

obituaries

recall of scientific facts continually amazed his associates. He represented somewhat of an enigma in a government office with his often-expressed disdain for bureaucracy and unwillingness to "play the game." Although he often presented a gruff exterior, those who knew him found underneath a soft heart with a true caring for the individual, especially the underprivileged.

Ruark will be remembered by most of his associates for his significant contributions to physics and fusion power. For me, however, the picture that appears in my mind is of a small, wiry man who possessed a mystical wisdom about life and death—a man who couldn't help but remind you of Mahatma Gandhi as he sat yoga style on the top of a small safe in the division director's office during staff meetings at the AEC—a true individual who believed that each person should seek his own path in life.

WILLIAM C. GOUGH
*US Department of Energy
San Francisco, California*

Raymond Bowers

Raymond Bowers, professor of physics for nearly 20 years at Cornell University, died 29 April. Born in England, he gained his BSc at London University in 1948 and his doctorate in physics at the Clarendon Laboratory, Oxford, in 1951. After two years of postdoctoral study at the University of Chicago, he joined the Westinghouse Electric Corporation in 1953 and was a research physicist there for seven years. In 1960 he came to Cornell, as a member of the department of physics and of the Laboratory of Atomic and Solid State Physics.

Bowers gained international prominence as an outstanding research physicist and as a commentator and analyst on science and public policy. His research interests were in the areas of solid state and low temperature physics, and his

discoveries included the first detection of the helicon, a magnetoplasma mode in metals akin to the "whistler" signal observed in the ionosphere. Bowers was aided in this work and in his work over the years on liquid helium, luminescence, semiconductors and thermoelectric phenomena, by many gifted research students and postdoctoral associates. The experimental metals-physics group he built up at Cornell was highly regarded in the United States and abroad.

In the middle and late 1960's Bowers developed what became an abiding interest in the impact of science and technology on national and international affairs. He was an astute and perceptive observer in this area and was a frequent participant on national task forces and committees. He served, for example, on the staff of the Office of Science and Technology in the Executive Office of the President in 1966–67, in 1968 on the National Academy of Sciences Panel to Study Science and Regional Development, on the Committee on Science and Public Policy of the American Association for the Advancement of Science from 1972 to 1975, and on a task force to study National Communications Policy Making in 1977. In addition he served as a consultant to industry and government, most recently to the Department of State and to the National Science Foundation. His knowledge, skill, and experience in questions relating to science and public policy were made available to the Cornell community at large through the establishment in 1969 of the Science, Technology and Society Program in which he served as the founding deputy director. He involved himself in the activities of this new venture with great intensity and effectiveness, and he played a very important role in formulating the policies and guiding the development of the STS Program at Cornell, especially during his period as director, from 1973 to 1978. His special interest was technology assessment, a field in which he became one of the world's experts.

His activities and interests encompassed both the sciences and the arts. During his years on the Cornell faculty, Bowers served on the Editorial Board of the Cornell University Press, on the Executive Committee of the Society for the Humanities, and on the Faculty Committee on Music. He was an excellent teacher and throughout his career at Cornell was deeply involved in teaching programs at both the undergraduate and graduate levels.

In recording these great qualities of Bowers as a scholar, a teacher, an innovator, and a wise man, we are likely to miss his marvelous personal attributes. He was a remarkably decent and kindly person, one who worried deeply about interpersonal relationships and who had a particular concern for young people, whether students, postdoctoral associates,

or junior faculty. He used his humor and wit with great effectiveness in illuminating even the most serious of issues.

NEIL W. ASHCROFT
FRANKLIN A. LONG
*Cornell University
Ithaca, New York*

Christopher Dean

Christopher Dean, professor of physics at the University of New Mexico, died in Albuquerque on 12 December. Born in Chicago in 1920, he attended Santa Rosa Junior College in California. During World War II he was trained in weather observing and forecasting at US Army Air Forces Training Schools. Following discharge from the service he attended Harvard where he received AB, MA, and, in 1952, PhD degrees in physics. His doctoral dissertation represented one of the earliest applications of Zeeman perturbation of nuclear quadrupole resonances to reveal information on crystal structure.

For one year after completing graduate studies Dean was a research physicist with Project Lincoln at MIT. He later spent two years at Allied Research Associates, Boston, and one year at Sperry Rand Research Center in Sudbury, Massachusetts. Most of his professional career, however, was spent as a physics faculty member at two universities. From 1953 to 1960 Dean taught at the University of Pittsburgh and in 1963 he joined the University of New Mexico, where he remained until his death.

Dean's early training in weather influenced his career and had an impact on many of his students. At Allied Research he helped design data processing techniques for pictures from TIROS and Nimbus satellites. At the University of New Mexico he introduced a meteorology course designed primarily for students with an interest in weather, but with limited technical background.

He was a gifted musician, both as a performer and as a teacher. He played bass horn with the Albuquerque Symphony, trumpet in a city-sponsored band, and jazz piano in many night spots. He also designed musical acoustics lecture and laboratory courses. With abundant courage he held musical acoustics classes until a few weeks before his death even though his health had been declining since 1976.

Dean impressed his associates with his intuition and persistence as well as his knowledge in a variety of fields. Occasionally his punchy manner of speech startled someone meeting him for the first time. But his students and colleagues who knew him well remember him gently.

CHARLES L. BECKEL
*The University of New Mexico
Albuquerque, New Mexico* □

BOWERS

