NEWCOMEN Links

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The Society's Patron, HRH The Duke of Gloucester at the Summer Meeting - full reports

The Overlooked History of Doors, Perfect Sound, Charles Richardson, Moravia and Silesia, Housing the Great Exhibition, Ingenious Mill-wrighting, Calendar for 2014/15 Season, News....

NEWCOMEN
The International Society for the History of Engineering and Technology

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HRH The Duke of Gloucester

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The front cover images

Members of the Rolls Royce assembly team show the intricacies of the jet engine to HRH The Duke of Gloucester, the Society's Patron.

Notes on Contributors

Dr Jim Andrew has worked with Birmingham's Science and Industry Collection since 1974. He is Secretary of the Midlands Branch.

Tony Barber BEng (Hons), CEng, FICE, MIStructE E began his career with Sir Alexander Gibb & Partners as graduate civil engineer. After several years in contracting, he joined Brown & Root in the offshore oil and gas industry and is currently working for Subsea 7. He has a special interest in the development of Bloodhound SSC for which he is a STEM Ambassador.

Robert Carr pursued an academic career initially in theoretical physics. More recently he has been engaged in industrial archaeology.

Mike Constable is a former Midland Branch Chairman and Council Member Mike and a retired Museum Professional with a special interest in Canals.

Roger Cline is the editor of The International Journal for the History of Engineering & Technology.

Sir Neil Cossons is former Director of the Science Museum, London and a Past-President of the Society.

Julia Elton is an antiquarian book dealer who has spent her career working with archives and manuscripts. She is a Past-President of the Society.

Michael Grace is a chartered town planner and environmental engineer with a life-long interest in the history of technology. He joined Newcomen in 1984 and is currently Vice-President. He is also Vice-President of the Industrial Heritage Association of Ireland.

Martin Gregory M.A., D.Phil. taught physics at Winchester College and has been a member of the Newcomen Society for 50 years. He is involved in Industrial Archaeology in Hampshire, is a trustee of the Twyford Waterworks Trust and the present editor of The Journal of the Hampshire Industrial Archaeology Society. His specialist interests in the history of technology lie in the sewing machine, the Stirling engine and the stationary steam engine.

Stephen K Jones' career is in industrial development and economic regeneration with particular interest is the study of engineering history, especially relating Brunel. The final volume of the trilogy, Brunel in South Wales, was published in 2009. He is a member of the ICE Panel for Historical Engineering Works (PHEW), sits on the editorial panel for the Engineering History and Heritage journal and is a member of Council.

Jur Kingma M.D. is a retired general practitioner. He is a publicist onindustrial archaeology, technical and maritime history of the Netherlands.

John Liffen is Curator of Communications and Electricity Supply at the Science Museum, London, and is a content developer on the Information Age project team.

Professor David Perrett is Professor of BioAnalytical Science, William Harvey Research Institute, Barts & the London School of Medicine & Dentistry, Queen Mary University of London. He is a Fellow of the Royal Society of Chemistry and a Chartered Chemist. He is a Past President of The Society, and a member of Council and has served on the Council of the Association for Industrial Archaeology 1986-98. He is actively involved in Industrial Archaeology at local, regional and national levels; lecturing widely and writing on I_A, organising regular lecture series, and arranging field visits and conferences.

John Porter has degrees in mechanical engineering and naval architecture and spent all his working life with merchant ships. Sailing on steam driven ships led to an involvement with the preserved Cornishengines at the Kew Bridge Steam Museum. He enjoys travel with NS and AIA, finally having time to see more of the countries he flashed through in his working days.

John Simpson's career was spent in the boatbuilding industry and included two years in the Merchant Navy. For most of this 45 years he worked in welded aluminium construction but did include traditional wood, moulded plywood and fibreglass reinforced plastic in his expertise. He is particularly interested in science subjects and runs a science group.

Geoff Wallis is the President of the Newcomen Society. He is founder and former managing director of Dorothea Restorations Ltd and has 30 years of experience as a contractor.

David Witt was an academic at Oxford University's Department of Engineering Science from 1959 until retirement in 1999 and has been a Newcomen member since 1962. He has a variety of interests and was always a strong promoter of student project activity.

David Yeomans is an engineer and an historian. He taught structural design and building conservation in schools of architecture in the UK and has been a visiting professor in American universities. He has also been a consultant to the UNESCO Division of Cultural Heritage advising on World Heritage Sites. His publications are on building conservation and the history of engineering.

Copy date for the next issue of

Newcomen Links

1 November 2014

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From the President,

The Newcomen Society was formed nearly 100 years ago to promote the study of the history of engineering and technology. Since its foundation, the Society has built up an archive of international significance, acted as a forum for exchange of information and inspired people to study the history of engineering and technology. For nearly a century we have operated in substantially the same way, and I am pleased to say that the Society is in a state of reasonable stability in terms of finance, membership numbers and output of learned papers.

We must not, however, be complacent as we face serious challenges from open-access publishing, declining interest in traditional engineering and manufacturing, and competition from other similar organisations. As our second century approaches we need to understand the threats and opportunities and think boldly about the future. 'History starts yesterday', so I believe that we should encourage the study of engineering and technology in the most recent quarter of a century, as well as in earlier periods. Should the by-line of the Newcomen Society be *the study of the development of engineering and technology* rather than *history*? What do you think?

We also need to consider the wider environment in which our activities are carried out. Since 2012, England has a National Planning Policy Framework based on a clear presumption in favour of sustainable development. Although the framework supports the conservation of our heritage, it allows for the justification of serious harm, even total destruction, on the grounds of public benefits, provided this is clear and convincing, and careful consideration has been given to conservation of the heritage asset. This is worrying.

What should the Newcomen Society's response be? In the past, we supported the campaign against insensitive works to the Thames Tunnel. I believe that the Newcomen Society should, and indeed must, lend its support to campaigns where the conservation of important engineering and technological sites and artefacts is concerned. We should also cooperate, as appropriate, with the efforts of other organisations. Should we do more, bearing in mind that the President and Council can facilitate action, but the initiative and hard work must come from members?

Please let me know your thoughts on president@newcomen.com

Geoff Wallis

From the Editor

This issue is divided into two parts. In the first section John Liffen writes on the Denman Horn and the quest for perfect sound; John Porter reports on an interesting trip to the industrial sites of Moravia and Silesia; Stephen Jones profiles Charles Richardson, the engineer of the Severn Tunnel and David Yeomans introduces a hidden history of the construction of doors. Our President, Geoff Wallis, reveals the sometimes-precarious nature of his work – up a ladder, in the windswept Fens on a site inaccessible by road. The Midland Branch lecture, by Jim Andrew on Paxton's Great Exhibition building is illustrated by two wonderful images from the Science and Society Picture Library at the Science Museum. Once again I am grateful to John Liffen and the staff at the SSPL for their generosity in allowing us to use the Library's superb images.

The second part, beginning on p20, contains the reports of the Summer Meeting. This year the Meeting concentrated on the M4 Corridor from Swindon to Bristol. Julia Elton co-ordinated the writing of the reports and I want to thank everyone for their contributions: both articles and photographs. There were many highlights of the Meeting; notable amongst them was the day at Rolls Royce and the Rolls Royce Heritage Trust. The Society's Patron, HRH The Duke of Gloucester joined members on both these visits. The numerous photographs I have received reveal what fascinating visits these were – touring the Rolls Royce factory (see front cover), talking to management and assembly staff, as well as sitting in the mock–up cockpit of Concorde.

The 2014/15 Calendar of Branch Events is in the centre spread, p16-17, of the magazine and divides the two sections. There is also a membership application form on p18 although new members can also join on-line. Please read the various papers that accompany this issue regarding Society matters and membership renewals.

Once again, many thanks for all the contributions. The copy date for the December issue is 1 November. I have already received articles for the next issue, and the file remains open.

Deborah Jaffé

Newcomen Matters

Visits to River Tees & an oil production site – postponed

These proposed visits, scheduled for the autumn, have been postponed until the spring, due to circumstances beyond our control. he remedial work on the Transporter Bridge was badly behind schedule. The canopy on the cross-river gondola has yet to be fitted, and more importantly the construction of the lift up the side of the bridge has yet to be started. A suitable date is still being sought for the visit to an oil production site.

Further information and dates will be announced as soon as possible. We apologise for any inconvenience this may cause.

The Newcomen Society Calendar for 2014/15 is on the centre spread, pages 16-17.

There is a membership application form on p 18

Membership Matters

We have been using the new Membership Database for a year or so and you may have noticed a few problems, we in the office certainly have.

The Database shows that we still have a number of "missing" emails and there have been a few cases of "bounced" messages. Could all members check the details on their record and ensure that the addresses, e and snail mail are up to date? If you have any problems signing in to the Database please get in touch with membership@newcomen.com.

As the traditional renewal date of 1st October approaches we have included the relevant details with this issue of "Links". Members who joined since the start of the new system will renew on the anniversary of of their joining and will be contacted at the appropriate time.

We have introduced the possibility of paying by on-line banking for the first time this year but do please ensure that you only use one method of payment.

Those members using PayPal may find they have a "recurring payment" already set up for another date. Could you please check that the payment is made on or soon after the 1st October?

Thank you all for your support during the last, trickyish, year and I look forward to your support in the coming year.

Dan Hayton
membership@newcomen.com

Writing for Newcomen Links

Relevant articles and items of news may be submitted to be considered for inclusion in Newcomen Links.

Articles should be a maximum of 1000 words and sent in Word format by email.

Images should be sent separately by email in jpg (digital) format of 300dpi minimum. They should not be embedded in the text of the Word document.

Copyright and reproduction issues on images, including diagrams, must be considered and wherever possible permission for publication granted. It is not possible to receive photographs/scans of images in books etc.

The copy date for the next issue is 1 November 2014
Please submit articles, information, details of events etc to:
The Editor,
Deborah Jaffé at: editor.links@newcomen.com
07798 603000

We welcome the following new members:

David Boughen,
René S. Christensen, Geoffrey Goldberg,
David Jury, Richard Lasson,
Neil Mackay, Tim Metcalfe,
Peter Mobbs, Yuichi Suzuki,
Paul Thestrup, David Wardrop

National Congress on Industrial Heritage in Tokyo

On 14 July the Prime Minister of Japan, Shinzo Abe, accompanied by five members of his cabinet, launched the first meeting of Japan's *National Congress on Industrial Heritage* (NCIH), held in Tokyo on 14/15 July. Prime Minister Abe emphasised the importance of Japan's industrial heritage in marking the history of the nation, with its roots in the Meiji era and the long tradition of craftsmanship that preceded it. He expressed particular pleasure at the recent inscription [at the UNESCO World Heritage Assembly in Doha, June 2014] of the Tomioka Silk Mill on UNESCO's World Heritage List and commended forthcoming nominations of historically important industrial sites.

He was fulsomely generous in recording the role played by Great Britain in Japan's Industrial Revolution, noting her global importance as the first industrial nation, and the clandestine voyage in 1863 of the five young men – the Choshu Five – to study at University College London, their subsequent determination to take Japan into the modern world, and their success in achieving that. He saw proper recognition of the industrial heritage as critically important to an industrial nation like Japan and wished to see it as a central element of education and of economic stimulus. In doing so he announced property tax concessions to industrial enterprises that owned historically important industrial sites in order to encourage and assist in their preservation.

In responding, Sir Neil Cossons (Society Past President), congratulated the Prime Minister and the Government of Japan on their outstanding initiative in inaugurating the new Congress, and especially for applying it as a platform for the engagement of both public and corporate sectors in support of the common cause of industrial heritage conservation.

He thanked the Prime Minister, on behalf of the overseas delegates, for the generosity of the reception they had received, and for what was a uniquely important event in recognising the importance of historic industrial sites not only in Japan but on the wider world. The National Congress provided a forum for exchanges on policy and practice in industrial heritage conservation which he was confident would have far-reaching benefits.

There were some 300 delegates at the Congress including representatives from Australia, Canada, France, Germany, India, Italy, Poland, the United Kingdom and the USA. Especially significant was the presence of senior representatives from Japanese industry, many of whom were sponsors of the Congress.

Letters received

To the Editor of Newcomen Links

Dear Deborah Jaffé,

Reading Fred Starr's article about 'Perks of the Job' and the reference to Rob Shorland-Ball's lecture on roller milling reminded me that we accepted, for the North Western Museum of Science and Industry in 1974, an early Henry Simon roller grinding corn mill. It was a more compact machine than the traditional type with a pair of horizontal stones as could be seen in wind and water mills.

A later accession must have come from Yates's Flour Mill in the centre of Manchester, which was probably based on Richard Roberts' patent. (Thomas Sharp & Richard Roberts, patent 6536, 1 January 1834, Machinery for grinding corn and other materials) Walking past one hot day, I saw two white-coated men sitting outside with the unmistakable smell of warm dry flour drifting out. I was invited to see the milling equipment and was surprised to find mills with their stones set vertically. I was even more surprise when I enquired about how often the stones needed dressing and was told it had not been done for many years, something that had to be done frequently with horizontal stones. Roberts even suggested the use of cast iron or steel instead of traditional stones, perhaps anticipating roller milling.

Yours sincerely,
Richard L. Hills

To the Editor of the International Journal for the History of Engineering & Technology

Dear Editor,

Dr Roger Kinns is to be congratulated on an interesting article: 'Did the Edinburgh Time Ball really Weigh 15 cwt?' in the July 2014 issue of the Journal (Vol 84, no2, p160). He answers his own question with an emphatic and well reasoned 'No' (page 173), after writing that how the misconception arose is a mystery. It had previously been explained that Charles Smyth, Second Astronomer Royal for Scotland, had mentioned the '15 cwt' figure as a casual remark in an 1853 paper.

I dare to suggest that the mystery of the misconception of the Edinburgh time ball's weight is due simply to Smyth the astronomer being a scientist not an engineer. It appears that he may have originated the concept of a time ball, and perhaps chosen a shape, i.e. a sphere, of a diameter appropriate for visibility at the likely viewing distance of local shipping. As an astronomer he was no doubt familiar with the concept of visibility of spherical objects versus viewing distance, and Table 1 of the paper shows that a number of other time balls were subsequently made of a similar size, confirming Smyth's choice of 5 foot diameter as entirely appropriate.

So much for Smyth's successful but purely conceptual design. No doubt he felt that this should be backed up by a weight estimate, and probably considered the proposed ball as a homogeneous sphere, likely to be made from the most commonly available and economical material in use at the time (and even today), i.e. timber. One source lists some types of pine in the air dry condition (15% moisture content) as having a specific gravity of 0.42. Calculation shows that a solid 5 foot diameter sphere of this material would weigh 15.3 cwt, easily rounded down to the nearest whole number as 15 cwt.

When it came to manufacturing such a time ball engineers would have had to produce a workable design. Realizing, as the author, Roger Kinns, evidently did, that a 15 cwt ball would be too heavy for convenient manual rewinding, they came up with the much lighter design of a thin skin, eventually zinc, on a wooden frame.

This surely goes to show that successful design needs practical engineers as well as scientific inventors.

Regards
Gordon Latham

Don McLean writes:
I wonder if the author had considered that a simple reporting error mixing Stones and Hundredweight would account for it? 15 stones = 95kg which was the other estimate (possibly for that reason).

Seen.....

In Switzerland the engineering of the railways is used to promote tourism, especially the stretch of the Rhätische Bahn (RhB) which has UNESCO World Heritage status. This advertisement was displayed in the carriage of the RhB train between Davos and Landquart and was seen, in larger format, at Zurich Hauptbahnhof. The RhB website has a tempting suggestion - to obtain a...*World Heritage Pass [that] is the free pass for discoverers on the Albula and Bernina section of track that is now over 100 years old. In terms of civil engineering and routing, the UNESCO World Heritage Rhaetian Railway in the Albula/ Bernina Landscapes is a true masterpiece. Spend two or more days taking in the sights in three language and cultural regions. The most popular photographed subjects are the Landwasser Viaduct, helical tunnels between Bergün and Preda and the Brusio Circular Viaduct.*

www.rhb.ch/en/world-of-railway-experiences/unesco-world-heritage

....The Door

Robert Carr's door with holes has prompted David Yeomans to consider the history of the construction of the door and gate as an overlooked area of study

David Yeomans

The illustration of the door prompts me to note that the history of door and gate construction is a neglected area of possible study. A colleague and I came to realise this when repairing the gates of Trinity College, Cambridge. Each leaf of the gate weighs 3/4 ton and the problem of construction is to prevent their racking. This had not been well done at Trinity College because the structure of the gate was a square grid of ledges and muntins with racking resistance only provided by the resistance to rotation of the halving joints between them. The doors to King's College Chapel seem to have also suffered from racking where the square grid is used decoratively. My colleague Hugh Harrison, having worked on the repair of a number of doors and gates of varying sizes was able to produce drawings and photographs of a number of examples showing very different ways of constructing doors to cope with this structural problem.

Some boarded doors rely entirely upon the fixing of the hinge straps to prevent racking. Other boarded doors may have ledges fixed to prevent racking while still others have elaborate carpentry along the edges of the doors to prevent sliding between them. Then the hinge straps simply hold the boards together. Complications arose when doors and gates were made in two or three layers with a grid like arrangement in one of the layers serving as stiffening and or decoration. Construction is made more complex when a wicket gate is incorporated into one leaf of a pair of gates. Then, but not only then, the lower hinge strap might be dispensed with in favour of a pivot underneath the hanging style.

The puzzle that we had in looking at the structure of the Trinity College Gate was to understand how such an apparently poorly functioning structure had developed. How were carpenters thinking about the structure of the gates they were making? In spite of the number of gates and doors Hugh Harrison had worked on and so recorded, the number of examples we had was relatively small. We were also aware that there have been few studies of this ancient technology.

Cecil Hewett, who is well known for his drawings of carpentry has made drawings of some doors, but experience with his drawings of roof structures shows that his work is not always reliable. Jane Geddes in a book on English ironwork devotes a chapter to the carpentry of doors – because it is to doors that the ironwork of her study is fixed. That is all that has been done. Nevertheless, while working on this I became aware that there are two late medieval inn buildings in Banbury, where I live, that have early doors.

If there are two examples in this one small market town how many more might there be across the country? Perhaps this is something that members might be interested in keeping an eye open for and letting us know of any examples they find. What we would want is a picture of both the back and front of the door or gate (the latter are simply doors into an enclosed space, such as a courtyard), its location and any information on its date, even if only approximate, that might be available.

Comment.....

.... Engines or Engine?

John Porter has further thoughts on Robert Carr's question - *Is it Engines or Engine?*

A little further enquiry into the question posed by Bob Carr "Engines or Engine?" brought interesting insight and a rational explanation.

When compounding was introduced at sea, from the 1850s, the usual design of engine was vertical with the high pressure cylinder in tandem above the low pressure unit, driving on a single crank. By the 1870s, the compound engine to this layout was very popular amongst leading shipowners. When more power was required, a second "engine" was simply added ahead of the first, driving on its own crank on a common shaft. The literature does make reference to a third "engine" occasionally being installed, though I have not identified any specific ship with that layout.

One shipowner who adopted the system in a big way was Thomas Ismay for his fledgling White Star line. He initially ordered four ships with the four-cylinder compound engines driving a single propeller and went on to order quite a few more, all from Harland and Wolff. Harland and Wolff did not have their own engine-building shop until 1880, and bought the engines in from Maudslay, Sons and Field in London and G Forrester & Co and Jack Rollo & Co, both in Liverpool. These were quite powerful engines, of around 2000 shp, with cylinders of 32 and 71 inches diameter and a 5 foot stroke, using steam at 35 psig. Doubling up with two or more identical units, rather than a single larger pair of cylinders, must have made manufacture and transport much easier. As it was, Harlands built their own coaster, with a large hatch, especially for transporting machinery to Belfast.

By the 1890s, higher boiler pressures meant that the day of this type of engine was done, and the "conventional" triple expansion engine, or even quadruple expansion, was powerful enough for all the demands of a single propeller and had become the norm.

It is now easy to understand why a propulsion unit, with two, or even three, identical vertical compound cylinders on a common crankshaft would be referred to as "engines" in the plural. The s.s. Doric that Kipling sailed in to New Zealand was so equipped and that was how the real life version of McAndrew[1], the Chief Engineer, would have referred to them. But once that type of engine had gone, usage would have reverted to "engine" in the singular for each shaft. And that is how it is today, even when the current large diesel engines applying 110,000 shp to a single screw are made up of 14 vertical cylinders in line, all on a common crankshaft.

Notes:

1. 'McAndrew's Hymn' by Rudyard Kipling, first published in 1894

Sources:

Cameron Stephen. Belfast Shipbuilders. Colourpoint 2011
Griffiths Denis. Power of the Great Liners. Patrick Stephens 1990
Guthrie John. A History of Marine Engineering. Hutchinson 1971
Smith Edgar C. A Short history of Naval and Marine Engineering. B&W, 1937.

News.....

Elsecar Newcomen Engine

Barnsley Council's £ 400,000 project to restore the Elsecar Newcomen Engine in Barnsley, South Yorkshire is nearing completion. This has been supervised by the Society's President, Geoff Wallis who will write a report for a future edition of NLinks.

Clipstone Colliery Headstocks

These are the tallest headstocks in the United Kingdom. and are Grade II listed structures. Inside they have one of the only remaining examples of a Koepe winding system. They are a national asset, of international importance to the heritage community and valuable to the local community. It is believed that they can be re-purposed as a leisure and tourist attraction to help regenerate Clipstone village and the surrounding Nottinghamshire countryside, which would boost the local and national economy. They are currently in danger. A planning application has been submitted to get the structures de-listed and demolished. To support the campaign to protect them contact: www.sgmrg.co.uk

Didcot A Power Station

At 5 am on Sunday, 27 July, three cooling towers at Didcot A power station were simultaneously demolished by Coleman & Co. A total of 180 kg, almost 400 lbs, of explosive was used bringing down 36,000 tonnes of material.

A Cable Network to link the US and Japan

A consortium of six tech companies has announced plans to build and operate a cable network under the Pacific Ocean, linking the US and Japan. Dubbed 'Faster,' it will deliver fast internet speeds, with a current design capacity of 60 terabytes per second. The consortium, which includes Google, China Mobile International, China Telecom Global, Global Transit, SingTel, and KDDI, is expected to spend a total of $300m, approximately £179m. The group hope to achieve such a high capacity by installing 6 fibre-pairs, which each carry 100 wavelengths of 100Gbps capacity.

"The 'Faster' cable system has the largest design capacity ever built on the trans-Pacific route, which is one of the longest routes in the world. The agreement […] will benefit all users of the global internet," said Woohyong Choi, chairman of the Faster executive committee.

The speeds by the 'Faster' cable will be much quicker than anything users in most of the US and Europe are accustomed to. The fastest widely available speed of broadband in the UK is currently 152 megabytes per second, compared to the 60 terabytes per second proposed by the consortium. Further information: http://thestack.com

The Science Museum Radio Communication gallery, looking west, September 1930. The mouth of the horn is over the doorway and the demonstration broadcast receiver is the tall dark cabinet on the right. Image: B004604 © Science Museum / Science & Society Picture Library -- All rights reserved.

In Search of Perfect Sound

John Liffen

In May 2014 the Science Museum, London, unveiled a recreation of the almost legendary horn loudspeaker which in the 1930s had given the Museum's visitors the experience of hearing the highest quality reproduction of broadcast sound. The original was the largest straight logarithmic, or exponential, horn loudspeaker ever made in Britain, being about 27 ft long and 7 ft square at the mouth. It was designed in 1929 by the Museum's curator of Electrical Communication, Roderick Denman. The following year Denman designed and built a demonstration broadcast receiver whose output was matched to the loudspeaker. In 1975, audio authority Percy Wilson could still say, 'no superior loudspeaker has to date been demonstrated in Britain'[1].

Sadly, the loudspeaker was accidentally destroyed in 1949. The original drive unit, a Western Electric 555W, was rescued, but no part of the horn itself was thought to have been kept. However, in the early 1980s I discovered the unharmed initial 8 ft section, a narrow tapering copper tube, while clearing out an 'unofficial' store in the Museum's roof space. I saw to it that it was properly preserved but there the matter rested for 20 years, as I moved on to other work soon afterwards.

In 2003 I was appointed Curator of Communications and in 2006 researched the history of the horn, discovering in the process that Denman's specification for the design still survived.[2] A little later I showed my findings to Aleks Kolkowski, a musician and historical audio researcher, who was on a year's appointment as 'sound artist in residence' at the Museum. Aleks was inspired by the thought that the horn could be re-created and had some money available from his residency. He discussed the idea with Steve Long of Science Museum Workshops, and found that not only were they keen to build a new horn in fibreglass to the original dimensions, but that the Museum's work schedule was favourable to the project. For practical reasons the new horn was to be constructed in six sections and would re-use the original initial section (the part to which the drive unit is fitted). The work involved making six core moulds in wood to the precise dimensions required, and then applying the chopped strand matting fibreglass. In the course of only a few months the horn came into existence, helped by the wholehearted enthusiasm and skill of the Workshops' staff. Everyone in the vicinity knew when fibreglass was being applied because the pungent reek of the resin permeated the basement corridor.

The horn was completed in the spring of 2013 and was first tested that August using another WE 555W horn driver from the Museum's collection. The test was made in the car park of the Museum's store at Blythe House, West Kensington (where the Society's office is located). This was a fulfilling

The Denman Horn, seen during a performance at the inaugural event, 19 May 2014. Actor Dudley Sutton (seated on right) performs with a group of musicians. Image D143058 © Science Museum / Science & Society Picture Library -- All rights reserved.

moment for me, having dreamed of such an opportunity for years, and one of great satisfaction for Aleks and the Workshops.

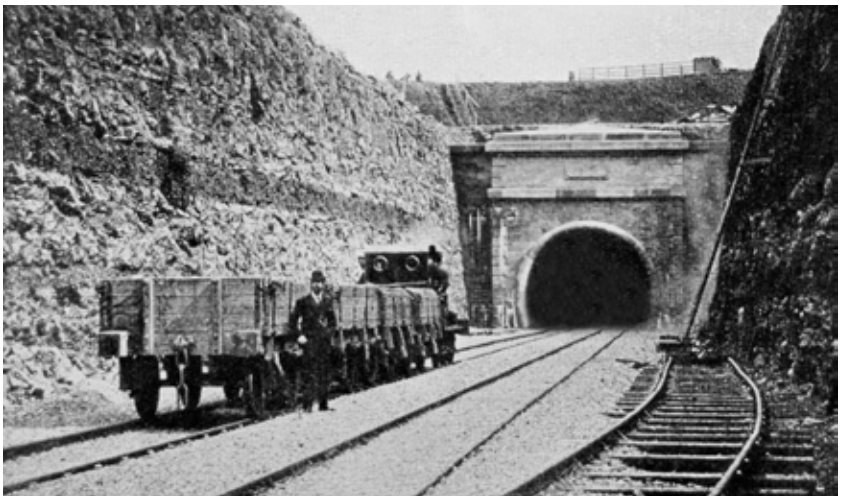
The tests showed that some parts of the horn needed attention to eliminate sound leakage, but nothing serious. We were unsure when the first public demonstrations could take place but unexpectedly a slot was made available for May 2014 in the Science Museum's 'Media Space'. Audio and electronics specialist Adrian Tuddenham designed and built an amplifier suitable for the WE 555W and after great effort the horn, now named the 'Denman Horn', was successfully demonstrated to the Museum's visitors for two months. The exhibition, called 'In Search of Perfect Sound', included live concerts, a dedicated audio feed from BBC Radio 3 and a month-long residency by London-based broadcaster Resonance FM.

The exhibition has now ended, but I hope that another opportunity will occur soon to enable the Denman Horn to speak again.

Science Museum Workshops staff pose for the camera inside the largest of the six moulds they made. Left to right: Kevin Carlin, Jake Fuller, Chris Ward, Frank Lincoln and Mike Ashelford. The mould is seen with a wax coating. Successive layers were a release agent, a gell coat and finally chopped strand matting with resin.
Image: D131570 © Science Museum / Science & Society Picture Library -- All rights reserved.

Notes
1. P Wilson and G L Wilson, 'Horn Theory and the Phonograph', Journal of the Audio Engineering Society, Vol 23 No 3, April 1975, pp 194-199.
2. J Liffen, 'The 1930 Demonstration Broadcast Receiver and Loudspeaker at the Science Museum, London', The Bulletin of the British Vintage Wireless Society, Vol 31 No 4, Winter 2006, pp 5-10.

Charles Richardson: Originator & Engineer of the Severn Tunnel



The Severn Tunnel on the Welsh Side.

Stephen K Jones

Charles Richardson (1814 - 1896) was a Victorian civil engineer whose achievements have been overshadowed by his contemporaries; his interest in engineering was fostered by his mother, his father having died when Charles was six years old. This talent was spotted by the Brunels who took him on as an apprentice; to work on the Thames Tunnel for Marc Isambard Brunel and on the GWR, including the Box Tunnel and later the Sapperton Tunnel on the Cheltenham & Great Western Railway (C&GWR) for Isambard Kingdom Brunel. At the age of 23 he was formally appointed resident engineer of the C&GWUR in 1837 with a salary of £300 p.a. He was to incur Brunel's wrath for taking time off to indulge his love of cricket, but appears to have mended his ways later when Brunel invited him to be the resident engineer on the Bristol & South Wales Union Railway (B&SWUR).

A direct crossing to south Wales was the imperative behind the GWR-backed and Brunel-led B&SWUR. Following the passing of the Act of 1857 Richardson began work on the Bristol side with the 1,245 yard long Almondsbury tunnel (now Patchway Old Tunnel) and a heavy cutting at Horfield. The single line railway was 11½ miles long, from a junction ½ mile east of Temple Meads with steep gradients; 1 in 75 for 2 miles up to Filton and 1 in 68 for 1¼ miles down to Pilning. On the Welsh side a branch line less than a mile long ran from the South Wales Railway (SWR) at Portskewett to a 708 ft. long timber pier. Trains would run to the end of the piers, whose floating pontoons allowed the steam ferry boat to come alongside at any state of the tide and then cross to a 1,635 ft. long pier at New Passage. Following Brunel's death in 1859, Robert Pearson Brereton (c.1818-94) took over and Richardson's role increased. The B&SWUR line, with its associated ferry service, opened to the public on 8 September 1863 but initially passengers were conveyed by road to the SWR mainline station at Portskewett until the branch line was completed. While he was working on the ferry piers in 1862-3 Richardson began to pursue the idea of a railway tunnel under the river Severn. It was an idea that Brunel had rejected back in 1845 on the grounds of cost and it took Richardson ten years to get his proposal accepted by the GWR, arguing that it would carry none of the risks of a bridge and would cost just £750,000.

In 1872 the Severn Tunnel Act was passed and construction began the following year. This was undertaken by the GWR with Rowland Brotherhood (1812–83) being engaged to sink trial shafts; he was well-known to Richardson as the major contractor for the B&SWUR and having worked on the GWR (with his father, William Brotherhood 1778–1839), as well as establishing a locomotive works at Chippenham. By October 1879 the headings from the English and Welsh sides were only 138 yards apart when a great inrush of water occurred, and the work was brought to a standstill. Frustrated by this setback the GWR brought in Sir John Hawkshaw (1811-91) who insisted that his trusted contractor; Thomas Andrew Walker (1828–89), was brought in to drive the work forward. Although retained as joint engineer with Hawkshaw, Richardson's role was now much diminished. It took until the end of 1881 with the most strenuous efforts of engineers and contractors together with the heroic efforts of men like diver Alexander Lambert, before the tunnel was pumped dry and work continued.

A special train carrying dignitaries made the first train journey through the tunnel on 5 September 1885, followed by a coal train on 9 January 1886 but the full opening of the tunnel was delayed until sufficient pumping facilities were in place. Regular passenger services did not begin until 1 December 1886. This date also marked the end of Brunel's unique steam ferry railway with the last crossing by the steam packet Christopher Thomas taking place the evening before. It is to Richardson that credit is due for the conception of the Severn Tunnel and amongst other innovations he developed a system for successfully aligning the two headings with unparalleled accuracy, however on occasion his advice was ignored when it might better have been followed. When building the B&SWUR, Richardson discovered a source of brick clay close to Almondsbury Tunnel, at Cattybrook. The brickworks he set up here would supply almost 20 million bricks to the tunnel and it is still in production today[1].

Ten years after the opening of the four-mile, 628 yard long Severn Tunnel which had taken almost fourteen years, and more than £2 million, to build, Richardson passed away on 10 February 1896. Remembered also for his cricket innovations, such as the development of the cane-spliced cricket bat, he died at 10 Berkeley Square, Bristol, and is buried in the churchyard of St Mary's, Almondsbury, where a church window is dedicated to his memory.

Note

1. See p28 for the report on the Summer Meeting visit to Cattybrook Ibstock Brickworks

A Visit to Moravia and Silesia

John Porter

In 2007, the Society visited Bohemia in the western part of the Czech Republic. In 2014, the AIA's Spring Tour was to the eastern provinces of Moravia and Silesia, close to the borders with Poland and the Slovak Republic.

This area had been the industrial heartland of Central Europe and was hit hard by the recession of the 1990s. Strenuous efforts are being made to offset this by developing a tourist industry. The emphasis is not just on the pleasant rolling countryside and neat towns, not too heavily marred by brutalist socialist architecture, but also by bringing out the remains of some very impressive industrial history. The tour was based in Brno and Ostrava, the latter still the home of heavy industry.

That the Czech Republic was a power house of engineering innovation there can be no doubt. There is an exhibition devoted to the Czech navy in the Technical Museum in Prague. A strange idea for a land-locked country, but it was the source of much of the technical staff and equipment of the Austro-Hungarian Empire until its demise in 1919. The armour plating, the guns, the engines, the propellers and shafting all came from here. A gallery showed the development of water power turbines and a London built steam engine was powering a spinning and carding works by 1816, Brno is where Kaplan developed his turbine with controllable pitch blades. By contrast, the preserved water mill at Slup was built in 1512. The four, very simple, undershot water-wheels are all operational, driving the mills through a wonderful collection of wooden gears and overhead line shafting.

The continued prosperity that this brought was shown by a visit to Villa Tugendhat, in Brno, designed by Ludwig Mies van der Rohe in 1929. The villa was commissioned by Jewish factory-owner Fritz Tugendhat on land he received as a wedding present. Fritz and Greta Tugendhat enjoyed just eight years in the villa before fleeing Czechoslovakia with their children in 1938. The care which had gone into the design of the central air heating and cooling system was of particular interest. After various vicissitudes, including the stabling of horses in the principal room, restoration commenced in 1994 and the building was added to the UNESCO World Heritage List in 2001.

The nearby town of Zlin is the Bata company town, developed by the shoe manufacturer for both efficient manufacture and contented workers. The central office block provided a fine view of the town for an informative talk and, the opportunity to travel 15 storeys in a paternoster lift.

The colliery buildings at Dŭl Michal were preserved when the mine closed in 1993. A deliberate policy of preserving the buildings in the exact condition they were at closure meant that the well-conducted tour felt real. This mine was electrified in 1913 and one piece of fascinating plant in the machine hall was an extraordinary dual motor generating set with two massive 20 tonne flywheels in the centre of a 40 to 50 metre long shaft line. On either side of the two flywheels was a lever operated clutch leading to the DC generator (to power the winder motors), the AC motor and the generator exciter. In the event of a total power failure, there was enough kinetic energy in the flywheels to allow for all the underground workers to be wound to the surface. One disadvantage of such a system is stopping it for checking and maintenance. This was done by applying wooden brake blocks to the flywheel rims with the overhead crane.

The group was fortunate in being able to visit an operating power station of 177 MW from three turbine units, all from Skoda. For many of us, the unusual feature here was the extensive auxiliary plant to supply thermal energy and district heating to a large part of the city of Ostrava. This plant was first built in 1933 and has been progressively updated ever since. Two superseded high pressure turbine rotors are on display, each preserved by a beautifully applied and, at first glance, imperceptible coat of paint. Recently, there has been investment in controlling emissions from this coal-fired plant.

There was a visit to the preserved trams of Ostrava. As the museum was well inside an operational bus and tram depot, the only way to keep camera-wielding enthusiasts under control, while waiting for the other half of the party to finish their tour of the historic tram shed, was to prolong the ride in a museum tram round the depot's test track. By the 10th circuit, even the tram buffs were crying "enough". All this was forgotten when the full impact of the Vitkovice Ironworks became clear. Steel-making finished in 1998 on this fully integrated site, with its own coal mine, coke ovens, four blast furnaces, steel-making furnaces and rolling mills. In 1994, nearly 35,000 people worked here and, not surprisingly, Ostrava had been a target for the allied air forces in WWII. Now it is a Cultural National Monument and has applied for UNESCO World Heritage Site status. If successful, it will be one of the biggest in Europe.

The 900 tonne gas-driven blower at the Vitkovice steelworks, made locally in 1938. It ran at 80 RPM and developed 3800KW

The gas-holder has been turned into a concert hall and a reception area for the tour of No 1 blast furnace – the smallest of the four. The furnace was modernised in 1988 and is in a very well-preserved condition. A pleasing feature is that one track of the skip hoist for materials has been turned into a people hoist, with fine views as one ascends to the charging platform. From there, further steps lead to the top where there is a lot of space between us and the view. From here the entire descent was on foot so that all technical aspects of the furnace could be appreciated. The Machine Hall has been turned into a general technical history exhibition, aimed at young people. A quick impression was that it does this well, but our attention was focussed on the two gas-powered reciprocating blowing engines. These were made locally and are, I suspect, bigger than those at Volklingen. The other exhibits had been allowed to encroach, but nothing can take away from the sheer size and grandeur of these massive machines.

Sue Constable, assisted by husband Mike,was responsible for the excellent arrangements and itinerary. As usual, Heritage of Industry, provided a reliable service.

Housing the Great Exhibition of the Works of Industry of all Nations

The Crystal Palace of 1851

Jim Andrew spoke about Joseph Paxton's iconic building at a meeting in Birmingham

Members of the Society of Arts (now the Royal Society of Arts RSA), with Prince Albert as President, began holding exhibitions of industrial and craft manufactures in the 1840s. They also travelled to Europe to view other exhibitions. In January 1849 they decided to hold a large exhibition in 1851 with manufacturers from around the world invited to exhibit, to make it the first international exhibition.

The exhibition was scheduled to open on 1 May 1851 but by May 1850, no progress had been made on a building to house it. Some 25 acres of display space would be required. What emerged was possibly the largest building the world had ever seen. It was also a temporary structure to suit the site in Hyde Park in London. An understanding of the enormity of the building's scale emerged as photographs became available.

As panic probably set in, Joseph Paxton, a gardener by training on the Duke of Devonshire's estate at Chatsworth, submitted a design. This was based on a glass house he had designed which was a 30th of the floor area required to house the exhibition. Agreement was reached on his design with ten and a half months to go. The building was to have a foot print of 19 acres and a mezzanine of 6 acres.

Paxton and his team had produced working drawings of a modular design in cast iron, wrought iron and glass in just two weeks. The main contractor was Fox and Henderson of London Works, Smethwick and the 1m sq ft of glass, in panes 10 ins x 4 ft were supplied by Chance Brothers also of Smethwick. The 26 acre construction site was surrounded by high fencing, to be re-used for part of the flooring. The first column was put up on 26 September 1850 and the frame was completed by mid-December. Glazing had probably started as soon as the roof was completed at one end of the 1,500 ft long building. It took four months to install glazing for the entire structure. Trolleys ran along the gutters allowing 80 workers to install the glass panes. This was the first prefabricated building.

With the building somewhat weatherproof, exhibits began to arrive in March 1851 and the exhibition was opened, on time, by Queen Victoria, on 1 May. About 14,000 exhibitors displayed around 100,000 exhibits at "The Great Exhibition of the Works of Industry of All Nations" which remained open until mid-October.

Exhibits included textiles, furniture, artworks, industrial processes and machinery for light and heavy engineering. The previous exhibition in London, in 1849, had attracted 100,000 visitors but this one brought over six million people to it. There were differing entry rates: five shillings, on Fridays and Saturdays and one shilling for Monday to Thursday.

The profit from the exhibition was enough to purchase the land south of Hyde Park, along the newly named Exhibition Road. Here, buildings were constructed for the new museums and colleges of South Kensington that now include the Science Museum, Natural History Museum, V&A, Imperial College, the Royal College of Music and the Royal College of Art.

Illustrated plates from Dickinsons' 'Comprehensive Pictures of The Great Exhibition' (1854).

The Transept of the Crystal Palace, London, 1851.
An illustrated plate depicting either the Opening Ceremony, or just after it. At the junction of the India stand a Crystal glass fountain is visible, and in the foreground visitors sit or parade among the tropical plants, elm tress, greenery and exhibits. The Crystal Palace was built to house the 'Great Exhibition of the Works of Industry of all Nations', conceived by Prince Albert (1819-1861). This was the first large-scale prefabricated ferrovitreous (iron and glass) structure and was designed by the landscape designer, Joseph Paxton (1801-1865). The prefabricated design made the construction, and later dismantling, easier and quicker.

The Whitworth stand of machine tools at the Great Exhibition, London, 1851.
Prominent objects on display include tools for planing, slotting, drilling, and boring, a wrought iron crane and spinning machinery.


INDIA

Ingenious Mill-wrighting

Geoff Wallis

Repairs were recently carried out on the National Trust's Wicken Fen Windpump, Cambridgeshire after a storm blew the sails off. The main wrought iron wind-shaft was found to be broken. The task presented the contractor Dorothea Restorations with a number of challenges.

The site is open to the public, and marshy with only board-walk access. Restoration had to be planned to use only equipment that could be man-handled onto site. With no road access for a crane to hoist the sails a 'sky hook' was created inside the restricted cap-space comprising a steel beam and scaffold trestle secured by webbing straps. The tail was tied down to the concrete base of the tower to prevent the cap being pulled off. Access for the mill-wright inside

the cap was via a very small gap between the curb and main frames called 'shears', requiring flexibility, good planning, and a minimal breakfast!

The new shaft was made of high-tensile steel with an iron journal cast on. The bore of the central cross holding the sails had worn extensively so the new shaft was 'blued' and dressed by power-sander to fit the worn hole.

Remote greasing lines were added to facilitate future maintenance. New aluminium cap-front sheets were fitted, and all exposed surfaces liberally coated with traditional tar varnish.

Before being hoisted into place the sails were placed on scaffold trestles and slinging-points adjusted to give the correct angle of lift. After hoisting into position, ropes on the tips of each sail manned by NT staff pulled the sail-assembly onto its new shaft, where it was secured by a single large nut.

The scoop-wheel is now working again, draining water from the fen on demonstration days, subject to wind conditions, operated by volunteers.

The National Trust website has details of the windpump at Wicken Fen.
'Standing sentinel over Sedge Fen, the Wicken windpump is a reminder of how people once earned a living - harvesting natural products from the fen. Originally used in spring and summer to drain peat diggings, today it's believed to be the last working wooden windpump in the Fens.'

Take a virtual tour of the windpump at: www.nationaltrust.org.uk/wicken-fen/things-to-see-and-do/virtual-tours/

To visit: Grid reference: TL 562 705. OS sheet: 154 Postcode: CB7 5XP. It is located about 9 miles SE of Ely, on A1123, at Wicken Fen Nature Reserve. Follow brown signs.

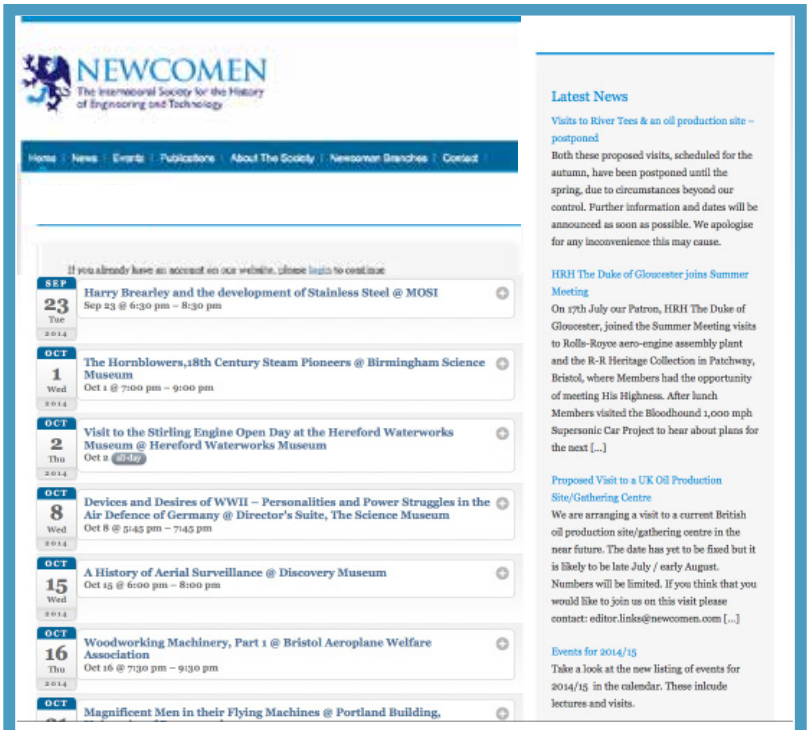
The Newcomen Society Calendar 2014/15

The next four pages have been designed as a pull out section. The centre spread contains the calendar of Branch events for the next 12 months.

There is a membership application form on the last page.

All events are also listed on-line. Please check the website for additions and changes: www.newcomen.com

Additional lectures and visits are planned throughout the year.



The Newcomen Society Calendar.....

Please check the Events pages on the website for updated information: www.newcomen.com

London Meetings held in the Director's Suite, The Science Museum, Exhibition Road, London SW7 2DD. Time: 17.45. Visitors welcome, admission free. Members & guests go to a nearby restaurant afterwards.

2014

8 October Phil Judkins: German Wartime Radar

12 November Cliff Lea: The UK and Oil Exploration

10 December Martin Gregory: Sewing Machines

2015

14 January John Wilson: Woodworking Machinery

11 February Geoff Wallis: The Presidential Address - Conservation Ethics in Practice

11 March José Luiz Dias: Electric Motor Refurbishment in Brazil tbc

8 April Ian Whittle & Fred Starr: Whittle Jet History

13 May Chris Barker: Model T Innovations

Midland Branch Meetings held in the Thinktank Theatre, at the Birmingham Science Museum, at Millennium Point, Curzon Street, Birmingham, B4 7XG. Time: 18.30 for 19.00. Visitors welcome, admission free. There is a pay-bar in the building which may be open before the meeting. A pub in Curzon Street serves meals and afterwards many adjourn there. Parking on-site from Jennens Road is £3 from 6pm or across Jennens Road at £1 from 4.30pm

2014

1 October Brian Corfield: The Hornblowers 18th Century Steam Pioneers

5 November Dr. Bryan Lawton: Tunnelling in the 1740s

3 December Dr. Tom Elliott: South Staffordshire Mines Drainage Commission

2015

7 January David Ensor: History of Instrumentation and Testing

4 February John Porter: Engines for the Titanic – insights from a Ship's Engineer

4 March Geoff Wallis: The Presidential Address - Conservation Ethics in Practice

1 April Stephen K. Jones: Brunel in South Wales

North Eastern Branch Meetings held at the Discovery Museum, Newcastle upon Tyne NE1 4JA. Times vary.

2014

15 October at 18.00 Arthur Dodds: History of Aerial Surveillance

10 December at 14.00 Geoff Wallis: The Presidential Address - Conservation Ethics in Practice

2015

11 February at 14.00 John Dobson: The Ingenuity of the Seagoing Engineer

22 April at 18.00 Brian Newman: The Titans

The Newcomen Society in Association with the Learned Society of Wales

Ribbon of Fire: how US strip mill technology came to Wales

by Jonathan Aylen

Thursday 30 October 6:45 for 7:00

Robert Recorde Room, Department of Computer Science,
Faraday Building, Singleton Park,
Swansea University, Swansea SA2 8PP

The American continuous wide strip mill halved the cost of steel sheets after 1926. This large scale technology was rapidly adopted in the USA to supply a growing market for autobodies, canstock and consumer goods. After much controversy, Welsh steelmakers built these new mills in the 1930s under pressure from customers and American technical partners. Once Richard Thomas had bought their Ebbw Vale mill in 1936, Summers at Shotton were tipped into ordering their wide hot strip mill from a rival American supplier. This lively paper based on US and European archive sources considers the personalities, the technical choices, the construction and the impact of these radical schemes on Wales. Marshall Aid funded a third strip mill at Port Talbot after the war, but a fourth private sector mill at Cardiff was abandoned once Llanwern got under way. The paper ends with a reminder of the fiftieth anniversary of direct computer control of the Llanwern wide hot strip mill in 1964.

The Newcomen Society is pleased to be working in conjunction with the Learned Society of Wales to bring a Welsh venue to existing and new members. Wales was an early adopter of the Newcomen engine with two engines erected sometime between April 1714 and December 1715.

The venue of this lecture, at Swansea University, is named after Robert Recorde (c1512–1558) who was a distinguished Welsh Renaissance writer of books on arithmetic, practical calculation, geometry and astronomy.

Jonathan Aylen of Manchester Institute of Innovation Research, University of Manchester is a joint editor and author of 'Ribbon of Fire: How Europe adopted and developed US strip mill technology (1920-2000)' published by Pendragon, Bologna 2012.

North West Branch Meeting at the Museum of Science and Industry, Liverpool Road, Manchester M3 4FP. Time 18.30, visitors welcome, admission free. Members meet at a nearby restaurant from 17.00. Parking is available on site.

2014

23 September *With the Manchester Association of Engineers*
Dr David Dulieu (Outokumpu Oy, Sheffield): Harry Brearley and the development of Stainless Steel.

28 October *With the Manchester Association of Engineers*
Deborah Jaffé: Frank Hornby and mechanical toys - Britain, Germany and the USA, 1880- 1950

25 November Branch AGM
Geoff Wallis: The Presidential Address - Conservation Ethics in Practice.

2015

20 January *With the Computer Conservation Society. Note change of start time 5.30 for 6.00 pm*
Dr Elizabeth Bruton (University of Leeds): 'Radar' of the First World War: B-stations and wireless direction-finding in World War One

24 February *With the Institution of Civil Engineers* Richard Byrom: William Fairbairn and the Iron Girder Bridge

24th March Julia Elton: The Thames Tunnel

Southern Branch Meetings held in Room PO 1-11, Portland Building, University of Portsmouth at 18.30. Some on-street parking is available. There is a charge for use of University car parks.

2014

21 October Peter Webberly: Magnificent Men in their Flying Machines

18 November Bob Otter: Railways and Warfare

9 December Henry Gunston: Military Railways in East Africa During WW1

2015

20 January Geoff Smith: Gunpowder Engines; Fact or Fiction

17 February Clive Barham Carter: Phaetons to Phantoms

17 March Carl Brookes: Strength Appraisal of the Iron Bridge

21 April Deborah Jaffé: Frank Hornby and Mechanical Toys – Britain, Germany and the USA, 1880-1950

19 May Geoff Wallis: The Presidential Address - Conservation Ethics in Practice

Western Branch Meetings held in Room 1 Bristol Aeroplane Welfare Association (BAWA), 589 Southmead Road, Filton, BS34 7RG from 19:30-21:00 Visitors welcome, admission free.

2014

12 October, Visit to the Stirling Engine Open day at the Hereford Waterworks Museum, Hereford. *Contact Branch Secretary.*

16 October John Wilson: Woodworking Machinery, Part 1

20 November Derek Hunt: Somerset Coal Canal

2015

15 January Joint Meeting with BIAS. Four 20 min talks. tbc

19 February Geoff Wallis: The Presidential Address - Conservation Ethics in Practice

19 March Laurence Ince: Neath Abbey Ironworks

16 April Philip Hosken: The Oblivion of Trevithick

21 May John Porter:Titanic's Engines-Insights from a Ship's Engineer

Do you know
someone
who would like to
join the Newcomen Society?

Membership details and an application form
are on the next page
or
to join on-line go to:
www.newcomen.com/membership/signup

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- Hard copies of NewcomenLINKS, the newsletter (published 4 times a year)
- Free access and download facilities to the Society's Archive of past papers back to 1920
- Membership of local branches and subject groups
- Access to a Members Only page on the website
- Invitations to summer meetings and conferences.

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Associate Members Receive:

- An electronic version of NewcomenLINKS, the newsletter (published 4 times a year)
- Membership of local branches and subject groups
- Access to a Members Only page on the website
- Invitations to summer meetings and conferences

To join

- To pay on line go to www.newcomen.com/membership/signup
- To pay by cheque complete the form below and post it with a cheque for the appropriate amount, made out to The Newcomen Society. Postal address:

  The Administrator
  The Newcomen Society
  The Science Museum
  London SW7 2DD

.....

Please delete as appropriate:

- I enclose a cheque for £55 in respect of a one year Full Membership
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Street (Second Line).....

City..... Postcode or Zip.....

County or State..... Country.....

Phone..... email .....

Obituary
Stuart Smith OBE
1944-2014

For over forty years Stuart Smith devoted his life with boundless zeal, energy and diligence to the preservation of the industrial heritage. As museum curator and later director at Ironbridge, and chief executive of the Trevithick Trust in Cornwall, he committed himself single-mindedly to Britain's industrial past. Internationally, his work over 26 years as Secretary of The International Committee for the Conservation of the Industrial Heritage (TICCIH) and as consultant on World Heritage projects brought him into contact with many of the leading advocates in the field. They found in him a friend and colleague of unswerving determination. An engaging and irrepressible personality with robust views and at times idiosyncratic tendencies, he was a collector and bibliophile whose knowledge, focus and resolve marked him apart from others of his generation.

Stuart Smith was brought up in a strongly nonconformist family, stalwarts of Baillie Street Methodist Church, Rochdale. After Rochdale Grammar School and graduation from the universities of Surrey and Manchester (UMIST), in 1968 he became a curator at Sunderland Museum where his acquisitive instincts were sharpened by the urgent need to capture evidence of the city's shipbuilding industry, then in decline. He was a founder member of the Ryhope Engines Trust, set up to preserve a pair of 1868 R & W Hawthorn beam water pumping engines and three 1908 Lancashire boilers, and present at the first steaming, forty years ago last Easter. He also worked as a volunteer for the new open air museum being established at Beamish, County Durham, dismantling buildings and machines and moving them there for preservation.

In 1972 he was appointed Curator of Technology of the Ironbridge Gorge Museum in Shropshire, later becoming Deputy Director and, from 1983 to 1992, Director. His deep knowledge of social and industrial history and an unquenchable capacity to get things done made him an important asset during the formative years of the museum. Perhaps his greatest contribution there was the reconstruction of the ironworks, based on Walmsleys Atlas Forge, Bolton, the moving of which he organised. In this he had the advice of Keith Gale (Society President 1963-5), a member of the Museum's advisory committee.

Stuart Smith on Hashima Island, the coal mining island off Nagasaki. Images: ©Neil Cossons 2014

Stuart Smith in a mine car in Taiwan

In 1973 Stuart participated in the First International Congress on the Conservation of Industrial Monuments, held at Ironbridge, out of which the present international body – TICCIH – was to emerge. In 1986 he became Secretary of TICCIH, a position he held until 2012. This brought him into contact with world heritage initiatives and he was instrumental in the Ironbridge Gorge being inscribed in 1986 by UNESCO as a World Heritage Site.

From Ironbridge he went to Cornwall, to live initially in Richard Trevithick's cottage. This was as the first Chief Executive of the Trevithick Trust, a consortium set up to manage a group of important historic industrial sites in the west of the county. He contributed to the tin and copper mining landscapes of Cornwall and west Devon, which gained World Heritage status in 2006. Since 2002 he had worked closely with an international team in Japan dedicated to securing World Heritage ranking for a group of sites – mainly in Kyushu and the Yamaguchi Prefecture of Honshu – that signified the emergence of Japan as an industrial nation during the Meiji era. The nomination was submitted to UNESCO in January 2014. In 2004 he was appointed OBE in recognition of his contribution, nationally and internationally, to the conservation of the industrial heritage.

A Fellow of the Museums Association from 1982, Stuart Smith was from 1991 to 1996 a member of the Royal Commission on the Ancient and Historical Monuments of Wales and from 1993 to 2002 of the English Heritage Industrial Archaeology Panel. He was a Vice President of the Association for Industrial Archaeology from 1992.

Stuart Smith made much of his northern upbringing. His at times bluff demeanour became something of a signature persona and validation for some of his more distinctive eccentricities. Immense motivation, application and capacity for hard work contrasted with his utter refusal to own or even use a computer, driving each day to collect print-outs of emails from his Secretary, Sarah, dictate answers and then file the hard copies.

Stuart Brian Smith died of lung cancer in St Julia's Hospice, Hayle, Cornwall on 13 April. He leaves his wife, Jacqueline, two sons and a daughter and two grand-daughters.

In his death the industrial heritage has lost an indefatigable campaigner and a luminary of great character, humour and knowledge.

Stuart Smith OBE, industrial archaeologist, was born on 19 August 1944. He died on 13 April 2014 aged 69.

Neil Cossons

The Summer Meeting 14-18 July

This year's Summer Meeting was spent along the M4 Corridor from Swindon to Bristol. Many different sites were visited and HRH The Duke of Gloucester, the Society's Patron, joined the meeting for the visit to Rolls Royce Plc and the Rolls Royce Heritage Trust. The Meeting provided an opportunity for the Society's members to meet and have access to sites not normally open to the public.

The Summer Meeting 14 July

The Collection of the Science Museum Group at RAF Wroughton

The Object Store

Jur Kingma

RAF Wroughton was operational just before the start of WWII. For D-Day of Operation Overlord, 600 Airspeed Horsa gliders were ready at the airfield. During the Cold War, Wroughton became host for Canberra bombers and later Westland helicopters. It was also a place where outdated military aircraft were scrapped. In 1979 the Science Museum took over the airfield. Now a number of hangars are used for storage of large objects for the Science Museum group of museums. Of the 220,000 artefacts of the Science Museum, only 8% are on display in South Kensington.

Objects stored at Wroughton include a 1947 Lockheed Constellation, an MRI scanner, bicycles and a Hovercraft. We visited the collection of road vehicles, which varied from a 1929 van for a race horse owner, with a rear seat for the groom, to a 1975 Rotinoff road tractor for heavy haulage to a new power station. In the same hangar was a huge collection of farm machinery. In another hangar objects of the National Railway Museum are stored. There is no rolling stock besides station ambulances and stretchers. But we saw signal box equipment, early ticket machines and stone sleeper blocks. The other half of the hangar is filled with objects for the National Media Museum in Bradford. Most items are wrapped in plastic, but we could recognise a number of early T.V. cameras.

The seven hangars are made of semi-circular steel beams with a concrete shell, which is rather porous. Humidity is a problem. The hangars gave me the impression of an IKEA shop with the large storage racks with pallets. To the conservators, who guided us, a modern logistic centre is the ideal storage space for artefacts because of the maximum control of temperature and humidity. The 1993 research store at Wroughton has a stable environment.

The Science Museum Library & Archives

Julia Elton

This library and archive contains over half a million items and forms one of the greatest research facilities in the world for the history of science and technology. It has been moved to Wroughton in Wiltshire from South Kensington quite recently and so it was interesting to see the new reading room. My party was taken round by John Underwood, assistant librarian, who was highly knowledgeable and enthusiastic about the material and had put a number of interesting items on display for us to see. Because I've spent my career working with antique books, I am often bored on these kinds of occasion because I usually know all the books. However, I had never seen 'A Pictorial History of the Great Eastern Steam Ship', published in 1859/60, which had splendid illustrations and its original printed wrappers bound in, so I perked up immediately. There was also a fine collection of trade literature and several books of construction photographs as well as Bourne's Great Western and similar well-known works. John then took us into the stacks and produced other gems, including a charming book of skating patterns. Good libraries like this often have unexpected little treasures and this was no exception.

Naturally, there was dismay when this world-class library was moved out of London but according to a recent Science Museum newsletter a new research centre is planned at its Dana Centre in London, housing a small library of books and journals and providing public access to the Museum's electronic resources. There will also be public access to items transported from the library and archive collections stored at Wroughton, including archive and rare books. In the meantime, the library at Wroughton is open to the public on Fridays by appointment only and Group visits are offered on Thursdays, subject to availability.

www.sciencemuseum.org.uk/about_us/collections/science_library/visit_library_wroughton.aspx

An International Harvester Mogul 8-16 c1914 which was used in Norfolk. The narrow front axle provides clearance for the belt drive and reduces the turning circle of the tractor.

Stroudwater Canal

Mike Constable

Splitting into two groups for this visit, half of the participants were dropped off at a convenient point to begin a walk along a length of the towpath of the Canal and to view the restored channel under the railway viaduct where the original channel had been lost to new road building and the area being filled with many tons of domestic rubbish, just like the Uckfield end of the Bluebell Railway. A screw pile concrete wall now retains the rubbish, with some very acute bends on the canal linking back to the original line at the Arundel Aqueduct. Eventually this concrete wall will be finished in a more appropriate way before the through route is reopened to navigation.

Meanwhile the other half of the group was being shown the new Dudbridge Locks Hydro Scheme. Restoring these locks to navigable status created a need to redirect the flood relief scheme around Stroud which had been directed through the closed canal. The excess water is either directed into a feed tunnel to the turbine house 5 metres below the level or through a bypass channel taking the water back into the canal below the next lock. A cross–flow turbine has been installed to cope with the variable flows, fed by a 900mm pipe from the filtered intake and generates 22 KW maximum output.

Flood damage to the Lock overflow channel by the input weir for the turbine.

The new channel through the rubbish tip beside the railway viaduct on the right. This channel takes a very sharp turn after passing beneath the viaduct.

The group waiting to enter the turbine building alongside the rebuilt lock. All images: ©Mike Constable 2014.

The overflow channel and the turbine house were both damaged by the February floods in the area but while repair work to the channel is still being disputed, the Volunteers there have completely rewired the turbine house and the generator is now working as designed.

Crofton Pumping Station

Martin Gregory

After a morning spent looking at canals in Stroud we set off after lunch for The Crofton pumping station. Crofton was built in 1807/9 to supply water to the summit level of the Kennet and Avon canal. The water supply is Wilton Water, a lake with springs, and the steam engines raise the water 44 ft (13.4 m) to a leat feeding the summit level of the canal. The original engine was supplemented by a second Boulton and Watt non-rotative beam pumping engine in 1812. This 1812 engine (now Number 1) is the oldest working steam engine in the world that is still on its original site and still performing the task for which it was purchased. It was restored to working order and steamed in 1970. The original engine, another Boulton and Watt engine obtained second hand, was rebuilt several times and is now known as Number 2. It was restored by a team led by our present President, Geoff Wallis, and steamed in 1971.

Although close to the canal, and the later railway, access by road is still challenging as our modern coach brushed trees and bushes on either side of the road from Grafton, emphasising the problems the builders must have had transporting large castings to the site two hundred years ago.

For our visit, the 1812 engine was in steam lifting a ton of water per stroke into the leat. We were greeted by Ian Broom, one of the original group of volunteers of the Crofton Society. Ian and his fellow volunteers split the party into groups to tour the engine and boiler house. On a beautiful sunny summer afternoon our tour ended with home-made cake and tea and Ian signing copies of his book, The Crofton Story. Now, over

Another ton of water into the leat. All images: © Martin Gregory 2014.

A puff of steam.

40 years after its initial restoration and return to steam, The Crofton Partnership is looking towards a Heritage Lottery Fund Bid to reinterpret Crofton for the present generation and ensure that its story continues to be told by working steam engines.

The ex GWR Chain Testing House, Swindon

Inside the chain testing workshop. Images: © Martin Gregory 2014. All rights reserved

David Perrett

Adjacent to the English Heritage headquarters in Swindon is a long, single storey building that still contains the Chain Testing equipment of the Great Western Railway (GWR). The building and its contents are listed Grade II* but are now in a rather forlorn state and the site forms part of an extensive housing development.

The building, which was opened in 1874, houses a S & E Ransome (London) chain tester of the same date with a pull of 130 tons. At the time of listing (early 1980s) it was said to be still workable but that is no longer the case. The system was powered by a 3-throw hydraulic ram pump situated at the measurement end. Chains up to about 30m long can be positioned between the measurement end and the hydraulic cylinder.

Also in the building is an Izod's Patent tester by Avery's of a later date as well as a large hand-operated overhead-beam testing machine by J Buckton & Co of Wellhouse Foundry, Leeds to Wicksteed's patent. According to Hugh MacGillivray, who had come down from Kirkaldy Testing Museum in London to be our guide, this machine probably had a capacity of 100 tons and is of a type once common in British testing laboratories.

We thank Hugh MacGillivray for ably guiding the groups around this rather sorry site even though he had never been there before and Thomas Homes Ltd for allowing access to the building.

Portbury & Avonmouth Docks

Roger Cline

When the ships trading with or from Bristol became too large to navigate the Avon Gorge, the Avonmouth docks were built in 1877 on the north bank of the Avon at its junction with the Severn. With Sir James Brunlees as engineer, this was arguably the most important development of the Port of Bristol since William Jessop created the floating harbour at the beginning of the century. They were extended by the building of the Eastern Dock by Sir John Wolfe Barry in 1902-8. After WWII as ship sizes increased the Portbury docks were built on the south bank. The docks were operated with some 4000 employees by the City of Bristol until 1991 when they were privatised into a profitable business using much mechanical handling and only 500 employees.

Ship entry to each set of docks is by a long lock with three longitudinal sets of gates, to counteract the effect of the high tides in the Severn (a rise of between 6 and 13 metres according to the season). Ships can use the locks for about four hours either side of high tide and it is usual to get up to six ships through a lock in one period. The loss of water through the locks has to be balanced by water pumped from the Severn; this water has a high silt content so that the docks require frequent dredging.

There are large areas in both sets of docks for vehicle storage, most after importation, although export of Range Rovers is significant now the world recession seems to be over. Good quality open cast mined coal from India and Australia and also poorer quality deep-mined coal from Russia is imported and stored in the Portbury docks, then transferred under the Avon by a belt conveyor to a rail terminal at the north end of the Avonmouth Docks, on the Clifton Extension Railway, also designed and built by Brunlees to provide a link with the Great Western and Midland railways. There used to be a rail connection between the two sets of docks under the Avon, but the Portishead branch closed by Beeching has now been reinstated to give direct access to the Portbury side. A gypsum board factory operates on the Portbury side, using imported raw material. Grain and animal feedstuffs are handled in silos on the Avonmouth side with controls to reduce dust.

Petroleum is imported and stored and there is a direct pipeline to Heathrow. Tankers are used for customers with lower consumption. Sand and gravel dredged from the Severn is also handled within the dock area. Peat is imported and bagged for sale to Garden Centres. Scrap wood is chipped and exported to Sweden for power generation. Scrap metal is chopped to small pieces for ease of handling.

Many of the older buildings in the Avonmouth docks have been demolished as loading and practices change – none of the buildings is listed. Tall concrete grain silos are being replaced by low-level buildings (although it costs £1.5 million to demolish a silo); grain mills within the docks are no longer operating. Most of the modern sheds are finished in a livery of cream walls with orange trim

Due to the high security we toured the docks in our coach under the able guidance of John Chaplin, Projects Director of the Bristol Port Company. We entered at the gate under the M5 bridge over the Avon, passing several sheds leased to local small businesses, the police post (the Docks have police rather than security guards) and a cleared area ready for redevelopment which will have 'nature corridors' for the maintenance of wildlife and the environment.

There is a container dock with special cranes (and x-ray and other devices to check for hot-blooded intruders). Beside this there are about 9 wind turbines (120m high by 90 metres diameter), three of which are leased by the Docks company with an agreement to take all the power generated for 25 years, most of which is used on site, the rest being sold to the National Grid. These three are direct drive turbines which move at lower wind speeds (and are virtually silent and do not involve more than the occasional bird strike) – some of the others have gearboxes (in a larger nascelle) which require higher minimum wind speed to operate. A deep sea container terminal is due for construction on reclaimed land in the Severn Estuary. A line of electricity pylons is due to straddle the site, to connect Hinckley Point with a gas-fired generator north of the site; the pylon locations need to be carefully chosen so that future redevelopment of the site is not hindered.

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Earthquake & Geotechnical Engineering Research Group, Bristol University

Tony Barber

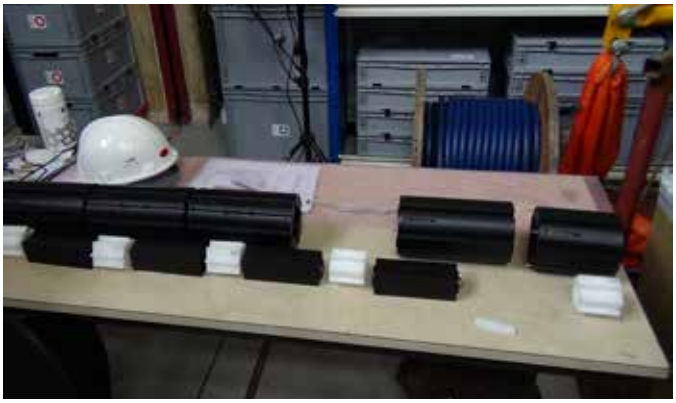
The party was welcomed by Dr Adam Crewe, Head of Civil Engineering, who gave a talk about the work being undertaken within the department. This ranged from his specialisation of investigating the response of buildings and bridges to earthquake loading to fluids, soils, composites and traffic modelling.

Dr Crewe explained the type of equipment that was used for testing the dynamic responses of structures and how scale models can be used by adding weights to simulate the results for different types of bridges. Several examples were provided including the issues associated with valve towers in reservoirs, which if rendered inoperable could prevent controlled lowering of the water level in the event of a dam being damaged. Techniques for improving the stability of masonry walls against collapse such as "wallpapering", the application of a thin fibre glass reinforcing layer, were demonstrated.

The talk was followed by a visit to the laboratories where we were able to see a helicopter on a test rig; soils testing equipment, which is used to determine the strength characteristics of the soil; open channels for the study of wave flow regimes; and a configuration of pipes and fittings of different sizes, which is used to demonstrate the effectiveness of crushed ice to remove debris from inside the piping. We also saw the 3m x 3m vibrating table which can create vertical accelerations of 6g and horizontal accelerations of 5.5g. This equipment is to be used to determine the responses of graphite fuel rods in a nuclear reactor.

Dynamic test rig for motor cycle

Rig to demonstrate how crushed ice can be used for cleaning pipework



Rod components for testing in core

Model test core for a nuclear reactor

Inside model test core

Rolls Royce Plc Defence Aerospace Operations Facility

Members of the Rolls Royce senior management and assembly teams show the intricacies of the jet engine to HRH The Duke of Gloucester. Images: ©Rolls-Royce plc, 2014. All rights reserved

Geoff Wallis

Rolls-Royce is the second largest provider of defence aero-engine products and services in the world with 16,000 engines in the service of 160 customers in 103 countries. Defence Aerospace Operations in Bristol carries out the assembly, repair and overhaul of military engines including the Adour, the EJ200 for the Eurojet Fighter, and the F35 LiftSystem as used in the short-take off /vertical-landing fighter.

The secure, modern facility was built in 2007 fully integrating logistics, assembly, test and dispatch. It incorporates best-practice in 'lean operation', ie the elimination of expenditure that adds no value for the customer, and focusses on precise compliance with process specifications.

Around 560 people are employed in teams with a further 85 in the adjoining engine-test facilities. Our tour encompassed the whole assembly facility where the workforce is well-trained and appeared highly motivated, working in a pleasant, spacious, air-conditioned, dust-free environment.

Further information at: www.rolls-royce.com

The Rolls Royce Heritage Trust

Geoff Wallis

The Rolls Royce Heritage Trust was formed in 1981. It has five branches in UK and one in Indianapolis in the USA. The Heritage Centre in Bristol is sited within the secure Rolls Royce factory and houses an unrivalled collection of Bristol-built engines ranging from the Jupiter, the most successful aero engine of the 1920s, through the wartime Bristol Hercules and Centaurus sleeve-valve radials to famous jets such as the Harrier's Pegasus engine and Concorde's mighty Olympus.

The display includes de Havilland and Blackburn engines, firms that merged with Bristol Siddeley before the final consolidation with Rolls-Royce.The Branch has a huge collection of brochures, manuals and other material relating to Bristol and de Havilland engines, and holds the records of the Bristol Aeroplane Company. The Trust has spacious workshop facilities where engines and related artefacts are restored for exhibition by volunteers.

Above: HRH The Duke of Gloucester, Patron of the Newcomen Society; Group Captain John Heron, Chairman of the R-R Heritage Trust and Newcomen President Geoff Wallis look at objects in the collection, which is housed in a former engine test-bed.
Below: HRH The Duke of Gloucester and from Group Captain John Heron discuss the complexities of controlling Concord in the flight-deck mock-up. Images: ©Rolls-Royce plc, 2014. All rights reserved.

Further information at:
www.rolls-royce.com/about/ourstory/heritage_trust/

Bloodhound Supersonic Car

A '1000mph Truck' inspires a new generation of engineers

The mock-up of the Bloodhound.

Geoff Wallis

To compete in a global marketplace UK Plc must have engineers. It is therefore essential we attract the attention of young people in schools and universities, and inspire them to adopt engineering as a career. In the past the space programme and Concorde helped achieved this but now the Bloodhound Project has taken their place.

The current world land speed record stands at 763.035 or Mach 1.01, set by Andy Green in 1997. His team is now attempting the audacious task of setting a new record at over 1,000mph, faster than the speed of a Magnum .357 bullet. Aerodynamic drag increases with the square of speed so a total power of 135,000 HP producing 47,000 lbf of thrust is required to drive what the team affectionately call their '7 T Truck'. 0 to 1,000 mph in 54 seconds is achieved with a Rolls-Royce EJ 200 Eurofighter Typhoon jet engine boosted by a Nammo solid-fuel rocket. At this speed the flat forged, 3ft diameter, aluminium wheels must withstand 50,000g bursting forces yet only penetrate the surface a few millimetres, acting more as 'air rudders' than through their grip on the ground.

Acceleration and deceleration must each be completed in 5.5 miles either side of the timed mile, and the return run completed within one hour. The Hakskeen Pan in Northern Cape, South Africa, has been selected as the only place with sufficient space and a suitable surface for the attempt, but was too stony, so the Project has employed over 300 local people to remove 21,000 tonnes of stones.

The engineering team has used proven technology from formula-one racing cars for the front end housing the pilot/driver and controls, and aircraft technology for the rear end comprising the RR jet engine and rocket, mounted on an aluminium chassis.

The vehicle is being hand-built using traditional skills, particularly from the aircraft industry. It is being assembled in modules on a 6m long cast iron surface table to ensure accurate alignment, and avoid errors arising from minute movements of the floor caused by the 14m rise and fall of the tide in the nearby Severn Estuary.

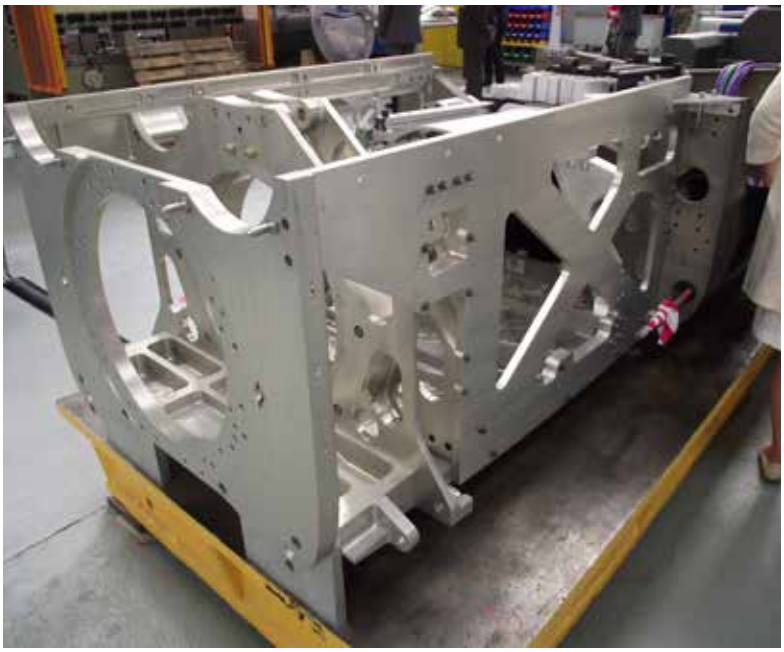
The Project is inspiring engineers of the future through its education programmes. More than 5,600 schools have signed up to use the free education resources. The ambitious 1,000 mph target is a showcase for British engineering talent and creativity, such that over 250 firms globally have contributed to the £41 million project. Project Director Richard Nobel pointed out that their aim of providing '... an unbeatable return for their investors has resulted in world-wide support, including from No 10'. The project costs £400,000 per month to run, 80% being spent on engineering, and receives no government funding, except for a STEM grant.

Newcomen members enjoyed an illustrated talk, by Chief Engineer Mark Chapman, about the vehicle's engineering and technology after which we viewed the hardware in the assembly shop. The organisation of the day was a challenge as by coincidence HRH Prince Philip had asked for a private visit on the same day as our Patron, HRH The Duke of Gloucester. The Bloodhound team, the Lord Lieutenant and the protection teams therefore had to cope with two Royal visits and that of our Members in the space of one, very hot, afternoon which they achieved admirably, and royal visitors signed the car's chassis to show support.

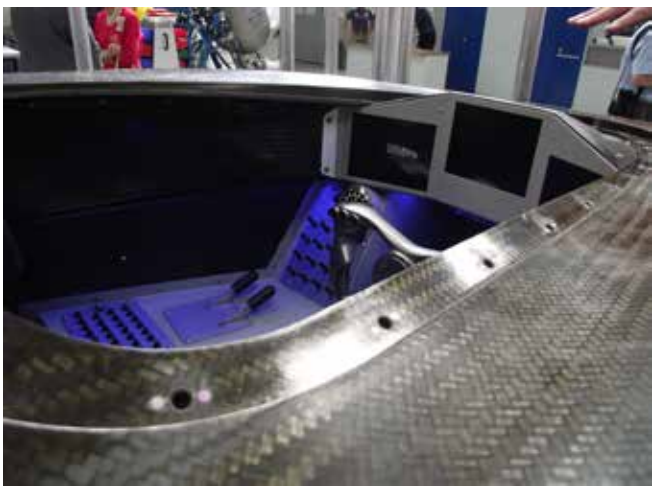
Our day's visits to Rolls-Royce and Bloodhound SSC inspired us with clear evidence that we in Britain still have both the will and capability to lead the world in practical engineering of the highest standards.

Further information at: www.bloodhoundssc.com

An over-all view of the chassis structure



The rear chassis structure



The layout of the cockpit

All images ©Martin Gregory 2014

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Ibstock, Cattybrook Brickworks

David Witt and John Simpson

Cattybrook brickworks was founded in 1865 by Charles Richardson, Chief Engineer on the Patchway Tunnel, which takes the GWR from Bristol under where the M5 now runs, its NE portal being just a few hundred metres away. He was assistant engineer to I.K.Brunel and found the clay here was most suitable for making bricks to line the tunnel, so took a lease from the local farm. It subsequently made the 20 million bricks needed for the Severn Tunnel, the next along the line and more were used at Portishead Power Station, Fry's factory at Keynsham, and Imperial Tobacco offices in Bristol.

Now operated by Ibstock Johnson, the works is fully stretched in meeting demand. We were given a sight of the clay quarry. which, with the works, now covers about 160 acres.

Geologically the quarry is in the Lower Coal Measures, and contains "red" clay lower down and "buff" clay above it, though there are "faults" which confuse the layering somewhat. The "red" and the "buff" can be combined in various proportions to get the colour required for the bricks. Clays are mined using a 360 degree excavator and a dump truck.

Once excavated the clay is stockpiled for a few months. The required mixture is then drawn from the stockpile, and fed first to a crusher and then to grinding mills which reduce it particles of size 3mm or less. It is then mixed with water and any needed additives before being extruded into long "slugs", which are then sliced into brick-sized blocks.

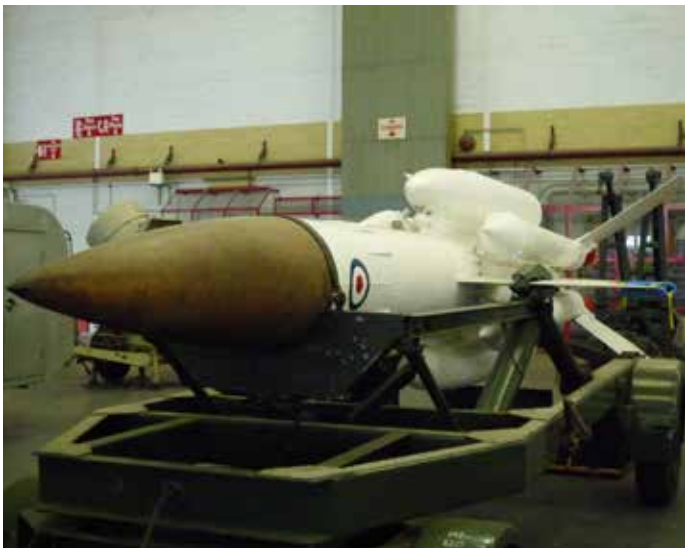
These blocks contain about 15% water, so need to be dried before firing in the kilns. After about 40 hours in the drying chambers the bricks are transferred to the kilns, where the temperature is raised gradually to 1100-1200°C and then lowered, the complete cycle taking 55 hours. The kilns are gas-fired, and the hot air extracted in the cooling stage is used to heat the drying chambers.

The bricks are then shuffled in an Autoblender which ensures an even mix of bricks, prior to being packed. Packs contain 500 bricks weighing approximately 1.25 tonnes. A typical pack has 2 slots to permit handling with a fork lift.

The main product is the standard sized and shaped brick, in a variety of colours. About 55 million bricks are made a year with specific shapes made to order. The works employs about 80 people, some of whom took us on a fascinating tour.

The brick making process

Bristol Aero Collection Trust, Filton



Bristol Bloodhound missile - an interesting comparison with the Bloodhound SSC visited on the previous day of the Summer Meeting. Image Courtesy of Michael Grace

Right: A Bristol Horse Tram in the Brabazon Hangar.
Left: The Bloodhound missile (on-board radar and computer).
Image: courtesy of Martin Gregory

Above: The iconic nose of Concorde.
Left: The flight deck of Concorde G-BOAF, now preserved at Filton
Images Courtesy of Michael Grace

Michael Grace

For the last visit of the Summer Meeting we returned to Filton, this time to the Bristol Aero Collection Trust. The Trust is in the process of developing an aviation heritage museum and learning centre, utilising two WWI Grade II listed hangars, as well as specially built facilities.

A significant collection of about 8,000 aerospace artefacts has been assembled, including complete aircraft such as a Bristol Scout, Bristol Fighter, Bristol Type 173 helicopter and a Blenheim IV (actually a Canadian Bristol Bolingbroke bomber, currently under restoration). The collection also includes other Bristol-related objects including a tramcar and a bus. A jewel of the collection is the last Concorde to be built and to fly – G-BOAF.

At present, the collection, apart from Concorde, is housed in the giant hangar specially built for construction of the Bristol Brabazon airliner and is not normally open to groups of visitors. We were, thus, very privileged and spent a fascinating morning examining the hangar itself, its many contents, large and small, and in visiting Concorde with highly knowledgeable and enthusiastic guides. Among the many objects we saw were the various aircraft, Bloodhound missiles and their associated equipment, the flight deck of a Bristol Britannia airliner, piston and jet engines, together with numerous weapons, models and ephemera.

The visit was a most interesting and fitting conclusion to a great Summer Meeting.

Dylan Thomas: The Pubs
Jeff Towns with illustrations by Wyn Thomas, 2013,
Y Lolfa
ISBN: 9781847716934, £12.95

In this year of the centenary of the start of the First World War readers might find this biography of interest, marking another centenary as it is 100 years since Dylan Thomas was born. It will appeal not just to Dylan fans but to anyone who appreciates the essence of the pub, presenting as it does a literary pubcrawl that is colourfully illustrated with previously unpublished photographs. It looks at the poet's favourites, from his 'ugly lovely' hometown of Swansea, through to west Wales (including of course, Laugharne) and on to London and the USA. Dylan saw the pub '…as a place of refuge, conviviality, warmth and shelter…' to quote the Swansea-based author who adds the pub was, '...a theatre in which he could always be counted on to perform and always be guaranteed an audience.' As well as this literary dimension the book gives a glimpse into the world of the pub's heyday, when it cut across a wide spectrum of society, from the mid-1930s and through the war into the early 1950s. Dylan also enjoyed the 'common-ground' offered as he felt that the link between host and guest was a tenuous one, 'but it never arose if one met in a pub'.

One Swansea pub frequented by Dylan also happened to be the venue in which the world's longest surviving railway, up to its ill-advised closure in 1960, was born. This was the Oystermouth Railway and in July 1804 a meeting took place in the Bush Inn, a public house frequented by Dylan Thomas. A sobering fact on the Bush Inn in Swansea was that fifty gallons of 'best draught' beer was used to put out incendiary fires that had fallen on it during the 1941 blitz. Each pub has a note on its current fate and sadly some have gone, one from the blitz but most due to the malaise affecting all pubs in recent years. The poet frequently used the Oystermouth or Mumbles Railway on his pub crawls referring to the '…trams that hissed like ganders…' and the need to keep something back for the return train fare! If he had still been alive in 1960 would they have been able to close the world's oldest passenger line?

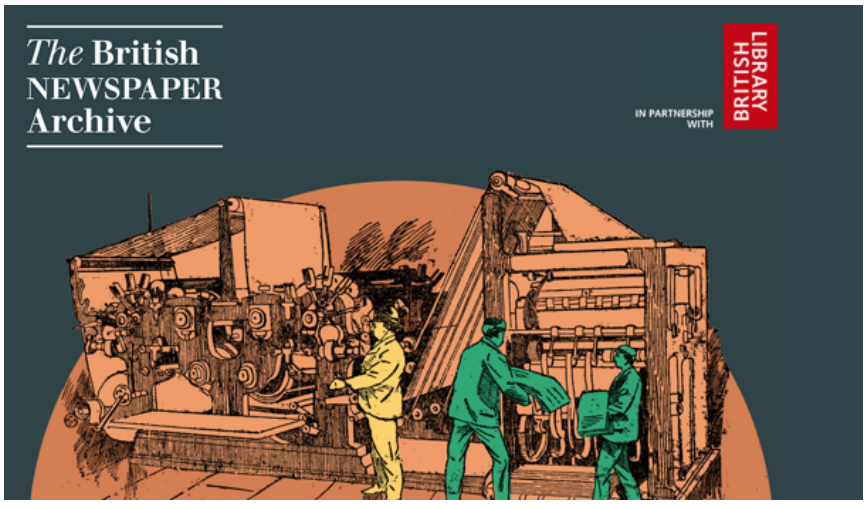
Stephen K. Jones

John 'Iron Mad' Wilkinson
by Richard Sells,
Leaflet published by Broseley Local History Society in conjunction with Freemans of Telford Ltd.
Full colour. Copies available from Freemans of Telford Ltd, Heslop, Halesfield 21, Telford, TF7 4PA, email: john.freeman1@btconnect.com

Richard Sells has written a resumé of the life of John 'Iron Mad' Wilkinson, the 18th century ironmaster, inventor and entrepreneur who helped to establish the New Willey Ironworks, near Broseley, Shropshire in 1757. Wilkinson was also involved in the decision to use iron to build the now famous bridge across the River Severn linking Broseley with what is now Ironbridge. He eventually operated nine ironworks including Bersham, New Willey, Bradley and Brymbo. His 88 acre works at Bradley became the first integrated ironworks in the world and included everything necessary for iron production from blast furnaces to canals and housing for his workers. One of his innovations at this site was to install the first Boulton and Watt rotative beam engine to drive his forges, slitting and rolling mills. Through this enterprise he earned the sobriquet the 'Father of the South Staffordshire Iron Industry'. He had investments in copper and lead mines, chemical plants, canals and banking. He also took advantage of the government's inability to produce enough copper coinage to meet demand and began to mint his own trade tokens depicting his own head.

Image: ©Ironbridge Gorge Museum

Wilkinson had various homes including The Lawns in Broseley which was his headquarters, and Castlehead in Morecambe Bay built as his retirement home. Here he became interested in land reclamation, eventually reclaiming 500 acres from the sea and converting 150 acres of heathland to agricultural use. He died in 1808 at Bradley.



The newspaper library at Colindale in North London, administered by the British Library closed some months ago. The BL are in the process digitising all the sources. So far 262 titles have been digitised and can be browsed on-line from any desk top. Searching can be done by people, places, events, newspaper title and place of publication.

It is a fantastic resource available at: www.britishnewspaperarchive.co.uk

The First Plastic Bank Note, Sir William Arrol & the Forth Bridge

Britain's first plastic bank note will feature an image of Sir William Arrol, one of Scotland's finest civil engineers, and be launched to mark the 125th anniversary of the Forth Bridge.

Sara Thiam, Director of the Institution of Civil Engineers (ICE) Scotland, commented:

"Sir William Arrol is one of Scotland's most prolific civil engineers. Brought up in the Glasgow area, he developed methods of working and techniques which are still used today and is responsible for three of the world's most iconic bridges - the Forth Rail Bridge, the Tay Rail Bridge and London's iconic Tower Bridge. His legacy is littered with engineering 'firsts' so it is fitting that he is to feature on this celebratory first plastic banknote and underlines the vital contribution of civil engineers to society, past and present."

ICE Scotland

RAILWAY & CANAL HISTORICAL SOCIETY

Conference: Birmingham 25 October 2014

Three of our leading research members will be giving an overview on research methods, source materials etc and working up the same for publication, and will work in small groups so that participants can gain some individual attention on a subject of their choice or one suggested.

The charge for the day is £28, it starts at 10.00am and finishes at 4.30pm, the charge including lunch and refreshments during the day.
Participants must provide their own computers charged. Sockets for power cables will be provided.
It is planned to view the archives in the new Birmingham City Library.
For more details and a booking form contact:
Christopher Dick on cpdick@o2.co.uk, or 01865-726017

Engineering heroes honoured in special WW1 collection

A collection of archived photos, accounts, designs, journal entries and lectures has been collated into a free online compendium by the Institution of Civil Engineers (ICE), to honour the contribution of civil engineers to British military efforts during the First World War.

'ICE compendium WW1' shows how engineers designed and adapted the tunnels, bridges, dockyards, water networks, shelters, communications infrastructure and transport networks that supported British military efforts in the trenches. It also includes details of the design of the Nile water supply to Palestine for Egyptian expeditionary work and information on the design of water infrastructure in the trenches. A memorial volume also provides biographies and photos of all ICE members who died in active service or by enemy action.

Content for the exhibition was sourced from ICE's library and archives, home to globally significant material on the lives of history's most influential civil engineers. It is hoped that the accessibility of the resource will benefit those who are eager to find out more about the First World War during the upcoming centennial commemorations.

The compendium can be accessed free of charge via ICE's virtual library:
www.icevirtuallibrary.com/info/compendia/ww1

The Opening of the Panama Canal

The 100th anniversary of The Opening of the Panama Canal was celebrated on 15 August. Geoff French, President of the Institution of Civil Engineers, said:

"The Panama Canal construction was a vast, complex project which transformed world trade – a true feat of engineering. It is little wonder that this enduring piece of infrastructure - which carries 3.5 times more tonnage than was predicted - is revered as one of the Seven Wonders of the Modern World. When the impressive Expansion Program is complete it will more than double its capacity again to 600m tons, securing its future for many years.

"The 100th anniversary of the canal's opening presents a fantastic opportunity to honour the civil engineers who delivered the project and celebrate the benefits of the canal to the world economy."

Heritage of Industry new address:

The Gables
20 Main Road
East Hagbourne
OX11 9LN
Phone/Fax: 01235 352275
www.heritageofindustry.co.uk
Email:
info@heritageofindustry.co.uk

For Sale

No. 1 The Thames, the Grain Battery Tower (see Slacklands, NLinks 230) is for sale. This former military installation, built in the 19th century with two 20th century additions, stands abandoned in the Thames Estuary off the Isle of Grain. It is surrounded by water for most of the day making access difficult.

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Writing for Newcomen Links

Relevant articles and items of news may be submitted to be considered for inclusion in Newcomen Links.

Articles should be a maximum of 1000 words and sent in Word format by email.

Images should be sent separately by email in jpg (digital) format of 300dpi minimum. They should **not** be embedded in the text of the Word document.

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The copy date for the next issue is 1 November 2014
Please submit articles, information, news, details of events etc to:
The Editor,
Deborah Jaffé at: editor.links@newcomen.com
07798 603000

Copy date for the next issue of

Newcomen Links

1 November 2014

editor.links@newcomen.com
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See pages 16-17 and the website for The Newcomen Society Calendar of Branch meetings and listings of events

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