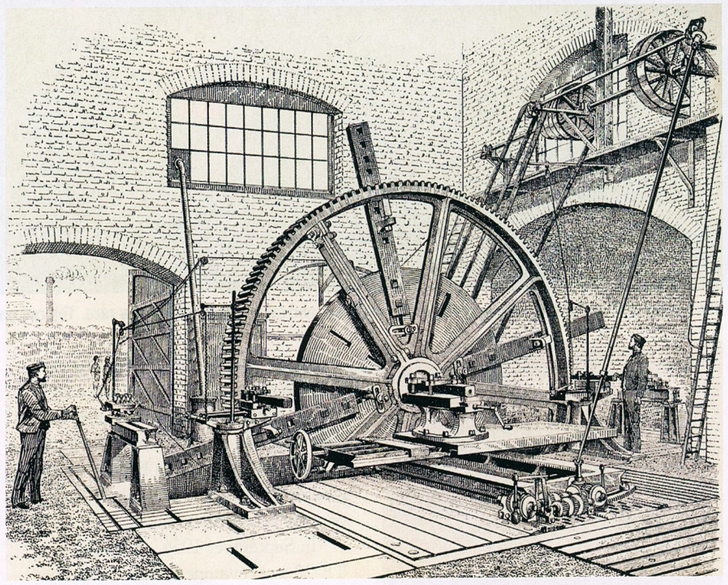
THE TRAGEDY AT BRICK MILL

John Hannavy tells the story of one of the many early industrial accidents of the steam age.

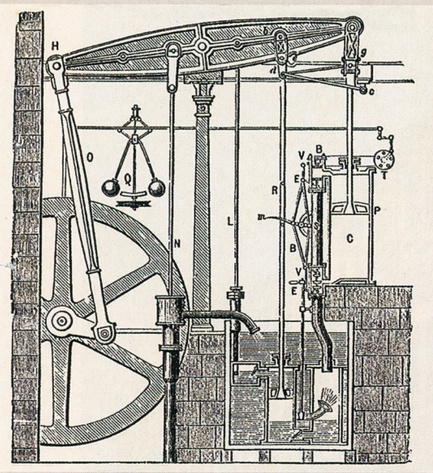
Back in the early years of the 19th century, Britain's canals were the motorways of the day. It was possible to travel by water the length and breadth of the country on the 'new' canal network which was already extensive and would be further extended in the following years. The timing was fortuitous, as mills across the country were converting to steam power and Britain's road system at the time was not designed for the efficient movement of large heavy engines over great distances – and beam engines were very heavy indeed.

Steam engine builders, Boulton & Watt, whose Soho Manufactory was in Smethwick in the Midlands, were early users of the canals to deliver their engines to the many companies which were replacing water power with steam power. The engine at the heart of this story was destined to be delivered in early 1815, 120 miles away from the Soho Works – a challenge hugely simplified by the growing canal network which meant that the engine components could be shipped to within a mile of where it was to be assembled. In this case, a likely route would have used the Birmingham Canal, Grand Union Canal and Oxford Canal, followed by a short distance along the Thames before joining the Wiltshire & Berkshire Canal and finally the Kennet & Avon Canal to the quayside at Hilperton Marsh – those last two canals had been opened just five years earlier in 1810.



Boulton & Watt's Soho Foundry in Smethwick, from where the Trowbridge engines began their journey south.

This gilded statue of William Murdoch, Matthew Boulton & James Watt by William Bloye (1890-1975) stood in Birmingham's Broad Street until placed in temporary storage in 2017.



An illustration of an early Watt engine, dating from 1784.

The Wiltshire & Berkshire Canal – plans are in hand to restore part of it.

A painted marker on the Kennet & Avon Canal marks where the Wilts & Berks once joined it.

Hilperton Marina – the site of the quay at Hilperton Marsh was about 200 yards away, now inaccessible.

Lifting a narrowboat at Hilperton Marina.

On the Kennet & Avon Canal.

How long that journey would have taken is not recorded.

Boulton & Watt had 'assemblers' based across the country whose job it was to organise the erection of the engines, and usually maintain them thereafter. Their agent in Wiltshire was one George Haden (1788-1856), who had been apprenticed at the Soho Works at the age of 15 before being entrusted – aged just 22 – with the sale and installation of engines first in the north-west of England and later across parts of the south-west. In late 1814, shortly after being assigned to the south-west, he arranged his first sale – a 10hp engine with a 19¾in. diameter cylinder and a 2ft 6ins stroke – to Stone Mill, a textile factory in Trowbridge owned and operated by John and Thomas Clark. The mill had hitherto been water-powered via a channel from the River Biss.

Records of the supply and installation of that engine tell us that the engine itself cost £873.11s.0d. A further £25.10s was spent on building a stone foundation for it, and Haden's fee – his name is spelled 'Hayden' in Clarks' records – was £30. A further £9.2s.6d went on wages for the workers who assisted him.

The Clarks' records also list the costs of shipping the engine from Smethwick to their premises. The canal journey cost £33.19s from loading on to barges at Smethwick on James Brindley's Birmingham Canal, to unloading at the quayside at Hilperton Marsh on the Kennet & Avon Canal – 5s.8d (28p) per mile. The shipping company is listed simply as 'Britten', with no information as to how many canal boats were required to ship the load south. For the last mile – from Hilperton Wharf to Stone Mill – local hauliers Godby & Company charged £6.16s.6d.

Haden's next sale was a 14hp double-acting crank engine to another Trowbridge mill, Brick Mill, a newly-built fulling mill and dyeworks owned by Daniel Strang and William Webber whose address was given as 'Upper Court' in Trowbridge – a name which harks back to the upper court of the long gone mediaeval Trowbridge Castle. Somehow their names have, over the years, been incorrectly transcribed in Boulton & Watt's records as 'Strange & Webber', and one can reasonably assume that shipping their larger – and heavier – engine would have cost rather more than the Clarks' engine.

Brick Mill today – a large section of the building was lost in a fire in 1856.

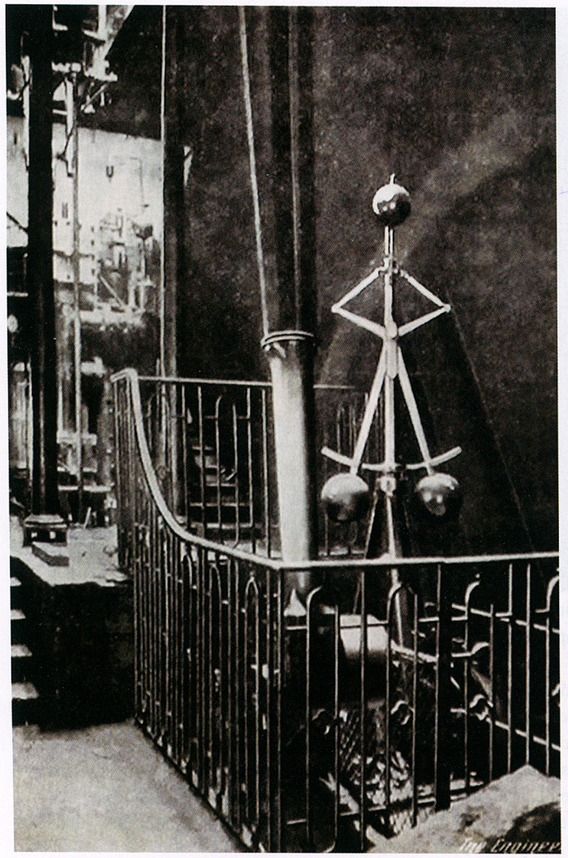
Brick Mill was adjacent to the Clarks' Stone Mill on Court Street for whom they did quite a lot of fulling and dyeing work from 1808 into the 1820s. In 1811, for example, the Clarks spent £251 with them – a significant sum back then, which today would amount to just over £20,000.

Strang & Webber had bought the land known as Upper Court early in 1814 and immediately built what was described as a 'factory and dye house' on the site, together with an Engine House designed by James Watt Jnr who also designed the engine. This was a thoroughly modern mill, destined to be powered by steam from the outset.

The drawings for the Strang & Webber engine and its engine house were completed on 17th December 1814, and survive in The Library of Birmingham. The engine was apparently not delivered until early 1815, as an especially cold winter caused part of the canal system to be closed due to ice.

Strang & Webber's engine was a Boulton & Watt 'D' Type engine with a 20¾in. diameter cylinder, a 4ft stroke, parallel motion, cast iron beam, a cast iron connecting rod and a governor – and such an investment, based on what the Clarks spent on their smaller engine, would have cost well in excess of £900 in 1814 and over £1,000 by the time it was installed – plus, of course, the cost of building the new engine house.

We know from the Clarks' records that while Boulton & Watt built engines, it seems they did not deliver them. As far as Strang & Webber are concerned, Boulton & Watt records simply identify their address as 'Trowbridge' – so it seems that whoever was transporting the engine relied on the buyer to tell them where delivery should take place. For the canal journey, perhaps they used the same carrier that the Clarks had used earlier – at least that carrier would already know the way.



One of Boulton & Watt's 40hp large rotative beam engines – typical of their early 19th century designs. This one was installed in April 1823 for use in Thomas Castle & Company's Bristol gin distillery – where it operated for almost a century – joining a 1793 engine which had been installed under the distillery's earlier name of Naylor, Castle & Company.

Stone Mill is now small industrial units.

George Haden seems to have done very well out of Trowbridge's textile mills as many more converted to steam at around the same time – and Boulton & Watt engines were the market leaders. Servicing the installed engines occupied some of his time, while also allowing him to develop a very successful business with his brother designing and marketing stoves. It was manufacturing stoves rather than erecting steam engines which made the Haden family's fortune.

Locally, fulling mills were sometimes referred to as a 'braying' mills, although the processes were similar, both being designed to clean and degrease the newly woven cloth, while also tightening the fibres together to give a smooth finish. Fulling, 'scouring' or 'braying' mills have been known since Roman times, but the introduction of steam power brought with it both the need for skilled engineers and introduced completely new dangers.

In the Friday 18th September 1815 issue of *The Salisbury & Winchester Journal*, there was an account of a horrific accident which had taken place in Strang & Webber's engine house the previous Wednesday, 13th September. The engine, by that time, had been in use for around eight months, and the mill seems to have been operating around the clock – or at least well into the night – to meet demand for their services.

The newspaper account made horrific reading.

"A fatal accident happened on Wednesday night at Mr Webber's factory in Trowbridge. It appears that two men were employed to look after an engine, one of whom, while putting some oil to it, was struck on the shoulder by what is called the governor, and turning suddenly round, was struck again on the head and knocked into the flywheel by which he was carried around and thrown upon the crank; the governor strap was broken by the concussion, so that the engine went round with unbounded velocity. When it was stopped, a shocking spectacle appeared: the brains of the unfortunate man were literally dashed out, the head nearly severed from the body, and almost every bone dislocated."

Given that these engines had to be regularly oiled while still running at full speed, accidents of such severity seem to have been mercifully unusual and engineers quickly learned to treat them with considerable respect. Even at the relatively low rotational speeds of early governors – the engine operated at 25rpm – the weight of the large spinning balls could do a great deal of damage.

Over time, more sophisticated designs of governors would become much smaller, but in the early decades of the 19th century, they were large and heavy. Comparing surviving beam engines by various builders with original drawings of Boulton & Watt engines, it

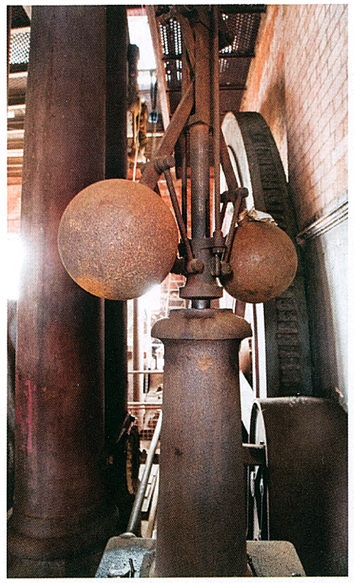
is clear that large fly-balls continued to be fitted to engines well into the second half of the century.

The Gimson Woolf-type beam engines at Claymills Pumping Station, for example, were installed in 1886, and the last one was shut down in 1971. In the years since then, three of the four engines have been restored, leaving only the A engine to be returned to life. Its unrestored governor shows the effect of the past 48 years of neglect.

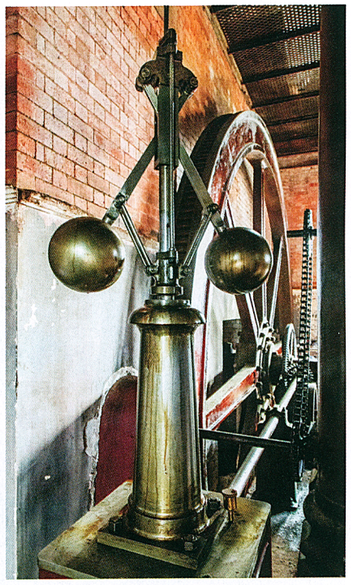
The governor on the B engine was lost during the period of closure, but the team at the Claymills Pumping Engines Trust have engineered a fully working replacement from scratch – a credit to their skills. It was during that work that the weight of each of the fly-balls was ascertained. Remarkably similar in size to the governor which would have been fitted on the 1815 Trowbridge engine, each fly-ball on the Gimson engine weighs 90 pounds – 41 kilograms.

The weight of each fly-ball on a similar Gimson engine built in 1878, which came from a sewage pumping station in Winchester and is now stored at Twyford Waterworks, has been calculated at 60-65kg, and spinning at 25rpm, that would have delivered a blow of some considerable force to a 75kg man. The only mercy is that on that fateful September night, Webber's unfortunate engineman would have known virtually nothing about it.

While Brick Mill was newly built, Stone Mill next door dates back in part to the early 16th century when it was built as a water-powered corn and grist mill, drawing water from the River Biss. It was acquired by Alexander Langford, a clothier in 1544 and continued to be associated with the textile industry in the town for more than 350 years.



An unrestored governor on one of the Gimson engines at Claymills Pumping Station.



The recently recreated governor at Claymills.

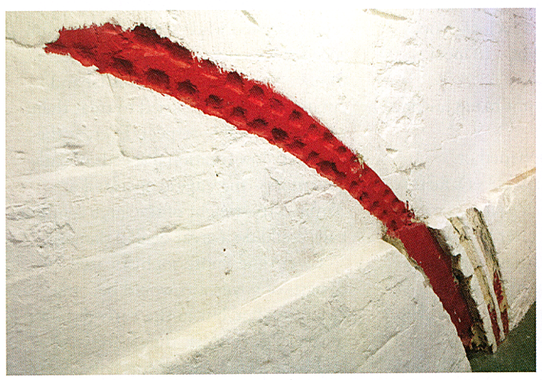
According to records, Langford sold the mill to William Rede in 1571, and by 1602, he in turn had sold it to the Earl of Hertford, whose successors granted 'life leases' to tenants named Lovell, Houlton and then Cooper between 1602 and 1785 when the site was sold to a John Clark. Clark later bequeathed the mill – trading as J & T Clark – to his niece, Harriet Walker of Bristol. She in turn sold it to Strang & Webber around 1817.

Strang & Webber added a new engine house to Brick Mill, although there remains some uncertainty as to just when that happened but a larger engine seems to have been installed in 1819.

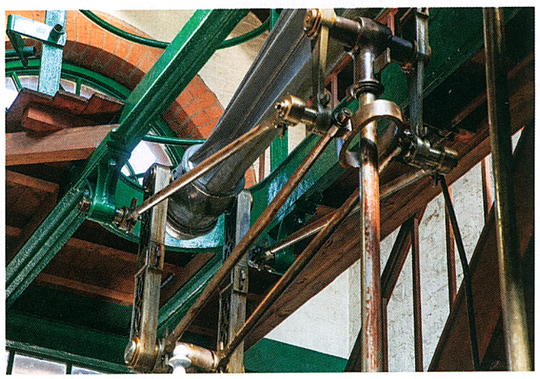
Despite the newspaper report referring to 'Mr Webber's factory', the business continued to trade as Strang & Webber until Strang's death in 1831. In his will he left everything to his sister, Rosamond, who just happened to be Webber's wife.

Brick Mill was extensively damaged in a serious fire in 1856 and only partly rebuilt. Both it, and Stone Mill next door are now commercial units. ■

My thanks to Martin Gregory at Twyford Waterworks in Hampshire, who first alerted me to the newspaper cutting around which this article is written, to Mike Guthrie at Claymills Pumping Station in Staffordshire for information on the weight of fly-balls, and to Jon Giles for giving me access to both Brick Mill and Stone Mill.



The only surviving evidence that a Boulton & Watt engine once stood in a pit at Stone Mill.



The parallel motion on the 1820 beam engine at the Museum of Science & Industry in Manchester.