
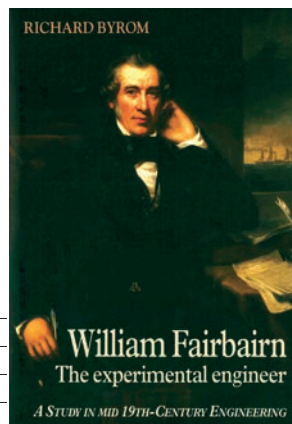


Review

 **Robert Thorne** enjoys this thorough and immaculately referenced biography of a great Victorian engineer whose inventiveness and achievements are underappreciated today.

William Fairbairn: The experimental engineer

Author: Richard Byrom
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William Fairbairn is not a name which immediately springs to mind when engineering heroes are discussed. Unlike Telford, Brunel and the Stephensons, he has not been the subject of a mainstream biography and there are no major projects popularly celebrated as his achievement. Yet for over 50 years, from the early 1820s until his death in 1874, his restless inventiveness put him at the forefront of almost every sphere of engineering, from waterwheels and steam boilers to bridges and shipbuilding. No account of the heady triumphs of Victorian engineering can avoid his contribution.

The problem for any biographer of Fairbairn is that, although he published 10 books and countless articles and reports, he left no papers or letters. The records of the firm he founded were destroyed in 1899. So, Richard Byrom has been forced to tell the story of his life through what is known about his works and the world in which he operated. Inevitably, the man himself never fully comes to life, but we are left in no doubt about what he designed, fabricated and built.

Fairbairn was of the generation of engineers that trained as millwrights, in his case at the famous Percy Main Colliery near North Shields. He then spent over two years on the road as a journeyman millwright before

arriving in Manchester in 1813. That city's phenomenal industrial growth enabled him to establish an engineering workshop with John Lillie and to hone his entrepreneurial skills. Fairbairn and Lillie lasted for 15 years, after which he ran his firm under his own name. He was later joined by his sons and, in 1864, when he had retired but was still fiercely active, it became the Fairbairn Engineering Co.

The keys to Fairbairn's success were his inventiveness (or his ability to spot the potential in other people's ideas), his networking instincts and his 'determination to excel'. His expertise, always more practical than theoretical, was primarily based on experiments and model-testing. For this he developed his own equipment, most famously the 'Fairbairn Lever' for measuring the deflection or crushing strength of iron. He was joined in carrying out many of his experiments by the scientist Eaton Hodgkinson and later W.C. Unwin. The 'Hodgkinson Beam', one result of these experiments, was crucial to Fairbairn's textile mill designs, along with his improved forms of power transmission.

Fairbairn is best remembered for his collaboration with Hodgkinson and Robert Stephenson in the design and erection of the tubular Conway and Britannia bridges,

1845–50. The story of these projects has often been told and Byrom forbears to repeat it in every detail. Fairbairn brought to the design of these bridges his knowledge of the buckling strength of iron beams, based on his shipbuilding projects, and his Thameside yard was used for the essential model-testing. But before the Menai tubes were raised, he had fallen out with both Hodgkinson and Stephenson.

It is typical of Fairbairn's fertile inventiveness that, while the Conway and Britannia designs were being developed, he conceived of a variant tubular bridge design. This consisted of pairs of rectangular tubes with cellular top flanges, carrying cross-beams between them to support the railway track. The first such bridges were built in 1846–47 and in 1861 Fairbairn claimed that over 200 bridges had been built 'upon his formula'. However, the vogue for tubular bridges was short-lived. They were superseded by lattice or plate-girder bridges, some of which were supplied by the Fairbairn Co., but which were not specially theirs.

Many people will want to raid Byrom's book to find what he has to say on whatever aspect of Fairbairn's life interests them most. Nowhere will they be disappointed, for this is an immensely thorough and immaculately referenced work. But to be selective will be to miss the strength of Byrom's connecting themes, particularly about the Manchester engineering culture and the performance of engineering firms. It is 140 years since the first Fairbairn biography was published. This is a far superior successor, which will not be overtaken for many years to come.

Robert Thorne

Robert Thorne is a Consultant at Alan Baxter Ltd, specialising in the conservation of historic structures and buildings. He has worked on Crossrail, The Midland Grand Hotel at St. Pancras, the National Gallery and Liverpool Cathedral. For 20 years he was editor of the journal *Construction History*.