

James Brindley, an English engineer, was born in Tunstead, Derbyshire, and lived much of his life in Leek, Staffordshire. He became one of the most notable engineers of the 18th century. Born into a family of yeoman farmers and craftsmen in the then isolated Peak District, he received little formal education but was educated at home by his mother.

At 17 he commences a seven-year apprenticeship as carpenter and millwright with Abraham Bennett of Gurnett, Sutton, near to Macclesfield, Cheshire. He was initially called a fool and bungler by his master and the other men. However a year or so into his apprenticeship he was being asked for by name by local mill owners when repairs were required, often in preference to the master himself.

An example of Brindley's ability and character is his response to a disastrous undertaking by Abraham Bennett:

Bennett was employed to create machinery for a new paper-mill, by the River Dane at Wildboarclough, Cheshire. He used the machinery in two other mills, as his model for Wildboarclough, but his drunkenness ensured he had insufficient practical information to do the job. However, Bennett set his men to work unwilling to forego the financial rewards of such a job. The assembled machinery would neither fit nor work and it was clear that Bennett was not up to the job. But Bennett and his men persevered making no satisfactory progress. Bennett was unwilling to admit to his own incompetence as a mechanic and feared for his reputation and thereby his future employment prospects.

The incompetent work soon became known in the local tavern. The work was described as a farce and that Abraham Bennett was wasting his employer's money.

Brindley was concerned for both the honour of the workshop and the reputation of his master. At the end of a week's work he left the mill without speaking of his intention to anyone. Instead of returning to his lodgings he went to Manchester. When Bennett discovered that Brindley was not at home he worried that he had absconded.

On the following Monday Bennett went to the mill, to find Brindley working on modifications to what had been done so far. Brindley had been to Smedley Mill, one of the models for the Wildboarclough mill, to inspect the machinery in order to solve his master's problems. He had walked the twenty-five miles there on the Saturday evening and on the Sunday morning had approached the owner of the mill in order to gain his permission to inspect the machinery. Brindley spent the whole of the Sunday making careful observations. He then walked the twenty-five miles back to Macclesfield.

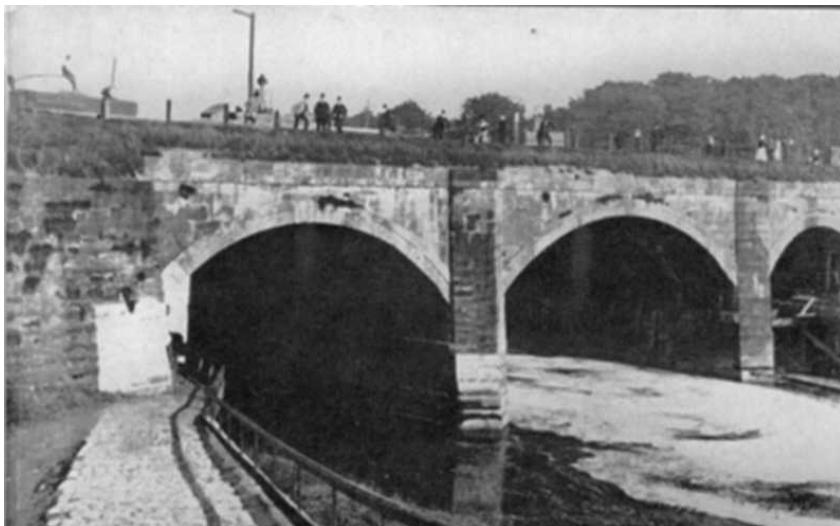
As a result of Brindley's effort, determination and skill Abraham Bennett handed the contract over to his apprentice. The design was revised according to Brindley's instruction, parts being rejected and rebuilt, others being redesigned and completely new improvements introduced. The work was brought to a successful conclusion, within the contractual time allowed, to the entire satisfaction of the proprietors of the mill.

The experience at Wildboarclough left no doubt in Abraham Bennett's mind as to James Brindley's outstanding skill and enormous ability. Bennett left him in charge of the workshop. For several years Brindley maintained Bennett and his family, and when Bennett died, Brindley continued with the outstanding contracts to their completion.

He subsequently set up business for himself as a wheelwright in Leek, Staffordshire. In 1750 he expanded his business by renting a millwright's shop in Oakham. He soon established a reputation for ingenuity and skill at repairing many different kinds of machinery. In 1752 he designed and built an engine for draining a coal mine, the Wet Earth Colliery at Clifton in Lancashire. Three years later he built a machine for a silk-mill at Congleton.

Brindley's reputation brought him to the attention of the 3rd Duke of Bridgewater who was looking for a way to improve the transport of coal from his coal mines at Worsley to Manchester.

In 1759 The Duke commissioned the construction of a canal to do just that. The resulting Bridgewater Canal, opened in 1761, is often regarded as the first British canal of the modern era (though the Sankey Canal has a good claim to that title), and was a major technical triumph. Brindley was commissioned as the consulting engineer and, although he has often been credited as the genius behind the construction of the canal, it is now thought that the main designers were Sir Thomas Egerton himself, who had some engineering training, and the resident engineer John Gilbert. Brindley was engaged, at the insistence of Gilbert, to assist with particular problems such as the Barton Aqueduct. This most impressive feature of the canal carried the canal at an elevation of 13 metres (39 ft) over the River Irwell at Barton



The Barton Aqueduct over the River Irwell, shortly before its demolition, 1891

Brindley's technique minimized the amount of earth moving by developing the principle of contouring. He preferred to use a circuitous route which avoided embankments, and tunnels rather than cuttings. Though this recognized the primitive methods of earth-moving available at the time, it meant that his canals were often much longer than a more adventurous approach would have produced. But his greatest contribution was the technique of clay puddling to make the bed of the canal watertight.

Brindley's reputation soon spread and he was soon commissioned to construct more canals. He extended the Bridgewater to Runcorn, connecting it to his next major work, the Trent and Mersey Canal. At this time Brindley had never built a lock and he first built an experimental lock in the grounds of Turnhurst, a house he had bought near the summit, and this determined the design of the narrow canal lock which characterized most of the canals in the Midlands, with a single upper gate and double mitre lower gates. These were for an elongated version of the boats designed for the underground system at Worsley, the so-called 'starvationers', which were subsequently known as narrowboats and this decision was to cast a long shadow on the English canal system.

Brindley believed it would be possible to use canals to link the four great rivers of England: the Mersey, Trent, Severn and Thames (the "Grand Cross" scheme).

Since the potteries around Stoke-on-Trent were in desperate need of something better than the pack-horse to carry their fragile wares, they wholeheartedly supported the connection of Staffordshire to the Trent and to the Mersey. The first sod was cut by Josiah Wedgwood in 1766 and Brindley carried it away in a barrow. From Runcorn, the canal would climb by a series of thirty-five locks, pass through a three thousand yard long tunnel (the Harecastle Tunnel), then descend by a further forty locks to join the Trent at Wilden Ferry, near Shardlow. There was mounting ridicule about his scheme and in the event, although the canal opened from Shardlow to near Stafford in 1770, it took eleven years to drive the tunnel.

The Trent and Mersey Canal was the first part of this ambitious network, and the later Chester Canal, started in 1772, was also a result.

However, although he and his assistants surveyed the whole potential system, for, from the start, he had asserted his view of the Trent and Mersey as the "Grand Trunk Canal" - the Grand Cross of waterways across the country - he would not live to see it completed. The Harecastle Tunnel finally opened in 1777 and coal was finally transported from the Midlands to the Thames at Oxford in January 1790, some 18 years after Brindley's death. Development of the network, therefore, had to be left to other engineers, such as Thomas Telford.

In total, throughout his life Brindley built 365 miles (587 km) of canals and many watermills, including the Staffordshire and Worcestershire Canal the Coventry Canal, the Oxford Canal and numerous others, and he also constructed the watermill at Leek, now the Brindley Water Museum.



In 1771, work had begun on the Chesterfield Canal, but while surveying a new branch of the Trent and Mersey between Froghall and Leek, he was drenched in a severe rain storm. It had happened many times before, but he was unable to dry out properly at the inn at which he was staying, and caught a chill.

He became seriously ill and returned to his home at Turnhurst, Staffordshire, where he was discovered to be suffering from diabetes.

James Brindley died at Turnhurst within sight of the unfinished Harecastle Tunnel on 27 September 1772

News & Letters

From Bradford MES

Hi folks, this is an advance notice that our diesel day will be held on **Sunday 31st July, 2011 from 10am until 5pm**. Tea, coffee and light refreshments will be provided. Please come and enjoy our woodland circuit and have a natter with friends old and new. Give steam a rest and let the diesel (outline) take the strain for a change! I will contact you nearer the day with a reminder but if you have any queries please let me know.

John Hawkes Publicity Officer, Bradford Model Engineering Society

Santa Specials.

I did not hear any funny comments from the little ones this year. I think that they were all absolutely amazed by Santas potting shed. They all seemed to be delighted with the gift that Santa gave them. I would like to thank all of the members who gave of their time and expertise to make this magic time for the children and parents possible. I have had telephone calls from friends saying what a wonderful time that they have had.