

trum. Van Valkenburg proposed using the cell under a microscope for visual observations at extreme high pressures, as well as using a stainless steel gasket and filling the chamber to place the sample under hydrostatic stress. The group's first apparatus achieved 30 000 atmospheres in a chamber about half a millimeter across; more recent devices have maintained pressures of more than 5 megabars for several weeks.

David E. Carlson (Solarex, Newton, Pennsylvania) received the Walton Clark Medal for his contributions to the use of hydrogenated amorphous silicon for solar energy conversion. Carlson received his BS from Rensselaer Polytechnic Institute (Troy, New York) in

1963, and his PhD in physics from Rutgers University (New Brunswick, New Jersey) in 1968. He was a physicist at the US Army Nuclear Effects Laboratory in the Edgewood Arsenal (Maryland) from 1968 to 1969. In 1970 he joined the technical staff of RCA Labs, where he studied ion motion in glasses and insulators, glow-discharge film deposition and thin-film photovoltaic devices. He invented the amorphous silicon solar cell in 1974, and has since worked on improving its efficiency. Carlson became head of RCA's photovoltaic device research group in 1977. In 1983 he became deputy manager and director of research of the thin film division at Solarex, and in 1986 he became general manager.

the APS finances had been a one-man operation. Burton developed a simple and easily understandable administrative system that was well suited to APS needs and which has proved very effective over the years. His record of accomplishments in nurturing and safeguarding the assets of the society is exemplary: The assets grew by a factor of 20 during the 15 years he was APS treasurer, while members' dues increased only modestly. In addition, Burton organized and managed several of the APS service programs, including industrial internships, the STEP travel grant for students, the minorities program, programs in physics education such as the Apker Award for excellence in undergraduate physics, and the program for improving the status of women in physics. He retired from APS in 1985.

Burton was a member of the governing board of the American Institute of Physics from 1969 to 1984, and a member of its executive committee from 1970 to 1975 and from 1977 to 1984.

WALTER L. BROWN
AT&T Bell Laboratories
Murray Hill, New Jersey

WILLIAM W. HAVENS JR
The American Physical Society
New York, New York

obituaries

Joseph A. Burton

Joseph A. Burton, retired director of physics research at AT&T Bell Laboratories and treasurer emeritus of The American Physical Society, died at his home in Chatham, New Jersey, on 31 August 1986, at the age of 72. Burton obtained his undergraduate education at Washington and Lee University, graduating with a bachelor's degree in chemistry in 1934. He obtained his PhD in chemistry in 1938 from The Johns Hopkins University. He joined the research staff at Bell Telephone Labs in August of that same year.

Burton's early scientific research at Bell Labs was with low-work-function CsSb photocathode materials and with luminescent phosphors, both of which were important in the rapidly developing field of color television. He subsequently worked with thermionic emitters for vacuum tube cathodes. Following the invention of the transistor at Bell Labs in 1947, Burton became deeply involved in the growth of semiconductor single crystals. He led a study of thermally driven convective mass transport in growth from the melt. He also made critical contributions to understanding the incorporation of impurity atoms during crystal growth, including both dopant impurities and unwanted fast diffusing "deathnium" impurities such as copper. These issues were critical in the early stages of development of semiconductor technology. In 1954 he became head of the semiconductor physics research department and in 1958, director of the chemical physics research laboratory, a position he held until 1971. During this period he not only encouraged research in semiconductor materials but also stimulated and pro-



BURTON

moted new research efforts in nuclear physics, biophysics and space physics as new scientific opportunities in these fields arose. In 1971, Burton became director of the physics research laboratory and continued to contribute his vision and support in the development of the scientific stature of the individual scientists in his organization. With a keen appreciation for new ideas and their connections to other parts of science and technology, Burton helped researchers at Bell Labs to interact with the world scientific and engineering communities in an extremely broad and effective way. He retired from Bell Labs in 1976.

Burton became treasurer of The American Physical Society in 1970, volunteering his services while still a research director at Bell Labs. When he retired from Bell Labs he accepted a full-time post as treasurer of APS. Before Burton became its treasurer,

Frank N. Edmonds Jr

Frank N. Edmonds Jr, professor emeritus of astronomy at the University of Texas in Austin, died at his home on 3 September, one day after he turned 67.

Edmonds was born on 2 September 1919 in Minneapolis, Minnesota. He received his undergraduate education from Princeton University, graduating in 1941 with a bachelor's degree in physics. World War II prevented his acceptance of a scholarship to attend graduate school in Toronto. Having completed ROTC he entered military service as a lieutenant in the Signal Corps of the Army Air Force (later the US Air Force), serving for five years, in both the European and Pacific theaters.

He resumed his studies in 1946 at the University of Chicago, where he received his graduate training in astronomy and astrophysics under two of the leading astrophysicists of the century: Otto Struve, the founder of McDonald Observatory, and Subrahmanyan Chandrasekhar. His PhD dissertation topic, "Two problems in radiative transfer theory" (1950), led to a series of papers on Compton scattering in stellar atmospheres and planetary nebulae, published in the *Astrophysical Journal* between 1950 and 1954.

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After two years as an assistant professor of astronomy (1950–52) at the University of Missouri, Columbia, he moved to the University of Texas at Austin, where he was assistant professor of mathematics and astronomy until 1958. In 1958–59 he transferred to the newly formed, separate astronomy department (initially a joint Texas-Chicago enterprise under the chairmanship of the late Gerard P. Kuiper) as an associate professor. He served as associate chairman in 1959–61 and as associate director of McDonald Observatory in 1960–62. Edmonds was promoted to professor in 1965, a position he held until his deteriorating health forced him to take a premature retirement in 1984. For more than 20 years he also served quietly and efficiently as graduate adviser and as chairman of the graduate studies committee, both positions of great import in the rapidly growing Texas graduate program. In recognition of his merits and his services to the department and to the observatory, the regents of the University of Texas created in 1984 the Frank N. Edmonds Jr Regents Professorship in Astronomy, which was endowed by matching a \$100 000 pledge from Samuel T. and Fern Yanagisawa.

For many years Edmonds did much of the teaching of the basic astrophysics courses in our department, offering introductory and advanced courses in astronomical physics and in astrophysics, particularly of stellar atmospheres. Apart from his teaching he leaves a solid record of scientific research in the areas of model stellar atmospheres, high dispersion stellar spectroscopy, statistical analysis of solar photospheric inhomogeneities, the theory of line broadening, radiative transfer, line blanketing and hydromagnetic stability. Perhaps his most important contributions are his series of papers in the *Astrophysical Journal* and in *Solar Physics* on solar granulation and his exhaustive quantitative analysis of the spectrum of Procyon, subjects to which he devoted the majority of some 50 papers published between 1954 and 1983.

Frank Edmonds was a member of three commissions of the International Astronomical Union: Commission 12 on radiation and structure of the solar atmosphere, Commission 29 on stellar spectroscopy and Commission 36 on the theory of stellar atmospheres. He will be remembered by his students and colleagues for his imperturbable equanimity, his careful and impartial examination of both sides of an argument or proposal, and his patience, gentleness and perfect civility.

GERARD DE VAUCOLEURS
The University of Texas at Austin □