



A handwritten signature in black ink, which appears to read "A. Earl Cullum, Jr.". The signature is written in a cursive, flowing style with a prominent initial "A" and a long, sweeping underline.

A. Earl Cullum, Jr.

1909–1985

By Arthur A. Collins and Jerry Stover

A. Earl Cullum, Jr., a pioneer in modern communications technology, died of a heart attack on January 31, 1985, at the age of seventy-five. Cullum's work in the field of radio, television, and microwave communications helped weave the electronic network that binds the nation together. At the age of twenty-seven, he formed his own firm (A. Earl Cullum, Jr., and Associates, Consulting Engineers) and soon became a widely known and well-respected authority in the problem solving associated with radio and television broadcasting. During his lengthy career, his name became synonymous with engineering innovation.

Cullum was born in Abilene, Texas, on September 27, 1909. He moved with his family to Dallas a few years later, where he worked as a technician at radio station WFAA from 1923 to 1926 when he was a student at North Dallas High School. After high school, he enrolled in several courses in math and physics at Southern Methodist University before leaving the Lone Star State to attend the Massachusetts Institute of Technology.

Following graduation in 1931, Cullum went to work for American Airlines as an engineer in its communications research and development departments in St. Louis and Dallas. He performed a similar function a few years later (1934) for the Southwest Broadcasting Company (SBC) in Fort

Worth, but this time in the post of vice-president. After leaving the SBC's research and development operations, he formed his own company.

During World War II, Cullum was associate director of the Radio Research Laboratory at Harvard University and a consultant to the U.S. Office of Scientific Research and Development and the National Defense Research Committee. The projects he supervised were vital to national defense, and under his guidance sophisticated electronic weaponry, such as radio jammers and radar receivers, was developed. He also served as a consultant to the U.S. Strategic and Tactical Air Forces in London, England.

For his service during the war, Cullum received the Presidential Certificate of Merit in 1948. Following the war, he was appointed one of the original directors of the Joint Research and Development Committee of the Army, Navy, and Air Force in Washington. In 1948 he was also awarded a fellowship in the Institute of Electrical and Electronics Engineers.

Cullum was responsible for developing a number of important engineering practices and innovations in the broadcasting field. For example, he originated the widely used multiplication method of designing and analyzing broadcast and directional antenna systems involving more than two towers. Early on, Cullum appreciated the necessity of continuously monitoring the amplitude and phase of currents in an individual tower located within a complex array of towers designed to avoid radiation of energy in a direction that would adversely affect another station. Consequently, he developed the first coaxial sampling loop used to adjust and maintain the components of a broadcast directional system. Cullum also demonstrated that as directional antennas became more complicated, accuracy of adjustment became increasingly important, a finding that stimulated the development of unusually precise monitoring systems.

Another Cullum pioneering practice was the use of elevated ground screens to stabilize critical directional characteristics

against changing ground conditions—for example, tides on the New Jersey meadows and sunflowers in Kansas. These techniques were first used at WINS-AM in New York. In his continuing efforts to improve the design of broadcast antenna systems, Cullum also originated the idea of using the area under the currents distribution curve to define accurately the radiating "moment" of an individual tower of a radiating system, thereby taking into account the effect on the current distribution of the coupling between towers.

In still another instance, he recognized the deterioration that reradiating structures, such as power-line towers or modern skyscrapers, could produce in a radiating signal, and he devised ingenious methods of detuning such structures to render them harmless. Specifically, Cullum helped to resolve problems caused by the John Hancock Tower and the Sears Tower in Chicago and assisted in obtaining the initial Federal Aviation Administration clearance for these structures.

Since its inception, the firm of A. Earl Cullum, Jr., and Associates, Consulting Engineers, has represented clients in major markets from Boston to San Diego and from Seattle to Miami, Puerto Rico, Hawaii, and Mexico. In addition to his duties with the firm, from 1960 to 1980 Cullum also served on the board of directors of the A. H. Belo Corporation—the owner of radio station WFAA, where he began his longtime romance with radio during his high school years. Cullum was nominated to membership in the National Academy of Engineering in 1970, at which time he was cited for "exceptional leadership and originality as a consulting engineer concerned with radio and television broadcasting."

Yet to examine only his efforts to advance technology would be insufficient to describe A. Earl Cullum, Jr., fully, for he was equally renowned for community and public service during the most critical periods of the Dallas-Fort Worth area development. Among his greatest accomplishments was the technical development of the first system to use microwave technology to broadcast classes from a university to an industrial facility. The system was first made operational

at Southern Methodist University (SMU), forming the basis for TAGER (The Association for Graduate Education and Research) and later for SMU's current off-campus education program.

Cullum was also an original member of the SMU Foundation for Science and Engineering and served on its executive board. He was a member of the Educational Television Foundation (KERA-TV, Dallas), the Dallas Citizens Council, the Dallas Chamber of Commerce, and the executive committees of both the St. Marks and Hockaday schools in Dallas.

