



Stewart E. Miller

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1918–1990

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Stewart Edward Miller, a pioneer in microwave and optical communications, died February 27, 1990, in Middletown, New Jersey. Most of his career was with the Bell Laboratories, but following his retirement from there in 1983 he was active as a consultant to Bellcore until his death. His fifty-year career in telecommunications established him as one of the most productive and influential leaders of this field.

Stewart (known to friends and colleagues as "Stew") was born in Milwaukee, Wisconsin, on September 1, 1918. He attended high school in Wauwatosa, Wisconsin, and three years at the University of Wisconsin before transferring to the Massachusetts Institute of Technology, receiving S.B. and S.M. degrees in electrical engineering there in 1941. He joined the Bell Telephone Laboratories (now AT&T Bell Laboratories) that year and began work on microwave radar and its components. He was a technical leader in design of X-band (3 cm) microwave plumbing for the radar bombsight used on B-29 aircraft during World War II. Following the war, he became the key person on the L-3 coaxial cable carrier systems, but saw the potential for greater information capacity through the use of higher carrier frequencies and other wave-guiding systems. He transferred to the Radio Research Department in Holmdel and made vital contributions to circular-electric modes for low-loss millimeter-wave guides,

microwave ferrite design, and many other millimeter-wave components.

In the early 1960s, following the demonstration of the laser, Stew was among the first to recognize the potential of optical communications and from that point on concentrated on this rapidly developing technology. At that time there was no good transmission medium for optics because fibers of that date were impossibly lossy. As a result, Stew, who was then director of Guided Wave Research, initiated a program to investigate a variety of periodic lens systems. With the availability of low-loss fibers in the late 1960s, he proposed and participated in the demonstration of single-material fibers that achieved single-mode and multimode guiding through transverse variation of the dielectric material. He also proposed the combination of several optical components on one semiconductor chip, and proposed the name "integrated optics" as analogous to the "integrated circuits" of modern electronics. This proposal stimulated a lively research endeavor, resulting in units that are now being placed in systems.

Stew was made director of Lightwave Research at Bell Laboratories in 1980. Following his retirement from that position, his work at Bellcore concentrated on analysis of semiconductor lasers for improvements in noise and linewidth properties important to advanced fiber-optic communication systems, and he also contributed to the new field of neural networks. Just a year before his death he wrote a fundamental and incisive paper on modal partition noise that was published in the Institute of Electrical and Electronics Engineers' (IEEE) *Journal of Quantum Electronics* (February 1990, p. 242). He had more than forty journal papers and eighty patents to his credit and was also coeditor of two very comprehensive books, *Optical Fiber Telecommunications* (with Alan Chynoweth) and *Optical Fiber Telecommunications II* (with Ivan Kaminow).

Stew was elected to the National Academy of Engineering in 1973. He was also a fellow of the Optical Society of America, the American Association for the Advancement of Science, a Life Fellow of the IEEE, and a member of the honor societies Sigma Xi, Tau Beta Pi, and Eta Kappa Nu. He was instrumental in

establishing the annual Optical Fiber Conference, with the first meeting in 1975, and was active in many other conference and professional society committees. He received the Naval Ordnance Development Award in 1945, the IEEE Morris Liebmann Award in 1972, the IEEE W.R.G. Baker Prize Award (with Tingye Li and E.A.J. Marcatili) in 1975, the Stuart Ballantine Medal of the Franklin Institute in 1977, and in 1989 the John Tyndall Award of the Laser and Electro-optics Society of IEEE for distinguished contributions to fiber optics technology.

Stew was an active member of the Freehold, New Jersey, Rotary, and was an enthusiastic and skillful renovator of Corvairs. He is survived by his wife Helen and three sons, Chris Richard of the U.S. Foreign Service; Stewart Ferguson, a pathologist in Tom's River; and Jonathon James, a software designer. His family, friends, and colleagues are proud of the key role he played in the development of lightwave communications—one of the major technologies of this century.