



THE INSTITUTION OF
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Panel for Historical Engineering Works

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Spaced at distances varying from two feet to 3ft 6in. the sleepers are laid on natural ground in a shallow trench, the spaces between them being filled with waste. The rails vary in cross-section and average 5 in. in width and 3½in. in depth, fixed to the sleepers by wooden dowels. The track gauge is 4ft 3in.

So far as can be ascertained, the wagonway dates from c.1790 but as the Lambton archive has not yet been made available for study, this date has not been confirmed. The track is thought to be the greatest length of timber wagonway excavated in the UK and only the third section ever to be discovered; it was first unearthed in 1995 but was not accessible for viewing until recently.

Forming part of the excavation and lying to the south of the tracks are the remains of the foundations of a building, not yet identified but thought to have been part of the colliery, the shaft of which was further south again; perhaps it housed either engines or boilers for the winding gear.

The excavation has been undertaken under the auspices of the City of Sunderland under the control of Ian Ayris, Tyne and Wear Industrial Archaeologist, and John Nolan, of the Newcastle City Archaeology Unit and it is by them that plans of the works have been made available.

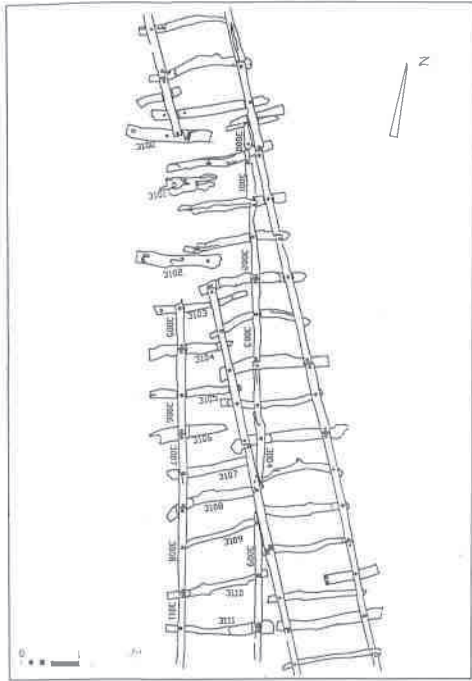
A RARE FIND: A WOODEN WAGONWAY UNEARTHED

by Bob Rennison

When the reclamation of the site of the disused Lambton Cokeworks (NZ 320 510) was proceeding, the excavations unearthed the remains of a length of wooden wagonway, much of it in surprisingly good condition.

The site of the cokeworks - alongside the Lambton Railway running to Sunderland - would seem to have incorporated the former Bourn Moor Colliery and it is thought that the track formed part of the wagonway layout in the pit yard. As can be seen above and overleaf, the track includes crossovers - not true points - and it would seem that the lines show more than one phase in development, in that the eastern leg was abandoned and the wagonway realigned. To prevent, or minimise, the derailment of the chaldron wagons, guard rails were provided at the curve leading into the yard.

One surprising feature of the layout is the fact that the sleepers comprise timbers almost totally undressed.



OUTWOOD VIADUCT RENOVATION

by Brian George

The Outwood Viaduct (HEW 2087) SD 782 067 at Radcliffe, Greater Manchester is to be renovated by Bury Metropolitan Borough Council with the help of a £500,000 grant from the Heritage Lottery Fund.

The Panel strongly supported Bury's application for a grant and the rest of the £800,000 required will come from the Irwell Valley Sculpture Trail, the Council, English Partnership, British Rail and the Railway Heritage Trust.

The five-span Grade II listed structure is a fine example of cast iron segmental arch construction and spans a gorge of the river Irwell. Erected in 1881, the viaduct formed part of the East Lancashire Railway.

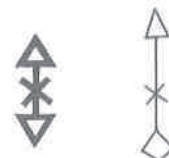
Each 60ft. span comprises six open spandrel cast iron ribs with lateral bracing, each rib built in three sections and 10ft. 6in. deep at the ends. British Rail applied for demolition in 1987 but this was refused.

The renovated deck will carry a footpath, bridleway and cycleway and give space for a variety of recreational activity.

THE CHAIRMAN'S COLUMN

by Roland Paxton

In 1996 three projects were examined for possible Saltire Conservation Awards by the Panel's sub-committee, but no award was made. Langholm Bridge widening came close to receiving a commendation and also engaged our attention in an entirely different context. This bridge, on which Telford is reputed to have worked c.1778, is believed to bear his mason-mark and we decided to look for one. As our inspection was made when the water level was low, it was possible to gain access to the east abutment face where an old mason-mark was found differing in shape from that given by Smiles in 1861 for Telford, in that its lower end was of quadrilateral rather than triangular shape. This mark may have been cut by another mason but, as it is similar, might Smiles' record be incorrect?



mason-marks

HEWS FEATURED ON LOCAL RADIO

by Roger Cragg

In early February, Roger Cragg, in his capacity as Area Panel Member for the Midlands, was interviewed for BBC Radio Hereford and Worcester by reporter Aidan McKeown.

Short recordings were made during visits to five sites in the County, one to be broadcast on each day of the following week. The sites, chosen by the BBC from a list supplied by Roger, were Great Malvern Station (with its ornately decorated column heads), Holt Fleet Bridge (Telford 1828, but strengthened in reinforced concrete), Standford Bridge (1905 reinforced concrete), Stourport Canal Basins (the terminus of the Staffordshire & Worcestershire Canal) and Tardebigge Locks on the Worcester & Birmingham Canal (Britain's longest lock flight). It was felt that these sites represented a good cross-section of the varied work of the Civil Engineer and also had the advantage of being geographically grouped together which made it possible to make all the recordings in one morning.

All the sites visited are featured in the second edition of *Civil Engineering Heritage: Wales and West Central England*, which is due to be published in March. It is hoped that the interviews will have given valuable publicity for the Panel and for the forthcoming book.

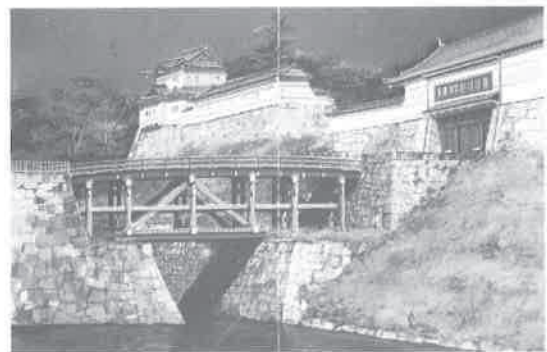
Recently, I was delighted to receive a letter from Lord Elgin expressing his *huge appreciation for the mass of fascinating material* contained in the last Newsletter (December 1996). He continues, *I did enjoy reading about the production of mild steel for the Forth Bridge. The spiral of this steel, presumably drilled out for a rivet placing, which my grandfather put in his pocket and brought home; is still as bright as the day the drill bored it out! The purity of the steel in these days - surely remarkable.* Thank you Lord Elgin for this welcome contribution and your kind remarks.

Returning to my Japanese visit. One of the most fascinating features of Tokyo is the Imperial Palace and its moated gardens, a haven of history and tranquillity in the heart of the city upon which modern development has not been permitted to encroach. The Palace, formerly Edo Castle, and its grounds were restored in the late 19th century as the official residence of Emperor Meiji and his successors. The gardens are now open to the public and, under the expert guidance of Professors Niitani and Hanzawa, past and present chairmen of JSCE's Committee on Historical Studies in Civil Engineering, and Dr Fukuda, I was able to enjoy at first hand the high quality of engineering conservation achieved.

Most of the extensive moat works and other masonry date from the 17th century. The timber structures are high-quality replicas in authentic period style. We entered the Palace Outer Garden on foot through the iron-studded Sakuradamon Gate (2 on the plan-route shown chain-dotted) and then proceeded to the 1887 two-span European classical style masonry bridge known as *megané-bashi* or *eyeglass bridge* (14). From here we could see a single span plain iron arch bridge of 1888 known as *Nijubashi* (15), which had replaced an historic double-decked timber structure. These bridges reflect western influences of the Meiji era. The traditional Japanese pagoda style architecture behind was of most striking appearance with its bases of Kirikomi style masonry, large stones shaped to fit and laid without mortar. The timber barracks and guardrooms although plain in style had attractive-looking tiled roofs. After passing through the beautifully landscaped grounds of Honmaru and the base of what once must have been an immense pagoda (49), we eventually left the gardens via Hirakawamon Gate (26) and the gently curved extrados of a finely executed traditional-style timber bridge. Its finely engraved replica 17th century copper post-caps date from 1914-1924. More anon.



Part of Imperial Palace grounds, Tokyo
(courtesy Imperial Palace Admin)



Pre-1888 Nijubashi double-decked timber bridge



Traditional style guard-house with tiled roof



Prof Niitani and kirikomi style masonry (17th century)



Prof Niitani and post-cap of Hirakawamon bridge

BOOKLET REVIEW

by F A Shepherd

A Short History of the Civil Engineering Surveyor
by Ron Cox and Jim Smith. ICES/ICE, 1996, 24pp,
(available from ICE Bookshop @ £2.50)

The booklet deals with *Historical Background and Responsibilities* as an introduction and places the profession of the Engineering Surveyor in context with the long established profession of Civil Engineering and Land Surveying. The *Authors* point out that the Engineering Surveyor, whilst only established as recently as 1972 is now recognised as a separate profession and is in widespread demand. Skills in data acquisition and management and in dimensional control have become so specialised as to require their own regulatory and qualifying professional body, the Institution of Civil Engineering Surveyors.

Early Civilisations. The skills of the Surveyor or Measurer are outlined by illustrating projects in Sumeria, Egypt and Mesopotamia involving irrigation schemes and the erection of such enormous structures as the pyramids. The *Greeks* and *Romans* continued development and reference is made to advancement in surveying instruments such as the gnomon, the diaptra, the groma and a simple form of plane table. In *Medieval Times* further examples of advancement in Persia during the 5th and 6th centuries are given and Moslem engineering practices are illustrated in which the astrolabe was used for measuring angles. During the *Renaissance*, many notable cathedrals were completed and early surveying equipment developed into much more sophisticated items used for astronomical purposes and the theodolitus was introduced.

The booklet deals with further *Instrumental Developments* in the 17th century when instrument manufacturers produced more precise devices and the technique of levelling was revolutionised. With the introduction of the telescope in 1608 the capabilities of surveying dramatically changed leading to the *Beginnings of Precise Measurement*. A chapter on *Victorian Engineering* shows that the long history of the development of optical distance measurement techniques is dotted with contributions by civil engineering surveyors.

And so to the *Twentieth Century* - with a period of appropriate education and training, young civil engineering surveyors joining the profession will generally be aware of the more recent developments in civil engineering design and construction in surveying instrumentation and in measuring and setting out techniques. Modern constructions, such as the Sydney Harbour Bridge and the Channel Tunnel illustrate the needs for modern instrumentation and techniques.

A most enjoyable read and well worth the attention of all practising engineers. The artwork was disappointing and not at the same level as the written word.

REQUESTS FOR INFORMATION

Concrete Shell Roofs

Paul Dunkerley

The United Reformed Church at Fairhaven, Lytham St Annes, Lancashire (known locally as *The White Church*) was built in 1911-1912 by Lewis Construction Company to designs by the architects Briggs, Wolstenholme and Thornely. The campanile tower has an octagonal reinforced concrete floor slab spanning about 3 metres part way up, and concrete rings beams supporting the bell tower for the smaller floor above. The octagonal plan is repeated to a larger scale in the shell dome roof of the church itself, where an octagonal fibrous plaster ceiling is suspended by wires from an octagonal 100mm thick reinforced concrete shell dome spanning about 10 metres. The concrete shell was waterproofed with an external layer of asphalt about 20mm thick, itself protected by bituminous felt. Searches in the local Building Control archives and also in the Lancashire Records Office have completely failed to discover any information about this unusual structure. Would anyone who has any information about such early concrete shells please contact either Paul Dunkerley, local PHEW Panel member (01772 671224), or