In the US he became more involved with hydroacoustics, underwater sound propagation, structural vibration and sound radiation. This work led to publication in the *Journal* of the Acoustical Society of the classic paper "The Physics of Flow Noise." A general theorem he developed on the response of complex structures to forced excitation was described in another JASA paper, "The Mean Value Theorem for Complex Vibrators." He is also the author of three books—*Die Grundlagen der Akustik*, *Vibrations and Sound Radiation of Simple and Complex Vibratory Systems*, and *Foundation of Acoustics, Volume I—Basic Mathematics and Acoustics*.

The Trent–Crede Medal is given to recognize outstanding contributions to the science of mechanical vibration and shock. Since 1969 only six others have won this honor; the ASA cited Eric E. Ungar "for his important contributions to our understanding of vibrations in complex structures, the effects of structural damping, and the propagation of structure-borne sound."

After completing his ScD at New York University in 1957, Ungar joined the staff at Bolt Beranek and Newman Inc. in Cambridge, Massachusetts. He has been a leader of the applied physics department there and is now Principal Engineer, directing corporate training programs and coordinating the dynamics and structural analysis programs in two divisions.

His combined interest in mechanical engineering and the physics of acoustics has been fruitful. He helped to describe the structural damping induced by viscoelastic coatings; he demonstrated the importance of damping by "air-pumping" in the spaces between structural components; he developed the statistical energy analysis technique, and, by applying it to aerospace, building and machinery vibrational problems, he was able to solve problems that had been insoluble using boundary-value techniques.

He has contributed to the scientific community by continuing to teach and guide students at New York University. He has also served as an editor for the Journal of the Acoustical Society of America, the Journal of Sound and Vibration and the Shock and Vibration Digest; he revised and translated, from German, Cremer and Heckl's *Structure-Borne Sound*; and he has been a vital contributor to several of the main reference works on vibration and noise control.

New York Academy presents awards

Among the winners of annual awards given by the New York Academy of Sciences was Frank Press, President of the National Academy of Sciences. Press won the NYAS Presidential Award "in recognition of his accomplishments in the cause of science." Irwin Shapiro (director, Smithsonian Astrophysical Observatory) was given the Physical and Mathematical Sciences Award "in recognition of his studies which constituted the strongest experimental evidence for the validity of Einstein's theory of relativity." Riccardo Giacconi (director, Space Telescope Institute) was honored with the A. Cressy Morrison Award "for his pioneering work in the field of x-ray astronomy." Bruce Murray (Caltech) was given the Boris Pregel Award for "his contributions to the field of planetary sciences and his outstanding leadership as Director of the Jet Propulsion Laboratory." Joel Levine (NASA Langley Research Center) received the Gregory and Freda Halpern Award for "his outstanding contributions to the photochemistry of atmosphere." Danelle Tanner, a graduate student working in nuclear physics at the Cyclotron Institute of Texas A&M University, won the Minoru and Ethel Tsutsui Distinguished Graduate Research Award in Science.

obituaries

Henry Primakoff

Henry Primakoff, Donner Professor of Physics at the University of Pennsylvania, died of cancer at his home on 25 July 1983, having continued to teach, to investigate, and to discuss physics until the very end of his life.

Primakoff was born in Odessa, Russia, in 1914 and came to New York in 1923. He did his undergraduate work at Columbia and his graduate work at Princeton and New York University, where he completed his PhD. He taught in New York, first at the Polytechnic Institute in Brooklyn, and then at Queens College. Together with Theodore D. Holstein, he developed the theory of spin waves during this period. Both the physical picture that emerged from their work and the theoretical techniques they used to construct the

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picture are now classics.

During World War II, Primakoff worked at the Columbia University Division of War Research on submarine detection by sonar. In 1946, after a year at New York University, he went to Washington University in St. Louis as an assistant professor. There his research ranged from cosmic rays to tensor forces to the properties of solid He^3. At Washington University, he published his paper on "The Photoproduction of Neutral Mesons in Nuclear Electric Fields and the Mean Life of the Neutral Meson," which first described the process later known as the Primakoff effect and ultimately led to precise measurement of the extremely short mean life of the neutral pion. Also, he and Eugene Feenberg were the first to suggest a possible collapsed state of nuclei. In the 1950's, Primakoff began to make the weak interaction the focus of his intellectual energies.

In 1960 he came to the University of Pennsylvania as the first Donner Professor of Physics. He continued to work on the weak interaction, in particular, on nuclear and particle phenomena that underlie the interaction. He became one of the world's leading authorities on muon capture, double beta decay, and the interaction of neutrinos with nuclei. He was always interested in fundamental symmetries and their breaking, and at the time of his death he was working, with Alfred K. Mann, on the possible relationship of parity violation in beta decay and the left-handed asymmetry of proteins.

Primakoff was noted as a teacher of physics to his colleagues as well as to his students. He had almost total recall and, with his wide interests and deep knowledge, was a living encyclopedia of physics. His lectures were an intellectural delight, interlaced with wit and apt analogies. To all who sought it he gave freely of his knowledge and of the time necessary to convey it clearly and fully. Unassuming and never in a hurry, he was always