



The Institution of Civil Engineers

Panel for Historical Engineering Works

NEWSLETTER

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Cressing Temple Barns, Essex ... Mr E A Labrum

Agricultural barns are not usually expected to rank as prime examples of engineering but the two great barns at Cressing Temple near Braintree, Essex, have outstanding merit as original specimens of early timber structures and illustrate in a spectacular way the skills of mediaeval carpenters. Said to be the finest remaining pair of mediaeval barns and the largest early timber framed buildings in Europe, these barns are deservedly listed as Grade I.

Built about 1260, the Wheat Barn is 130 feet long, 44 feet wide and 40 feet high with a tiled roof, hipped with gables at both ends. The Barley Barn, which preceded the Wheat Barn by some 40 years, is marginally shorter in length and has a similar style of roof covering. Both barns have a large projecting porch (midstrey) at half length, of a size capable of admitting a loaded cart.

The interior of the barns has something of an

ecclesiastical air, open to the lofty roof ridge, with roughly 12 inch square main posts flanking the central nave. The engineering interest lies in the oak roof structures with their intricate but economical arrangements of braced struts and ties. The Wheat Barn roof has retained the original system of passing braces and intermediate trusses whilst the Barley Barn roof was modified to a crown frame in the 16th century. There is plenty of evidence of the early notched lap joints favoured by 13th century carpenters; it is estimated that the mediaeval carpenters had to make about 1200 joints in constructing the framework for each barn.

The site has an intriguing history. Cressing manor was granted to the Order of the Knights Templar in 1137 by Queen Matilda, wife of King Stephen. The Order was first established in Jerusalem, based upon the el Aksa Mosque which the Knights identified as Solomon's Temple, and from there they carried on their self imposed task of protecting pilgrims to the Holy Land. As the influence of the Templars widened the Order was granted further lands, and in England there were about 50 main Templar holdings of which Cressing was one of the earliest foundations. The principal house for the Order in England was the Temple in

been unsuccessful with his design for the Fulham Bridge, Allen then apparently submitted it to the Royal Society. It is worth noting that at least five of the 'subscribers' were Fellows of the Royal Society at that time, including a leading member of the sub-committee, Dr William Cheselden, Surgeon at St Thomas's Hospital.

There is no doubt that, had John Allen's design been accepted and built, much more would be known about this ingenious and inventive man.

Can any reader say how novel his bridge design was?

Bibliography

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Footnote

Allen's design was unusual for Britain, which never developed a great tradition of timber bridge construction. The idea of an arch reinforced frame had certainly developed in Germany and Switzerland, with their covered bridges, by the eighteenth century, and possibly Allen had seen an example there. There is an example in Scamozzi (1615), though not as well developed as Allen's. The great development of the idea took place in the nineteenth century when American engineers like Burr and Howe patented their systems.

The Chairman's Column ... Roland Paxton

The Institution's inaugural Smeaton Lecture, on the subject of Sir Joseph Bazalgette and his work, was delivered by Dr Denis Smith to a large attendance at Headquarters on 16 July. It was an outstanding success and not only attracted favourable comment from the Director General and Secretary but even from 'George Street'! Thank you again Denis. The subjects for the next two lectures will be John Smeaton and the Thames Tunnel with the intention of complementing anniversaries and joint ICE/ASCE activities.

In the last *Newsletter* I commented that the Panel is uniquely qualified to influence excellence in the conservation of historical engineering works. I did not foresee that within a matter of weeks this expertise was to be put to the test regarding an application to demolish the Eastern Dock footbridge at St Katherine's Dock! On 26 June after consultation with the Technical

Secretary and the London Panel Member, the following letter was sent to the London Docklands Development Corporation:-

"I am writing on behalf of the Institution's Panel for Historical Engineering Works to object to the proposed demolition of what you describe as an 'effete' footbridge at the Eastern Dock.

This bridge was designed by Thomas Telford, first President of the Institution, and his Resident Engineer Thomas Rhodes in about 1829. The bridge is unique as a retracting bridge from that period, is of constructional interest in its early use of flat wrought iron bars for the chords, and is moreover, one of the very few remaining Telford features left in the Dock.

The Panel is aware that some alternative preservation and conservation strategies have been discussed but is not convinced that its sympathetic modification to modern load standards has been fully explored. The bridge should be retained in its original position if at all possible.

We are particularly concerned that the demolition of this bridge would result in the unnecessary destruction of a unique and historically significant structure".

As far as I can recall this is the first time that the Panel has formally objected to such a proposal. From past experience in Scotland I am convinced that a firm line on a strong case offers the opportunity of a successful outcome. We await developments with interest!

Did you know that Sir John Fowler used his engineering ingenuity and wealth to create a number of fascinating structures on a ruggedly beautiful tract of the far West Highlands known as Braemore?

Part of this estate is about to change hands, which prompted a letter to me from Colonel Mitford, Sir John Fowler's great grandson, with a view to safeguarding the future of some of his forebear's engineering eccentricities.

The works concerned range from slender wrought iron bridges over deep gorges, a stable of railway tunnel form thought to have an abstract connection with the Metropolitan Underground Railway, creating a loch and hydro-scheme to provide water and power to his magnificent house (completed in 1867 and now demolished) high up the side of a steeply wooded valley side, to a stag-safeguarding wall rising to some 3,500ft above sea-level.

The two Scottish Panel Members found the challenge of this request irresistible and in one action-packed day they recorded four of the structures, visited Sir John's great granddaughter Lady Troughton (noting with approval a mellowly impressive Metropolitan Line print with tunnel-shaped mount in the loo), measured up the bonus of a Telford bridge and returned to Queensferry in good time for my attendance at the formal opening for the season of the Forth Bridges Visitor Centre. It seems appropriate here to pay tribute to a remarkable driving feat by Jim Bowie!

In the near future we intend to present a case to

Historic Scotland for listing some of these works, in particular the 'tunnel' byre and slender iron lattice arch at Gleann Mor.

HEWs in the News ... Brian George

The closure of Transmanche-Link's tunnel lining factory was announced in *NCE*, 2 May, with the production of the last of the 436,000 precast concrete segments heralding the closure of the two running tunnels. The north running tunnel was completed after the British boring machine was buried and the French machine broke through into the British drive in May. The south running tunnel was closed at 11:50am on 28 June when the Robbins/Kawasaki French machine bored through in mid-Channel, again after the British machine had been buried. The breakthrough beat the 1985 schedule by three days and the current programme by six weeks.

The French crossover cavern, half complete, is the only big tunnelling task left. Here problems were reported (*NCE*, 9 May) when cracks found on the outside of the lining were 20 times that predicted by the contractor. However, the integrity of the cavern was safeguarded by the addition of support steel.

The Basingstoke Canal (HEW 1575) featured in *NCE* 2 May. It was built for the privately owned Basingstoke Canal Navigation Company by John Pinkerton between 1788 and 1794 to designs drawn by William Jessop. It has taken 18 years to restore nearly all but a few kilometres of the 59.2km canal which descends 59m through 29 locks from near Basingstoke to join the National Trust owned canalised river Wey at West Byfleet in Surrey.

By the 1960's all traffic had deserted the canal but eventually the Surrey and Hampshire County Councils bought the canal by compulsory purchase order in 1973. Besides the 29 locks, structural restoration work has included 55 of the 61 overbridges. Volunteers worked an average of 28,000 hours a year and raised £750,000 to pay for plant and materials. The restoration of the aqueduct carrying the canal across the main Basingstoke to London railway line at Deepcut was carried out professionally. When reopened in early May the restoration of the Greywell tunnel at the western end had yet to be attempted.

A painting by Terence Cuneo of construction of the Bailey Bridge over the Rapido at Monte Cassino published by permission of the Officers of the Corps of Royal Engineers reminded us (*NCE* 9 May) of 50 years of wartime and civilian use of the Bailey panel for temporary and permanent works. Bailey's original system has been used through all this time with very little fundamental change, the original structure for testing being fabricated by Braithwaite and Company in 1941. Between 1942 and 1945 some 490,000 tons of

bridges were manufactured by 650 United Kingdom firms. NCE showed one of more than 200 bridges still in France, wartime use of the bridges in Italy and a Bailey bridge in use at Canary Wharf today. Sir Donald Bailey was consultant to Thomas Storey (Engineers), who continued manufacture after the war, until his death in 1985.

Back in Italy again, *NCE* 16 May reminded us that this year Venice's Rialto bridge celebrates its 400th anniversary. One of Venice's most elegant and admired structures, the bridge attracts visitors from all over the world who come to look at it from bank side cafes or glide underneath in gondolas. The Rialto bridge is the same today as it was when Antonio de Ponte, winner of an open competition, finished supervising its construction in July 1591. The single span comprises a 30m arch and a series of sloping steps carries 24 shops taking the deck to its highest point in the centre of the bridge, 7m above street level.

The need for massive repair work to our cathedrals featured in *NCE* 30 May where it was noted that almost all of England's 61 cathedrals were engaged in appeals to raise restoration money. The cost of refurbishing the 42 Anglican and 19 Roman Catholic buildings appears to be some £200 million but estimates rise as detailed investigation uncovers more problems. The softer sandstones and limestones which facilitated easier cutting into blockwork are threatened by such modern day horrors as acid rain while the enormous weight of towers and spires threatens structural collapse if the material rots.

It is nothing new for cathedrals to need major repair work. Structural engineers who work on these buildings point out that a cathedral needs an overhaul at least every 100 years. Members of the Panel remember visiting Ely Cathedral in 1983 when Professor Jacques Heyman showed them the innovative work he had supervised 10 years before in strengthening the West Tower where the large window openings had imposed excessive stress on the remaining stonework.

The opening of the major exhibition at the ICE commemorating the centenary of Sir Joseph Bazalgette was noted (*NCE* 6 & 13 June) together with the publication of a catalogue and the announcement of Dr David Smith's talk after the annual general meeting on 16 July. Eighteen members of the family joined members of the Panel and ICE staff for a reception to mark the official opening of the display which can be seen at Great George Street all Summer.

Ordnance Survey, the UK's national mapping agency, starting its existence 200 years ago in the Tower of London as a branch of the Army. During the intervening years the survey has evolved from its military work into a vast complex civilian organisation. It has been an executive agency since 1990, a separate government department responsible to the Secretary of State for the Environment and dealing directly with the