

Shimon Ofer

Shimon Ofer, professor of experimental physics at the Racah Institute of the Hebrew University, Jerusalem, died on 30 September 1983, after a short and severe illness. He was at the height of his scientific creativity. Ofer was one of the leading experimental physicists in Israel and an outstanding member of the international Mössbauer community.

He was born in Jerusalem in 1927 and obtained his MSc and PhD degrees in physics at the Hebrew University, specializing in nuclear spectroscopy. After a two-year postdoc at Brookhaven National Laboratory, he returned to Jerusalem in 1959 and began his researches in Mössbauer spectroscopy, discovering the Mössbauer effect in the lanthanide isotope Dy^{161} . This breakthrough opened up a wide and rich field of research into the solid-state chemistry and physics of lanthanide compounds, including the study of magnetically ordered systems (garnets and intermetallic compounds), spin relaxation in paramagnetic systems and anisotropic lattice dynamics. It also led to the discovery of large temperature-dependent isomer shifts in europium intermetallic compounds, associated with fast fluctuations between different 4f valence configurations. In addition, Ofer initiated Mössbauer studies in actinide compounds.

During the last decade of his life Ofer became increasingly involved in the application of the Mössbauer effect to biological and medical problems involving the element iron. To collaborations with biochemists and hematologists at home and abroad, he brought great enthusiasm, drive and imagination. Ofer and his coworkers established the presence of large quantities of the iron storage protein (ferritin) in abnormal red blood cells of those suffering genetic blood diseases, particularly thalassemia. In investigations of malaria they followed the fate of hemoglobin iron in infected cells. In other studies they dealt with synthesis of hemoglobin in cultured blood cells, where they found ferritin to be a precursor in one of the important metabolic pathways. Discovering that *E. coli* bacteria take up iron in significant amounts, they separated and identified a new iron storage protein, "bacterio-ferritin." In Mössbauer studies of protein crystals containing iron (ferritin and myoglobin), they found a new physical phenomenon: "quasi-elastic" Mössbauer absorption, which pointed to the presence of stochastic collective internal motions in these proteins and threw new light on the dynamics of proteins.

Ofer was an experimentalist *par excellence*, with a brilliant flair for

planning the strategy to attack a problem; he was adept in data analysis and unusually free from bias towards theoretical preconceptions or prejudice. Ofer was a wise and able scientific administrator, whose counsel was much sought in matters of central University policy. He was a highly successful dean of the Faculty of Science of the Hebrew University (1968-72). His life was an expression of a passionate commitment to science and public service.

E. RIVKA BAUMINGER
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William Ralph Bennett

William Ralph Bennett died 21 August 1983. He was born on 5 June 1904 in Des Moines, Iowa, and received his bachelor's degree in electrical engineering from Oregon State University in 1925 and his master's and PhD degrees in physics at Columbia University.

He joined Bell Telephone Laboratories in 1925; there he made early contributions to network theory and to the understanding of distortion produced by unwanted modulation products. His later work included investigations of multichannel systems, pulse code modulation and electrical noise. In 1959 he became head, data theory department. Upon his retirement in 1965, he started a new career as professor of electrical engineering at Columbia University, teaching and directing research in communication theory.

Bennett wrote many technical papers on telecommunications and held fifteen patents on inventions in that area. He was principally engaged in basic investigations of multichannel communication systems and the related problems of noise and nonlinearity. He was among the first to recognize the feasibility and advantages of transmitting voice and other analog signals by digital representation. He wrote several books in his field and edited *Transactions of the IRE Professional Group on Circuit Theory*. He remained active in communications until his death. His last technical paper, published in January 1983, described the spread-spectrum properties of the X-system for secret telephone communications, of which he was a co-designer during World War II. This system, which was only declassified in 1976, was the first practical example of digital speech transmission; it was used to send secret telephone messages between President Franklin Roosevelt and Prime Minister Winston Churchill at the time of the Normandy invasion.

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