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Thaddeus Lowe: Refrigeration Pioneer

BY ANDY PEARSON, PH.D., C.ENG., FELLOW ASHRAE

He has been described as “the most famous American you’ve never heard of” and “the most shot-at man in the Civil War.” As a teenager he ran away from the family farm to join the circus, and he went from rags to riches several times in a long career in science and engineering. At the age of 23 he met a 19-year-old Parisian actress, fell madly in love and a week later they were married, on Valentine’s Day, 1855. Despite this whirlwind romance they raised a family of three sons and seven daughters, and when she died on May 16, 1912, after 57 years of marriage, he was heartbroken and only survived a further eight months.

His main passion was the science of manned flight. The circus act that enticed him from the farm was a traveling show that filled soap bubbles with hydrogen and floated them across the audience. This led him in turn to develop interests in the new sciences of aeronautics, climatology and astronomy, and then to him competing (unsuccessfully) to be the first person to cross the Atlantic by balloon. Although he often used the title “Professor Lowe,” he had no formal education and was largely self-taught. However, this did not prevent him from achieving several successful balloon flights in 1860 and 1861 and coming to the attention of President Lincoln.

At a demonstration to Lincoln of his ballooning capability on the Mall in Washington, D.C., in 1861, Lowe showed how a balloon observation post could be

deployed in a short time, giving unrivaled intelligence of enemy troop positions. As a result Lincoln invited him to form the U.S. Army Observation Corps, and despite being a civilian, he went on to serve in numerous battles as a “spotter” for the Union Army artillery. His equipment was mounted on two gun carriages for portability and used a mixture of zinc, iron and sulphuric acid to create hydrogen gas, which was then pumped into the balloon fabric. Within a couple hours of establishing camp, he could be in the air, using a telegraph wire to signal to the gunners below.

After the war his interest turned, among other things, to the preservation of meat. He adapted his hydrogen pump to work with carbon dioxide and created a system to condense

Reach for the skies.



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and evaporate the working fluid in a closed loop. Although vapor compression had been described by several people including Jacob Perkins, Alexander Twining and James Harrison, Lowe was the first to use carbon dioxide, predating the first closed-loop ammonia system by about six years.

While it was technically successful, with three patents granted in 1867, his ice making machine was not sufficiently attractive commercially, so Lowe returned to the Northeast and developed interests in the production of gas. In 1875, he patented a process for the production of “carburetted water gas,” a mixture of carbon monoxide and hydrogen produced by passing superheated steam over hot charcoal while injecting oil. This was highly successful and enabled him to retire to Pasadena, Calif., on the proceeds.

Once there he indulged his passion for astronomy, building an observatory on a peak in the San Gabriel Mountains and constructing a gas works, hotel,

electricity generating station, and funicular railroad (to the observatory on “Mount Lowe”) in the city.

A theme recurs throughout this story. There are numerous sharp changes of direction in Lowe’s career. It seems that he not only had a quick brain, but a quick temper, too. He left New York, the Army and the refrigeration business after failing to see eye to eye with people and falling out with them. Yet he was also faithful to his wife, his family, his business partners and his ideals. This brought him into contact with presidents, generals and the leading scientists of the day.

If his life had been scripted in Hollywood, it would be dismissed as “too unbelievable.” Indeed, it has the air of Forrest Gump about it, being edited into the major moments and inventions of his century. However, he was someone who appeared at just the right time with just the right mix of inventiveness, adventure and charm to succeed. ■

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