

ISAMBARD KINGDOM BRUNEL: INNOVATIONS IN TRANSPORT



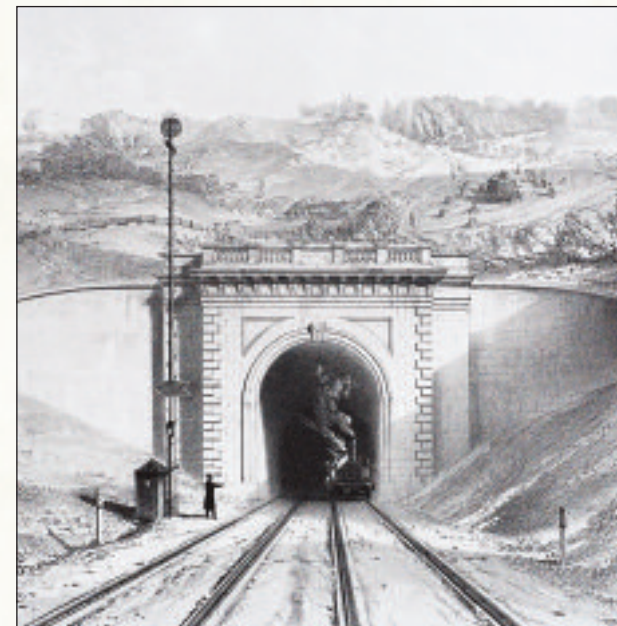
Isambard Kingdom Brunel
(Institution of Civil Engineers).

Isambard Kingdom Brunel was a polymath whose career embraced civil, structural, mechanical and marine engineering, architecture, art and design. He was a key figure within an influential group of engineers and inventors that included Thomas Telford, John McAdam, George and Robert Stephenson, and Joseph Locke who provided the impetus for Britain's industrial growth during the nineteenth century. With his railways and his steamships Brunel could conquer time and distance and open up new opportunities for travel and trade, the sort of opportunities that allowed Phileas Fogg to make his trip around the world.



In 1833 Brunel was appointed chief engineer for the Great Western Railway (GWR), with the responsibility of devising a rail route from Bristol to London, that was later extended down to Penzance in Cornwall and throughout the South West. He had no previous experience in railway construction, but convinced the line's promoters that he was the right man for the job with his self-confidence, passion and eloquence. During his years in office he became personally involved in every aspect of the enterprise, negotiating with the clients, designing the track layout and rolling stock, devising radical solutions to civil engineering problems, securing finance, and recruiting, motivating and managing staff. Brunel's technical ingenuity was put to the test and among his lasting achievements along the route are Paddington station, the Maidenhead Bridge, the viaducts at Hanwell and Chippenham, the two-mile-long Box Tunnel, and the Royal Albert Bridge at Saltash.

Brunel had insisted on using his broad gauge (7 ft 1/4 in / 2.14m) system instead of the standard gauge (4ft 8 1/2 in / 1.43m) endorsed by the Stephensons. This led to difficulties when the two gauges met at stations such as Gloucester as passengers had to transfer trains before continuing their journeys. With carriages and steam locomotives designed by Daniel Gooch to Brunel's specifications, the broad gauge system was considered to be more comfortable and allowed for faster travel than the narrower gauge. However, in 1846 the government decided in favour of the standard and all new lines were built to that scale. On the weekend of 21-22 May 1892, 5,000 navvies completed the task of replacing Brunel's broad gauge with standard gauge the length of the GWR's Paddington-Penzance route, including re-laying the entire track from Exeter to Truro.



The entrance to Box Tunnel on the GWR.



Skew bridge carrying the GWR at Bath (Elton Collection: Ironbridge Gorge Museum Trust).

Transferring from the broad to standard gauge at Gloucester, 1846.

Through his work on the railways Brunel contributed to a process that would come to physically unify the country, widen access to public transport and lead to the general adoption of Greenwich Mean Time for the accurate coordination of timetables. By the end of his career it is estimated that Brunel was responsible for laying nearly 1,200 miles of track including stretches in Italy, Ireland and Bengal as well his lines in the South West, South Wales and Midlands. Although other railway engineers may have produced more miles of track and more economically, no other rail system was so influenced by a single creative genius.



A railway viaduct in South Devon (National Trust).

Brunel's first shipbuilding project was the ss *Great Western*. Launched in Bristol in 1837 and making her maiden voyage the following year, she was an oak-hulled paddle steamer and the first steamship to provide a regular transatlantic service, heralding a new era of ocean-going transport. Of perhaps greater significance for world travel was the *Great Western*'s sister ship, the ss *Great Britain* launched on 19 July 1843. She was the largest and most powerful ship to have been built to date and the first propeller-driven, steam-powered iron ship to cross the Atlantic. She went on to make regular runs to Australia and is thought to have carried the forbears of around 250,000 modern day Australians. Brunel's final maritime project was the ss *Great Eastern*. The biggest steamship yet to be built, capable of carrying 4,000 passengers at a time on a non-stop trip to Australia, she was launched in 1858. She proved uneconomic as a passenger ship but had a new lease of life when she was used to lay the first successful transatlantic telegraph cable, connecting Ireland to Newfoundland in 1866.



ss *Great Britain*, 2005 (ss *Great Britain* Trust).

ss *Great Western* (Private collection).

