

Celebrating the achievements of David Boyle

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I recently set out to investigate the life and work of Scots-born engineer David Boyle. He is included in an elite group of 65 eminent figures who are accorded a short biographical note in “A history of refrigeration throughout the world” by Roger Thévenot, published by the International Institute of Refrigeration in 1977. Note that 10 of the group of 65 are Scots, or worked in Scotland, including Dr William Cullen, Sir John Leslie, Lord Kelvin, and two former Presidents of this Institution, Professor William Rankine and Mr Alexander Kirk. Boyle was inducted into the Scottish Engineering Hall of Fame in October 2022, joining Kelvin, Rankine, Kirk and Clerk Maxwell, but it always seemed to me that he was quite different to the rest of Thévenot’s group.

Thévenot wrote that Boyle “designed an ammonia refrigerating compressor (patented in 1872)” and “at the end of 1872 he built the first ammonia compressor in New Orleans”. Noting that 2022 was the 150th anniversary of this achievement I set out to find out more about this little-known and enigmatic figure.

He was born in Johnstone, Renfrewshire in 1837, where his father owned the grocer’s shop on High Street. David rebelled against his father’s desire that he too should become a grocer and so he emigrated to the United States at the age of 21 with his younger brother James. During the Civil War the brothers were conscripted into the Confederate Navy but towards the end of the war, while living in Demopolis, Alabama, David noted that the supply of ice for cold drinks was erratic in price and availability. The ice was typically harvested from lakes and rivers in the northern states and he concluded that local manufacturing of ice could be a very profitable business. He later stated that his vision had been to make enough ice for “the whole of Demopolis”, a town of about 1,200 people.

He doggedly pursued this vision for the next ten years, including the grant of a patent on “Improvement in Ice Machines”, issued in 1872. However this text doesn’t give any detail of the compressor used and doesn’t mention ammonia so it’s not quite the landmark achievement suggested by Thévenot. Reading around this topic I



discovered that others had tested ammonia compressors before 1872, including French chemist Charles Tellier and American engineer Francis De Coppet. David and James Boyle had designed and built an ice making system using an ammonia compressor but they didn’t get it running until the spring of 1874, not in New Orleans but in Jefferson, Texas. Encouraged by this success David relocated to Chicago to establish a production facility for their machines and it was James who applied for a patent on the novel aspect of their compressor, the poppet valves used to let gas in and out of the cylinder of the compressor. This application was filed on November 24, 1875 but James died just five days later, leaving his widow, Theresa, and his business partner, Thomas Rankin, to manage the patent process. This patent, “Improvement in Gas Liquefying Pumps” was granted on March 21, 1876 after Rankin had successfully responded to some queries from the patent examiner in December 1875.

Meanwhile David Boyle continued to develop his business in Chicago, initially working with the Crane Brothers Company to get machines manufactured and then setting up his own business, The Boyle Ice Machine Company, which successfully proved the technical superiority and commercial viability of the ammonia compression system for refrigeration. This created a surge of activity with many manufacturers in America and Europe following Boyle’s lead so that, although he had initially been very successful, his business was overtaken by larger concerns and by 1891, having merged with a competitor in 1884, was finally closed down.

My conclusion to this fascinating investigation was that, although his achievement was not as popularly described and 1872 wasn’t a particular highlight, David Boyle’s success in establishing ammonia refrigeration systems as a viable business sector is undoubtedly worth celebrating.