

## Acoustical Society honors Klein, Eckart

Elias Klein, an expert in the field of shock and vibration, and Carl Eckart, a theoretical physicist who has devoted much of his career to the study of underwater acoustics and geophysical hydrodynamics, were awarded medals by the Acoustical Society of America last month in Los Angeles. Distinguished Service Citations were presented to Robert W. Young, a former president of ASA (1960-61), and to Betty H. Goodfriend, administrative secretary for the Society.

Klein was awarded the Trent-Crede Medal for his work in the area of shock and vibration. Klein completed his PhD at Yale University in 1921, and in 1927 he joined the staff of the Naval Research Laboratory. His major research efforts at the Laboratory included investigations of the characteristics and applications of piezoelectric crystals, development of techniques for the growth of synthetic rochelle salt and ADP crystals, and his development, in cooperation with the B. F. Goodrich Company, of the so-called "rho-c" rubber, which constituted an important advance in underwater acoustic technology. When the Centralizing Activity for Shock and Vibration was created by the Research and Development Board of the Department of Defense in 1947, Klein was named director, a position he held for the next ten years. It is primarily for his contributions to the collation and coordination of data on shock and vibration during this period that Klein was awarded the Trent-Crede Medal. He retired from NRL in 1959.

Eckart was given the Pioneers of Underwater Acoustics Medal for his development of theoretical foundations for the understanding of the principles of underwater sound and acoustic signal processing. Eckart completed his PhD at Princeton University in 1925, and after three years of postdoctoral study with A. J. Sommerfeld in Munich, he joined the staff of the physics department at the University of Chicago. In 1942 he moved to San Diego to work on the development of sonar systems with the University of California Division of War Research. This move allowed him to bring to the study of underwater acoustics and geophysical hydrodynamics his theoretical training and background in atomic physics and



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quantum mechanics. During his years there Eckart was particularly concerned with ways of formulating the problems of reverberation and scattering from the sea surface and with the unexplained high absorption exhibited by seawater as opposed to fresh water. After the close of the war Eckart remained in San Diego as director of the UCDWR. During this period the Marine Physical Laboratory was established and Eckart was named the first director. He is presently professor of geophysics at the University of California, San Diego.

## Boyle and Smith awarded Stuart Ballentine Medals

Two physicists were awarded Stuart Ballentine Medals by The Franklin Institute last month. Willard S. Boyle and George E. Smith, both affiliated with Bell Laboratories, were honored for their "invention of the charge-coupled device structure, a conceptually simple semiconductor technology with significant application to image sensing, serial memory and signal processing."

Boyle, a native of Canada, received his PhD from McGill University in 1950. He joined Bell Labs in 1953 and is presently executive director of Pennsylvania Laboratories of Bell Laboratories in Allentown, Pennsylvania. Boyle was a co-developer of the first continuously operating ruby laser.

After completing his doctorate at the University of Chicago in 1959, Smith began working for Bell Labs. He is now head of the Unipolar Design Department at the Laboratories in Murray Hill, New Jersey.

## AVS Welch Award goes to L. A. Harris

The winner of the American Vacuum Society's fourth Medard W. Welch Award is Lawrence A. Harris, a physicist at the General Electric Research and Development Center in Schenectady, New York. Harris was given the award in recognition of work demonstrating the utility and extreme sensitivity of Auger electron spectroscopy for the identification of elemental composition on surfaces.

Harris completed his doctorate at the Massachusetts Institute of Technology in 1950. He subsequently served as associate professor of electrical engineering at the University of Florida and the University of Minnesota before joining General Electric in 1955. Harris's other research interests include electron-beam dynamics, electron optics and ultrasonic imaging.

At Case Western Reserve University Robert W. Brown, Arnold J. Dahm and David E. Farrell have been promoted to