



George H. Brown

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One of the world's leading experts on antennas and a near forty-year veteran of the Radio Corporation of America (RCA), George H. Brown died on December 11, 1987, at his home in Princeton, New Jersey. After a brilliant career in electrical engineering research and engineering management, George Brown retired from RCA in 1972. He is best known technically for his pioneering developments in directional antennas and for his invention of the turnstile antenna that has been used extensively for television broadcasting at very high frequencies (VHF) throughout the world. He is also well known as a participant in the team at RCA Laboratories that developed the dot-sequential color television system and as the team leader who relentlessly pursued its adoption as the U.S. standard for broadcasting. The principles embodied in that system are incorporated in all present-day systems of color television, including NTSC (National Television Systems Committee), PAL (Phase-Alternating Line), and SECAM (Sequentiel Couleur avec Memoire).

Born October 14, 1908, in North Milwaukee, Wisconsin, the son of a train dispatcher for the Chicago, Milwaukee and St. Paul Railroad, George Brown graduated from high school at Portage, Wisconsin, and entered the University of Wisconsin at Madison where he studied electrical engineering.

At the end of his junior year, he spent the summer in the Test Department at the General Electric Company in Schenectady, New York, a prestigious position for a college junior. An outstanding student who often took a heavier-than-normal schedule of courses, George won two highly competitive graduate fellowships administered by the University's Electrical Engineering Department. He received a B.S. in 1930, M.S. in 1931, and Ph.D. in 1933. While a graduate student at Wisconsin, George met and married Elizabeth Ward, also a graduate student, who would bear him twin sons and help to keep his life on an even keel for over fifty years.

After completing his studies at Wisconsin, George joined RCA at Camden, New Jersey, to do research in antennas and wave propagation. He moved to the new central research laboratories of RCA at Princeton, New Jersey, in 1942. From the position of member of the technical staff, he was appointed director of the Systems Research Laboratory in 1952; chief engineer, Commercial and Industrial Electronic Products at Camden in 1957; vice-president, Engineering, for the RCA Corporation in 1959; vice-president, Research and Engineering, 1961; executive vice-president, Research and Engineering, 1965; and executive vice-president, Patents and Licensing, 1968. He served as a member of the RCA board of directors from 1965 until his retirement in 1972.

In addition to his service to RCA, he served as a member of the board of directors of the Trane Company, La Crosse, Wisconsin, and of the First National Bank of Hamilton Square, New Jersey.

George was always active in engineering societies. He was a fellow of both the Institute of Radio Engineers (IRE) and the American Institute of Electrical Engineers (AIEE) before the merger of those two societies into the Institute of Electrical and Electronics Engineers (IEEE). He was also a fellow of the American Association for the Advancement of Science and of the Royal Television Society before which he delivered the prestigious Shoenberg Memorial

Lecture at the Royal Institution in 1972. He was a member of Sigma Xi, Tau Beta Pi, and was elected eminent member of Eta Kappa Nu in 1967. Among his many awards are the IEEE Edison Medal in 1967, the De Forest Audion Award of the Veteran Wireless Operators Association in 1968, and an honorary Dr. Eng. at the University of Rhode Island in 1968. He was elected to the National Academy of Engineering in 1965.

In spite of his busy schedule as an executive in RCA, he found time to serve on several advisory committees. These included the Ford Foundation Advisory Board, the Advisory Committee of the Office of Scientific Personnel of the National Research Council, advisory groups to NASA, the Postmaster General's Advisory Council on Research and Engineering, and, probably his favorite, the George Washington Council of the Boy Scouts of America. He served as a member of the executive board of the Council from 1954 to 1971. Starting as chairman of the Stony Brook District Committee in 1954, he advanced to a vice-presidential post on the Council in 1957 and to the executive committee in 1967, and served on the Region 2 Long-Range Planning Committee for several years. He was awarded the Silver Beaver Award of the Boy Scouts of America in 1962 and the Silver Antelope Award in 1969.

During his career at RCA, George Brown was awarded eighty patents and published over one hundred technical papers. Of the most significant patents are the turnstile antenna mentioned earlier; a vestigial-sideband filter for VHF broadcasting; and a method for bonding thermoplastic materials by radio frequency heating, used initially in the construction of plastic raincoats and still used today in the manufacture of plastic bags and other products. His early work on the design of directional antennas was published in the *Proceedings of the IRE* in 1935, 1936, and 1937, and has been republished in many engineering handbooks to the present day.

Perhaps the greatest challenge that George Brown faced

in his illustrious career was his pursuit of color television standards in the United States and abroad. While he was still a member of the technical staff at RCA Laboratories, heading a small group in antenna and transmitter technology, an innovative team of researchers under Raymond D. Kell had developed the concept of a color television system that would be compatible with the existing black-and-white television system that was placed in service in the years following World War II. At about the same time a group under Dr. Peter Goldmark of CBS, who had been working for many years on a field-sequential method for color involving a revolving disk of color filters placed in front of both the television camera and the display tubes, had petitioned the Federal Communications Commission (FCC) for approval of the field-sequential system for commercial broadcasts in color. Although the field-sequential system was simple in principle, it required a higher bandwidth and was not compatible with the existing black-and-white service. That is, broadcasts in the field-sequential color system could not be viewed on the existing black-and-white television sets, even in black and white, because of the requirement for a different frequency of synchronization. The RCA Laboratories approach, called simultaneous color television, was more complex, also required a higher bandwidth, but at least had a measure of compatibility with the existing service and would not make obsolete the several million TV sets already sold. Hearings on the proposed CBS system were to be held before the FCC in the fall of 1949. Under the guidance of General David Sarnoff, then president of RCA, the Laboratories were directed in early 1949 to improve the simultaneous system and to prepare it for demonstrations before the Commission within nine months time. It was at this point that George Brown was assigned (without promotion) the responsibility to coordinate the efforts of the several groups at RCA working on the various aspects of color television and to ensure that the required equipment could be ready for the scheduled demonstrations. During this short period

of time, major improvements to the system were invented, reducing the required bandwidth and improving compatibility. Thus new tests were required, new experimental equipments had to be constructed to supplement the existing equipment, and the many logistical tasks involved in setting up demonstrations had to be solved. Under George Brown's able leadership, the demonstrations were successfully carried out, with George personally writing much of the supporting documentation for the hearings. Although the effort failed in its attempt to convince the FCC that the compatible approach (by now called the dot-sequential system) was preferred over the incompatible field-sequential method, the entire television industry did become convinced, and the unfortunate FCC decision that selected the field sequential system as the U.S. standard was reversed three years later.

George Brown's reputation as a raconteur spread widely both inside and outside RCA. He was always in great demand as master of ceremonies for retirement and other social events, as his sarcastic wit and intriguing embellishments of true life stories about both friends and adversaries kept him in good stead for entertaining speeches, even on serious subjects. Through the encouragement of his many colleagues and friends, his early retirement years were devoted to writing his memoirs entitled *and part of which I was—Recollections of a Research Engineer*, (1979, Angus Cupar Publishers, 117 Hunt Drive, Princeton, New Jersey 08540), which is replete with his amusing stories while at the same time constituting a reliable history of the technical development of television broadcasting and related fields.