



Charles W. Elston

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1914–1989

By Charles H. Holley

Charles W. Elston, engineer, business and community leader, and, above all, unselfish humanitarian, died on June 5, 1989, at the age of seventy-four.

A Philadelphia native, Charlie Elston graduated from high school in Downingtown, Pennsylvania, and in 1937 received a degree in mechanical engineering from Drexel University. He then joined the General Electric Company in Schenectady and soon became widely known in the power generation field for his technical competence and integrity, his leadership, and his ability to inspire a climate of soundly based technical confidence in his associates. He possessed the ability to look beyond immediate details and see the overall problem. Throughout his career, he continuously made significant technical contributions to the technology of bulk power generation.

Mr. Elston was elected to the National Academy of Engineering in April 1967.

Early in his career he was instrumental in the development of three-dimensional flow concepts of the 3-D design system for turbine buckets, which resulted in increased turbine efficiency. He was a prime contributor to the design and development of the original opposed-flow reheat steam-turbine design, a design simplification that led to widespread acceptance of the reheat cycle. This is a concept that became universal in U.S. design practice, except for the very largest ratings.

He led the establishment of substantially higher steam temperatures and pressures, with corresponding advances in the metallurgy, the forge and foundry practices, and the quality control and inspection practices necessary to support these advances. This work led to the design of the world's first supercritical steam turbine, the 125-megawatt Philo #6 unit, for American Electric Power, which established the supercritical steam cycle as a preferred option for high-efficiency base load steam power plants.

The combination of the reheat cycle and advances in steam conditions described above provided efficiency gains of 8 to 10 percent over levels existing in the late 1940s. In 1980, for example, these improvements equated to an annual saving by the electrical utilities of 2 to 3 percent of the total U.S. energy consumption, including sixty million barrels of fuel for oil-fired power plants.

Under his leadership there was a rapid growth in steam-turbine generator ratings with 3,600-rpm tandem compound units going from 60 to 800 megawatts, while maintaining high efficiency and reliability. He also led the development of nuclear steam-turbine generators, successfully putting into service units at 1,100 megawatts.

He was one of the first in the industry to evaluate the importance of operating practices in controlling thermal stresses and turbine casing cracking. His paper, "Factors Involved in the Starting and Subsequent Loading of Modern Steam Turbines," at the American Society of Mechanical Engineers (ASME) Annual Meeting in 1952 was a significant contribution to power plant operation.

He was responsible for the introduction of the Package Power Plant, an integrated preassembled gas-turbine generator plant that fostered the rapid growth of gas-turbine peaking generation by substantially reducing the installed cost of such plants. He also had a leading role in the gas-turbine design and in the overall cycle development for one of the first combined-cycle gas-turbine/steam-turbine generating plants at Oklahoma Gas and Electric's Horseshoe Lake Plant.

His continual striving for improved performance and reliability was instrumental in enabling his company to provide large turbine generators with reliability substantially better than the nation's average. Mr. Elston has achieved international recognition for the quality of his work in this area.

During his long career in the power generation business, he was a major factor in the design and production of reliable and efficient steam-and gas-turbine generators. His positive influence is evident in approximately half of the capacity of power generation equipment installed in the United States today.

His broad experience and technical insights were recognized widely within the General Electric Company as well as by others. For example, he played a key role in assessing the reliability of boiling water reactor systems components. Mr. Elston was most penetrating in his evaluation of mechanical equipment in nuclear plants, and was instrumental in specifying test programs to define operating problems and to determine practical solutions to these problems.

Mr. Elston was interested in education throughout his career and made significant contributions to technical education. He was a member of the Visiting Committee on Mechanical Engineering for Lehigh University, and a member of the Board of Trustees of Green Mountain College in Poultney, Vermont.

He was a founding member of the Board of Trustees of Schenectady County Community College and its chairman for ten years, and was instrumental in the establishment of the college. In recognition of his work, in 1978 the main college building was named Elston Hall. Further, in 1985 he received the Distinguished Citizen of the Year Award from the State University of New York, the state education system's highest award.

He served numerous other volunteer civic organizations throughout his career. For example, his work as a board member of the Schenectady Boys Club earned him recognition as a national associate of the Boys Clubs of America by then Vice-President Richard M. Nixon.

From 1983 to 1987 he was chairman of the board of managers at Ellis Hospital, having been a member since 1964. As chairman,

he spearheaded the revitalization of the hospital, and the planning and construction phases of a new surgical suite that included facilities for cardiac surgery—a first for Schenectady County.

With all of his many areas of activity, Charlie Elston, a gentle man of good humor, always had time and patience to meet with his peers and others to discuss their problems and career progress. He was recognized as a mentor and role model by all who knew him. He lived a life of love and integrity.

Mr. Elston's contributions have had a positive effect on the economy and the standard of living that we have in the United States. His untiring contributions have had a significant impact on providing reliable and inexpensive electrical energy for the nation. His peers recognized his contributions by electing him to the grade of fellow in the American Society of Mechanical Engineers. In further recognition of his achievements, in September 1974 he was awarded the ASME George Westinghouse Gold Medal for his significant contributions to power generation technology. In 1980 he received an honorary doctorate from Union College in recognition of his business, technical, and community contributions.

The author of this tribute has never known of anyone who made as many significant contributions and gave so freely of his time and talents throughout his lifetime as Charlie Elston.

