

Weldon Bridge over the Trent

Digging deeper

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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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Locked down-what can an archives addict do with themselves???

By Mike Chrimes

Like many, I had a number of plans before the three months of extreme lockdown struck, including in my case visiting Wakefield Records Office and the National Library of Scotland. Both of these visits remain unfulfilled.

The first activity to be frustrated by Lockdown was the Construction History Society's Annual Conference at Cambridge University. Fortunately papers had already been submitted for publication, and James Campbell's team were rapidly able to liaise with speakers and offer them the chance to prepare their lectures on line, for broadcast. A programme was drawn up with Q&A sessions using zoom technology. Of course the chance to meet socially was lost, but the conference was effectively saved, the conference volume was published, and they, together with the presentations, can be viewed online <https://www.arct.cam.ac.uk/research/history-theory/building-histories/the-seventh-annual-conference-of-the-construction-history-society>

Zoom, teams and other networking sites have now become the norm; the ICE's historical panels were able to have a long overdue meeting in July, and planning for events next year is now assuming that a zoom option may in fact be the only practical way for researchers to exchange their ideas. Anything like a collective setting. It may

in fact prove liberating, as people are now looking actively for online events they might have disregarded in the past.

My visit to Wakefield was intended to enable me to look at Bridgemaster records relating to the Hartley family, and try and fill in some gaps and uncertainties in Jesse Hartley's career. I have put that on hold for the moment; where I have got to is effectively published in the CHS conference, and I also need to visit Dublin to see the Lismore papers. The visit to the NLS however, was part of a new line of enquiry into the financial affairs of Thomas Telford, as the NLS has the hitherto unexplored bills and accounts of Telford in its manuscript collections. While the broad extent of Telford's wealth is known, much of what has been published on consultant's fees and income is based on occasional mentions in minute books. This has been collated by Skempton in the first volume of ICE's Biographical dictionary of civil engineers , and again in Ferguson and Chrimes 'Consulting engineers <https://www.icevirtuallibrary.com/doi/abs/10.1680/tce.64003.fm>. The NLS papers should allow a more detailed investigation.

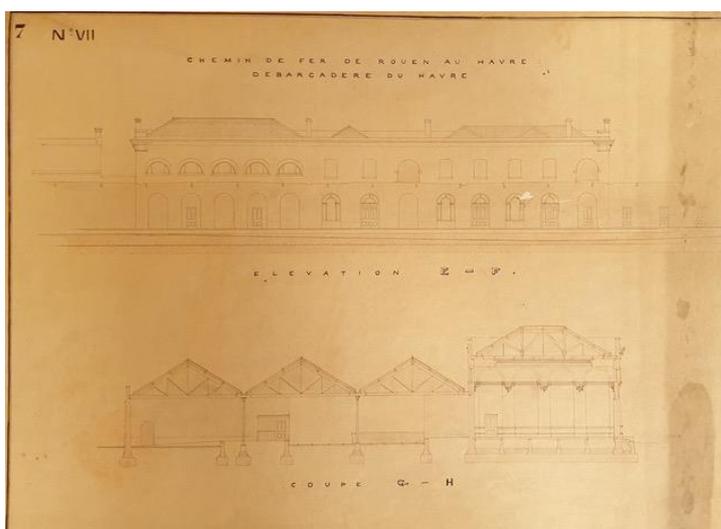
I had hoped that although the NLS is closed to the public, staff would be in to answer enquiries and possibly scan or photograph documents. Although my enquiry was immediately answered, it was not possible to obtain copies. Obviously working conditions in Library and archives, and concerns about travel have meant most staff are either working from home or furloughed. That has been true until recently of the ICE, and continues at the IStructE. This has meant that researchers seeking access to non-digital material have been unable to make much progress. Given the likelihood of the COVID-19 crisis continuing into 2021, one has to ask how new historical research can be initiated; for those interested in engineering or construction history the situation is probably more challenging as the subject area is generally less popular than the works of Jane Austin or Charles Dickens, and the digitised offering consequently less comprehensive.

However I do have to report some hope. Frustrated with two projects I decided to take up the possibility of a paper on the 'architect's office' for possible publication in a French journal. I realised that William Tite might make an interesting case study, as he had a London office, and undertook work in northern France and northern Britain. From published work available to me at home I thought I had the skeleton of a paper. Access to online catalogues, guided by the National archives Discovery site enabled me to compile a decent bibliography of sources, and digitised copies of The Builder, Civil engineer and architects journal, and some contemporary railway magazines, enabled me to compile a fairly full picture of Tite's career.



William Tite

Fortuitously I already had some scans from the ICE archives of Tite's drawings for the Paris-Rouen-Le Havre railway, and the ICE membership application forms are available on Ancestry. I circulated a draft to architectural historians John Minnis and Philip Brown, and they put me in touch with London railway historian Peter Kay. They had all made notes in railway committee archives and TNA. Some gaps remain as to how many stations Tite actually designed, but a picture emerged of an architect immersed in the financial affairs of many businesses which gave him access to commissions, and influence beyond the reach of many of his contemporaries. His wealth was perhaps twice that of other leading architects.



Design for Rouen - Le Havre railway station [ICE Archive]

I was fortunate that so many relevant journals are available on the Internet archive; coverage of relevant book titles is much poorer, and plates are missing more often than not. Without pre-existing knowledge of their content I would have struggled.

Gaps in the Railway Minutes at TNA may mean that we can never be sure how many stations Tite designed, and his influence over the architects/station designers who worked on some of the London and South Western Railway lines with which it seems unlikely he was the architect. But the exercise has demonstrated for me that it is possible to work in lockdown, with the help of others, and pull together more than was available in published form before.

Looking forward it seems clear more digitisation is required in our sector, and employers need to enable digitisation work to continue through what may prove to a series of ongoing lockdowns and remissions where travel is difficult. For experienced researchers like myself there are workarounds, but how can PhDs be started without access to digital records. We are likely to see reworking of Brunel and Roebling, rather than serious work on the unknown bridge masters of the eighteenth and nineteenth centuries....

In the short-term enough research may have been underway to ensure a supply of papers for the next 18 months but there is likely to be a medium time impact even if the lockdown ends next year.

Living on the ceiling: How archives are helping inform a survey of the ceilings at One Great George Street

Recently Sarah Mayfield of Mayfield Heritage has been taking advantage of the building closure to survey the ceilings at One Great George Street. Here Sarah describes how she has used the ICE archives.

OGGS offers unique challenges when it comes to surveying the ceilings. There are precious few points to access the void between the ceilings and concrete slab above so the surveys are constantly balancing the need for intrusive survey locations that require drilling and repair versus the conservation guiding principle of minimum intervention. The archives have been an invaluable resource for describing the structure hidden by the ceilings and resolved queries over differing construction methods and phases of building. The decorative schemes have all be cleaned and refreshed since the days of pea soupers, smoking indoors and all the associated atmospheric filth. Archive photos show the Tait library prior to redecoration including clues to the materials and supports. Thermotheresis is a process where dirt attaches to surfaces more easily where cooler resulting in differing surface patterning. This aids our work to describe and locate the material reinforcement etc above.

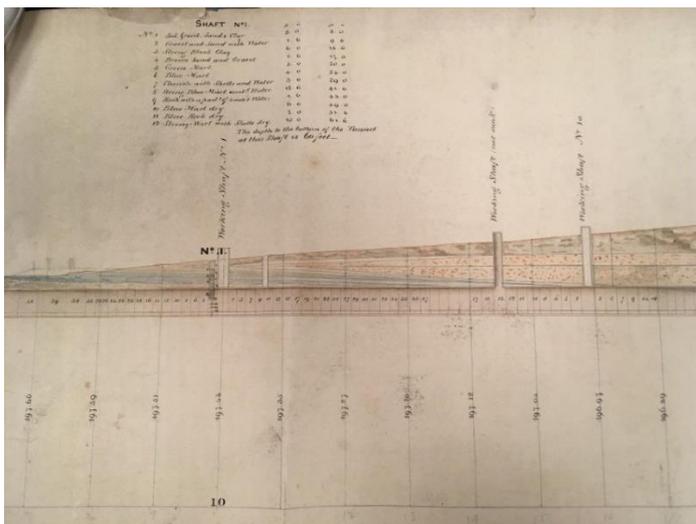


Photograph of Tait Room showing the effects of thermotheresis

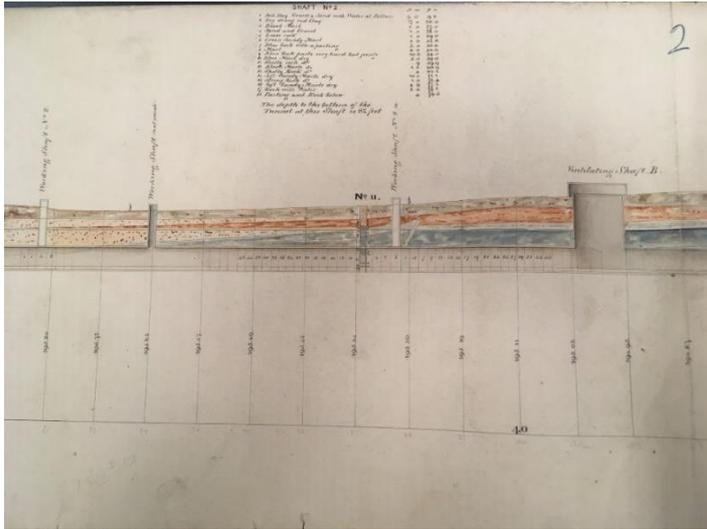
The archives also yielded original train tenders and other clues to the people fitting the work and the parameters and constraints of their specifications. Such social history has more practical implications than just human interest as it can explain many apparently arbitrary decisions on fixing locations and material choices’.

Recent acquisitions and newly listed material

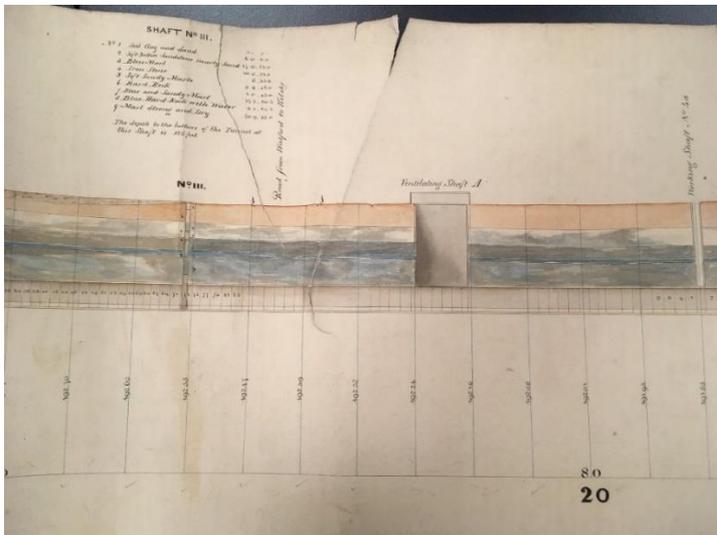
Kilsby tunnel longitudinal section and plan of route of London and Birmingham railway through the parishes of Dadford and Long Buckley [Acc 1984].



Part of the longitudinal section showing working shafts 1 and 1a



Working shafts 2 and 2a with ventilation shaft B



Working shaft 3 and ventilation shaft A

We recently received these two items from a donor in America. They were purchased some years ago at an auction in London and are believed to have been sold by British Rail.

The tunnel section needs cleaning and on closer inspection appears to be missing a section between shafts 2 and 3 which will require some research.

The tunnel on the London and Birmingham railway at Kilsby, Northamptonshire was designed by Robert Stephenson and built by contractor Joseph Nowell and Sons, although Nowell died before the tunnel was completed leaving the railway company to complete it. The Resident Engineer was Charles Lean but the drawings are not signed.

Trial borings, as shown on the photographs below, did not identify areas of quicksand which resulted in the tunnel flooding. A total of 25 working shafts were built to enable the tunnel to be built and 9 (or 10??) of these were retained, along with (or including???) two new larger shafts with castellated tops, to allow ventilation once the railway opened.

You can read more about recent repairs to the shafts at <https://www.railengineer.co.uk/stairway-to-heaven-shaft-repairs-at-kilsby-tunnel/>

Panel for Historical Engineering Works record <https://www.ice.org.uk/knowledge-and-resources/historical-engineering-works/details?hewID=1585>

Book Reviews:

Spanning the centuries-an anthology of essays reflecting the influence and heritage of the Union Bridge to celebrate its bi centenary 1820-2020. Edited by Roland Paxton. Berwick: Friends of the Union Chain Bridge, 2020.

Gordon Miller, Samuel Brown and Union Chain Bridge. Berwick: Friends of the Union Chain Bridge, 2017.

www.unionbridgefriends.com

Among the many events of interest to engineers and engineering historians that fell victim to the COVID-19 lockdown was an intended international symposium at Horncliffe Memorial Hall to celebrate the bicentenary of the opening of Samuel Brown's Union suspension bridge over the Tweed, the first traffic bearing suspension bridge in Europe, and the longest span in the world at the time. It is a remarkable survival, the longest serving example of a chain supported level deck suspension bridge in the world. In recognition of the achievement it was due to be inscribed as an international civil engineering landmark by the American Society of Civil Engineers, with the support of the Institution of Civil Engineers, and Japan Society of Civil Engineers. The symposium programme was arranged by Professor Roland Paxton under the auspices of the Friends of the Union Chain Bridge, who have attracted Heritage Lottery funding to enable a full restoration programme to begin, under the Union Chain Bridge Project Board.

Although the symposium could not take place Paxton was able to ensure the intended papers were published, and thanks to the efforts of local printers Printspot, with illustrations to a very high standard, particularly valuable with the outputs of the radar site investigation by Atomic Dietric Response (ADROK). The essays provide useful

background on the bridge, its historic significance, its future including recent investigative work, together with essays on some well-known record beating international suspension spans.

Roland Paxton discusses the bridge's significance, paying tribute to both Samuel Brown, and John Rennie who provided engineering advice, and also explaining the recent work by Heriot Watt and Adrok to use radar to investigate the location of the original chain anchorages to aid current restoration work. Colin Stove provides details on the radar investigation, Steve Jones gives details of Brown's chain manufactories, focussing on the Pontypridd works that continued in use until 1998. Simon Rudman gives details of the planned restoration works, while Miles Oglethorpe of Historic Environment Scotland, Rowan Brown and Matt Storey (Museums Northumberland) talk more about the educational and heritage opportunities provided by the restoration of the bridge and promoting it as a heritage site of international importance. Local resident Heather Thompson gives a personal and local perspective on growing up alongside the bridge, and how the local community can benefit from understanding the bridge and its story. While the papers by Raymond Paul Giroux (Brooklyn), and Hiroshi Isohata (Akashi Straits) describe well-known suspension bridges, Hans Seland, a retired civil engineer from the Norwegian Public Roads Board, describes the influence of Samuel Brown's bridges on the Bakke bridge, Norway's first (and surviving) suspension bridge. Brown's Kalemouth Bridge, rather than the Union Bridge, seems to be the more direct model for the Bakke design, but there is plenty in this volume to make clear the primary significance of the Union Bridge.

The volume makes clear the importance of archives in telling the story of suspension bridges and informing restoration, but also the need for site investigation to make clear uncertainties regarding the current state of older structures. There are many contemporary drawings and illustrations reproduced here, covering two centuries of bridge design, as well as valuable insight into episodes like the impact of an earthquake on the construction of the Akashi crossing, however, unfortunately, there are no bibliographic references. The essays provide a useful starting point for anybody interested in the history of suspension bridges, and community engagement with heritage engineering, but the reader will have to look elsewhere to follow up on the detail.

For the Union Bridge story, and relevant earlier sources one can turn to Gordon Miller's history of the Union Bridge, which includes a chapter by Stephen Jones on the Brown Lenox ironworks referred to above. Miller gives a meticulous account of the Union Bridge story down to 1974, and restoration work to that date. Unfortunately it contains no references to work done on Brown subsequently by Thomas Day and Emory Kemp, or indeed by Roland Paxton. It is an essential monograph on the Union Bridge, but not the last word on Brown more generally.

Michae Eckert, Physik im Schlosspark, Munich: Buch & Media, 2020.

Eckert looks at a little explored aspect of early engineering-the technology of water supply in palace gardens, notably Versailles, Nymphenburg (Munich), and Sanssouci (Potsdam). This is a story of better understanding of hydraulics, the transition from water powered pumping machinery to steam power, and the strength of materials, heavily illustrated from a variety of printed texts, topographic views, and some modern photographs. The bibliography is thorough, including reference to Andreas Kahlow's 2017 monograph on the pumping works at Sanssouci (Das Pumpwerk fuer die Fontaenen von Sanssouci, Berlin: BundesIngenieursKammer). It is evident these developments in water features were international in their scope, as ruling dynasties across Europe vied to have the most spectacular gardens. While the engineering work of Capability Brown has attracted some interest, Eckert's work suggests it would be a rewarding research subject for engineering historians.

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