



Andy Pearson

Watt's the Big Occasion?

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

James Watt, the Scotsman in the trio of famous names from April's column, was the oldest of the three, being born in 1736, over 80 years before Joule and Kelvin. He also lived the longest and arguably had more impact on the industrialization of society than any other. His life is a mixture of contradictions, and he is frequently misunderstood and misrepresented. Like James Joule, Watt had no formal university education but relied on personal contact with the leading academics of his day to formulate and develop his ideas.

Watt trained as an instrument maker, specializing in making laboratory instruments for Glasgow University and the shipping trade. His workshop was set up within the precincts of the university after Watt completed his craftsman's apprenticeship in one year rather than the usual seven years. Commissions included laboratory instruments and navigational aids such as quadrants, parallel rules, barometers and telescopes as well as musical instruments including wooden flutes, fifes and pipe organs. This led to a post of astronomical instrument maker for the university where he worked with Joseph Black and John Anderson.

One of his repair jobs for the university was reconditioning a model of a Newcomen steam engine, but even after repair he found it would barely work because the efficiency was so low. Watt's "big idea" came to him in an instant while strolling on Glasgow Green in May 1765. It took four years to get this idea—the separate condenser—designed, tested and patented. Watt partnered with Matthew Boulton who ran a factory in Birmingham, England, and their compact steam engines delivered up to five times more power than the previous design.

Although Watt is often credited with inventing the steam engine and many of its accessories, this is clearly not so. He took an existing poor design and transformed it into a practical and beneficial reality. However, it is also wrong to see him merely as a mechanic using his skill with machines and tools to effect improvements. Despite his lack of higher education, he absorbed knowledge from a wide range of fields and was instrumental in the development of many chemical advances in bleaching, dyeing and the separation of gases.

Sir Humphrey Davy, a colleague in many of these chemical experiments, said "he was equally distinguished as a natural philosopher and a chemist, and his inventions demonstrate his profound knowledge of those sciences," and that Watt had "that peculiar characteristic of genius, the union of them for practical application." However, Watt himself confessed that he was not a businessman, writing, "I would rather face a loaded cannon than settle an account." This is where Matthew Boulton played his part, managing the business side of Boulton & Watt, leaving his partner free from the financial worries that had filled his

early career and allowing him to mix with the finest scientific minds in Britain and Europe. Watt more than held his own in such elevated company despite his humble origins.

A footnote to Watt's early career was found in the contents of his Birmingham workshop gifted to

London's Science Museum over 100 years after his death. Among the wide range of woodworking tools were several specialist pieces required for the manufacture and repair of flutes, dating back to his early years in Glasgow. These tools include a manufacturer's stamp bearing the legend "TLOT," clearly intended to give the impression the instrument was made by leading French manufacturer, Thomas Lot, the "Stradivari of flutes." This adds an intriguing twist to young Watt's financial predicament. Fortunately, his association with Joseph Black's chemistry department and its needs for ingenious instrument repair kept him out of prison and enabled him to take that fateful, inspirational stroll on Glasgow Green exactly 250 years ago. ■



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PHOTO: BAROQUE FLUTE BY BOAZ BERNEY, AFTER AN ORIGINAL BY THOMAS LOT, 1740.

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