For Carrier, Inspiration Came Out of the Air
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AMERICAN ENTREPRENEURS

For Carrier, Inspiration Came Out of the Air

In a centennial-year series, The Wall Street Journal is profiling entrepreneurs who have made noteworthy contributions to American business over the past 100 years.

A cold, foggy night in a Pittsburgh railroad station in 1902. Willis Haviland Carrier, a 25-year-old Cornell University engineering graduate, gazes absent-mindedly into the mist that hovers around the station and tracks. Suddenly, he grasps the answer to a vexing problem.

Carrier has been trying to cure the fluctuating humidity levels at a Brooklyn, N.Y., printing company. Rising and falling humidity causes the plant's paper stock to expand and contract so colors printed on successive days don't mesh on the page.

Willis Carrier

Carrier's fog-inspired idea: Blow air through a fine mist, and the mist particles will act as tiny condensers, drying out the air. Since moisture content in the air varies with temperature—cold air is drier than warm air—changing the temperature of the mist will alter the humidity.

"Apparatus for Treating Air," is how Carrier titled his subsequent patent application. Now it's called air conditioning.

If Willis Carrier had done nothing but set down the theory and formulas for air conditioning, he would be revered by engineers. But he did more. He designed and built increasingly sophisticated air-conditioning systems. He figured out how to efficiently air-condition multistory buildings, allowing architects to design climate-controlled skyscrapers. He founded Carrier Corp. of Syracuse, N.Y., now a unit of United Technologies Corp.

And by marrying two infant technologies, refrigeration and electricity, he fathered an industry that brought prosperity and population growth to hot, muggy areas of the world, including the U.S. Sun Belt.

Air conditioning, as much as oil, built Houston. Atlanta without climate control wouldn't attract many Yankees. In the end, Willis Carrier altered the landscape of the South far more than Gen. Sherman.

Cooling the interior of homes and offices was an afterthought. Carrier's early successes came in solving humidity problems for textile, pharmaceutical and other industries.

In 1922, he developed a compact machine that did away with toxic ammonia as a refrigerant. When New York City refused to permit use of the new refrigerant in a movie theater, claiming potential safety problems, Carrier stunned the city's safety chief by marching into his office, pouring a batch of the chemical into a container, and throwing in a match. It fizzled harmlessly, and the permit was issued.

Air-conditioned theaters proved wildly popular and ended the motion picture industry's summer doldrums. Carrier, also a bit of a huckster, claimed that watching an air-conditioned movie "imparts the same splendid Exhilaration you would feel after a two-hour vacation in the naturally pure air of the Mountains."

Congress called on Carrier in 1928 after a House committee declared that Washington's muggy summer climate was straining the health of the nation's legislators. The House chambers were air-conditioned that year, and other government agencies weren't far behind.

In 1937, Carrier rescued architects from the nightmare of designing bulky, space-stealing air ducts into large buildings. His solution was shooting moisture-laden air at high velocity through small-diameter pipes, and then cooling or warming the air in each room with individual units under each window. The glass-covered, high-rise office building was born.

Carrier's only stumble was cracking the housing market. The first home air conditioners were noisy and expensive. It cost more than $1,000 to air-condition a home in the late 1930s. Carrier's company lost $1.3 million in three years on home air conditioning, and abandoned the market for three decades to such companies as General Electric Co., Westinghouse Electric Corp. and Chrysler Corp.

—EUGENE CARLSON