

'ORDERS WILL BE NUMEROUS' STEAM ENGINES AND THE SOHO FOUNDRY

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The Soho Foundry, which still partially survives in Smethwick, was the first purpose-built steam engine manufactory in the world – and was to be a major factor in the development of steam power.

The Soho Foundry was established in 1795 by the second generation of Boulton & Watt, Matthew Robinson Boulton (1770–1842) and James Watt Jnr (1769–1848), the latter taking the lead role. The Foundry should not be confused with the Soho Manufactory, established in the early 1760s by Matthew Boulton on Handsworth Heath.

In the 1790s, the future of Boulton & Watt steam engines was threatened. The patent for B&W engines with a separate condenser was due to expire in 1800 and it was imperative for the business to obtain an advantage over future competitors. This was made even more necessary by the break-up in 1795 of the firm of the brothers William and John Wilkinson, located in Bersham, Shropshire – suppliers of the finest engine cylinders in the country.

In 1796 one standard B&W rotary beam engine with a 20in cylinder rated at 14H (hp) was installed in the new engine house at the Foundry. It provided all of the power to the boring mill to the west and the drills and lathes in the turning shop to the east, and was also connected to a blowing cylinder to produce blast to the cupola in the main Foundry building.

The arrangement proved to be unsatisfactory as the single engine was required to do too much work, made worse by the power being transmitted through an over-complex system of interlocking toothed and bevelled spur wheels. As a result the boring rod could not be kept steady whilst revolving, but vibrated, or 'dithered,' an unacceptable action for the accurate boring of engine cylinders.

Over the next two and a half years many alterations were applied to the gearing without any appreciable improvement in performance. What happened next reflected the ability of B&W to adopt technological change to solve a major production problem. It was fortunate that James Watt Snr, understandably a stalwart proponent and defender of the beam engine and no other, had retired from the firm. Providence had, however, bestowed upon B&W another engineering genius, whose remarkable contribution to this firm is still to this day much underestimated.



The Soho Foundry with the boring mill in the foreground, 1895 immediately after closure.

William Murdoch's Importance

It is a great credit to James Watt Jnr that in late 1798 he persuaded William Murdoch (1754–1839) to return from Cornwall, where he was busily engaged in erecting B&W engines, in order to solve the problems of a defective boring mill.

Murdoch accomplished this by installing two small beamless bell-crank engines (3H each) – which he was the first to invent but never patented – to run two of the boring machines independently. The existing

beam engine was left to power the third boring machine and the turning-shop machinery.

Murdoch further introduced the 'worm screw', a smoother method of transmitting power from one line shaft to another than through the more conventional cogged wheels. By October 1799, after many delays and teething troubles, the major refit had been completed and was successfully boring its first engine cylinder. In 1802 a third boring machine and bell crank engine was installed.

The future of stationary steam power was to be that envisioned by Murdoch rather than Watt Snr. In the nineteenth century, engines came in a wide range of sizes and a bewildering variety of design, some with beams, many without. Despite the prejudices of his father, James Watt Jnr as early as January 1799 predicted that '...Orders for these Small Engines will be numerous'. His prediction was to be correct. ●

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Further Reading

George Demidowicz, *The Soho Foundry Smethwick West Midlands A Documentary and Archaeological Study*, for Sandwell Borough Council and the Heritage Lottery Fund 2002.

John Griffiths, *The Third Man, The Life and Times of William Murdoch, inventor of gaslight* (Andre Deutsch, 1992)

Laurence Ince, 'The Soho Engine Works 1796–1895,' *The Journal of the International Stationary Steam Engine Society*, 2000 no 16.

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