



REFRIGERATION REVIEW

Mechanical Refrigeration: The Research Begins

The following is an excerpt from Industry in the Cold, prepared by the International Institute of Ammonia Refrigeration, Chicago, Illinois.

The development of a thermometer by Galileo Galilei in 1597 marked the beginning of 300 years of research that led eventually to the modern mechanical refrigeration system. Early highlights of these experiments include the development of the standardized thermometer scale in 1709 by instrument maker Gabriel Daniel Fahrenheit, and the isolation of ammonia, oxygen, and carbon dioxide gasses in 1773 by Englishman Joseph Priestly.

One of the phenomena observed by the "natural philosophers" of the 18th Century was the ability of volatile liquids such as ether to freeze water when allowed to evaporate while in contact with water. This observation, combined with Englishman Michael Faraday's successful liquefaction of ammonia and carbon dioxide gas by means of pressure, formed the basis of the refrigeration research of the 19th Century. Most of this work took place in Europe, and especially in England and France. The United States, with its abundance of harvested ice, complacently ignored most refrigeration research during this time. Two Americans, however, did make worthwhile contributions.

Early Pioneers

In 1834, Jacob Perkins, an American living in England, built the first vapor

compression machine which actually worked. Although his achievement was not mentioned in print for nearly 50 years, Perkins' machine, which was charged with ether, employed the four principal parts used in every compression installation to this day: a compressor, a condenser, an expansion valve and an evaporator.

Dr. John Gorrie is credited with the first ice machine patented in the United States in 1851. The first public demonstration of his machine occurred in Apalachicola, Florida, on Bastille Day in 1850 at a party held by a French cotton buyer, Monsieur Rosan. Rosan, a personal friend of Gorrie, had made a wager with other cotton buyers that there would, indeed, be iced champagne in spite of the delayed arrival of the ice shipment from the north. Rosan won the wager with several pounds of ice from Gorrie's new machine, which used the rapid expansion of compressed air in the presence of water to create the ice.

Unfortunately, Gorrie never was able to build a large version of his machine because of the rumored manipulations of the northern ice merchants. His work was not totally in vain, however. It is reported that Monsieur Rosan, upon his return to France, described Gorrie's machine to the Carré brothers, thus giving stimulation and impetus to their own ice-making research. The Carré brothers also benefited from the work of Leslie and Vallance in vapor absorption refrigeration techniques.

With the demand for "ices" in the cafés of Paris outstripping the capabilities of hand-cranked preparation, there was a definite need for ice-making machines. The Carré brothers perfected the Vallance technique and brought out the forerunner of the ammonia absorption plant, which relies on the rapid evaporation of liquid ammonia hastened by the absorption of the ammonia gas into an absorbent such as water. The ammonia/water mixture then enters a generator where heat is applied, causing the separation of the ammonia and water. The ammonia gas, under greater pressure, enters the condenser where it is cooled and condensed back into a liquid, which is slowly fed back into the evaporator and the cycle begins anew.

President Eisenhower an Operating Engineer

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The President of the United States, Dwight D. Eisenhower, put in a couple of years as an ice puller, fireman, and operating engineer in an ice plant and creamery near Abilene, Kansas, it was learned by NAPRE, through its National Treasurer, Leland Kenagy. Lee sends a clipping from the Kansas City Times in which the owner, P. D. Hoffman, Belle Springs Creamery, Abilene, recalls employment of Ike's father as a chief engineer in his plant back in 1892. David Eisenhower, the father, saw to it that his boys gained practical experience working in his department. They pulled ice, worked on the ice delivery dock, fired coal-burning boilers, and in some cases, stood the night shift as engineers. Mr. Hoffman was quoted as follows: "His name first appeared on our company payroll in June, 1906. The next time is the summer of 1908 when he probably helped in the ice department. In June 1909, he was evidently firing the coal-burning boilers. By fall of that year he was night operator in charge of the night fireman and night ice puller.

He was also taking some post-graduate work in the local high school. This allowed him to play football and also to get prepared for the West Point examinations. This night job was a 12-hour shift -- 7 days a week. So he was a pretty busy young fellow."

When Leland Kenagy visited the Eisenhower home in Abilene, he noted a certificate on the wall from the International Correspondence School issued to David Eisenhower for completion of the course in stationary engineering.