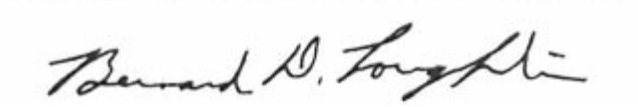

Bernard D. Loughlin

1917–1988

By Harold A. Wheeler

Beynard Dunlevy Loughlin, retired vice-president, technology, of Hazeltine Corporation, died of a heart attack on December 25, 1988, at the age of seventy-one. His career with that company spanned forty-nine years, from 1939 to 1988.

Barney (as he was known to his family and friends) was born in New York City on May 19, 1917, and lived in New Jersey during his college years. He earned a B.E.E. in 1939 and an E.E. (professional degree) in 1945, both from Cooper Union, and a M.S.E.E. in 1946 from Stevens Institute of Technology. In 1943 he married Dorothy Turner, and they had three children, David, John, and Mary Ellen.

Barney was steered into the field of radio by his uncle, Charles A. Weingardner, a Cooper Union graduate who was working at Bell Telephone Laboratories in New York City. While in high school, he became active as a "ham" with operator's license dated in 1933 and amateur station license W3EAL, later W2GQX. Using a short-wave CW transmitter, he was qualified in the Amateur Radio Relay League network.

Working at home while attending Cooper Union, he made a small television receiver to pick up the experimental signals from the RCA transmitter on the Empire State Building in New York City. Then he conceived and constructed what he called a "vector response indicator." On a frequency sweep on a small cathode-ray tube, he displayed the amplitude and phase response of a

band-pass amplifier. This subject he presented in the 1939 annual student paper contest hosted by the American Institute of Electrical Engineers at Cooper Union. He won first prize. This concept developed into the "phase-curve tracer" that later became his first major project after joining Hazeltine.

After his graduation in 1939, Barney Loughlin applied for employment at the new Hazeltine laboratory in Little Neck, Long Island, New York. He was interviewed by Dan Harnett (chief engineer), Les Curtis, and me. (When Dan sent him in to talk with me, he said, "Don't let him get away.") Barney also was favorably impressed and accepted our offer of employment before he left that day.

His first major assignment was to design and build the "phase-curve tracer" for TV circuits, based on his previous work at home. On a large cathode-ray tube, he displayed the phase angle of response over a frequency band on a horizontal frequency sweep. That was test equipment that was needed but was not available anywhere. It required a rack containing many vacuum tubes (sixty-seven). Prominent engineers from the major laboratories came to see demonstrations of its operation. It was presented at the 1940 Rochester Fall Meeting of the Institute of Radio Engineers (IRE) and Radio Manufacturers Association, and published in the *Proceedings of IRE* for March 1941. Subsequently it became the subject of Barney Loughlin's first patent (of the one hundred and twenty U.S. patents issued to him over his career).

Before Pearl Harbor in 1941, he worked on several projects of interest to the military. During World War II, he worked on the U.S. Navy program of Interrogation Friend-or-Foe, an adjunct to radar for which Hazeltine had the prime contract. From 1946 to 1948 Loughlin was a member of the Hazeltine research team working on FM receivers and TV receivers (monochrome).

The years 1949 to 1951 saw the intensive activity on color television that brought international fame to the Hazeltine group. The group was headed by Art Loughren (IRE fellow 1944, president 1956). In addition to Loughlin, other leaders were Bill Bailey (fellow 1954) and Charlie Hirsch (fellow 1951). They assembled equipment for demonstrating the problems and

optical behavior peculiar to a color television system (transmitter and receiver). They educated the industry and the regulating agencies to enable a prompt decision on the essentials of the present color television service. Their contributions were recognized by writers and their principal competitor, RCA, which collaborated in adopting the standards.

In addition to the facilities for demonstrations, Hazeltine contributed three major concepts of innovation, two of which were adopted in the U.S. standards. The third became practical after further advances in technology, so it also was adopted in the later color TV standards in Europe.

Barney Loughlin was individually responsible for these three concepts. They required an education in the behavior of the human eye toward colors, followed by circuit inventions for their practice in transmitters and receivers. They were used with RCA tubes (three tubes with mirrors in the transmitter and the three-gun picture tube in the receiver).

These three concepts are difficult to describe in a few words, but they are identified by simple names: "Shunted Monochrome," U.S. Patent 2,774,072, December II, 1956; "Constant Luminance," U.S. Patent 2,773,929, December 11, 1956; and "Color-Phase Alternation," U.S. Patent 2,943,142, June 28, 1960. Unfortunately, these were not patented in Japan because the company did not anticipate that the Japanese would produce many TV receivers. (Japan did pay royalties on U.S. patents for receivers imported to the United States.) The royalties on these patents were a substantial fraction of the company's income during the years before they expired (December 11, 1973) and even afterward on prior usage and foreign patents.

A by-product of the experience with color TV was the Color Film Analyzer (CFA). From a color-film negative, it displayed instantly the positive that would be obtained by processing in accordance with a formula described by a set of numbers seen on dials. This avoided a laborious trial-and-error process. Developed by Loughlin, Bill Bailey, and Charlie Page, in response to a conversation with an engineer at Pathe, a breadboard model, U.S. Patent 2,976,348, March 21, 1961, was delivered to Pathe in 1957, described in the, *Journal* of the Society of Motion Picture

and Television Engineers (SMPTE) in January 1958. It achieved universal use in the film industry. (When China was opened to U.S. commerce, China's first order included three CFAs.) In April 1970 in Hollywood, it was recognized by an Academy Award to Hazeltine Corporation.

A shift in the orientation of research in the company in 1957 influenced Loughlin to "retire at forty" and engage in consulting work for a few years. In 1962 he accepted an invitation to return to Hazeltine and head the research operations.

From 1969 to 1974, Loughlin served as chairman of the Broadcast Television Systems (BTS) Committee of the Electronic Industries Association (EIA). This group comprised outstanding engineers with experience in broadcast networks, receiver manufacturing, and television systems. In addressing practical programs, they perceived the need for a feature they called a Vertical Interval Reference Signal. This was shortly standardized, and Loughlin was accorded much of the credit for this result.

In the last decade of his employment, from 1977 to 1987, Loughlin devoted much effort to the development of "AM Stereo," which so far has not realized its potential as a service. It was brought to the company by Leonard Kahn, an Institute of Electrical and Electronics Engineers (IEEE) fellow and Loughlin's neighbor on Long Island. It was distinguished from other proposals by the designation IS (Independent-sideband) AM Stereo System. The two separate sidebands within the AM channel were used to excite the separate speakers of a stereo audio system. The result was rather impressive, with transmission limited to the standard AM channel bandwidth. The future of this system remains to be seen.

The last major effort of Barney Loughlin, before final retirement in 1988 at age seventy-one, was the writing of a monumental, largely autobiographical, story of his life and the contemporary activities of Hazeltine Corporation. Centered on the intensive developments relating to color television, he named the story, *Hazeltine's Colorful Days*.

My friend and colleague, Barney Loughlin, has been one of the most brilliant engineers and delightful companions of my acquaintance.

In addition to his many U.S. and foreign patents, the following principal honors and awards give some measure of the recognition accorded to his contributions in the field of color television. In 1952 he received from the IRE the Vladimir K. Zworykin Award, and in 1955 he became an IRE fellow. In 1957 he received an award from the IRE's Professional Group on Broadcast and Television Receivers. In 1965 he earned from the National Association of Manufacturers the Modern Pioneer Award. In 1967 Barney was elected a member of the National Academy of Engineering "for research and development of television systems." In 1968 he became a member of Tau Beta Pi, Cooper Union. In 1970 he received the Gano Dunn Medal, Cooper Union, and in 1972 Barney was honored with the Consumer Electronics Award, IEEE. In 1973 he was recognized with an International Television Symposium Citation, and in 1977 Barney received a special commendation award, SMPTE. In 1978 he was given the Engineering Emmy Award, BTS/EIA, and in 1981 he received the Armstrong Medal, Radio Club of America, "for his pioneering contributions to Color TV."