

DOE bestows Fermi awards on Courant and Livingston

The US Department of Energy last December honored Ernest D. Courant (Brookhaven National Laboratory) and the late Stanley Livingston with Fermi Awards for their contributions to the physics and design of particle accelerators. The Enrico Fermi Award is the highest scientific award given by DOE, and includes a Presidential citation, a gold medal and \$100 000 for each recipient.

Courant was cited for "his many contributions over more than three decades to the physics of acceleration of charged particles, including his role in the invention of alternating gradient focusing, which is the essential mechanism of strong focusing now used in accelerators of the highest energies, and for his many studies of beam interactions and instabilities that have been of critical importance in accelerator design." Courant received his BA (1940) from Swarthmore College, and his MS (1942) and PhD (1943) from the University of Rochester. After working for some time on reactor theory in



COURANT

Montreal and Chalk River, Canada, and at Cornell University (1946-48), he went to Brookhaven National Laboratory in 1947. He initially studied theoretical aspects of the Cosmotron, a

proton synchrotron whose design and construction was led by Livingston. Courant developed theories of the growth of and loss in particle beams, and particle orbits. At Livingston's suggestion he began studies that showed that alternating gradients of an appropriate magnitude could form the basis of a new and much stronger particle-beam focusing system. Courant has taught at the University of Cambridge, Yale University, Princeton University and the State University of New York at Stony Brook. He is now senior physicist at Brookhaven.

Livingston, who died on 26 August 1986, was cited for "his leadership contributions to the development of nuclear accelerators over a half-century, from his involvement in the designing of the first cyclotrons to his role in the discovery of strong (alternating gradient) focusing, now used throughout the world for the design of nuclear accelerators and particle beams of the highest energies." (See page 88).

American Geophysical Union honored eight in 1986

The American Geophysical Union last year honored several individuals for their contributions to geophysics and related fields.

James C. I. Dooe received the 1986 Bowie Medal, the highest award bestowed by the union for having "broken new ground in mathematical hydrology and in the development of scientific programs and cooperation." He received his undergraduate degree from University College Dublin (1942) in science and civil engineering, and master's degrees from the National University of Ireland (1952) in civil engineering and from the University of Iowa (1956) in fluid mechanics and hydraulics. Dooe held several engineering positions with the Irish government (1942-1958), and he served four elected terms in the Irish Senate (1961-77). He was a professor of civil engineering at

University College Cork from 1958 until 1970 when he became a professor of civil engineering at Dublin. Throughout his career Dooe has pursued two lines of research: He has worked extensively on unsteady flow in open channels, recently extending his results to channels of arbitrary shape and to arbitrary friction laws. In addition he has made fundamental contributions to a systems approach to hydrology, including a mathematical formulation of the unit hydrograph (the response of a drainage basin to a unit impulse of rain), models of surface water runoff and groundwater problems, and work on a linear theory of hydrologic systems. He has participated in many international scientific organizations. Dooe retired from Dublin in 1986.

George E. Backus (Scripps Institu-

tion of Oceanography) received the 1986 Fleming Medal for his "important, original contributions to mathematical geophysics." He received his BS (1948), MS (1950) and PhD (1956) from the University of Chicago. He worked on Project Matterhorn at Princeton University (1957-58) and taught mathematics at the Massachusetts Institute of Technology (1958-60) before becoming an associate professor of geophysics at the University of California at San Diego, where he was named full professor in 1962. Backus went to Scripps in 1960. In 1957 he and Arvid Herzenberg (then at the University of Manchester, now at Yale) independently confirmed Walter M. Elsasser's hypothesis that a fluid sphere could undergo dynamo action if its axisymmetry were broken, an important result for geomagnetic dynamo theory.



DOOGE



BACKUS



MALONE

In the 1960s he worked on models of the Earth's seismic activities; with Freeman Gilbert he developed the theory of rotational splitting of the earth's seismic modes, proposing techniques for linear and linearized inverse problems. In geomagnetic studies in the late 1960s Backus showed that the flow at the core-mantle boundary could not be uniquely determined for surface magnetic data, as had been thought, and he demonstrated that the current thermodynamical model for the core was wrong.

Thomas F. Malone received the second Smith Award in 1986, which honors extraordinary service to geophysics. After receiving his PhD from MIT in 1946, Malone served successively as an associate professor at MIT, senior vice president and director of research at Travelers Insurance, dean of the graduate school at the University of Connecticut and director of the Holcomb Research Institute at Butler University. He was vice president and presi-

IMBRIE



dent of AGU for 1960-64. As a long-time chairman of the Geophysics Research Board of the National Academy of Sciences, and foreign secretary of the academy (1978-82), Malone has been a prime mover in the organization and execution of many international geophysics projects, including the Global Atmospheric Research and International Geosphere-Biosphere programs, and he was instrumental in the establishment of the NSF National Center for Atmospheric Research (Boulder, Colorado). Malone has been active in the International Council of Scientific Unions since the early 1960s, serving as its treasurer for 1978-84.

John Imbrie (Brown University) received the 1986 Ewing Award, which honors work in marine geophysics. Imbrie received his PhD in geology from Yale University in 1951 and taught at the University of Kansas for a year before moving to Columbia University. In 1967 he went to Brown where he is now Henry L. Doherty Professor of Oceanography. His initial studies were in Paleozoic paleontology and stratigraphy, but his major work has been on the Pleistocene ocean and the origin of glacial cycles, where his work helped to establish the Milankovitch theory of the ice ages. In 1978 he collaborated with his daughter Katherine Palmer Imbrie to write *Ice Ages*, a history of the ice age concept. He and his son John Z. have proposed a physical model that helps explain the mechanisms of ice age cycles. John Imbrie was one of the leaders of the NSF-sponsored CLIMAP project, an international collaborative effort aimed at mapping and understanding the Earth during the last major ice age.

Abel Wolman received the 1986 Horton Medal for "outstanding contributions to the geophysical aspects of hydrology." Wolman received a BS in

civil engineering from The Johns Hopkins University in 1915. As assistant and chief engineer with the Maryland State Department of Public Health (1914-39) he worked on water supply management and waste disposal, publishing with L. H. Enslow in 1919 a paper that established a basis for the controlled purification of water supplies through chlorination. Wolman became professor and chairman of the Johns Hopkins department of sanitary engineering in 1937; he became professor emeritus in 1962. He has served on many state, local and national commissions, boards and committees concerned with water pollution, flood control, forest management and public works; after World War II he served on the Atomic Energy Commission Advisory Committee on Reactor Safeguards (1947-60) and the Atomic Safety and Licensing Board Panel (1960-72). In addition, he has participated extensively in many international water management programs.

WOLMAN



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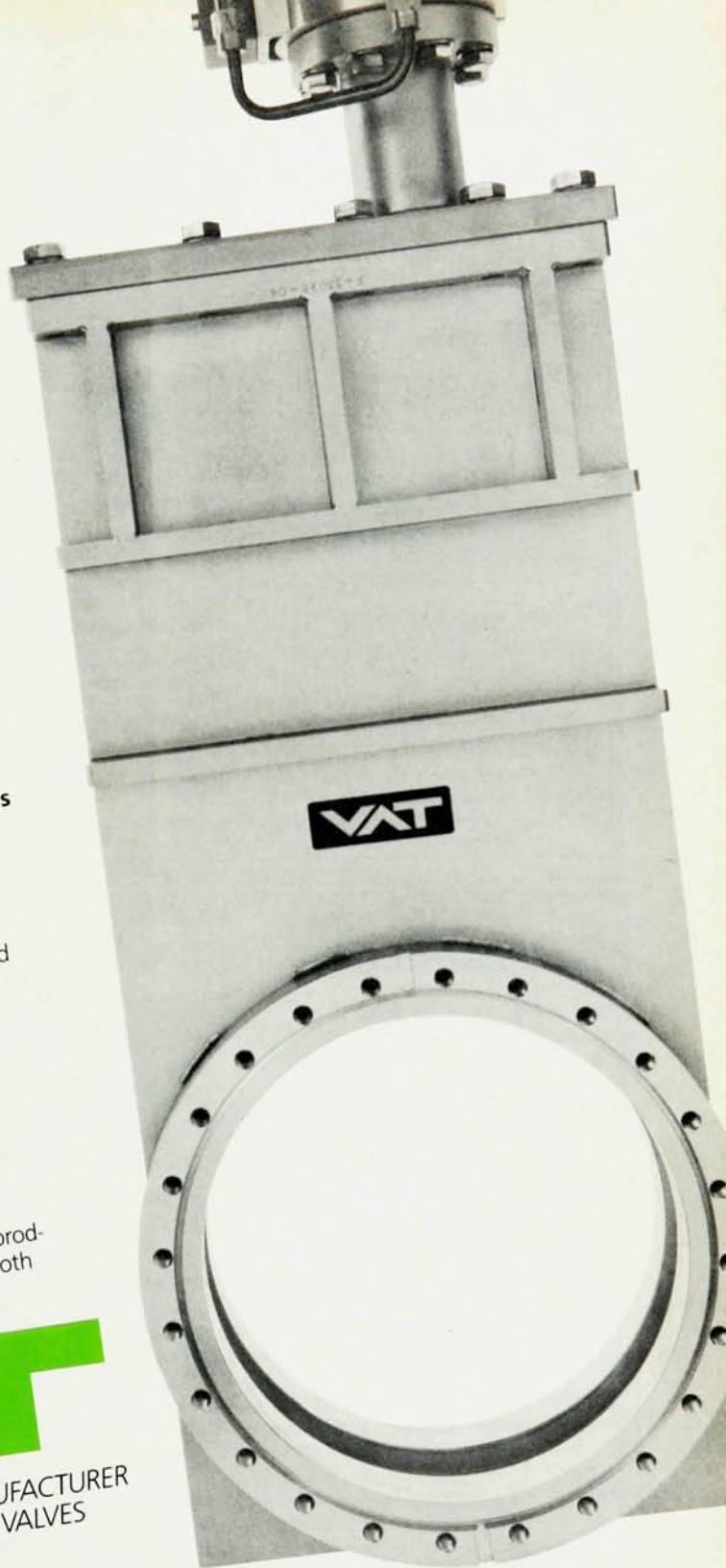
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Edward M. Stolper (Caltech), Robert A. Weller (Woods Hole, Oceanographic Institute) and Bradford H. Hager (Caltech) received Macelwane Awards in 1986; these are given "in recognition of significant contributions to the geophysical sciences by a young scientist of outstanding ability." Stolper went to Caltech after completing his PhD at Harvard in 1979. His interests have included lunar science and meteoritics, igneous petrology and igneous differentiation in the upper mantle. Weller received his PhD from Scripps (1978); in 1979 he went to Woods Hole, where he is now an associate scientist in the physical oceanography department. He has studied the flow response of the upper ocean to atmospheric forcing; he and Russ Davis developed a vector measuring current meter to measure horizontal velocities in the upper ocean. Weller has recently made direct observations of Langmuir circulations. Hager has focused his research attention on kinematic models of mantle convection, beginning with his PhD thesis, which he completed at Harvard in 1978. He went to Caltech in 1980 as an assistant professor of geophysics, becoming an associate professor in 1985.

in brief

Stig Hagstrum, formerly manager of the general sciences laboratory at the Xerox Palo Alto Research Center, has become professor and chairman of the Stanford materials science and engineering department.

Venkatesh Narayanamurti, formerly of AT&T Bell Labs (Murray Hill, New Jersey), has become vice president of research at Sandia National Laboratories (Albuquerque, New Mexico).

John Clarke, professor of physics at the University of California at Berkeley, has been named California Scientist of the Year by the California Museum Foundation of the California Museum of Science and Industry. He was honored for his role in developing the superconducting quantum interference device, which has been adapted for applications ranging from neurophysiology to geophysical prospecting. The \$5000 award is the highest civilian honor bestowed by the state.

B. Gale Dick, professor of physics at the University of Utah, has been named dean of the university's graduate school.