

University, received his PhD from Rice in 1959.

Academy of Sciences names award winners in physics

At its annual meeting in April, the National Academy of Sciences presented 12 awards, of which four honored individual accomplishments in physics or physics-related fields.

The J. Lawrence Smith Medal was presented to John A. Wood of the Smithsonian Astrophysical Observatory in Cambridge, Massachusetts for his "influential works over the past decade on the structure, classification and evolution of meteorite bodies."

Walter H. Munk of the Institute of Geophysics and Planetary Physics, University of California, San Diego received the Agassiz Medal for "experimental and theoretical research on the spectrum of motion in the oceans and the earth."

The National Academy of Sciences Award for Environmental Quality, which was established in honor of Frederick G. Cottrell by the Research Corp (New York City) and includes \$5000, was given to David M. Evans, engineering geologist, Denver, Colorado, "for his key discovery that injection of liquids deep underground can generate earthquakes, and for his subsequent studies ... of the environmental implications."

Charles K. Reed, executive director of the NAS Research Council's Assembly of Mathematical and Physical Sciences, was honored with the National Academy of Sciences Award for Distinguished Service and \$2000 for exceptional achievement as a member of the Research Council professional staff.

Siegbahn wins Chandler Medal for ESCA method

The Charles Frederick Chandler Medal, presented by Columbia University for achievement in pure or applied chemistry, has been awarded to Kai Siegbahn, head of the Institute of Physics at Uppsala University, Sweden.

The award recognized Siegbahn's development of electron spectroscopy for chemical analysis ("ESCA"). The citation states that this method "has proven to be of fundamental importance in the understanding ... of composition, electronic configuration and structure of molecules."

In 1944 Siegbahn earned his doctorate at the University of Stockholm and joined the Nobel Institute of Physics. He has been associated with the University of Uppsala as professor and head of the Institute of Physics since 1954.

The National Academy of Sciences has announced the election of 75 new members in recognition of their achievements in original research. Physicists will be interested to note the following among them: **Robert K. Adair** (Yale University), **Clarence R. Allen** (California Institute of Technology), **John N. Bahcall** (The Institute for Advanced Study, Princeton, N.J.), **Charles P. Bean** (GE Research and Development Center, Schenectady, N.Y.), **Alastair G. W. Cameron** (Harvard University), **Julian D. Cole** (University of California, Los Angeles), **Ernest D. Courant** (Brookhaven National Laboratory), **Ugo Fano** (University of Chicago), **Harold P. Furth** (Princeton University), **Homer D. Hagstrum** (Bell Laboratories), **John R. Huizenga** (University of Rochester), **Jerome Karle** (Naval Research Laboratory), **Joaquin M. Luttinger** (Columbia University), **Kenneth G. McKay** (Bell Laboratories), **Albert W. Overhauser** (Purdue University), **George E. Pake** (Palo Alto Research Center, Xerox Corp), **Walter A. Rosenblith** (Massachusetts Institute of Technology), **John Ross** (Massachusetts Institute of Technology), **Peter P. Sorokin** (IBM Watson Research Center, Yorktown Heights, N.Y.), **Harry Suhl** (University of California, San Diego) and **Richard N. Zare** (Columbia University).

Among the 15 newly elected foreign associates of the Academy are **Ludwig Biermann** (West Germany) of the Max Planck Institute, Munich, **Leo Esaki** (Japan) of the IBM Watson Research Center, **Res Jost** (Switzerland) of the Institute for Theoretical Physics, Eidgenössische Technische Hochschule, Zürich, **M. James Lighthill** (England) of the University of Cambridge and **Seiya Uyeda** (Japan) of the University of Tokyo.

For his inventions leading to the first practical light-emitting diode, **Nick Holonyak, Jr** of the University of Illinois at Urbana-Champaign has received the 1975 John Scott Award. The award, which is presented by the City of Philadelphia, was established 150 years ago by a Scottish chemist to honor "ingenious men and women who make useful inventions."

Gale I. Harris, formerly head of the nuclear-structure physics laboratory and deputy director of the solid-state physics laboratory at the Aerospace Research Laboratories, Wright-Patterson Air Force Base, Ohio, has joined the faculty of the new department of radiology at Michigan State University with a joint appointment in the physics department.

The W. R. G. Baker Prize Award of the Institute of Electrical and Electronics Engineers has been given to **Robert W. Keyes**, research staff member at IBM's Watson Research Center for his paper entitled "Physical Limits in Digital Electronics." Keyes received his PhD in physics from the University of Chicago

(1953) and now specializes in electronics technology.

Cornell University radio astronomer **Frank D. Drake** has been named first recipient of the University's newly created Goldwin Smith Professorship in Astronomy; he will continue as director of the National Astronomy and Ionosphere Center at Cornell.

Basil Venitis has become president of Searchex, a new company of consulting scientists and management consultants that is located in New York City and specializes in theoretical physics, operations research and ocean transportation.

Among the seven recipients of ERDA's Distinguished Service Award are: **Andrew W. Decora** (director, Laramie Energy Research Center), **James S. Kane** (deputy assistant administrator for solar, geothermal and advanced energy systems), **Roger W. A. LeGassie** (assistant administrator for planning and analysis) and **Admiral Hyman G. Rickover** (director, division of Navy reactors, Office of the Assistant Administrator for Nuclear Energy). Distinguished Associate Award winners were **Bruce N. Ames** (University of California-Berkeley), **Frederic H. Coensgen** (Lawrence Livermore Laboratory), **Donald J. Grove** (the Princeton Plasma Physics Laboratory), **William Howard** (Sandia Laboratories, Albuquerque) and **Ronald W. Kiehn** (Reynolds Electrical and Engineering Co, at ERDA's Nevada Test Site).

The Energy Research and Development Administration has announced the appointment of **William H. Hannum** as deputy manager of the agency's Idaho Operations Office, which administers the Idaho National Engineering Laboratory.

The director of Kappa Systems' new resource science institute in Colorado Springs, is **William J. Veigle**, the former president of Resource Science, Inc.

The president of the State University of New York at Stony Brook, **John S. Toll**, has been elected chairman of the Universities Research Association Inc, which operates the Fermi National Accelerator Laboratory.

John T. Ewing, formerly with the Lamont-Doherty Geological Observatory of Columbia University, has been appointed chairman of the department of geology and geophysics at the Woods Hole Oceanographic Institution.

Among the 122 newly elected members of the American Academy of Arts and Sciences are **John N. Bahcall** (Institute for Advanced Study, Princeton, N.J.), **Herbert S. Bridge** (Massachusetts Institute of Technology), **Bruno Coppi** (MIT), **Ugo Fano** (University of Chicago), **Owen J. Gingerich**

(Harvard University), **Theodore D. Holstein** (University of California, Los Angeles), **Kerson Huang** (MIT), **John W. Hutchinson** (Harvard University), **Kenneth I. Kellermann** (National Radio Astronomy Laboratory), **Benjamin Lee** (University of Chicago), **C. Kumar N. Patel** (Bell Laboratories), **Henry Primakoff** (University of Pennsylvania) and **Richard N. Zare** (Columbia University).

Pierre-Gilles de Gennes (University of Paris, Orsay, France) was among the 22 new foreign honorary members.

Anthony J. Armini has been elected vice-president of Simulation Physics Inc, a Burlington, Massachusetts-based research and development firm and manufacturer of solar cells, pulse power systems and aerospace instrumentation.

Norman D. Coggeshall, formerly vice-president, exploration and production, Gulf Science and Technology Co, has been appointed to the newly created position of vice-president, technology-government coordination for GS&T.

The new chairman of Cornell University's department of astronomy is **Kenneth I. Greisen**. Greisen, professor of physics with interests in high-energy particles and gamma rays of cosmic origin, began his three-year term 1 July.

Raymond Kaufman has been elected president and chief-executive officer of Del Electronics Corp; he served as vice-president, secretary and director of Del Electronics for 21 years.

with the experimentalists, interpreting results and proposing experiments. The molecules that intrigued him most were those with physical constants in just the right range to exhibit particular phenomena most clearly: carbon dioxide with its Fermi resonances, water vapor with the full complexity of an asymmetric rotator, ammonia with an inversion frequency accessible to measurement and methyl alcohol with all the features of rotational tunneling. His work on methyl alcohol, which began in the 1930's and resulted in the first spectroscopic determination of an internal-rotation barrier in molecules, continued to the end of his life.

The onset of World War II caused Dennison to turn his energy toward problems that were far from molecular structures. His contributions included work on the radio proximity fuse, for which he was cited by the US Navy for exceptional service.

Following the war, Dennison returned to his favorite subject, molecular structure, but worked also on the design of the race-track synchrotron that was built at Michigan. With the late Theodore H. Berlin, he worked out the theory of the stability of orbits in a synchrotron with straight sections, a feature that became standard in all large synchrotrons.

Throughout his long career at Michigan, Dennison gave inspiration and warm understanding to all who knew him and worked with him, or attended his beautiful lectures. His place in our lives will not be filled.

H. RICHARD CRANE

KARL T. HECHT

The University of Michigan

obituaries

David M. Dennison

David M. Dennison, theoretical physicist in the field of molecular structure, died 3 April at the age of 75. After receiving his doctorate from the University of Michigan in 1924, Dennison spent three years in Europe with groups of young physicists who were assembled around Niels Bohr, Erwin Schrödinger and other pioneers of quantum mechanics. In 1927, he accepted a faculty appointment at the University of Michigan, where he remained until his retirement in 1971; he served as chairman of the physics department from 1955 to 1965, and in 1966 he was appointed the Harrison M. Randall University Professor.

Dennison made his mark in molecular structure in 1927, in a way that had repercussions in atomic and nuclear physics as well. At that time, the specific heat of hydrogen was a great puzzle because measurements were in striking disagreement with calculations. Following the discovery of the spin of the electron, there had been hope that the problem would be solved if a spin were assigned to the proton. But such attempts had failed. Dennison solved the problem beautifully by adding one new postulate to that of a spin for the proton: that the ortho and para states of the molecule were very long lived and transitions did not occur appreciably in the time during which measurements were made. The agreement between theory and experiment then became quite exact, provided the spin of the proton was taken to be $\frac{1}{2}h$ —this was the first solid, quantitative evidence for the spin of the proton.

In 1932 Dennison, with George E. Uhlenbeck, solved the two-minima problem for the position of the nitrogen atom in the ammonia molecule, the configuration sometimes called the "reversing umbrella." This work predicted an absorption



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level at a very long wavelength (about 1.6 cm), and Dennison recognized that this might be observable by means of microwaves from a magnetron. He inspired a colleague in the department, Neil Williams, and a graduate student, Claud E. Cleeton, to attempt the experiment. They succeeded by making magnetrons that were almost microscopic and a spectrograph consisting of parabolic reflectors and a venetian-blind grating, with a large bag of ammonia in the radiation path. This experiment was ahead of its time—it anticipated by a decade or more the post-war burst of interest in microwave molecular spectroscopy.

Throughout the 1920's and 30's the physics department at Michigan was an active center for infrared spectroscopy, under Harrison M. Randall. During most of this period Dennison worked closely

George V. McCauley

George V. McCauley, a Corning Glass Works physicist who designed and supervised casting of the 200-inch mirror for the Mt Palomar Observatory telescope, died 19 April at the age of 93.

McCauley was born in 1882 in Missouri and in 1908, entered the University of Wisconsin where he earned a master's degree in 1909 and a doctorate in 1911. He then taught at Northeastern University for five years and served a year of wartime duty with the National Bureau of Standards before joining Corning in 1918 as a physicist in the research and development division.

His early work at Corning included viscosity studies and the formulation of improved annealing schedules for various glasses—this latter interest led to McCauley's involvement in the production of large optical flats and mirrors.

In 1931 when Corning was approached with a request for a 200-inch telescope disc, McCauley's group undertook the project to cast what was then the largest piece of glass ever made. The first at-