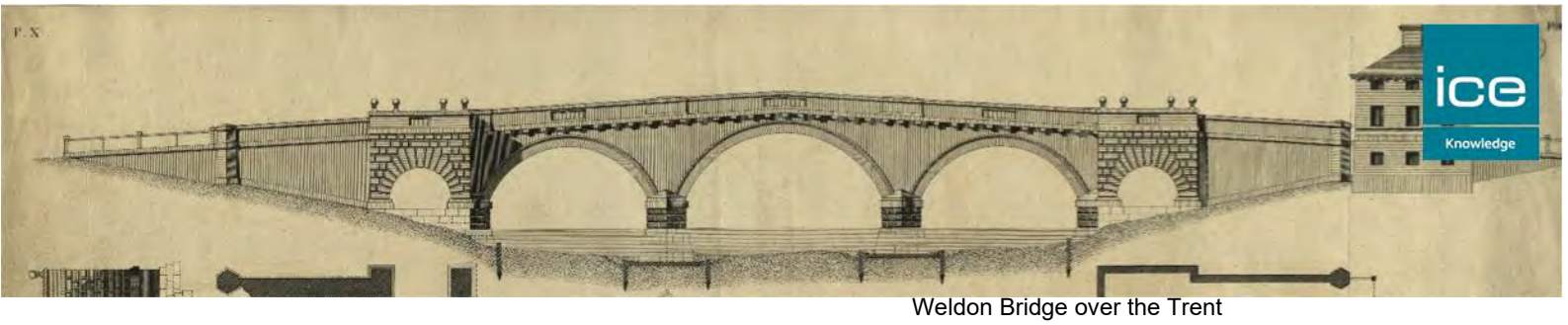

Weldon Bridge over the Trent

Digging deeper

Issue 1 Spring 2020

A Quarterly Newsletter highlighting how the ICE archive helps deepen understanding of our heritage for the engineers and researchers of today

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Welcome

Mike Chrimes (editor) and Carol Morgan (archivist)

We welcome readers to this Newsletter featuring articles from engineers and other researchers making use of the Institution of Civil Engineers archive collections. Archives are often seen as a source for historical research but their usefulness and significance to today's projects can be overlooked.

It is intended this newsletter will give ICE members and other researchers an opportunity to describe their work, with an emphasis on the use of the archives for current projects or new discoveries.

We hope you enjoy reading about how our archives and how they are being used. We would welcome articles and / or comments, or news about how you are using or have used ICE or other engineering archives.

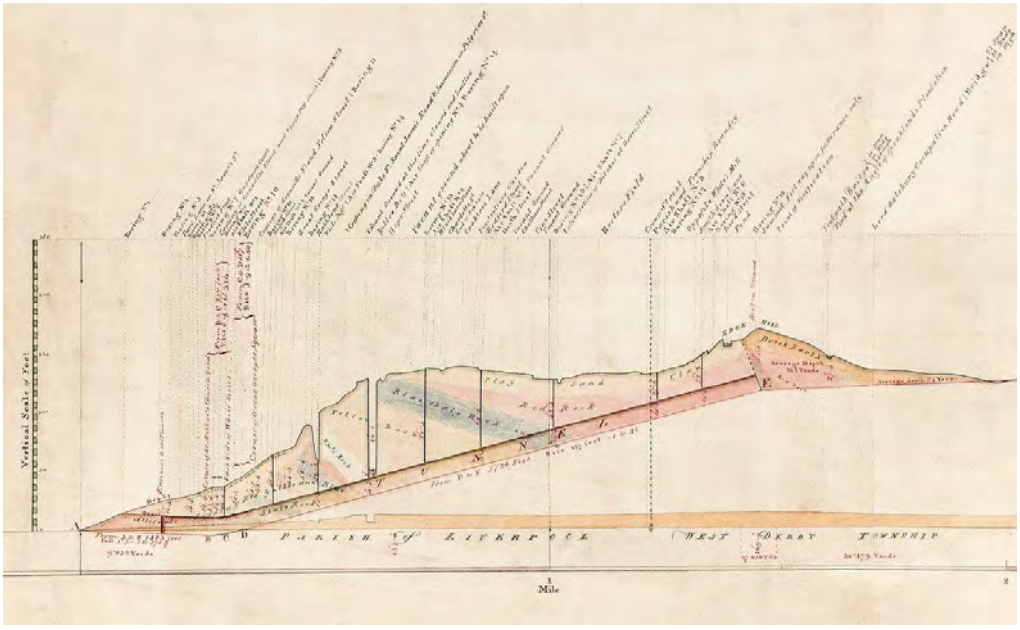
Making Steam from ICE

By Paul O'Donnell, Trustee, Liverpool and Manchester Railway Trust

In 2015, the Liverpool and Manchester Railway Trust was formed with the vision of saving the original 1830 passenger terminus at Edge Hill, in the heart of Liverpool. We

all knew more about the railway than most, but to do this correctly, we needed to be the authority on the subject. For the last five years we have travelled the country visiting archives to hoover up all the primary sources we could find and cut through all the myths and tall tales that have sprung up over the last 190 years. We needed the whole story to be able to argue the importance of the site and to convince Historic England that the site is worthy of historic monument status.

What we have learnt is that records of the design and engineering of the railway are very hard to come by. There are no original plans of the Rocket locomotive as it was drawn out on the floor of Robert Stephenson's Fourth Street works in Newcastle. Even now, no-one knows exactly how the original Rocket looked. It is a similar story with the infrastructure. The world's first Passenger terminal, on Crown Street, as well as the most iconic structure on the Railway, a grand Moorish Arch which straddling the tracks as you entered Liverpool, both only exist as idealised artists etchings.



I was not expecting these questions would be answered at ICE, but I was looking forward to viewing many contemporary items that promised to fill in some of the gaps. Three items that stood out are, (O.C/68) a detailed account of a return journey on the railway on its second day of operation. The author records several technical details plus the weather conditions. It also contradicts existing information that claims only one train ran that day and it was a private charter, and it was not pulled by the locomotive he claims he rode behind. Secondly, (1830LIVDDD) a slim volume showing the plans of the Duke of Wellington's coach's route on opening day. This offers evidence of where the coach was going to be at both ends of the track and will allow greater accuracy with any future art or computer modelling. Finally, Thomas Telford papers (T/LM) which he had collected and created while writing a report to the

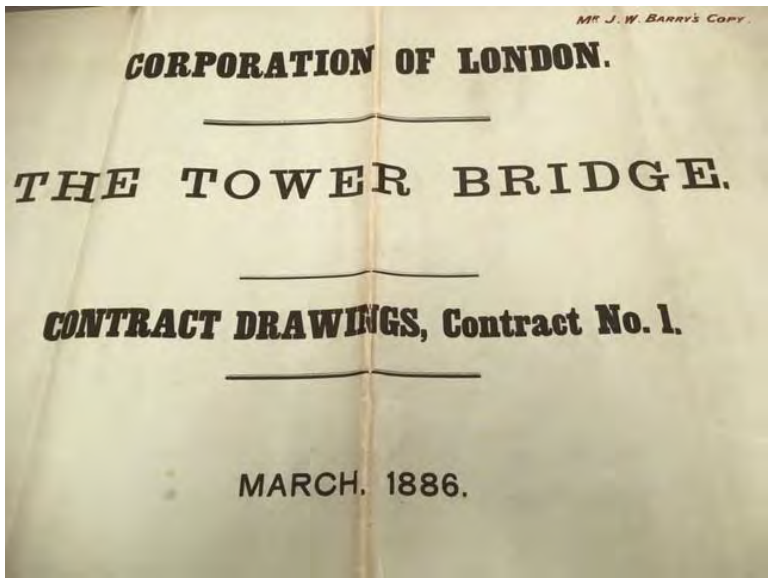
Commissioners for the loan of Exchequer Bills. This was full of a great deal of contemporary records, but none so exciting as a thirty foot geological section of the entire line, drawn from the 66 borings taken for the survey. Apart from simply being exquisite in its own right, it lists every last feature along the line, which when married up with other sources, will allow us to generate a very accurate computer model, which could also serve as an expansion pack for the Train Simulator computer game.

I am still processing the images from the visit, but ICE will soon have digital copies of everything I looked at, hopefully allowing many more people to view some of the excellent material in the ICE collection.

An uplifting lot : Tower Bridge drawings

By Carol Morgan

Thanks to the generosity of the Friends of National Libraries, (https://www.fnl.org.uk) we were able to obtain a number of drawings relating to the construction of Tower Bridge at auction last July. These are a particularly important addition to our collection as they appear to come from the office of Sir John Wolfe Barry, engineer for the bridge, and complement a collection we already hold.

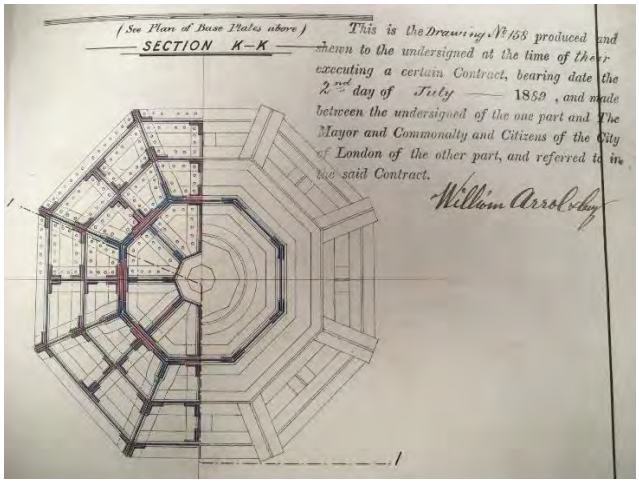


Sir John Wolfe Barry was a versatile engineer and collaborated with a number of partners, His career began in the 1860s on Charing Cross and Cannon Street Railway bridges under Sir John Hawkshaw. He went on to be involved in various projects including Barry, Immingham and Royal Edward (Avonmouth) docks, the Metropolitan District railway in London, the Ballachulish branch of the Callender - Oban railway including Connel Bridge and of course, probably his most famous work - Tower Bridge.

Some years ago, we were presented with a large collection of Sir John Wolfe Barry's drawings. Although these cover most of his projects, there were no drawings of Tower Bridge. The drawings all had a distinctive stenciled number which was also present on the Tower Bridge auction lots confirming their source. There were also a few other drawings in other lots relating to other projects which also confirmed their authenticity.

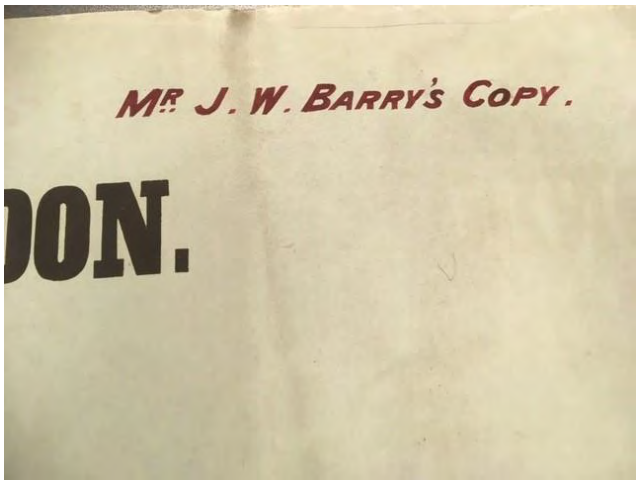
The addition of the Tower Bridge drawings means we now have a comprehensive archive of one of the great civil engineers of the second half of the nineteenth centre, represented in drawings, specifications, published papers and photographs.

2019 was a special year for Tower Bridge as it celebrated its 125th anniversary, having been built between 1886 and 1894. It was designed by Horace Jones, the City Architect, in collaboration with John Wolfe Barry, responsible for the engineering input - which was considerable given the opening bascule span, the suspension road and footway, the deep foundations in a tidal waterway, and the steel framing of the towers. The death of Jones in 1887 put Wolfe Barry in sole charge, although George Stevenson, Jones' assistant, was responsible for the masonry cladding to the towers which are such a key element of the visual appearance of the bridge.



The significance of Barry's contribution has not always been fully recognized, with attention concentrated on the architecture and machinery. These drawings show various aspects of the construction from the approaches to the foundations of the piers to the steelwork superstructure which is hidden by the masonry exterior, and make clear the significance of both Wolfe Barry's contribution, and that of Sir William Arrol's firm.

Of 8 contracts associated with the bridge, 4 are represented here (1, 2, 4, 6) and cover most of the civil engineering work.



The majority of the drawings were produced by Sir William Arrol and Company to deliver contract 6, and show detailing of the steelwork.

The set of drawings, showing details of the foundations, is marked `Mr J W Barry's copy'.

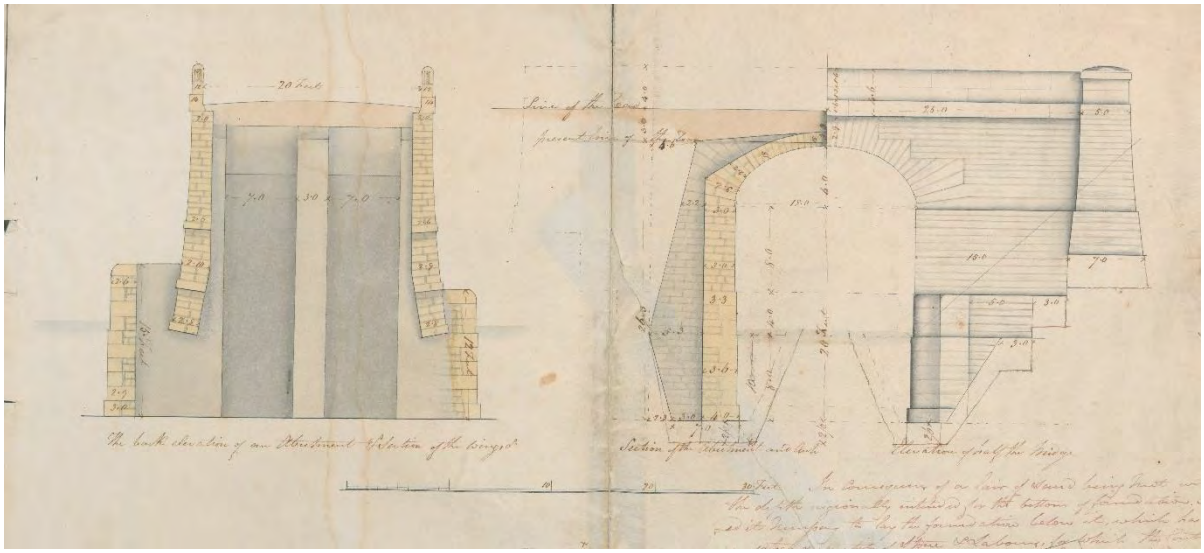
Other drawings of the bridge are to be found in the London Metropolitan Archives.

The drawings have recently undergone cleaning and some minor conservation and are now available for researchers.

Jesse Hartley, Dickenson Mill Bridge and bridgemaster records

Mike Chrimes

Thanks to the kindness of Robert Lamb MIStructE the ICE was recently given the drawings and contract documentation for a small arch road bridge near Wigan. It was designed by Jesse Hartley the well known Liverpool Docks Engineer when he was Bridge master to the Salford Hundred (1818-24).



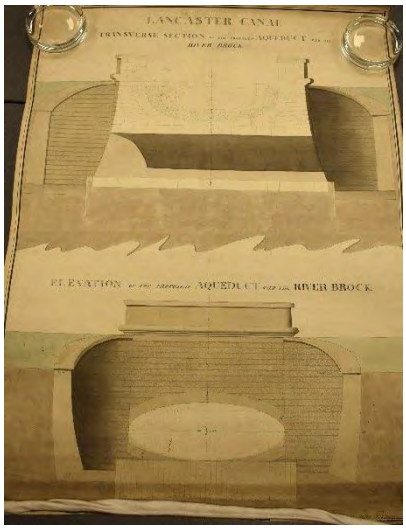
The drawings have a much greater significance beyond the modest span they depict as they appear to be the only surviving drawings from this period of Hartley's career. Although involved with many bridges in the Greater Manchester area at this time no other drawings seem to have survived. In part this is because most of the road crossings over the Irwell with which he was involved were replaced later in the nineteenth century. However, his work on bridges over the Irk are now hidden amongst the extensive culverting work associated with the railway lines into Victoria Station and it is possible foundations and abutments remain in the Oxford Road crossing of the Medlock and at the Staly Bridge.

The theme of bridge master records was touched on by Steven Brindle in his Sutherland Lecture at the IStructE in February. Discussing the eighteenth century origins of the engineering profession he featured two bridges over the Ribble built by John Law, another Lancashire Bridgemaster around 1780. Law was a mason but surviving records do not make clear who designed the bridges. One might ask does this matter to practicing engineers who may have little interest in the eighteenth century origins of the profession. Well the answer must be a resounding yes. Law's bridges, like the Hartley Bridge, survive. They require maintenance which to be at its most effective should be informed by how the bridge was originally designed and intended to perform, and with what kind of foundations. Many eighteenth and early nineteenth century crossings survive from the period before Victorian reform of local

government and the quality of surviving records is patchy. Hardly any of the bridgemasters of the period have been studied. John Carr is a great exception but even in his case few bridge designs survive compared to his drawings of country houses. Yet as recent pictures of river floods have demonstrated our old masonry bridges are under growing threat from nature never mind the wear and tear of traffic. More research needs to be done on such structures and the engineers who designed them

Recent acquisitions and newly listed material

John Rennie drawings of proposed aqueducts on the Lancaster canal [Acc 1973].



These drawings were purchased at auction thanks to a grant from the Friends of the National Libraries. They show proposed structures to be built on the canal including aqueducts over Baguely Brook and rivers Keer, Calder and Brock. They are all signed by Rennie and the contractor, either John Pinkerton, or William Ross, and are dated 1794. John Pinkerton, was one of the most successful of the early contractors. The Keer aqueduct, see photo, survives as a listed structure and is typical of the small span aqueduct bridges on the canal.

These drawings complement material deposited by the Rennie family including a report book, and a volume of specifications relating to the completion of the canal under William Crossley

Collection of 35mm slides relating to the history of tunneling. Acc 1976

This set of 9 boxes of slides were used by Halcrow engineers to illustrate talks on the development of tunnelling and the firm's projects. They include images relating to Thames Tunnel, through to Channel Tunnel including the use of London Underground tunnels as shelters during WWII. Halcrow, along with Mott Hay and Anderson, dominated tunnelling consultancy for much of the twentieth century, as described in **Hugh Ferguson and Mike Chrimes the Consulting Engineers ICE Publishing 2020**

We hope you have enjoyed our first newsletter. If you have any comments or would like to submit an article, please contact us: archive@ice.org.uk Follow us on Twitter @ICELibrary to see more of our collections.