

single nucleon. Subsequently she held research positions at several institutions, including the universities of Illinois, Rochester and Colorado, where her husband, physicist George Salzman, was a member of the faculty. During this period, she and her husband studied single-particle exchange models for inelastic interactions at high energies. Her extension of this work to multiperipheral models was influential in early treatments of multiparticle production reactions. Boldly and successfully applying these models in kinematic regions in which the underlying approximations were difficult to justify, she nevertheless obtained significant results concerning the range of interactions at high energies. Later work by others on absorptive single-particle exchange models and Reggeized multiperipheral models was a logical extension of these early ideas. The Salzmanns also made contributions to the theory of electromagnetic interactions of vector bosons during this period.

In 1965, the Salzmanns both accepted positions at the newly opened Boston Campus of the University of Massachusetts. Here they were charged with the responsibility of establishing teaching and research programs in physics from scratch. Although her husband was appointed with tenure, Freda Salzman's appointment was only three-quarter time, in order to avoid a possible conflict between AAUP guidelines on tenure and the University of Massachusetts' policy on nepotism then in effect. Around this time, the Salzmanns also presented a theory of time-reversal violation via electric dipole interactions.

In 1967, the Chancellor stated that a committee of the Board of Trustees reaffirmed as University of Massachusetts policy that husband and wife could not hold contemporaneous appointments in the same department, except under extraordinary circumstances. Subsequently the administration terminated Freda's appointment and the appointments of other wives of faculty. This action, condemned by many faculty and women scientists nationwide, led to a protracted but successful struggle by the Salzmanns and the department to have Freda Salzman reinstated. The case was influential in the abolition of the nepotism policy at the university; she was reappointed to the faculty in April 1972. Despite these difficulties, which were an evident strain on her health and emotional energy, Salzman initiated research in general relativity on the dynamical content of the Schwarzschild metric. Together with previous work, it confirmed her reputation as a highly creative and versatile theoretical physicist.

Partly as a result of her difficulties as a woman scientist, Salzman became deeply involved with feminist issues and with the social consequences of scientific and technological policy. She also sought to be a model for other women engaging in scientific careers.

DONALD M. LYONS
*University of Massachusetts
Boston*

Bernard Weinstock

Bernard Weinstock died unexpectedly of a heart attack on 12 September 1981, at the age of 63. He was born in New York City, received an AB degree from Brooklyn College in 1938, and entered into graduate studies in physical chemistry at Columbia University in 1939. A student of Harold Urey, he soon became involved in isotope separation and was one of the pioneers of the



WEINSTOCK

atomic energy program at Columbia.

In 1945 he went with Urey to the University of Chicago, where he received his PhD in 1948.

He was employed by SAM Laboratories at Columbia University from 1941 to 1943 and at Los Alamos from 1943 to 1945. He was a senior scientist at the Argonne National Laboratory from 1947 to 1960, when he joined the Ford Motor Company Scientific Laboratory; he was manager of the chemistry department of the Ford engineering and research staff when he died.

His research, which covered a wide range of activities, began with his graduate studies on isotope separation of deuterium and uranium. During a good portion of his career at Argonne he studied the properties of liquid helium-3. His investigations of uranium and plutonium hexafluorides began at Los Alamos and extended to hexafluoride chemistry of other metals as well. He played a significant role in early studies of xenon fluoride chemistry.

After joining the Ford Scientific La-

boratory, he initiated a program in gas phase kinetics together with H. Niki. This led him to considerations of environmental atmospheric chemistry, a subject which occupied the bulk of his attention in the last decade of his life.

A fellow of the American Physical Society and a member of the Executive Committee of the APS Division of Chemical Physics from 1963 to 1965, Weinstock was also a United States Delegate to the Second International Conference on Peaceful Uses of Atomic Energy in Geneva in 1958. In addition he served on numerous scientific editorial advisory boards.

ROBERT ULLMAN
*Ford Motor Company
Engineering and Research Staff*

Marvin M. D. Williams

Marvin M. D. Williams died on 3 August 1981 at the age of 78 in Rochester, Minnesota, after a brief illness. His distinguished career was devoted almost entirely to medical physics. His initiation into this field, in 1927, occurred when perhaps no more than a handful of physicists in the US were applying themselves to medical matters. Williams helped make medical physics the flourishing field—of 1300 practitioners—it is today and helped convince physicians of the value and importance of his discipline, especially in its application to radiology. As a member of the staff of the Mayo Clinic, Williams provided superb physics support to his colleagues and instructed several hundred residents in the Mayo radiology training program over the many years of his tenure. The skill and excellent organization of his teaching were widely recognized. Even after his retirement, he was much in demand as a visiting professor at medical schools throughout the country, most of which had physics faculty members.

In his many years as a Guest Examiner in Physics for the American Board of Radiology he exerted considerable influence on the training of medical physicists as the result of a unique situation in which the American Board of Radiology provides examination and certification not only of radiologists (who are, of course, physicians) but also of physicists. As a member of the Physics Credentials and the Examination committees, he participated in setting standards of education, training and experience for applicants to the certification process.

Williams began his physics education at Whitman College, in Walla Walla, Washington, where he received a BS in 1925. He earned an MS in physiology from the University of Pennsylvania in 1929 and, in 1931, a

PhD in biophysics at the Mayo Graduate School of the University of Minnesota. The mentor for his doctoral studies was Charles Sheard, who started the department at the Mayo Clinic in 1923. Upon receiving his doctorate, Williams left for China with his wife Orpha, who had been librarian at Mayo Clinic and later editor of Williams' books and articles. There Marvin Williams served as radiation physicist and assistant professor at the Peking Union Medical College from 1931 to 1935. On his return to the US he began his long association with the Mayo Clinic as a staff member, which continued until his retirement in 1967. He was appointed professor of biophysics of the Mayo Graduate School of the University of Minnesota in 1950.

Williams participated energetically and effectively in scientific and professional societies. A charter member of the American Association of Physicists



WILLIAMS

in Medicine, he served as its president in 1963. He rose to the rank of second vice-president of the Radiological Society of North America, the highest office held up to that time by a nonradiologist. He also served on the National Council of Radiation Protection and Measurements from 1966 to 1973.

In 1980 Williams was asked to visit the People's Republic of China as a representative of the US medical physics community and of the AAPM in particular. He was escorted by one of his former students, who is now a high-ranking official in the Chinese medical establishment. The trip was a great success in establishing relations with the Chinese medical physics community. As a sequel to this visit, Marvin and Orpha Williams established, with their own resources, a scholarship fund to enable Chinese medical physics students to study in the US. Known as the Marvin M. D. Williams Scholarship Fund, it will be administered by the AAPM. The first two students have

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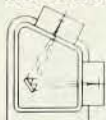
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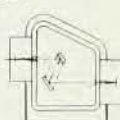
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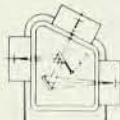
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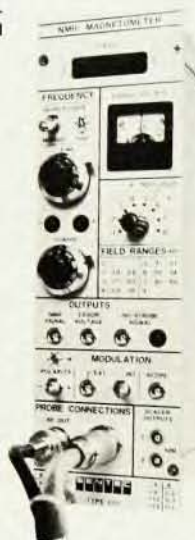
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been selected, and they are expected to start their visits in the near future. This fund is a most fitting memorial to Williams.

ARNOLD FELDMAN
Peoria, Illinois

Liviu Bighel



Liviu (Lee) Bighel died on 30 August 1981 in Knoxville, Tennessee, at the age of 34. He was born in Bucharest, Rumania; at the age of 14 he emigrated with his parents to Australia. He attended the University of Sydney, where he received his PhD in 1974.

Lee wrote his dissertation on and spent his career working in plasma physics. He spent three years at the Center for Plasma Physics Research at Lausanne, Switzerland, where he performed experiments on the Lausanne belt pinch device. In 1977, he returned to the University of Sydney to work on the Tortus tokamak experiment. In 1979, he moved to Oak Ridge, Tennessee, to carry out experiments on the EBT device at the national laboratory. At the time of his death, he was in charge of diagnostics for the EBT-P device and was also deeply involved in the analysis and interpretation of experimental results from EBT-S.

LEE A. BERRY
DAVID W. SWAIN
JOHN C. GLOWIENKA

Oak Ridge National Laboratory

E. D. Shipley

Elwood Dwayn Shipley, the first director of the Thermonuclear Experimental Division at Oak Ridge National Laboratory, died 2 October at the age of 74.

Shipley received BS, MS and PhD degrees from the Ohio State University, taught there for several years and then became professor, co-founder (with J. G. Tarboux) and head of the electrical engineering department at the University of Tennessee, Knoxville,

beginning in 1936. In 1944 he joined the Manhattan Project at the Y-12 Electromagnetic Plant, operated then by the Tennessee Eastman Company, while he continued at the University of Tennessee (until 1955). He became Director of Research and Development at the Y-12 plant in 1949 and later was an Assistant Laboratory Director at Oak Ridge.

In 1957, after having delivered inspiring lectures for several years to all who could attend the classified Sherwood Project seminars and discussions on controlled thermonuclear research, he became the first director of the ORNL Thermonuclear Experimental Division, now the Fusion Energy Division. There he helped develop the principal direct current experiments (DCX-1 and DCX-2).

He was the driving force behind the ORNL fusion exhibit at the Second Atoms for Peace Conference at Geneva, Switzerland, in 1958. This exhibit consisted of two working models depicting the principles of the dc experiment (DCX-1) then in vogue, with energetic molecular hydrogen ions passing through a long carbon arc where dissociation resulted in the trapping of a



SHIPLEY

ring of energetic protons in a magnetic mirror field. Soviet visitors who were permitted to operate the controls of the exhibit worried the Oak Ridge operations crew by pushing the beam current from the ion source to the limit.

Shipley later became a member of the senior research staff at ORNL and retired from the Union Carbide Nuclear Division in 1972. He then served as UCND consultant for several years, working in the Stable Isotope Separation Program to resolve questions on quality, efficiency and stability of the ion beams used in electromagnetic isotope separators, called "calutrons." He was interested in ion beams of all types, including cyclotron beams, DCX beams, the Geneva exhibit beams and calutron beams. He also applied his