at the disposal of the student or colleague with whom he was engaged at the moment. This generosity earned him their admiration and devotion. He was an alchemist as well as a physicist, who could transmute leaden questions into golden inquiries with the comprehensiveness and insight of his answers.

He was a member of the National Academy of Sciences, as is his wife, the distinguished biochemist, Mildred Cohen. Together they created an intellectual environment that provided great support to them and to others in their scientific careers.

RALPH D. AMADO
ALFRED K. MANN
University of Pennsylvania

Bart J. Bok

Bart J. Bok, professor emeritus of astronomy at the University of Arizona, died 5 August 1983, at the age of 77.

Bok was born in Hoorn, Holland, in 1906 and was educated at the universities of Leiden and Groningen. In 1929 he went to Harvard University, where he served on the faculty for 28 years, becoming the Robert Wheeler Wilson professor of astronomy in 1945. He resigned that position in 1957 to become director of the Mt. Stromlo Observatory and professor of astronomy at the Australian National University in Canberra. In 1966 he returned to the US and was appointed director of Steward Observatory and professor of astronomy at the University of Arizona; he became professor emeritus in 1974.

Bok's primary research interest was the structure of our galaxy. From 1930 to 1950, he and his colleagues and students used star counts and statistical analyses to investigate the distribution of stars in the galaxy. His 1937 book, *The Distribution of the Stars in Space*, was the definitive work of the time on that subject. In particular, it described the problems inherent in the star-counting approach and forecast many of the developments that were to follow. Bok's interest in the galaxy was shared by his wife, Priscilla, who was also an astronomer. Together they wrote the book *The Milky Way*, which, now in its fifth edition, has entertained and educated countless students, amateurs and professionals.

When Harold Ewen and Edward Purcell first detected the 21-cm line of neutral hydrogen at Harvard in 1951, Bok was quick to recognize and exploit its potential as a tool for galactic research. He initiated a radioastronomy program at Harvard Observatory, built a 24-ft, and then a 60-ft, radio telescope at the observatory's Agassiz station and led the research program until his departure for Australia in 1957. He directed the effort to collect an extensive body of data on the distribution of hydrogen in the interstellar medium and on the relationship of hydrogen to other constituents of the galaxy. He also played a leading role then in the establishment of the National Radio Astronomy Observatory.

The star-counting efforts of the 1930s and 1940s were severely hampered by the effects of interstellar absorption. Dark nebulae, which harbor dense masses of interstellar dust and cause the absorption of starlight, became another target of Bok's research interests. He was the first to call attention, with Margaret Risley in 1947, to the existence of small, dark clouds, now often called Bok globules, which contain very high densities of dust. He pointed out their probable importance to studies of stellar evolution and went on to elucidate, in a series of studies, many of their major properties.

The southern Milky Way, that is, the portion of the galaxy that is best observed from the southern hemisphere, had a special attraction to Bok throughout his life. He was especially interested in the Carina region of the galaxy and made many important contributions to our understanding of its structure and physical properties. He was also a strong and effective advocate of the need for better observing facilities in the southern hemisphere. This advocacy culminated, during his tenure at the Australia National University, in the establishment of the Siding Spring Observatory, now the major observatory south of the equator.

Besides being a prolific research astronomer, effective administrator, and midwife for the birth of several observatories and telescopes, Bok was also noted as a teacher and as a popularizer of astronomy. As a teacher, in particular, his energy, enthusiasm, and ability to stimulate others were legendary.

DAVID S. HEESCHEN
National Radio Astronomy Observatory

Tracy S. Kinsel

Tracy S. Kinsel, an applied physicist with Bell Laboratories, died on 21 March 1983 at the age of 52.

Kinsel was born in Waterloo, Iowa, and received BS and MS degrees from the University of Chicago and a PhD from Rutgers in 1963, all degrees in physics. He started his professional career at RCA Semiconductor Division at Somerville, NJ, where he was a group leader for silicon and GaAs characterization. His early work included minority carrier lifetime studies and radiant heating anneals of GaAs.

After receiving his PhD, he joined Bell Labs at Murray Hill and worked on acousto-optical devices. He later developed an automatic inspection system (AMIS) for use on photolithographic mask measurements and transferred it to manufacture and widespread laboratory use. He also developed a high data-rate optical transmission system. In 1979, he became a supervisor at Bell Labs in Whippany, NJ.

Kinsel was, at the time of his death, supervisor of the Systems and Controller Group in the Recording System Department. This group was responsible for the architecture of small peripheral tape systems and the design of peripheral controllers. He was an expert in the design of microprocessor-based systems.

Kinsel used materials and media familiar to physicists to create artwork, such as "ELLI," an electronic laser light image display, which was driven by voice or music and was exhibited at the Museum of Modern Art, the Smithsonian and the Brooklyn Museum.

THOMAS E. SEIDEL
Bell Laboratories

Lee A. Fowler

Lee A. Fowler, 32, fell to his death in a rock climbing accident near Lake Placid, New York, on 3 July 1983.

Fowler was graduated in physics from Cornell University in 1973. He completed his doctoral work with Joseph H. Taylor at the University of Massachusetts at Amherst. Fowler collaborated with Taylor and Peter McCulloch of the University of Tasmania on the project to measure the arrival times of pulses from the binary pulsar. This work led to their announcement in 1978 of the measurement of the second- and third-order relativistic effects in the orbit of the binary pulsar PSR 1913 + 16 that yielded self-consistent estimates for the masses of the pulsar and its companion and quantitative confirmation of the existence of gravitational radiation at the level predicted by general relativity.

Fowler continued his work on pulsars at the Max Planck Institute for Radio Astronomy in Bonn from 1979 to 1981. He returned to the US to do solar research with Peter Foukal of Atmospheric and Environmental Research, Inc., in Cambridge, Massachusetts. They conducted photometric studies of patterns of heat flow to the solar photosphere. Lee succeeded in attaining temperature sensitivities an order of magnitude better than had been done previously by photospheric photometry. He continued his pulsar work and had accepted a research associate position at Dartmouth College that was to have begun last summer.

TIMOTHY H. HANKINS
Dartmouth College □