(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.

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 $\frac{1}{2}\hbar$—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 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

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-

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tempt failed because the furnace melted pieces of the mold; however, a second casting in 1934 was successful. The 20-ton mirror blank was then shipped to California where, after several years of grinding and the interruption of World War II, the telescope was finally inaugurated in 1948.

McCauley retired from Corning the same year, but was called back in 1959 to supervise the production of an 84-inch disc for the Kitt Peak Observatory in Tucson, Arizona.

Joseph H. Howey

Joseph H. Howey, professor and director emeritus of the Georgia Institute of Technology school of physics, died 23 March in Tampa, Florida.

Born 1 September 1901 in Wayne County, Ohio, Howey received his BA from the College of Wooster in 1923 and his PhD from Yale University in 1930. He served as a physicist in the research laboratory of the Firestone Tire and Rubber Corp, 1929–31, before returning to Yale as an instructor—a position he held until 1934 when he joined the faculty at Georgia Tech as professor of physics. His research interests included magnetic thin films and crystal growth. He was director of the school from 1935 to 1963, at which time he requested to be appointed associate director so he could devote more time to the design and construction of the new physics building. Aside from a brief absence spent working at the Massachusetts Institute of Technology Radiation Laboratory in 1945, Howey devoted the remainder of his professional life to the development of the school of physics at Georgia Tech. He continued teaching until his retirement in 1969.

For 28 years Howey remained at the helm of the school of physics. Under his leadership a graduate program was initiated, and the undergraduate program grew in stature to become one of the larger departments in the US.

He was a conscientious and exemplary classroom teacher. As an innovator of lecture demonstrations and a major contributor to undergraduate laboratories, he made significant changes in the teaching of physics. Upon his arrival at Georgia Tech, Howey began writing a set of laboratory instructions that was published in collaboration with E. T. Prosser in 1946. Under continued revision, this manual served the sophomore physics laboratories for 20 years.

He was an active participant in professional societies and served as both vice-chairman and chairman of the Southeastern Section of the American Physical Society. □