



Lin Wang

An Wang

1920-1990

By Leo L. Beranek

BORN IN A SMALL CITY about thirty miles from Shanghai, China, An Wang created and nurtured a small high-tech company into a major worldwide supplier of office information systems. Early in primary school, he discovered he was good in mathematics, but he found subjects that required rote memorization, like history and geography, difficult. English was compulsory at school from the fourth grade onward, but his command of the language was solidified by his father, who was an English teacher. His mother taught him Confucianism, a practical philosophy, which he always emphasized was important to success in business, being characterized by the attributes of moderation, patience, balance, and simplicity combined with the golden rule.

At thirteen he entered Shanghai Provincial High School, considered the best in China. His mathematics texts were those used in freshman classes of American colleges, and his geography and history books were written in English. At the age of sixteen he entered the MIT of China, Chiao Tung University in Shanghai. After graduation in 1940 he spent the next year as a teaching assistant in electrical engineering. In the summer of 1941 he escaped through the Japanese invasion lines to central China and was put in charge of a group designing radio equipment to be used in the war. While there, he learned about a program that sent highly trained Chinese engineers to the United States to prepare them for the reconstruction of China.

He applied, was successful, and in June 1945 arrived at Newport News, Virginia, with a stipend of \$100 per month for support. He was sent to Georgetown University, where he stayed briefly.

Luck was with him. He applied for admission to the graduate school at Harvard and was accepted in the Applied Physics Department solely on the basis of his letter. With straight A grades, he earned his M.S. in two semesters in 1946. He was offered a Harvard part-time teaching fellowship at \$1,000 a year, which permitted him to work for his doctorate. His thesis topic was in applied mechanics, and he received the Ph.D. in the spring of 1948.

Wang went to work in the new Harvard Computation Laboratory under Howard Aiken, designer of the Mark I IBM computer, then called Automatic Sequence Controlled Calculator. Aiken gave him the problem of finding a way to record and read magnetically stored information without mechanical motion. Out of this work came a basic invention that Harvard allowed him to keep and patent—a magnetic core memory, which led to a practical delay line. Following a vital extension of the concept by Jay Forrester of the Massachusetts Institute of Technology, his invention was the basis for the core memories in computers for the next twenty years.

In 1949 he married Lorraine Chiu, who had come to the United States as a special student at Wellesley College. There are three children, Fred, Courtney, and Juliette. In 1955 An and Lorraine became American citizens.

With \$600 in savings, he opened Wang Laboratories in Boston in 1951. Wang's product was magnetic, toroidal-shaped, nickel-iron cores, around which wires were wound. It was in this period that he learned the principles of manufacturing, marketing, and management. In 1956 he assigned his patent to IBM for \$500,000.

In 1965 Wang Laboratories introduced LOCI, a desktop calculator, the forerunner of today's pocket computers. That year they sold twenty calculators and the following year six times as many. Improvements followed; the calculator became programmable; and the company grew from thirty-five employees in 1964 to four hundred in 1967. In 1965 John Kemeny of Dartmouth developed the computer language BASIC, which Wang recog

nized would spell the death of his desktop calculator. He decided to develop a minicomputer, similar to DEC's later PDP-8, which, after several false starts, led to the model 2200 computer, first shipped in late 1972.

Next came more elaborate word processing systems. Under Dr. Wang's general direction, an engineer Harold Kaplow and his team developed the word processing system that made Wang Laboratories the world's leader in sales of office equipment. That new machine was cathode ray tube-based, so the user could manipulate text by moving words as they appeared on the screen. The system was driven by a series of menus, so at each decision point a secretary could respond to a clear set of choices. It was perhaps the first computer with which an ordinary person could interact.

In addition, a decision was made to allow multiple access to a central station, a concept already employed by IBM, but different in that Wang's workstations were semi-intelligent. This permitted the addition of a Wang workstation at about one-third the cost of a competitive workstation. In October 1977 Wang Laboratories introduced a general-purpose computer, the VS, which combined word processing with general-purpose computing. Business grew at a compound rate in excess of 40 percent annually, and Wang Laboratories in 1985 reached a sales level of \$2.4 billion.

Throughout that period, An Wang was a brilliant conceptualizer, both in guiding the products of his company and in entering the financial markets at exactly the right times to permit the company's extraordinary growth. As one director said, "He has done so much right for so long that you become a believer, a disciple." He was concerned about loss of control of his company and devised a combination of two classes of stock that assured him of permanent control. Wang said in his autobiography (Addison-Wesley, 1986) that no outside shareholders would manage the company as well. "There is the fact that the company bears my name," he wrote. "I take its health and performance personally.... I have more interest in seeing the company prosper than any other shareholder."

In 1982 Wang was elected a member of the National Academy

of Engineering.

Dr. Wang was generous with his time in community affairs. He gave Boston's Metropolitan (performing arts) Center \$4 million, which, when matched, produced \$10 million in restoration support. It is now called the Wang Center. He endowed the Wang outpatient care unit of the Massachusetts General Hospital and contributed \$1 million to support Chinese studies at Harvard. Through the years he provided help to Chinese persons in many ways through scholarships and support of cultural institutions. Dr. Wang's death left a void not only in his company but also in the hearts and well-being of the residents of Greater Boston.

