



The Institution of Civil Engineers

Panel for Historical Engineering Works

NEWSLETTER

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Annual Panel Meeting 1993, at Lincoln ... The Editor

The annual gathering and meeting of the Panel took place at Bishop Grosseteste College, Lincoln, from 8 to 10 September. The meeting and most of the visits were attended by the President of the Institution, Mr Michael Cottell, and Mr Kenneth Marchant, Director of Member Services.

It was announced at the meeting that a plaque to commemorate Sir Marc Brunel's Rotherhithe Tunnel was to be fixed at the south end of the tunnel on 25 September, and that another plaque was to be fixed at the head of the Manchester Ship Canal. At Bentpath in Eskdale (Dumfriesshire), because of road widening, the Telford memorial was to be moved from its present site and re-erected at the other side of the road.

The Chairman congratulated Mr Mike Chrimes for his paper on Sir John Fowler, published in *Civil Engineering* in **September** 1993 and reminded members that the Editor had agreed to publish similar papers at least twice a year.

All people filling in HEW record forms were asked to follow the new guidelines that have been issued. Record

forms should be revised every five years, but preferably not by the persons who filled them in originally. University students could well do them as part of their course work, if the civil engineering professor gave his backing.

Panel Members should make themselves known to their Local Associations, and should encourage them to produce Heritage Trail leaflets.

A suggestion that a charge should be made for the Newsletter was discussed, but it was decided that it would not be worth the extra administrative work that would be needed.

The President said he foresaw closer cooperation between the various engineering Institutions, which could be reflected in their historical panels. In the present financial climate he saw no hope of any increase in the PHEW budget. The President makes awards (Saltire Awards) for conservation schemes in Scotland; a similar scheme for England and Wales was to be considered.

Panel Member Paul Dunkerley would be glad to have more names for the list of people who are prepared to give lectures to publicise the history of civil engineering, and the Technical Secretary would like to have more names of people with specialised knowledge who could attend public enquiries and similar events as expert witnesses.

The sales of the *Civil Engineering Heritage* books had reached 1,781 for the Northern England volume and 1,192 for the Wales and Western England volume. The next two volumes (Southern England and Eastern and Central England) will have 1,500 copies each printed, which will be on sale before Christmas at a price of £12.50. Thanks were expressed to Mr Marchant for handling the budgeting for the publication of these two volumes. Panel Members' requests for copies of these volumes on a sale-or-return basis should be made to the Panel Secretary, Mrs Mary Murphy.

within the breadth of the waterway. Although the bridge, like that at Potarch, sprang from relatively high banks on either side of the river. Telford, who was ultimately responsible for the elevation of the bridge, still ensured that the roadway, 15ft 6in wide, rose to an apex over the crown of the arch. This feature can be seen re-worked in many of the bridges designed by Telford.

Although involved subsequently with a number of bridge and harbour projects, Minto was directly associated with Telford for only two other projects. First, he was the contractor with John Gibb for the construction, at Duror, Inch, Kilmeny, Lochgilhead, Oa, Portnahaven and Tomintoul, of the highland churches and manses designed by Telford, and by himself for the construction of manses at Inverwick, Kirkton of Foss and Rannock. Second, he was the contractor for the construction of the nine miles of Commissioners' road which connected Potarch bridge to the Bridge of Alford. This road was the only one in Aberdeenshire to be constructed under the auspices of the Commissioners, and was made by Minto using Telford's standard specification for the construction of highland roads.

The Chairman's Column: Book Review ... Roland Paxton

'Thomas Telford's Temptation' by Charles Hadfield.
M & M Baldwin, Cleobury Mortimer, Salop, -. ISBN
0947712194, £12.95 (£14.20 inc. p&p)

In this recently published book sent to me by Mark Baldwin, Charles Hadfield reviews the contributions made by Telford and Jessop to the engineering of the Ellesmere and Caledonian Canals. In the space available here I have confined my consideration to one of Hadfield's major queries: who was the engineer most responsible for the conception and creation of Pontcysyllte Aqueduct in cast iron on tall masonry piers? For more than 150 years posterity has recognised these innovations as Telford's and neither Jessop during his lifetime, nor his family later, raised any objection to this as far as is known.

Hadfield now hypothesises in support of Jessop believing that the aqueduct *'cannot be called Telford's'* (p.114) and suggests that posterity was misled into this mistaken attribution by a conspiracy instigated by Telford and Rickman. An unlikely story! Most engineering historians will not be surprised at the dearth of personal papers of engineers of Jessop's generation, but Hadfield finds this *'strange'*, and poses that Telford successfully engaged in *'character erosion'* against Jessop by not mentioning him when he ought to have done and by causing his papers to be *'misaid'* (p.10). He even invokes Miss Marple! The reader is given a selection of facts and much comment tending to diminish Telford's and Rickman's reputation, and then is invited to judge whether or not Telford was tempted as charged.

In attempting to support his case in chapter 3, Hadfield critically examines the canal company's publications of 1805/1806, which firmly established Telford as the *'Engineer'* for the aqueduct (p.48). Hadfield finds Telford's use of the title *'Engineer'* hard to accept, mistakenly believing that Telford's engineering role was that of *'a resident engineer in charge of day-to-day construction'* (pp.16,93). There is no doubt from the above publications, Telford's job description in the Minutes (p.78) and from his writings that his brief was wider than that of a resident engineer, and that it included planning and design. Hadfield seems unaware that the Canal already had a resident engineer in Duncombe, who for salary and acting as *'resident engineer'* from 1791-mid 1803, received £4402.2.5d.

Hadfield mentions from the company accounts that Jessop received £1103.18.0d including expenses, from 1791 to 1805 but, perhaps significantly, omits that Telford from 1793-1805 received over £6,400, about 75% of which was for salary and expenses. The relatively small sum paid to Jessop, amounting on average to about £100 per annum or less including expenses, contrasts markedly with Whitworth's 600 guineas per annum for design and completion of the Forth & Clyde Canal from 1785-91, and is suggestive of a comparatively small time commitment by Jessop at Pontcysyllte over and above his known early work and acting for the company on at least 4 Parliamentary Bills. These figures are consistent with Telford having had the design and planning role for the aqueduct, Jessop the approval and ultimate responsibility, at least in the early years, and probably a minimal involvement in the as-built design and erection of the aqueduct, particularly after his alternative proposal in 1801 for a railway on the piers was not adopted. This would offer an explanation for his name not being included by the company on the aqueducts information card in 1805 (p.48), his non-attendance at the opening ceremony and why Telford rather than himself was retained as consulting engineer thereafter.

Chairman Hunt's independent and authoritative confirmation in 1805 that Telford, in consultation with Jessop, *'... invented and with unabated diligence'* carried the aqueduct into execution is worth high-lighting in support of Telford's evidence. In 1805, *'invent'* meant *'devising something not known before'* (Dr Johnson). Hadfield's assessment of the 1805/06 evidence and his claim that the idea of the iron aqueduct could have been Jessop's is unconvincing.

Much of chapter 5 is taken up with a consideration of discrepancies in various drafts of Telford's *'Life'*, written some thirty years after the event and from which Hadfield deduces that *'Telford's failing memory or an abiding jealousy of Jessop'* (p.177) make this an unreliable source. Telford does seem to have had one minor lapse of memory relating to the timing of an event in 1795, but the rest of this supposition is unsubstantiated. In fact, Telford made sure that his *'enlightened colleague'* and *'friend'* received a handsome 3-page tribute in the *'Edinburgh Encyclopaedia'* in 1817 and acknowledged the

'advantages and satisfaction' he had received from more than 20 years enjoyment of Jessop's 'uninterrupted intimacy'.

In moving from 1806 to the 'Life' Hadfield has completely overlooked earlier and important evidence by Telford, which was known to Sir Alexander Gibb when making his assessment that Jessop acted, in effect, as a consulting engineer. Telford wrote in the 'Edinburgh Encyclopaedia', 17 years earlier than in the 'Life' and thus free from any allegation of unreliability arising from memory loss, that at Pontcysyllte he had *introduced a still more decided deviation from the usual form by building upright piers only and instead of masonry arches, putting cast iron ribs ...* (v.XV, 312). For the Canal, he wrote, *The engineers were John Duncombe, who traced the original lines; William Jessop, who was occasionally consulted in obtaining the acts and during the early part of the canal operations; and Thomas Telford, who planned the aqueducts and under whose direction these, as well as all the canal works, were executed.* These explicit, widely circulated and, as far as is known, uncontroverted statements provide first hand evidence that Telford introduced the masonry piers and cast iron arches and trough concept, in consultation with Jessop, thus supporting posterity's attribution.

Finally, the earliest known design for an iron aqueduct anywhere, is Telford's sketch of March 1794 for Pontcysyllte Aqueduct in Reynolds' note book (p.89, see also *Newcomen Society Transactions*, v.51, 129-142). The levels indicated seem to be those for the masonry aqueduct then proposed. The signature and content of the sketch are consistent with the March 1794 dating. The sketch shows a soundly based design on the arch and column principle, utilising the strong compressive quality of cast iron and with the trough acting as a beam. Similar in fact to, and the forerunner of, Telford's Longdon Aqueduct which Professor Schofield rightly considers 'a truly nice piece of engineering in both thought and execution' (p.86) and which still exists. Hadfield is unimpressed by the sketch, suggesting that the date is a mistake for March 1795, that the aqueduct would probably have collapsed under its own weight, which is most unlikely, and dismissing it as a 'dream structure' (p.90). If Telford had prepared the sketch in March 1795, it would almost certainly have shown masonry piers to utilise the stone already cut.

Enough! The book is well illustrated, contains many useful facts and references and is very readable, with much thought-provoking comment, but the seeker after truth should tread warily!

HEWs in the News ... Brian George

Steel bascule bridges by their very nature are not very old but their rarity makes them particularly interesting structures. The Parkman Review tells us that Birkenhead's Duke Street Bascule Bridge, designed and

built by Sir William Arrol in 1930, was floated away in March on a 50m x 17m pontoon downstream to Cavendish Quay for refurbishment.

There it was to be repaired following an inspection and assessment and will have been returned in September to handle the much increased lifting frequency that has followed business development in the Birkenhead Docks area.

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Another bascule bridge recently being repaired is described in *New Civil Engineer* 12/19 August. This is Bristol's Redcliffe Bridge. The city centre's bascule bridge over the Floating Harbour has been completely restored in a tight six months contract to repair or replace corroded members in the 50 year old structure while upgrading it to cope with modern loading standards.

The £640,000 contract was awarded in February by Avon County Council and is being carried out by the Costain Building and Civil Engineering's Bridge Strengthening Unit. Cass Hayward and Partners were commissioned in 1988 to assess the bridge and prepare the strengthening scheme.

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New Civil Engineer 12/19 August reviewed *Old Waterfront Walls* by R N Bray and P F B Tatham, E & FN Spon, £65.00. This is the final report of the CIRIA research project which was supported by the British Ports Federations. It covers walls in ports, canals, breakwaters and coastal defences. The history of these walls generally dates from 1700, although most of the examples considered were constructed in Victorian times.

More than 100 types of walls are illustrated, with details of their construction, often taken from Institution of Civil Engineers Library sources, although the original plans may have been altered during construction and "as built" details may not be known. A list of the historic sources of information is given which should prove useful in determining environmental changes and alterations in use which may affect the performance of the walls.

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Rail, Number 209 of 15 September 1993 gave the news that "the 200 year old cast iron Pontycfnau bridge, now a public walkway, is closed until December for heavy repairs. It is still structurally sound". This unique iron "bridge of troughs" at Merthyr Tydfil, HEW 656, located at SO 038 071, still spans the River Taff where it was built in 1793 to carry a tramroad and a water supply into Cyfarthfa ironworks. The designer was the chief works engineer, Watkin George.

The bridge spans 47 feet. Two substantial A-frames, one on each side of the deck, have their feet embedded in the river walls, with the apex at mid-span. The frames are held together with mortice-and-tenon and dovetail joints and incorporate sockets which carry transverse members at mid-span and quarter points. These in turn support a deck structure which is a closed rectangular box, 2 feet deep and 6 feet wide. Originally there was