in assessing Boudart's contributions. "Moreover, his current research programs continue to reveal important new information of great industrial value," he adds. Boudart is William M. Keck Sr. Professor of Chemical Engineering at Stanford University.

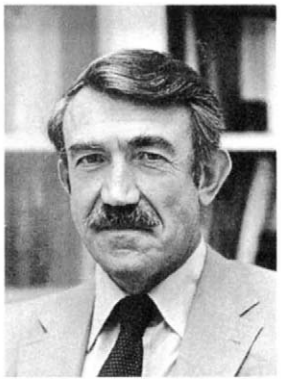
Born in Brussels, Belgium, in 1924, Boudart studied chemical engineering at the University of Louvain before receiving his Ph.D. from Princeton in 1950. While at Princeton, Boudart studied under Sir Hugh Taylor in the field of physical characterization of catalytic materials and kinetics of heterogeneous catalytic reactions.

After graduation Boudart joined the Princeton faculty. While there he spent two summers working at Esso's research labs in Linden, N.J. Here he and others performed a series of experiments that defined the state of aggregation of platinum metal in petroleum reforming catalysts. These key experiments laid the goundwork for subsequent research on the phenomena of chemisorption, characterization of catalytic materials, and a more accurate and rigorous mathematical treatment of heterogeneous catalytic processes. In a 1960 paper (with Larry Spenadel), "Dispersion of Platinum on Supported Catalysts," Boudart reported that platinum in reforming catalysts was present in very small clusters or rafts in which nearly all of the component metallic atoms were exposed; this revolutionary view is now universally accepted.

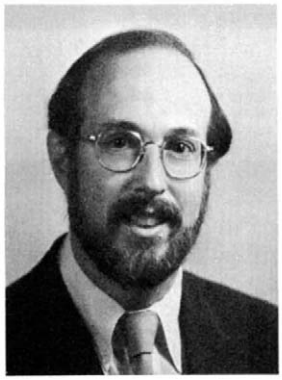
Boudart and his students next studied the rates of reaction of these rafts to determine the turnover frequency—the number of reactions per second on each catalytic site—establishing the relationship between turnover frequency and size of the surface bound metal cluster or raft. Their work soon became the principal factor in revolutionizing the previously accepted view about

the structure and activity of heterogeneous catalysts.

Boudart joined the University of California, Berkeley, in 1965. He moved to Stanford University in 1968. He is a cofounder of Catalytica Associates Inc., a research company in catalysis.



Boudart



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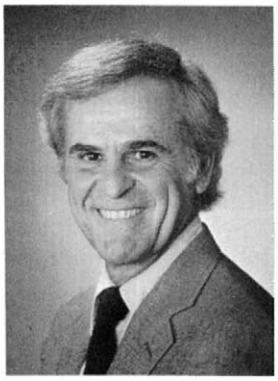

Choppin

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

sponsored by Fritzsche Dodge & Olcott

DAVID E. CANE, professor and chairman of the department of chemistry at Brown Unversity, is one of the world's leaders in the biosynthetic community. He has combined brilliant chemical and biochemical considerations with spectroscopy of stable isotopes.

The main emphasis of Cane's research has been the elucidation of the biosynthesis of a wide variety of natural products. In examining individual metabolites, his focus isn't only on understanding particular biosynthetic metabolites, but in studying processes common to many systems. In particular, he is interested in carbon-carbon bond-forming and bond-breaking reactions, including intramolecular rearrangements, and the stereochemistry of such processes.

Further, Cane's work involves a number of techniques of general utility and interest: carbon and deuterium magnetic resonance, homo- and heteronuclear double labeling, and the use of cell-free systems and enzymic techniques to study the stereochemistry of biosynthetic processes and examine individual biosynthetic steps. In connection with his work on macrolide and polyether biosynthesis, he has recently become interested in the genetics and molecular biology of antibiotic biosynthesis in Streptomyces.

Cane also is one of the pioneers in the use of multiple isotopic labeling, such as the incorporation of uniformly labeled ^{13}C-glucose, and the interpretation of the resulting ^{13}C NMR spectra. Recently, he has come up with a unified biosynthetic model which accounts for the stereochemistry of complex polyether antibiotics.

Cane was born in New York City in 1944. He did his undergraduate and graduate studies at Harvard University, receiving his A.B. magna cum laude in 1966, his A.M. in organic chemistry in 1967, and his Ph.D. in organic chemistry in 1971 working with Elias J. Corey. Cane held a postdoctoral position with Duilio Arigoni at the Eidgenossische Technische Hochschule in Zurich for two years before joining Brown University in 1973. He was promoted to associate professor in 1978, professor in 1980, and chairman of the department of chemistry in 1983.

ACS Award for Nuclear Chemistry

sponsored by an anonymous donor

GREGORY R. CHOPPIN, R. O. Lawton Distinguished Professor of Chemistry at Florida State University, Tallahassee, has contributed much to the understanding of the nuclear fission process, identification of nuclear properties, and to the production of new heavy element isotopes. But it is in elucidating the nuclear chemistry and radiochemistry of the 4f- and 5f-transition elements, particularly the actinides, that his contributions are specially recognized.

After receiving a B.S. from Loyola University and Ph.D. from the University of Texas, Austin, Choppin joined Lawrence Radiation Laboratory as a postdoctoral fellow in 1953. His early research and pioneering development of rapid separation techniques for actinides and lanthanides and his studies of the production and nuclear properties of new isotopes of americium, berkelium, californium, einsteinium, fermium, and mendelevium are well known. Another pioneering investigation was his study of prompt neutron emission from the spontaneous fission of californium and fermium isotopes and correlation of neutron multiplicities with various modes of fission—the first studies of this type.

Choppin has developed a keen ability for sensing potential applications of his fundamental research to a variety of practical problems. Some of his recent investigations are particularly relevant in assessing the behavior of actinides and lanthanide fission products in the environment. Among these are studies of the interaction of actinides and lanthanides with humic and fulvic acids, solution chemistry of the actinides, thermodynamics of plutonium(VI) interactions with bicarbonate, interaction of uranyl ions with carbonate ions, kinetics of the reduction of plutonium(VI) by dicarboxylic acids, and the speciation of plutonium in seawater and fresh water.

Boudart's publication record of more than 200 papers ranges from studies of nuclear fission to actinide speciation and complexation in environmental systems.

From 1956 to date, Choppin has taught at Florida State University (with the exception of one year spent at Centre d'Étude Nucleaire in Belgium, and a year at the European Institute for the Transuranium Elements in Karlsruhe, West Germany). He was named associate professor in 1959, and professor in 1963. From 1968 to 1977 Choppin was chairman of the chemistry department.