

obituaries

ment and finally at Steward Observatory. During this time he became affiliated with the Universidad Nacional Autonoma de Mexico and was instrumental in establishing the Universidad's Baja Observatory at San Pedro de Martir.

Harold Johnson will be remembered by his many friends as a person who was always willing to help, especially those just starting their careers. He would always give his honest opinion, a trait which offended some but that was sincerely valued by many more. Astronomy has truly lost a person of integrity and a giant in the field. It is fitting, therefore, that the International Astronomical Union's Symposium 96 on Infrared Astronomy is being dedicated to his memory.

ROGER I. THOMPSON
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Richard Brooke Roberts

Richard Brooke Roberts, physicist and biophysicist, died on 4 April 1980 at the age of 69. A native of Titusville, Pennsylvania, he received his bachelor's, master's, and PhD degrees (1937) from Princeton University. Roberts's doctoral thesis described studies of deuterium-deuteron nuclear reactions. He joined the department of terrestrial magnetism of the Carnegie Institution in 1937 to continue work in nuclear physics with Merle Tuve and Lawrence Hofstad. In January 1939 Roberts was one of a small group of Americans who confirmed the existence of uranium fission. Later with Hofstad, he discovered that delayed neutrons are associated with uranium fission, a phenomenon important to the control of power reactors.

During World War II, Roberts was a key figure in the rapid and timely development of the proximity fuze. This weapon was very important in the naval war in the western Pacific as well as in the Battle of the Bulge. Tuve, who was director of the proximity-fuze effort from its inception at the Carnegie Institution and later at the Johns Hopkins Applied Physics Laboratory, has said, "if any one man can be judged as the immediate technical parent of the proximity fuze, that man is Dr. R. B. Roberts. Dr. Roberts personally devised and tested the many circuits and circuit variables from which the final selection was made and he contributed at every point to the planning of technical programs, first for the elimination of difficulties and the achievement of appropriate target patterns, then in the evolution of this pilot activity into an industrial program."

Following World War II, Roberts re-

turned to the department of terrestrial magnetism to resume work in biophysics. Prior to World War II, while engaged in nuclear research, he had also pioneered the use of radioactive tracers, particularly Na^{24} , in the study (with Lewis Flexner) of transfer of Na^{24} through the placenta.

From 1947 to 1963, Roberts was active in molecular biology, particularly in the study of biosynthetic pathways in microorganisms. Using a number of different radioactive tracers, including P^{32} , S^{35} and C^{14} , it was possible to elucidate in considerable detail the processes and synthetic pathways by which cell replication occurs. Around 1963, Roberts turned to neuroscience, conducting successful experiments on mice with drugs that affect memory.

Although he officially retired in 1975, Roberts continued to remain active at the department of terrestrial magnetism. He was broadly interested in all aspects of science and especially those that involved applications of physics. On the morning of 3 April 1980 he talked with astronomers on the staff there about calculations he had made analyzing the density of the universe at the time of the Big Bang. Later that day, he was stricken with a heart attack and died early the next morning.

Roberts served on many advisory committees, including one sponsored by the US Arms Control and Disarmament Agency (1963). With the group, he made notable contributions to methods of detecting hidden nuclear explosions.

Roberts was a former president of the Biophysical Society, and former vice president of the American Association for the Advancement of Science. He was elected to the National Academy of Sciences in 1961.

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Herbert L. Lashinsky

Herbert L. Lashinsky, research professor of the Institute for Physical Science and Technology, University of Maryland, died in Fairfax, Virginia on 14 April 1980. He was 58 years old.

Lashinsky devoted most of his career to experimental and theoretical studies of the nonlinear behavior of oscillations in low-temperature plasmas. At a time when few methods were available from theoretical plasma physics to calculate and describe the nonlinear behavior of collective phenomena, he adopted analytical methods based on the concept of the van der Pol oscillator which had been used to describe mechanical and electrical systems, developed the theory further, and extended its application to the plasma domain.

His approach was, in essence an engineering one, and it proved quite successful.

An early success of this approach was an explanation of the frequency spectra of drift waves in a Q-machine plasma. Lashinsky showed that a mechanism, which he termed "periodic pulling," could cause simultaneous amplitude and frequency modulation of a natural mode of oscillation. The mode would produce an asymmetric sideband frequency spectrum when it was perturbed by a weak signal at nearly the same frequency. The spectrum appears in other areas of physics research as well and has been referred to in the literature as the "Lashinsky Spectrum." In another application of the van der Pol approach, Lashinsky showed that an ensemble of initially synchronized van der Pol oscillators



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can lose their synchronization and result in a spectrum of stochastic solutions. This result constituted a major advance in explaining the transition to turbulence in plasmas.

Born and educated in New York City, he earned his BSc from City College somewhat later than usual, because of a tour of duty in World War II. After several years as an industrial electronics engineer, he received his PhD in physics (1961) from Columbia University where he worked on the Cerenkov effect at microwave frequencies in the Columbia Radiation Laboratory. He then joined the Princeton University plasma group for three years. In 1964, Lashinsky came to the University of Maryland where he carried out research in plasma physics and nonlinear oscillations.

At Columbia and for many years after, he was sought out by book publishers, and particularly by the American Institute of Physics, to help with the translation of the emerging Rus-