induced fluorescence for detection of impurity atoms in neutral beams and on a novel technique for producing high-intensity hydrogen and deuterium beams with a high degree of nuclear polarization.

Burrell participated in a wide range of projects in our group, and made significant contributions to such diverse activities as the development of a high-current source of negative helium ions and a model that derives the properties of positive ion sources from basic atomic physics. He also actively participated in outdoor activities—he particularly enjoyed sailing, bicycling, hiking and cross-country skiing.

WILLIAM S. COOPER
ROBERT V. PYLE
WULF B. KUNKEL
ALFRED S. SCHLACHTER
Lawrence Berkeley Laboratory

Forrest F. Cleveland

Forrest Fenton Cleveland, professor emeritus of the Illinois Institute of Technology in Chicago, died 5 February 1985, at the age of 79. He was born on 10 January 1906 and received his MS and PhD from the University of Kentucky, where he also began his career as an instructor in physics. After serving as professor and head of the physics department at Lynchburg College for four years, he joined the faculty of IIT in 1939 as an associate professor, becoming a full professor in 1943 and remaining there until his retirement in 1971.

Molecular spectroscopy was a central theme in Cleveland's career as a physicist: Throughout his life he contributed actively in every possible and significant way to the field. He founded the spectroscopy laboratory at IIT and, as director, guided research in molecular spectroscopy, in Raman and infrared spectroscopy of polyatomic molecules, and in the theory of vibrational spectra. Most notable among his achievements is a series of articles he wrote with Arnold Meister in 1943 and 1946 on the normal-coordinate analyses of molecular vibrations using Bright Wilson's FG-matrix method.

In addition to his research interests, Cleveland was a strong advocate of the use of a common language among all scientists; he used the language "interlingua" in his publication *Spectroscopia Molecular*. He was a conscientious and dedicated teacher.

S. SUNDARAM
University of South Florida

James N. McGruer

James N. McGruer of the University of Pittsburgh died on 4 December 1984.

He was born on 16 October 1921 in Madison, Wisconsin, and earned his PhD in 1952 from the University of Wisconsin. His doctoral thesis, which made an early attempt to quantify the nuclear force and to test the charge independence, significantly advanced the precision study of proton–proton scattering.

McGruer became a member of the physics faculty at the University of Pittsburgh in 1952. There he codesigned the precision analyzing system used in the early direct nuclear-reaction experiments with the 15-MeV cyclotron. He then supervised the construction of the present Nuclear Physics Laboratory and the installation there of the three-stage tandem Van de Graaff accelerator. Subsequently he guided the operation of the accelerator through its most productive years. McGruer was a major participant in the high-energy accelerator design project in Wisconsin for the Midwest Universities Research Association. He contributed greatly to the application of dual ion beams to study radiation damage in structural materials for fusion reactors. At the time of his death he was deeply involved in the construction of an ultra-high-vacuum channeling facility to be used for surface studies.

Cheerfully irreverent in style, McGruer was noted for his encyclopedic knowledge and his many skills, both in physics and in an astonishing variety of more personal activities: amateur astronomy, musical-instrument construction and horticulture. Everyone who knew McGruer benefited from him as a friendly and courteous source of information or advice.

B. L. COHEN
N. AUSTERN
W. J. CHOYKE
University of Pittsburgh

Wolfgang K. H. Schuebel

Wolfgang K. H. Schuebel, research physicist at the Air Force Avionics Laboratory, Wright-Patterson Air Force Base, Ohio, and a pioneer in hollow-cathode discharge lasers, died on 9 March 1985.

Born in Jena, Thuringia, Germany, on 1 September 1931, Schuebel received his diploma in physics (1958) and his PhD (1963) at the Technische Hochschule in Munich for studies on mass spectroscopy under P. W. Ewald. He emigrated to the US and joined the Avionics Laboratory laser group of W. C. Eppers in 1965, where he was a colleague of Gustav Medicus.

Schuebel's studies focused primarily on the development of long-life, compact, visible- and near-infrared lasers.