W. LINCOLN HAWKINS

1911–1992

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W. LINCOLN HAWKINS, a leader in the engineering of polymeric materials for long service life, died at his home in San Marcos, California, on August 20, 1992. Hawkins was employed with Bell Telephone Laboratories (now AT&T Bell Laboratories) from 1942 to 1976. He was assistant director of the Chemical Research Laboratory at the time of his retirement. From 1976 to 1983 he was director of research of the Plastics Institute of America and was also active as an independent materials consultant and an expert witness.

Hawkins was born in Washington, D.C., on March 21, 1911. He attended public schools in Washington and was inspired to enter a technical career by a high school teacher, Dr. James Cowen. He persisted in his studies through the difficult years of the 1930s and received a B.S. in chemical engineering from Rensselaer Polytechnic Institute (1932), an M.S. in chemistry from Howard University (1934), and a Ph.D. in chemistry from McGill University in 1938. Hawkins taught at McGill from 1938 to 1941 and was a postdoctoral fellow at Columbia University from 1940 to 1942. His doctoral thesis involved the chemistry of lignin, an important component of wood that must be removed in the making of paper. This work resulted in sixteen publications.

Hawkins's arrival at Bell Labs coincided with the beginning of the age of polymers ("plastics" in vernacular usage, but the field also includes elastomers, thermosets, and other types).

Hawkins was drawn to telecommunications applications of organic materials. He was well aware of a strong prejudice against the use of organics in "quality" products, justifiably based on oxidation and degradation of useful properties. During the 1950s Hawkins and his colleagues made critical contributions to the field of polymer stabilization, which enabled the replacement of lead sheath for cables with polyethylene.

Polyethylene is subject to degradation through photo and thermal oxidation and the tough, flexible polymer becomes brittle and unsuitable to protect the cable. For cable sheath, carbon black is an effective additive to screen out the ultraviolet light that causes photooxidation, but carbon black was antagonistic to the additives used in the 1950s to retard thermal oxidation. Hawkins (and V. L. Lanza) found a thermal antioxidant that performed well (even better) in the presence of carbon black, and this combination was the basis of their patent.

Communications cable is a product that is expensive to produce and install, and basic changes in materials are accepted only after extensive validation of any innovation. Hawkins appreciated the importance of proven integrity and was a prime mover in a program to establish a methodology for accelerated aging based on oxygen uptake. The program was successful and led to widespread acceptance of the Hawkins stabilization package. This is an early example of the use of plastics in a demanding application requiring long service life (forty years!). As a bonus, huge quantities of lead were eliminated from installation.

Beyond these empirical aging tests, Hawkins and his colleagues worked actively on understanding the chemistry of the oxidation process and explaining the surprising synergism of the antioxidant and carbon black. He explored the chemically effective structures for polyolefin stabilization and enriched our knowledge of the basic processes. To an unusual degree he combined the roles of engineer and scientist and made lasting contributions to each field. He taught through the publication of articles in leading journals and through the organization of many symposia on polymer stabilization. Thus, Hawkins was not only a technical creator and practitioner but

he communicated the science, engineering, and practice for the improvement of society.

In the mid-1970s the technical community became alert to the finite character of the world's resources. Hawkins, who had been active in the reduction of waste through enhanced durability for more than two decades, turned his attention to the recycling of plastics. Hawkins led an effort that worked out practical procedures for separating and reprocessing factory scrap. He also made substantial advances toward the reuse of plastics from retired apparatus. This problem was of massive proportions, but Hawkins's methods provided tangible results and pointed the way toward necessary research.

Over his career Hawkins published fifty-five technical articles and three books and was issued eighteen U.S. patents.

During his long and fruitful career, Hawkins received many honors and awards. He received the Burton C. Belden Award of the American Chemical Society, the Percy L. Julian Award of the National Organization of Black Chemists, the International Award of the Society of Plastics Engineers, the Honor Scroll of the American Institute of Chemists, and the Achievement Award of the Los Angeles Council of Black Professional Engineers. He received honorary doctorates from Montclair State College, Stevens Institute of Technology, Kean State College, and Howard University. In June of 1992 Hawkins received the National Medal of Technology from President Bush at the White House.

In addition to his outstanding technical accomplishments, Hawkins was enormously effective as a role model and mentor for minority engineers and scientists. Within Bell Laboratories he worked tirelessly on minority education and employment programs and always found time for individual career and personal counseling. With Hawkins's input and advocacy, the Bell Laboratories Summer Research Program for Minorities and Women, founded in 1974, assisted more than 1,200 participants. Hawkins was also active in the founding and operation of the Bell Laboratories Cooperative Research Fellowship Program, which supplies support (monetary and personal) for minority Ph.D. candidates in technical areas. Sixty-six minority engineers

and scientists have obtained their Ph.D.'s through this program. Hawkins was the first chairman of the American Chemical Society (ACS) Subcommittee for the Education and Employment of the Disadvantaged (Project SEED). He also served as chairman of the National Academy of Sciences/National Research Council Committee on Minorities in Engineering. In these roles Hawkins had a broad impact on the integration of minority technical contributors into the mainstream of the U.S. technical community. The impact of his effort was national in scope. As the United States faces a future in which engineering and scientific manpower needs will require increased minority participation, his leadership will be ever more appreciated.

Beyond the singular history outlined above, Hawkins was chairman of the North Jersey Section (the largest) of the American Chemical Society and was a national councilor of the ACS for twenty-five years. In addition he found time to hold academic, civic, and church offices in his home state of New Jersey.

We have recorded above the documented traces, which, however accurate, do not capture the essence of the man. Linc, as he was known to everyone, was extraordinary in many, many ways. His grandfather was a slave who escaped, found his way north with difficulty, became a preacher and then bishop of the Canadian Methodist-Episcopal church, and later toured England and had his history recorded by an Oxford Don.

Linc was not notably athletic, but he took great interest in local sports and brought humor to the Bell Labs softball league as an umpire. In the 1950s there was a three-hole golf course on the front lawn of Bell Labs at Murray Hill. One day while strolling after lunch, Linc was attracted by a group of colleagues involved in a hole-in-one contest. Each participant was given two chances. Linc was no golfer and missed entirely with his first swing, but he hit the winning shot on his second, to the amazement of all. He never touched a golf club again.

Linc was always good natured, honest, wise, and friendly. He had a gift for resolving conflict. As an administrator he was kind and firm and got the most people had to give. We never knew anyone who did not like and admire Linc. He was cheerful, the perfect colleague to have on those days that yielded

less than we had planned. He loved engineering and chemistry, and his forced retirement from AT&T, under what was then a rigid age rule, was difficult for he was still at the height of his powers and had much to offer. He never complained. He continued to maintain an office at Murray Hill as a consultant on personnel issues, an area in which he continued to make exceedingly valuable contributions. Even so, his technical involvement was lost, which we regretted.

Linc always had a story, never at anyone's expense, to lighten up an occasion. Earlier this year he was being honored by induction into the New Jersey Inventors Hall of Fame. The evening was long, and many speakers possessed of great self-admiration had had abundant access to the microphone. Linc said, "I have only this to remark: 'Behind every successful man there is an amazed mother-in-law.'" Brevity is, indeed, the soul of wit.

It is a matter of ultimate satisfaction that Linc Hawkins, grandson of a slave and educated in segregated schools, stood in the Rose Garden of the White House to receive from the president the highest honor the nation has to offer an engineer.