

Five receive awards from Acoustical Society of America

At its recent meeting in Minneapolis, 8-12 October, the Acoustical Society of America presented the following awards: Laurence Batchelder received the Gold Medal; Vincent Salmon was presented the Silver Medal in Engineering Acoustics; Arthur H. Benade was awarded the Silver Medal in Musical Acoustics; William W. Lang received the Silver Medal in Noise; and William S. Cramer was honored with a Distinguished Service Citation.

Batchelder, a leading figure in research on underwater sound for more than five decades, received the 1985 Gold Medal for "significant contributions to underwater acoustics, acoustical standards and the Acoustical Society of America as fellow, officer and patent reviewer." After obtaining an MS in physics from Harvard University in 1929, Batchelder joined the Submarine Signal Company. He remained with the company through its merger with the Raytheon Manufacturing Company in 1946, and retired in 1970. His early research included inventions in beamforming and in sonar reception and amplification that were useful to the US Navy in World War II, as well as work on bearing deviation indicators, nearfield transducer calibration and air-towed sonar. In 1949, Batchelder became a patent reviewer for the *Journal*, producing in the ensuing years an enormous quantity of clear and incisive reviews. Throughout his career, Batchelder has played a pioneering role as a member of both national and international organizations in developing and refining acoustical standards.

Salmon (SRI International) received the 1984 Silver Medal in Engineering Acoustics "for contributions in the design of horns and the control of noise and vibration." Salmon earned his doctorate in theoretical physics from the Massachusetts Institute of Technology in 1938, with a thesis on the "Sound Field of a Hyperbolic Horn." He joined the Jenson Manufacturing Company and, by 1943, was made senior physicist in charge of research and development. During World War II, he served as a consultant on the design of electro-acoustic equipment exposed to under-



BATCHELDER

water shock and on special devices used in radar and countermeasure work. At this time he also developed a theory of a family of horns that has substantial advantages over the "exponential" type. In 1949, Salmon joined SRI International, where he established research programs in industrial acoustics and conducted research on shock-wave initiation and propagation, noise and vibration control, and music production systems. He eventually became chairman of the sonics section. Since retiring in 1976, Salmon has retained the position of staff scientist at SRI and continues to study problems in noise control.

Arthur H. Benade received the Silver Medal in Musical Acoustics "for pioneering research on the acoustics of brass and woodwind instruments and for the leadership of a generation of musical acousticians." Benade received his PhD in 1952 from Washington University with a thesis on cosmic-ray physics. He then joined the faculty of Case Institute of Technology and, for the next ten years, he researched a mixture of problems in nuclear physics and the design of musical instruments; the former involved much use of the Case betatron. In 1959-60, he pub-

lished his first articles in musical acoustics in the *Journal of the Acoustical Society of America*, wherein he discussed the theory of bores and finger holes in woodwind instruments. The model he and his colleagues presented led to the concept of cutoff frequencies for isotropic and anisotropic radiation from a woodwind, a feature of musical and perceptual importance. Working on the theory of wave propagation in flared horns, Benade developed a formalism assuming locally spherical wavefronts; his theory yields a complementary boundary limit to the usual assumption of planar wavefronts. He and his students also developed a general formalism for the production of sustained sound in wind instruments that is based upon the work of Pierre Maxime Henri Bouasse (1866-1953). Such a theory provides information on the nature of the spectrum of instruments.

William W. Lang was awarded the Silver Medal in Noise for "significant technical contributions to noise control, for sustained national and international leadership in noise and electroacoustics standards, and for advancing the professional status of noise control engineering." Lang served in the US Navy, studied undergraduate and graduate physics at the Massachusetts Institute of Technology and taught at the US Naval Postgraduate School in Monterey, California, completing his doctorate at Iowa State University in 1955. Soon after he joined IBM in 1958, Lang established the company's first acoustics laboratory, located in Poughkeepsie, New York. Working with the Institute of Electrical and Electronics Engineers in the mid-1960s, he was instrumental in developing fast Fourier analysis as a means of determining acoustic power spectra. From 1970-80, as chairman of the International Organization for Standardization Working Group 6 on Noise Emitted by Machinery and Equipment, he developed a set of seven international standards on machinery noise emission that has since been adopted by many countries, including the US. One of the scientific highlights



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of his 35 years of service in the US Navy and Naval Reserve was his leadership of a group of Reserve data-processing specialists gathering information for intelligence operations through the analysis of acoustical data from the oceans.

William S. Cramer was honored with a Distinguished Service Citation for "outstanding and devoted editorial service to the acoustics community over a period of almost a quarter of a century."

American Geophysical Union presents awards for 1984

At its spring meeting, the American Geophysical Union presented the following awards: Marcel Nicolet received the William Bowie Medal; Charles V. Theis was presented the Robert E. Horton Medal; Mary K. Hudson, Raymond Jeanloz and John H. Woodhouse were jointly awarded the James B. Macelwane Award; and Xavier LePichon received the Maurice Ewing Medal, which is mutually sponsored by the AGU and the US Navy.

Nicolet, who worked in the US and Belgium, received the Bowie medal for "outstanding contributions to fundamental geophysics and for unselfish cooperation in research." He was cited by Julian Heicklen as having made "a greater contribution to our understanding of the chemistry of the earth's upper atmosphere than any other single individual." Nicolet's earliest research determined the molecular composition of the Sun and, later, he carried out a similar analysis on the composition of comets. During the period 1937-40, he concentrated on the physical and chemical processes associated with atmospheric airglow and auroras. After World War II, he published his famous work on the constitution of the ionosphere that has formed the basis for many subsequent studies of the ionic chemistry of Earth's upper atmosphere. Nicolet's research interests have also included the mechanisms of infrared airglow formation and the determination of photoionization and photodissociation coefficients. He predicted the presence of many molecular species in the upper atmosphere before they were measured, and correctly predicted the presence of the helium layer. Nicolet also acted as Secretary General of the Special Committee of the International Geophysical Year from 1953-60 and has been instrumental in fostering international cooperation and the exchange of ideas in astronomy.

Theis, a pioneer in the science of groundwater hydrology, was awarded the Horton medal "for outstanding

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