PATEL

cal engineering from Stanford University. He then joined the technical staff at Bell Labs.

His research interests have included work with many aspects of lasers and laser action as well as investigations of nonlinear optics, work on high-resolution spectroscopy and the development of techniques for detecting pollution in the atmosphere and stratosphere. Recently Patel has been exploring weakly absorbing condensed materials to characterize quantitatively their spectral properties using a pulsed laser and an acousto-optic detector based on a piezoelectric transducer.

obituaries

Robert S. Shankland

Robert S. Shankland, Ambrose Swasey Professor of Physics at Case Western Reserve University for more than 40 years, died 5 March 1982 at the age of 74. Following his retirement in 1976, he continued to engage in his scientific and other interests, in particular, in his contributions to the best in architectural acoustical design through his consulting activities.

Born in Willoughby, Ohio, in 1908, Shankland studied under Dayton C. Miller, at Case School of Applied Science, where he received his BS, and Arthur C. Compton at Chicago, under whom he earned his PhD. He returned to Case to become head of the physics department on Miller's death in 1940 and continued his affiliation with Case to the end of his life.

During World War II he headed the Underwater Sound Reference Laboratory at Columbia University, charged with calibration and testing of underwater sound equipment, served as chairman of the US Navy Underwater Measurements Committee, and in 1943 was a scientific representative to the United Kingdom.

SHANKLAND

His scientific career, spanning many interests, centered on architectural acoustics, nuclear and reactor physics, and the history of physics. He published extensively on acoustics and served as consultant for innumerable churches, concert and lecture halls, and other structures with large rooms. He promoted recognition of the concept that sound diffusion is as important for concert hall acoustics as are balanced reverberation and the absence of echoes. As a result of his close association with George Szell during the latter's directorship of the Cleveland Symphony, he stressed the importance of design elements in the stages of performance halls to improve the ability of members of musical ensembles to hear each other clearly and thereby to play together better. His exceptional expertise benefited not only from his own fine musical taste and Szell's knowledge and observations, but also from his extensive studies of the acoustics of performance halls from Greek theaters, through churches and cathedrals of every age, to modern concert halls.

Following World War II he was a frequent summer collaborator at the Lawrence Radiation Laboratory in Berkeley. He participated in early experiments with the first synchrocyclotron, including the first experiment to yield information on the p-wave proton–proton interaction. Later he was a consultant for many years and the first acting technical director of the materials testing reactor at Idaho Falls.

On five occasions in the mid-fifties he conducted personal scientific interviews with Albert Einstein in which Einstein provided new current and retrospective views of his work on relativity and on the origins of his ideas. Published, these became an important primary source in the history of this significant chapter in modern physics. Shankland was also author of a textbook, *Atomic and Nuclear Physics*, contributed many articles to encyclopedias and scientific journals, and served as an associate editor of both the *American Journal of Physics* and of the *Journal of Scientific Instruments*. He was also president of Associated Midwest Universities and a member of both the physical sciences division of the National Research Council and of the Governing Board of the American Institute of Physics. Always avoiding the limelight, he was an outstanding scientific statesman of his generation, particularly of the period in which the US assumed world leadership in physics.

LESLIE L. FOLDY
Case Western Reserve University

Ralph A. Goodwin

Ralph A. Goodwin professor of physics at the United States Naval Academy, Annapolis, Maryland, died 3 May 1982 at the age of 69.

Born in Chariton, Iowa, he earned an AB at Simpson College in 1935 and PhD at Iowa State University in 1939. He was an instructor in physics at North Dakota State in 1939–40 and an assistant professor at Kansas State, Fort Hays, in 1940–41.

In 1941 he joined the civilian faculty of the US Naval Academy, where he remained until his death. He was chairman of the physics department 1950–59 and 1974–78. In 1944 he was co-author of *Physics*, USNA Edition.

Through the years, Goodwin maintained an interest in experimentation, especially in optics, but his natural curiosity often led him into other fields, such as the mechanism of regulation. In the summers of 1971–73, he was a member of the staff for an NSF-sponsored *Short Course in Lecture Demonstrations for College Teachers*, held at the Naval Academy.

E. R. PINKSTON
J. R. SMITHSON
United States Naval Academy

Julius Ashkin

Julius Ashkin, professor of physics at Carnegie-Mellon University, died 4 June 1982, after a lengthy illness. As a theoretical physicist, he made significant contributions to statistical mechanics, nuclear physics, and elementary-particle physics. As an experimental particle physicist, he was a leader in two of the most crucial experi-