

NEWCOMEN

# Links

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*booking open for:*  
NEWCOMEN SUMMER  
MEETING  
10-14 JULY 2017  
IN THE  
CENTRAL BELT OF  
SCOTLAND

A Nordic Mystery  
The Women of Steel  
A Steam Safari  
Archives from a Brewery  
Riding Tornado  
The Sea-Coal Trade  
Postscripts  
News, AGM, Calendar,  
Meetings & Conferences



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## Notes on Contributors

**Jonathan Ayleen** is Chair of Newcomen North-West and a newly elected Vice President of the Newcomen Society. His interests include the evolution of Cold War technology and the history of rolling mill design.

**John Dobson** did an apprenticeship in a Tyneside shipyard and then spent fourteen years as a sea-going engineer, the last four of which were as Chief Engineer. Following that, he spent several years in ship repair work and was then employed as Maintenance Engineer in a North East England brewery.

**Nigel Jopson** is a consultant Industrial Chemist who retired from the pulp and paper industry in 2013. He has a fascination with furnaces, fires and forges and is a devout worshipper at the Shrine of Steam.

**Alan M Levitt**, an independent scholar and historical archaeologist, focuses on the social impacts of early American railways, and the use of printers' trains. He was a founding member of the Advisory Board of the Railroad Archives Collection at the University of Connecticut, and of the New York City Transit Museum Advisory Board.

**Knut Markhus** is director of Norsk Vasskraftog Industristadmuseum, The Norwegian Museum of Hydropower and Industry

**Robert Mason** is editor of the Greater London Industrial Archaeology Society newsletter. His interest in steam was sparked by the huge Garratt locomotives in Kenya where he was born.

**David Perrett**, Emeritus Professor of Bio Analytical Science at Barts & the London School of Medicine & Dentistry, Queen Mary University of London, is still active in research on cleaning surgical instruments. This gets him invitations to speak around the world now always attached to a holiday. He is the author of over 200 scientific publications. He is a past President of the Newcomen Society and Chair of the Greater London Industrial Archaeology Society (GLIAS). He lectures widely not only on science but also Industrial Archaeology and the History of Technology

**Olwen Perrett** trained as a primary school teacher with a special interest in history with a bias towards social, economic and industrial aspects. In the late 1970s she helped to draw up the guidelines for teaching history in primary schools. She joined Denis Smith's IA evening class at Goldsmith's College where she met David and the rest is history.

**John Porter** has degrees in mechanical engineering and naval architecture and spent his working life with merchant ships. Sailing on steam driven ships led to an involvement with the preserved Cornish engines at the Kew Bridge Steam Museum.

**James Ranahan** is an archivist and Hon Secretary of Newcomen Midlands.

**Michael Taylor** is a Trustee, Exhibitions Curator, Newsletter Editor and Webmaster of the Robert Stephenson Trust. He is a Chartered Civil Engineer, Past Chairman of the North Eastern branch and Fellow of the Chartered Institution of Highways and Transportation and is North East Representative for the Panel for Historical Engineering Works, Chairman North East Heritage Panel, and Chairman ICE NE Senior's Group.

**Dick Swann** was Executive Secretary of the Newcomen Society from 2000 to 2009. He is a retired member of the RIBA and has a particular interest in engineering and technology.

**Robert Taylor** is a museums and heritage consultant, with a particular interest in the development of industrial heritage sites. A scientist by training, he has worked in a range of cultural organisations, including being director of Amberley Working Museum and the Royal Gunpowder Mills. He is President of the Newcomen Society.

## From the President, Robert Taylor

At the Annual General Meeting on 8 February in London I had the honour to be elected the next President of the Society. I have been a member since the 1980s when I joined while I worked at the Science Museum. Since then my career has involved managing museum and heritage sites, and then becoming director of an IT company. More recently I have worked as a museum and heritage consultant in the UK and abroad.

As President, I will continue the work of the Society carried out by my distinguished predecessors over the past 97 years. In this regard I would like to pay tribute to my immediate predecessor, Michael Grace. Although being based in Dublin, Michael has spent many hours travelling to Council and evening meetings and has steered the Society skilfully over the last two years. During his Presidency, he also managed to find the time to organise the very successful Summer Meeting in Dublin last year.

The Society is continuing to develop both within the UK and abroad. From the Society's origins at the Science Museum in London, we now have active Regional organisations in many areas, including the new South Yorkshire Region which was established last year. I look forward to visiting all our Regions and meeting many of our members during my Presidency. The International Journal for the History of Engineering and Technology remains a key aspect of our work and is increasingly international in its scope with Volume 86 featuring papers entitled 'Electric Motors in São Paulo, Brazil 1900–1950' and 'William Richards and the Unrecorded Success Abroad: A British Engineer in the Spanish Gas Industry in the Nineteenth Century'. The takeover of our previous journal publisher by Taylor and Francis brought a number of new challenges, and caused publication delays, but hopefully we are beginning to get the publication schedule back on track.

Over the next year, we will continue to deliver the aims of our strategy to meet the needs of existing members, attract new members and ensure that we face the future with confidence. During my first year as President, our thoughts will also be turning to the celebrations of the Society's Centenary in 2020. I would like this to be a celebration which is nationwide and beyond, and involves all our Regions. Some good ideas to promote the Society for its Centenary have already been suggested, but other proposals, will be welcome, either directly to me or via the office.

## From the Editor, Deborah Jaffé

My role, as editor of Newcomen Links, is to provide a platform for the membership and to encourage the writing of articles. One of the tasks of an editor is, in my view, to give new perspectives. As I have been preparing this issue various news items arrived on my screen that make me wonder about re-engineering and redesigning objects that we take for granted. At what point is it necessary to take a new perspective, look at the newest engineering and technologies, decide what is needed and what can be discarded? When do we fully question why something is like it is? An article in ICON questions the bulkiness of the British three pin plug alongside svelte pieces of digital technology. The Nokia 3310 mobile phone became a technological and style icon when it was launched 17 years ago but it has been superseded by the slimline and smarter tablet like phones. Now it has been reissued in the same casing, with the latest smart technology. But does this form follow the function or is it a step into nostalgia? This brings me to suggest that we cover new perspectives on the validity of 'improvements' and I encourage you to send me suggestions and examples.

In January I gave the inaugural lecture to Newcomen South Yorkshire in Sheffield. I was delighted to meet Newcomen members and to have the opportunity to spend time at Kelham Island Museum and the Hawley Tool Collection, which is housed there. I cannot recommend highly enough a visit to Kelham Island and also to see the Women of Steel statues outside the City Hall. Ken Hawley's extensive collection is not only of tools but also of their displays, the shop-fronts where they were sold, catalogues, advertising material - in fact anything relating to tools. They range from a tiny pair of embroidery scissors to saws and large scythes. Crucially, this vast collection demonstrates the invaluable contribution that collectors make. Free from institutional constraints, but with enthusiasm and focus, they push boundaries and collect. Without their energy and foresight much of the history of the basis of engineering and design, or what some regard as the insignificant, would be lost. David and Olwen Perrett discovered many such collections on their Steam Safari in New Zealand. How to preserve these collections is crucial.

Also, in this issue, Jim Ranahan shows us what a brewery's archives can reveal, Robert Mason describes his ride on Tornado and Newcomen North East's fascinating lecture on the sea-coal trade is covered. There is also a Nordic mystery to be solved. This year's Summer Meeting will be in Scotland and booking is now open for it and also the International Early Engines Conference at Elsecar.

I look forward to receiving your contributions. The copy date for the June issue is 1 May.

## Writing for Newcomen Links

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

**Articles** should be about 1000 words and sent in Word format by email. Short pieces are also welcome. Longer articles may be submitted after discussion with the editor.

**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.** Please, where possible, label each image with its subject rather than by reference number.

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It is not possible to receive photographs/scans of images in books etc if they are still in copyright.

**The copy date for the next issue is 1 May 2017**

Please submit articles, information, details of events etc to:  
The Editor,  
Deborah Jaffé at: editor.links@newcomen.com  
Tel: 07798 603000

### The Front Cover

*A Nordic Mystery; Sheffield's Women of Steel; preparing the replica Newcomen engine for work; a Hoffman Kiln*

## At the Society's AGM

The AGM was held on 8 February 2017. Michael Grace was thanked for all the work he had done on behalf of the Society during his two year term as President.

The following members were elected as Officers from 1 March 2017:

Robert Taylor, President  
Jonathan Ayles, Vice-president  
Julia Elton, Hon Secretary  
Frank James, Hon Treasurer:

Phil Judkins, John Suter and David Yeomans were elected as Council Members as from 1 March 2017.



Robert Taylor, the Newcomen President for the 2017-19 term

### New Members

We welcome the following new members:

Neville Barrett  
Neale Binnion  
Oliver Carpenter  
Catherine Casson  
Philip Davies  
David Dulieu  
Julian Garratt  
Mark Hester  
James Miller\*  
William O'Neil  
Raymond Powell  
Geoffrey Theasby  
Jan van de Veen

\* Associate Member

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@Newcomen\_Mid

Newcomen Scotland  
@Newcomen\_Scot

booking open for:

NEWCOMEN SUMMER MEETING  
10-14 JULY  
IN THE CENTRAL BELT OF SCOTLAND  
see page 24

FIRST INTERNATIONAL EARLY ENGINES CONFERENCE  
11-13 MAY  
ELSECAR, SOUTH YORKSHIRE  
see page 28

Copy date for the next issue  
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Newcomen Links

1 May 2017  
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## ASME Engineer-Historian Award

Congratulations are due to Dr Bryan Lawton (Newcomen Western) who was presented with the American Society of Mechanical Engineers' (ASME) Engineer-Historian Award for 2016. The award was made for the two volumes of *Various and Ingenious Machines: The Early History of Mechanical Engineering*, which were published in 2004 by Brill, Leiden. They cover the history of mechanical engineering from the flint mines of pre-history to the start of the Industrial Revolution, and are unusual in that the relevant mathematical analysis and engineering theory, where appropriate, are included.

The ASME has now contracted with Brill to republish a shorter version in paperback format for a new generation of engineers and students. Bryan is currently



Bryan Lawton (left) receiving the award Thomas H Fehring, Chair, ASME Committee on History and Heritage.

editing the text for publication. Details of the new edition will follow in due course.

## The Inaugural Lecture at Newcomen South Yorkshire

### Jonathan Ayles

A capacity audience of 70 turned up in January to the inaugural meeting of the new Newcomen South Yorkshire to hear Deborah Jaffé's talk on *Frank Hornby and mechanical toys - Britain, Germany and the USA, 1880- 1950*. This was the first meeting of this new branch based at Kelham Island Industrial Museum in Sheffield - a natural venue for those interested in the history of engineering and technology.

The audience included the son of the chief designer of Hornby Double trains and Dinky Toys. His father had worked in the design office at the Binns Road plant in Liverpool, while his brother had been apprenticed to the adjacent tooling design office. Deborah's talk also ranged widely across other toy manufacturers and distributors, especially Gammages which helped promote German and British engineering based toys in the global market before and after World War I. Other children got their exposure to construction through Bayko,

the housebuilding kit that made a model suburban house using slot-in plastic parts and steel guide rods.

Many members of the audience were first exposed to the nuts and bolts of mechanical engineering through Meccano.

There was much praise for the versatility of Meccano and its inspirational qualities. But, there was also discussion as to whether Meccano helped or hindered mechanical engineering design. Did the use of Meccano parts limit possibilities and inhibit creative design flair? One member of the audience admitted to making their own parts to supplement the kits. Giving the vote of thanks, Jim Nicholson gently complained of the design constraint of 2:1 gear ratios as Meccano always used a half-inch-module to size their gears. This made it hard to design convincing gear boxes and clocks.

But there was no complaint about Deborah's excellent talk, or the large audience. Clearly, the setting up of Newcomen South Yorkshire was long



overdue. David Eaton and his hard working Committee are to be heartily congratulated on a brilliant start to a welcome initiative and the support of Kelham Island Museum is much appreciated (see NewcomenLinks 238, June 2016 p 14/15) As one Newcomen member wrote afterwards: "It was a great launch, never thought that I would get so carried away by childhood memories triggered by the presentation, guess many others were in the same boat."

## The Website SURVEY

We are undertaking a survey of the website to ascertain how it is used and improvements that could be made. This will include ways to update it for easy access on devices including tablets and mobile phones.

A good website is vital for the Society to communicate with both the membership and the wider public. The Newcomen site already has much to commend it including a full listing of all Society events and the complete, online archive of Newcomen papers from 1920.

But it can be much more and suggestion will be very useful.

Please help us by completing the survey form. It does not take long, but all comments are useful for the future devel-

### \* Newsflash \*

Have your say about Newcomen.com

Have you got a suggestion as to how we can make the Newcomen website better? Why not fill in our short survey and let us know what you're thinking. You can access the Website Survey [here](#). We look forward to reading your comments and suggestions. Many thanks

opment of the site.

Access to the survey is clearly marked on the Home Page of the website: [www.newcomen.com](http://www.newcomen.com)

# Shaping the Summer Meeting

Your thoughts on future Summer Meetings, please.

Jonathan Ayle (Vice President) and Fred Starr

Recent Summer Meetings have been to: the Limerick-Shannon Region, Manchester, the M4 Corridor, South Wales and the Dublin/Leinster area. This year's visit to the Central Belt of Scotland is advertised in this issue of Newcomen Links (see opposite page).

The Society is considering running future Summer Meetings starting over a weekend instead of, as we have done, from Monday to Friday. This change will enable those of us, Newcomen members, guests and other interested members of the public who cannot get away for a full working week, to be able to join us on what is effectively a long weekend where the Saturday and Sunday would be used for a mixture of presentations and visits.

We will continue to have a visits programme in the days before or after the weekend. The 2018 programme could be a test of these new arrangements. We will be visiting Teesside for the first time in the history of the Society.

Furthermore, although Teesside and its environs have made a magnificent contribution to the development of technology, an important aim of the visit will be to raise the Society's profile and encourage new members.

Your views would be appreciated by 1 June. Please email your thoughts to: [membership@newcomen.com](mailto:membership@newcomen.com) or write to Shaping the Summer Meeting, The Newcomen Society, Blythe House, 23 Blythe Road, London, W14 0QX.



## NEWCOMEN SUMMER MEETING

10-14 JULY 2017

## THE CENTRAL BELT OF SCOTLAND



Queensferry crossing. John CCBY-SA4.0



PS Waverley. Dave Souza CCBY-SA 2.5



New Lanark. mrpbps



Falkirk Wheel. Sean McClean CCBY-SA2.5

A large part of Scotland's industrial development took place in the Central Belt. In the 18<sup>th</sup> century the textile industry dominated but when raw cotton became unavailable during the American Civil War, Scottish industries were forced to look in other directions. With its large stock of coal the area diversified and became a centre for engineering that included shipbuilding and locomotives.

This year's Summer Meeting includes visits and talks that cover some of the history of Scottish engineering and modern developments. Sites to be visited include:

- The UNESCO World Heritage Site of New Lanark
- The very new Forth Replacement Crossing
- The Falkirk Wheel
- Biggar Gasworks
- Bonnington & Falls of Clyde hydro-electric plants
- Riverside Transport Museum
- National Mining Museum to see the most powerful steam winding engine in Scotland
- The "Maid of the Loch" the last paddle steamer built in the U.K.
- A demonstration of the last working steam slipway in the U.K.
- A cruise "Doon the Watter" on the World's Last Seagoing Paddle Steamer, Waverley.

There will be evening talks by:

- The 'Celebrating Watt Group' who will discuss the life and times of Scotland's most famous engineer
- Prof. Gordon Masterton on the unique Falkirk Wheel and its associated structures and the challenges of their design and construction (followed the next day by a visit to the Wheel)

The Meeting is based at a comfortable modern hotel within a few minutes' walk of Glasgow Central Station for easy access by rail.

The price is from £575 per person, full board and includes all visits Tuesday to Thursday. Monday afternoon and Friday morning visits are optional.

Places are limited – book early to avoid disappointment

The Meeting is organised by Heritage of Industry. Full details and booking forms are available

in the Members' Area of the Newcomen website: [www.newcomen.com](http://www.newcomen.com)

and at Heritage of Industry: [www.heritageofindustry.co.uk](http://www.heritageofindustry.co.uk)

Email [info@heritageofindustry.co.uk](mailto:info@heritageofindustry.co.uk)

Phone: 01235 352275

### The Summer Meeting in Ireland Limerick-Shannon Region, 2-6 July

The Limerick - Shannon region of Ireland has long been of strategic and economic importance to Ireland. The Summer Meeting visits included the Steam Museum in Straffan, peat bogs, power stations, a monorail, airport, cement works, alumina refinery, telescope and the latest orthopaedic implants at Zimmer in Shannon Free Zone. We saw the development of Limerick and its dockyard, bridges and tunnel; at Ardara we discovered the relevance of the Siemens contract to construct a hydro electric power station and went to Charles Parsons' family home at Birr Castle. There were excellent lectures on the social and economic history of the region and impact on the whole of Ireland. The following reports, by different delegates, reflect the breadth and scale of the meeting.

#### The Steam Museum, Straffan, Co. Kildare

The first visit of the summer meeting was to Straffan to see the excellent collection of steam engines and models housed at the country estate of Robert Guinness, a member of the Society. Having been to Robert's home some 25 years earlier to see some of the collection in its pre-museum days, I had been much looking forward to seeing it in its museum setting. To house the collection, Robert had acquired the disused Victorian Gothic St. Jude's chapel that had formerly served the needs of the railway employees at Inchicore railway workshops in Dublin. The chapel had been dismantled and re-erected at Straffan, retaining its structural features and fenestration, but adapted to accommodate the seven stationary steam engines retained there in working order, as well as the large collection of models. The party was warmly welcomed by Robert Guinness and by Brendan Delaney, President of the Industrial Heritage Association of Ireland, both of whom acknowledged the importance of the tercentenary of Thomas Newcomen's 1712 pumping engine in the history of engineering. A commemorative display board in the museum highlights this engine's significance as the progenitor of all the engines displayed therein. This fine collection of industrial engines from sites all around Ireland forms an excellent cross-section of those in use in

the 19<sup>th</sup> and 20<sup>th</sup> centuries including:

- Six pillar independent beam engine, c1820, maker unknown. Rowan's patent valve gear was added in c1876 when it was moved from Cook to Middleton, Co. Cork where it was used, in conjunction with a water wheel, at the distillery there.
- Vertical engine, c1830, maker unknown, possibly used in a brewery in West Cork. It is displayed driving line shafting for contemporary laundry equipment.
- Single column beam engine with architectural detail, c1847, maker unknown. It is said to have been purchased from the Manchester Exhibition and was used in Smithwick's brewery at Kilkenny.
- Inverted vertical duplex pumping engine, c1898, built by Frank Pearn & Co. Ltd. in Manchester. It was used to pump water at the Jameson distillery in Dublin.
- Single cylinder mill engine, c1910, built by Victor Coates & Co. Lagan, Belfast, and was used to drive linen manufacturing machinery.
- Triple expansion marine reciprocating engine, c1920, built by Workman Clark & Co. Ltd., Queen's Island in Belfast. It was one of a handed pair on the S.S. Devis operated by Belfast Corporation.
- Open double-acting high-speed engine, c1940, built by W.H. Allen, Sons & Co. It drives a continuous current dynamo and was used for

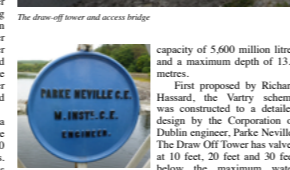


#### The Summer Meeting 2016 Vartny Reservoir and Waterworks & Stillorgan Service Reservoirs

We disembarked from our coach on the public road which crosses the dam impounding the Lower Vartny Reservoir, where we were greeted by the waterworks engineer, Ned Fleming. The Vartny scheme has provided Dublin with clean drinking water since the early 1860s and, although enlarged, is essentially unchanged since its construction. Previously, the Corporation of Dublin obtained water mainly from the Royal Canal and the City Canal, with an additional supply from the River Dodder at the City Weir. From 1854, when Dr John Snow of London identified polluted water as the cause of cholera and other diseases, a Dublin doctor, newspaper proprietor and politician, John Gray, campaigned for a new, clean supply and became chairman of the Dublin Water Works Committee. Thomas Hawksley was appointed consulting engineer, and considered a number of competing proposals. In 1860 John Hawksley was appointed sole Royal Commissioner



tion of locomotive displayed in the side Hall. These had engine model, self-propelled dry twenty large



capacity of 5,600 million litres and a maximum depth of 13.4 metres. First proposed by Richard Hassard, the Vartny scheme was constructed to a detailed design by the Corporation of Dublin engineer, Parke Neville. The Draw Off Tower has valves at 10 feet, 20 feet and 30 feet below the maximum water level, feeding a 33-inch pipe

### The Summer Meeting 17 July 2014 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. Photo: 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 employees 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 re 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 operations', i.e. the elimination of waste on precise compliance with process specifications. Around 560 people are employed in further 85 in the adjoining engine-test facility encompassing the whole assembly facility which is well-trained and appeared highly motivated, pleasant, spacious, air-conditioned, dust-free.

Further information at: [www.rolls-royce.com/about/ourstory/heritage\\_trust/](http://www.rolls-royce.com/about/ourstory/heritage_trust/)

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### The 2013 Summer Meeting in Manchester

James Cockburn This year's Summer Meeting was organised by Heritage of Industry, and included two additional days at the start and another at the end. This was to provide wider coverage of the industrial history of the area for visitors from overseas, and to provide an industrial archaeology activity for those who were staying on for the 24<sup>th</sup> International Congress for the History of Science, Technology and Medicine (ICHSTM) being held in Manchester the following week. The pre-meeting visits included the National Railway Museum in York, The National Coal Mining Museum and the National Waterways Museum.

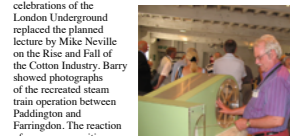
The Summer Meeting was based at the Premier Inn in Dale Street, immediately across the road from the Piccadilly bus station of the Rochdale Canal. The 53 delegates filled the coach, which made things easy for the Heritage of Industry tour manager Bill Barkfield, who simply had to ask if there were any empty seats – if not we were all there. As well as Newcomen members, the party included members of the AIA and visitors from Australia, France, the Netherlands, Japan and the United States. Unusually for Manchester, and in common with the rest of the UK, the weather was hot and sunny throughout – some would say too hot.

The Newcomen Society Summer Meeting visits and lectures included:

17 July, Quarry Bank Mill and the Styal Estate; Marple aqueduct and locks. See p10

18 July, A Day of Mills: Helmsboro Textile Mills, Queen Textile Street and the Ellerswood Engine House. See p8,9

19 July, Barry Lejeune's evening lecture on the recent 150 Year celebrations of the London Underground replaced the planned lecture by Mike Neville on the Rise and Fall of the Cotton Industry. Barry showed photographs of the recreated steam train operation between Paddington and Farringdon. The reaction of passengers waiting underground for their modern electric tube train at the sudden appearance of a Victorian steam train can only be imagined.



Geoff Wallis, attempting to spin a yarn at the Helmsboro Textile Museum. Photo: Clive Ellum

#### The Summer Meeting Tuesday 7 July 2015 Brunel in South Wales

Pontypridd to Dowlais Roger Davies

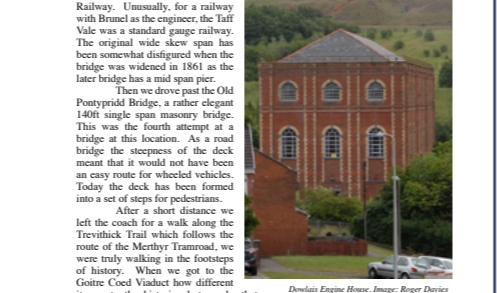
On Tuesday morning we all assembled on the coach and departed for a tour of a number Brunel's structures under the guidance of Stephen Jones. Our first 'drive round' was the Pontypridd (Newbridge) Railway Viaduct, the first structure to be started on the Taff Vale Railway. Unusually for a railway with Brunel as the engineer, the Taff Vale was a standard gauge railway. The original wide skew span has been somewhat disfigured when the bridge was widened in 1861 as the later bridge has a mid span pier. Then we drove past the Old Pontypridd Bridge, a rather elegant 140m single span masonry bridge. This was the fourth attempt at a bridge at this location. As a road bridge the steepness of the deck meant that it would not have been an easy route for wheeled vehicles. Today the deck has been formed into a set of steps for pedestrians.

Returning to the coach I was wishing that the woods could be opened out near the viaduct so the general public could appreciate its history and the wildlife would prosper due to the increase in the light. Next we visited Dowlais, a town that had been built around a single ironworks. Today the works has disappeared except for the Engine House which was the scene for coffee and a short talk by Hew Williams on Dowlais. The Engine House is a large imposing brick building that used to contain the steam engines for the blowers for the works. Today it is used by a youth club for various sports. Even though the Engine House was integral to the works, it was the historic photographs that I remembered from the Archive magazine. In view is now somewhat obscured by trees but seeing through them the viaduct across the River Taff is visible. Brunel's octagonal piers make sense. They mean that the cut water can be aligned close to the river flow without appearing to be wrong. When, in the 1860s, John Hawksley widened the viaduct he seems to have had a less easy route around the piers.

Further information at: [www.rolls-royce.com/about/ourstory/heritage\\_trust/](http://www.rolls-royce.com/about/ourstory/heritage_trust/)

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## Seen in Sheffield.....



The Women of Steel, outside City Hall, Sheffield. Images: Deborah Jaffé

### Deborah Jaffé

During my visit to Sheffield, for the lecture to the newly formed Newcomen South Yorkshire group, I was delighted to find the Women of Steel. They stand, life size in bronze, wearing their overalls, outside the City Hall in Barker's Pool. I had read about the women but seeing them, made to commemorate the work of women in the city's steel industries during the two World Wars, was very moving.

According to the Sheffield City Council :  
The statue was unveiled on 17 June 2016 and over 100 surviving Women of Steel came along to the unveiling ceremony... During both World Wars, thousands of women were conscripted to work in the factories and steel mills to keep them running whilst the men were away fighting.

The women, many of them in their teens and early twenties, took on these roles, which were often dangerous and physically demanding, alongside looking after their families and other duties. At the end of the war these women were simply dismissed from the factories as the men returned and for

many years their outstanding effort went unrecognised.

*The Women of Steel are an important part of Sheffield's history and an inspiration to young people today.*

*The statue was created by leading sculptor Martin Jennings who worked closely with a group of Women of Steel to come up with the design.*

*The funding for the statue was raised through public donations and made possible by the enthusiasm and generosity of local people and businesses. We have also been able to honour many of the surviving Women of Steel and the families of those no longer with us with a commemorative medallion specially produced by the Sheffield Assay Office. Following a request for applications nearly 800 medallions have been issued.*

Source: Sheffield City Council  
[www.sheffield.gov.uk/planning-and-city-development/urban-design--conservation/public-art/women-of-steel.html](http://www.sheffield.gov.uk/planning-and-city-development/urban-design--conservation/public-art/women-of-steel.html)

## Seen....

Contributions to Seen... are always welcome. Just email a hi-res image (even if taken on a mobile phone) and a short, descriptive paragraph with location details to:

[editor.links@newcomen.com](mailto:editor.links@newcomen.com)

Newcomen Links 241 March 2017

## Postscript: Brick Kilns

### Nigel Jopson

The article on Matthews' brickworks in NewcomenLinks 240, December 2016, featured Scotch kilns. Recently, the opportunity was taken to visit two more varieties of brick kiln. The first group was a pair of circular downdraught kilns next to the Grand Union Canal at Great Linford on the north-east edge of Milton Keynes<sup>1</sup>. The site of a third kiln was also visible with possibly the location of the chimney foundation.

The second group were the large Hoffmann kilns at Stewartby, the former London Brick Co (LBC) site south of Bedford, off the A421.<sup>2</sup> The distant shot was taken with the kind cooperation of the resident watchman, who revealed that the site closed in 2008 and was awaiting re-development. It was hoped that the 'Stewartby' chimney will be preserved as a local landmark. The site is considered too dangerous for close inspection.

The circular downdraught kilns were found in brickyards in places as diverse as Cornwall and South Wales as well as the Midlands. However, kilns of this type were also used for the production of pottery, salt glazed pipes, sanitary ware and even clay pipes as exemplified by the small kiln at Broseley.<sup>3</sup> The circular downdraught kilns were used in a batch process of load-fire-cool-unload; heat being supplied by a series of fireholes around the circumference of the kiln.

The Hoffman kilns were familiarly used for bricks but a Hoffman lime kiln survives at Llanymynech.<sup>4</sup> Both circular and rectangular Hoffman kilns were known. They had an annular 'tunnel' divided into chambers by removable walls.



The large Hoffmann kilns at Stewartby. Image: Nigel Jopson

## Postscript: The French Connection

*Alan Levitt adds a postscript to the report of the Newcomen Symposium, Annihilating Time & Space, in NLinks 240.*

The first French cable that was installed in 1869 and landed at Duxbury, Massachusetts, did not last long at that site. This was then a very busy shipping area, and much damage to the cable resulted from fishing and shipping operations. A new, (second) French cable was laid in 1879 to North Eastham, Cape Cod, Massachusetts, near the Nauset Light, where a cable station was built. This site was in an isolated area and thus difficult to reach in bad weather. So, a new station was built in Orleans, in 1891, near the town's commercial district, and the cable connected to it. This station remained in service until 1959. The Orleans station is now a fascinating museum tracing the history of the French cable and its role in trans-

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The 'Stewartby' chimney from afar. Image: Nigel Jopson

Each chamber was defined by the characteristic loading arch seen on the outside of the structure.

The kilns operated on a semi-continuous process in which a the firing sequence progressed around the kiln with a cooling chamber supplying heat to its loaded neighbour before that was ignited in turn. Fuel was supplied through hatches on top of the kiln structure, which would have been covered by roofed enclosures now missing at Stewartby. Communication between the chambers and the chimney was controlled by flue dampers that would be closed during the cooling/emptying/loading parts of the cycle.

This begs the question: by what criteria were the kiln types selected when a brick plant was erected? Were the circular down draft kilns selected on the basis of the size of output or flexibility in production? It would be easier to increase capacity by erecting further kilns on a unitary basis. The Hoffman kilns were more fuel efficient but maybe less flexible and more capital-intensive in smaller sizes. Were there also technical factors in terms of the combustion and firing properties of different clays that influenced kiln selection? Perhaps a more knowledgeable reader would care to comment.

### Sources:

- <https://discovermiltonkeynes.wordpress.com/2013/03/13/great-linford-brick-kilns/>
- [www.derelectplaces.co.uk/main/industrial-sites/32117-stewartby-brickworks-bedfordshire-2015-a.html](http://www.derelectplaces.co.uk/main/industrial-sites/32117-stewartby-brickworks-bedfordshire-2015-a.html)
- [www.shropshirehistory.com/industry/claypipes.htm](http://www.shropshirehistory.com/industry/claypipes.htm)
- [www.llanymynech.org.uk/html/hoffman\\_kiln.html](http://www.llanymynech.org.uk/html/hoffman_kiln.html)

Atlantic telecommunications. On display and demonstrated are the various transmitting and receiving devices ranging from mirror galvanometers to the Telex devices of the late 1950s. Also visible, depending on winter's erosion of the cliff, is the severed end of the French cable that once was buried in the beach sands and under the water. Nearby, at Wellfleet, is the outdoors site of Marconi's pioneering trans-Atlantic radio-telegraph receiving station. The Marconi-RCA Wireless Museum in Chatham, is housed in the erstwhile WCC wireless station facility.

**French Cable Station Museum, Located at the corner of Cove Road and Route 28, Orleans, MA 02653.**  
[www.frenchcablestationmuseum.org](http://www.frenchcablestationmuseum.org)

**Marconi-RCA Wireless Museum, Chatham Marconi Maritime Center, 847 Orleans Road, North Chatham, MA 02650** [www.chathammarconi.org/](http://www.chathammarconi.org/)  
*Both museums are seasonal.*

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# A Steam Safari in North Island, New Zealand

Part I of David and Olwen Perrett's report of their recent three month tour of New Zealand and Australia



The Art Deco style National Tobacco Company Building in Napier Port was opened in 1933.

## David & Olwen Perrett

Many travellers refer to New Zealand as being like Britain 25 or more years ago. This is certainly true of South Island but less so for North Island. However, with regards to industrial archaeology, both islands are far behind the U.K. and Europe. I could not find any current guides to IA in New Zealand. Yet, almost every town, no matter how small, has a heritage museum usually with some industrial items on display. Nearly everywhere seems to have preserved, often rusting, portable engines, usually made in England. So in our three months of travel in Australia and New Zealand, and between visiting the more usual tourist sites, we visited so many of these heritage museums that we could fill a whole issue of NLinks! To make this first report manageable this article will concentrate on steam in North Island, New Zealand, travelling up the island from Wellington.

## South of North Island

Wellington, at the very bottom of North Island, is the Capital of New Zealand and where the ferries from South Island dock. It is rather prone to earthquakes and we experienced a 5.5 magnitude earthquake and that magnitude really shook our hotel.

Like most city docklands, those in Wellington are now home to upmarket restaurants and pubs but a fully working floating steam crane is still moored there. The hull of the Hikitia was built by Fleming & Ferguson in 1926 and the crane is by Sir William Arrol & Co. of Glasgow giving a total weight of 926 tonnes. She travelled to New Zealand via the Panama Canal. The crane, weight 310 tonnes, was built to lift 80 tonnes



The Glasgow built floating crane Hikitia in Wellington Harbour

but has on occasions lifted well over 100 tons. Her twin screws have direct drive compound steam, steamed from two locally made package boilers that replaced an earlier Scotch boiler. The Hikitia floating crane is the oldest known operating steam powered floating crane in the world and was undergoing some serious

maintenance when we saw her in preparation for more work. She does though have a sibling crane, the Rapaki, which we saw preserved in Auckland Maritime Museum.

Travelling north to Palmerston North we went by the Tokomaru Steam Engine Museum which has the largest

collection of preserved engines in New Zealand only to find that it had been closed for over a year and was up for sale – but with no takers. The collection has been built up by Colin Stevenson and his wife Esma since 1960, when Colin took it upon himself to preserve examples of New Zealand's industrial heritage, after steam engines became obsolete and were being smashed up for scrap. The museum opened 1970 and subsequently over 35 engines, mostly of British origin, were collected and maintained in operational condition. According to Brian Hillsdon's article in ISSES bulletin 17.2 (1995) the



oldest engine in the collection is a 50 hp horizontal duplex of 1869 by Appleby Brothers, London, that came from a patent slip in Wellington. The largest engine, a horizontal tandem compound, built in 1916 by Filer & Stowell Co., Milwaukee, drove a Ball ammonia compressor making 200 tons of ice each 24 hours. Now aged 86 Colin has sadly put it all up for sale including the family house.

We spent New Year in the remarkable town of Napier. Following a massive earthquake in 1931, when Napier and neighbouring Hastings were razed to the ground, Napier was rapidly rebuilt in the Art Deco style. In 2011 it was declared a World Heritage site. Tourists flock to the town to see its dozens of Art Deco buildings including The National Tobacco



Faraday Museum. Above: Bryan Donkin horizontal and Force Engineering Enclosed engine. Below: English Electric generator set

Company Building which was opened in 1933 following the 1931 earthquake. The Architect was J.A.L. Hay and it is listed NZ Grade 1. A short distance to the west is the infrequently open Faraday Museum. Housed in former power station buildings the collection is maintained in fully operational condition by a group of ex-engineers. The collection ranges from printing presses, to a fully working Lamson Rapid Wire system and an iron lung. Children are encouraged to try and use every exhibit. Its largest exhibit is a Fullagar marine diesel engine, a massive and impressive generator set made by English Electric. It was used to supplement power during peak times but became a life saver after the 1931 quake when it supplied emergency power to the temporary encampment of those made homeless. The museum has a number of small steamable engines, such small horizontals by Bryan Donkin of Chesterfield and Tangye.

Some 200km north of Napier is Gisborne where



Some of the collection in East Coast Museum of Technology at Gisborne



Captain James Cook made his first landing in New Zealand. Visiting the Cook memorial we found a short steam railway where trains are hauled by a newly restored 1897 New Zealand railways locomotive. Talking to one of the railroad engineers he suggested that we visit the Technology Museum just outside of town if we were interested in technology. Turning off the main road we drove down a dirt road into what appeared to be a derelict factory to be greeted by a notice saying "This is a multiple hazard site" next to a Truslove of Colchester steam engine rotting away in the yard. Later we learnt the sign had only recently put up in view of the nature of the site. Eventually, someone came to the office and we paid our 5NZ\$. The museum consists of dozens of buildings/sheds in what was a former dairy sited at the end of a branch railway from the main line. In the first building we entered we were greeted by an amazing site with a sign saying this is "your heritage please respect it by looking not touching" in front of what appeared to be a pile of rusting machinery. The rooms got bigger and bigger and more and more crowded. One was full of unlabelled old lawnmowers, another of printing equipment much of it Victorian and made in London with some gems lost among the piles of machines. A further room had more small steam and oil engines than I have ever seen in one place before. Old computer and telephone equipment filled other rooms.

A recently revamped area was called Domestic Bliss with old cookers and other kitchen equipment, at least most had labels. The next building was filled with old cars from Model T Fords to early minis, another had commercial vehicles, another had military vehicles and yet another was home to dozens of fire-appliances engines. Everything was in need to extensive restoration. Large plant filled another area including a massive Mirlees diesel generator set that according to two chalk-written blackboards had come from a 1914 submarine and was then used to power the local tram system and a compressor for ice making dating from 1915 according to the hand written notice hanging on it. There were just three volunteers on site: one enjoying riding an early motorbike around among the exhibits, a lady drilling out Ford V-8 engine blocks and the lead volunteer who proudly said that he would show us something

from the Isle of Man. In a totally derelict shed, much too dangerous to enter, were the sorry remains of a narrow gauge steam locomotive obtained from the Goudle Glen Railway about 1910 by Gisborne Council. Other than a few friends of the volunteers we were the only visitors at the height of the summer holidays. The museum has no full listing of exhibits and the site deserves a major archaeological investigation to find its hidden gems.

### The gold mining legacy of the Coromandel Peninsular

The east coast of North Island running into the Coromandel Peninsular was an area of major gold discoveries. The first was near what is now Thames in 1869 and further discoveries were made throughout the region. There is a still very active goldmine in Waihi. The original mine opened in 1878, now called the Martha mine. It has become a giant open hole having produced some 174,160 kg of gold and 1,193,180 kg of silver. Recent slippage has brought down a large section of quarry wall and stopped production here but mining of the same seams just outside town continues in a massive way and we were able to visit this site. Some 2,840kg (100,000ozs) of gold and 19,886kg (700,000ozs) of silver were being produced annually before the collapse.

Waihi town centre is totally dominated by its Cornish pumping engine house built in concrete in 1903 to house an inverted beam engine. The pump, constructed by Hathorn-Davey, had a stroke of 4 metres and dewatered the mine workings from 399m at a rate of 7000 litres per minute. The engine itself was replaced by electric pumps in 1913. By 2005 the mining site was starting to undermine the engine house so in 2006 the mining company was forced to agree to move the entire engine house. It was moved intact on stainless steel sliders a distance of 296m to its present position (pic).



Above: The Cornish Engine House Waihi showing steel sliders on which it was moved  
Below: The Tangye engine at Thames gold Battery Mill

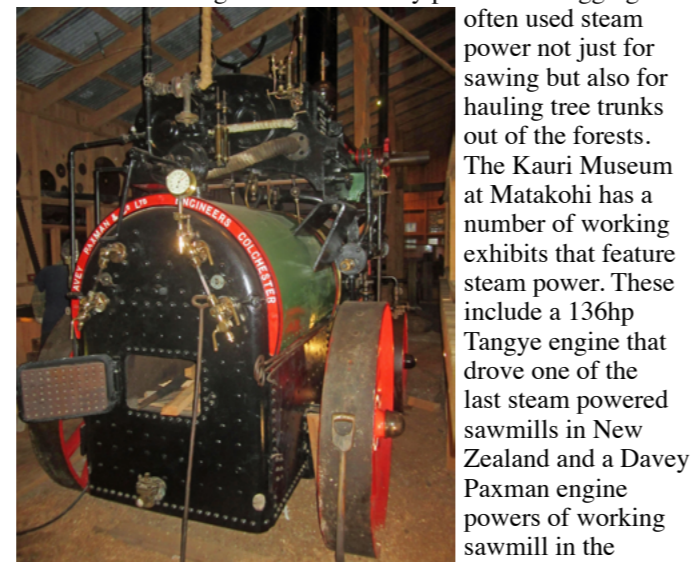
The gold in this area is embedded in quartz which needs to be crushed before future processing. A number of battery (stamp) mill sites using Californian stamps survive. In fact many townships have mounted sets of stamps as their boundary markers. In Coromandel Town the working stamp mill, dated 1900, is powered by New Zealand's largest water wheel, but disappointingly it, like the School of Mines now the village museum, was firmly locked up. Further down the coast is Thames itself, which is a fascinating work-a-day town with its own School of Mines opened in 1886 and remains complete. It had two major iron foundries that supplied equipment and steam engines to the gold mining industry. One, A & G Price's foundry, was established here in 1871 and is still at work. It became notable for its steam engines, locomotives and ship building and particularly its patented Pelton wheel: many of which can be found in the country. Surprisingly it had a Bessemer converter now preserved at the battery mill. Just north of the town is the Thames gold battery mill complete with a number of replica working items to crush and separate gold. As soon as the young knowledgeable guide realised that we knew what we were being shown he became keen to show us every closed off area. In the basement of the mill is a workable Tangye colonial horizontal engine unfortunately awaiting repairs to its boiler. The site has other Tangye engines and at least one high speed enclosed engine in various states of repair.

### Auckland District and further north

The best known steam site in New Zealand is the former Western Springs Pumping Station in Auckland now part of the Museum of Transport & Technology (MOTAT) that contains the only beam pumping engine known to survive in N.Z. The engine was built in 1876 by John Key & Sons of Kirkcaldy, Scotland and is frequently steamed. Although we passed MOTAT on a number of occasions they were never when the engine was in steam.

Further north, the town of Kawakawa must be the only place where the principal tourist attraction is the public toilets! These are elaborate tiled conveniences designed in a Gaudiesque style by the artist Hundertwasser in 1997. Yet immediately in front of the toilets and running with the cars down the middle of the Main St is the oldest railway in New Zealand, opened as a coal line in 1868. A small Peckett of Bristol tank engine built in 1927 now hauls tourists a couple of miles to the coal transshipment point on the nearby river at weekends and on summer weekdays.

The giant logging forests of New Zealand are no longer populated by massive Kauri trees. Logging over two centuries, for their near perfect wood, nearly destroyed these trees and remaining forests are strictly preserved. Logging



A Davy Paxman portable engine driving sawmill in Kauri Museum

often used steam power not just for sawing but also for hauling tree trunks out of the forests. The Kauri Museum at Matakohi has a number of working exhibits that feature steam power. These include a 136hp Tangye engine that drove one of the last steam powered sawmills in New Zealand and a Davey Paxman engine powers of working sawmill in the museum. A very large



Above: Ken Pointon instructs me in starting the replica Newcomen Engine  
Middle: Ken and Andre Pointon tend to the Newcomen Engine  
Below: The new waterwheel attached to the Newcomen replica to provide a load

steam powered log hauler is displayed outside the Museum.

### Running the Replica Newcomen Engine

The highlight of our visit to Auckland was a trip to see the replica half-size Newcomen Engine briefly described in NLinks issue 226 June 2013. The engine was built by members of the team that had returned the Kay beam engine at MOTAT back to stem. An enhanced group, all members of the Auckland Steam Engine Society, consisting of engineers, a blacksmith and carpenters proposed to MOTAT that they would build the museum a replica Watt engine but in the end they settled on a Newcomen engine. The engine was designed by Ken and Andre Pointon and is based in most part on the scale drawing of the Dartmouth engine that appeared in Transactions back in 1963. Although built to half scale it is still a sizeable working machine standing some 24 ft high. In the end MOTAT did not offer the engine a home so it was dismantled after its initial public display and moved to Society's base adjacent to Ken's home.

I emailed Ken asking if I could see the engine and he generously said yes. Our visit to 'Colonial Ironworks' on 9 January 2017 was then planned. They would steam the engine for a small audience of enthusiasts. There would be a sausage sizzle i.e. a barbeque and I would give a talk on the "Archaeology of the Newcomen Engine". So Steve, the friend we were staying with near Auckland, drove us to Whangaparaoa, a small town about 40km north of Auckland and they easily found the steam engine society's buildings since it was only a few hundred metres from their brother's home. Since the site is completely hidden by trees and in a shallow valley neither his brother nor Steve knew it was there! The site has a number of buildings with a significant number of machine tools. A pair of working Tangye colonial engines could drive the workshop and a small inverted engine by Anderston's of Christchurch was awaiting attention. The Society's President's recently completed steam launch was in the yard awaiting transportation to a lake.

The Newcomen replica itself is now in the yard beneath a simple roof and to give it some load the team have built a waterwheel so that it can generate circular motion. Some two dozen people had gathered for the event. Andre's young son, aged 11, was proud stoker for the day shovelling coal and wood in to the haystack boiler. After the sausage sizzle and much climbing all over the engine by everyone, enough steam had been raised for Ken to guide me in actually starting the engine. On my second attempt the engine started perfectly and then ran without stopping for the next two hours or so.

A TV screen was then attached to the engine and I gave my talk in the open air; a first time experience for me. Just as the talk ended the heavens opened – a welcome relief in a drought stricken area such as North Island. So many thanks to Ken, Andre and the other members of the group for a fantastic day. Hopefully I can put some video of the engine in steam and pumping over the waterwheel on the Newcomen website.

Ken and Andre Pointon plan to travel to the Newcomen symposium in Elsecar this May when they will give a paper on building and running the engine ( see the back cover

### Websites for North Island, New Zealand

- Gisborne: [www.ecmot.org.uk](http://www.ecmot.org.uk)
- Kauri Museum: [www.kau.nz](http://www.kau.nz)
- Kawakawa its toilets & railway: [https://en.wikipedia.org/wiki/Kawakawa,\\_New\\_Zealand](https://en.wikipedia.org/wiki/Kawakawa,_New_Zealand)
- Museum of Technology, Wellington: [www.motat.org.nz](http://www.motat.org.nz)
- Napier Town: [www.artdeconapier.com](http://www.artdeconapier.com)
- Steam crane in Wellington: [www.hikitia.com](http://www.hikitia.com)

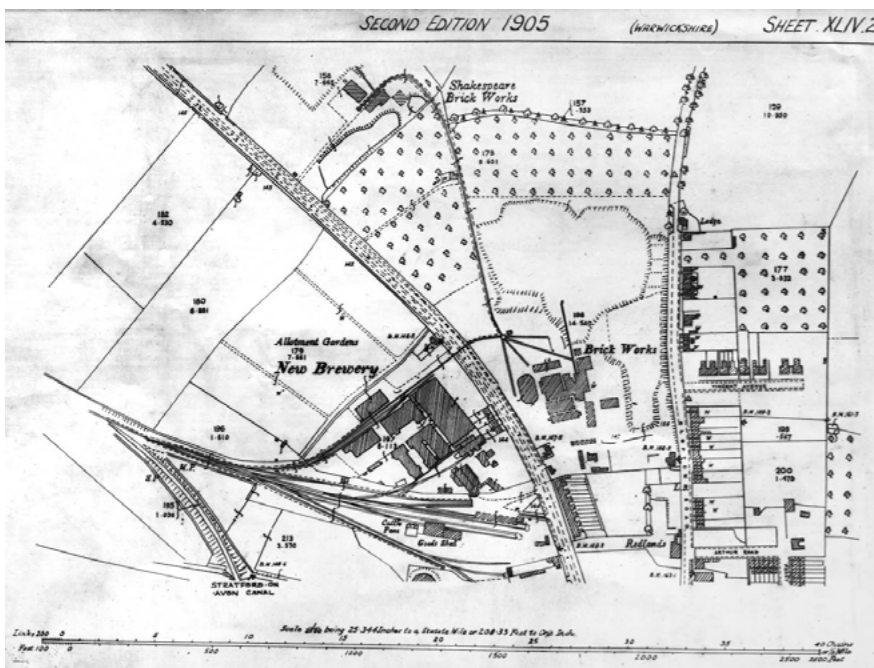
# Inspired by Shakespeare, Powered by Steam: Brewery Archives in Stratford-upon-Avon

**Jim Ranahan**

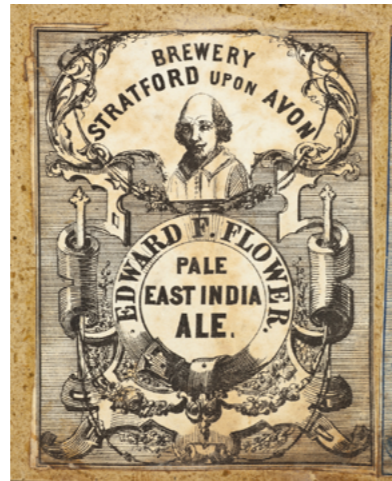
Whilst the banks of the Avon are perhaps more readily associated with Shakespeare and his literary legacy, the Bard's hometown also has a proud industrial legacy. Shakespeare was himself familiar with the processes of the tannery, a key element in his father's business and Stratford later acquired the hallmarks of industrialisation – canal, railway, factories and a brick-works named after Shakespeare! Perhaps the most iconic industrial complex – and certainly the one that linked literary and industrial Stratford was Flower's Brewery, the records of which are held at the Shakespeare Birthplace Trust, along with a copy of Shakespeare's will and much more besides! Researchers interested in the development of many aspects of the brewing industry will find archives and supporting material to further their investigations including: malting, production, logistics and chemical infrastructure.



Flower's Brewery, Stratford-upon-Avon [1940s]. SC23/214 ©Shakespeare Birthplace Trust



Photographic copy of 1905 Ordnance Survey map, showing location & layout of Flower's New Brewery, Shakespeare Brickwork and canal & railway services. SC23/213 ©Shakespeare Birthplace Trust



Label for Edward F. Flower India Pale Ale, Stratford-upon-Avon Brewery [C19]. DR227/121 ©Shakespeare Birthplace Trust

For over 130 years, the Flower's Brewery dominated Stratford, from 'The Bull' hooter announcing the working day at 6.30 to the last train whistle as another consignment of India Pale Ale left the railway sidings at close-down. The Brewery offered a pragmatic counter-balance to theatrical activities at the other side of town, and of course the Flower family was instrumental in the construction of the Shakespeare Memorial Theatres, in 1879 and again in 1932, after a

disastrous fire. They were also civic leaders and trustees of the Shakespeare Birthplace Trust, who now hold the archives relating to their varied interests.

Given the central role that Flower's Brewery played in Stratford's economic and industrial life, relevant archives are spread across numerous collections, including:

- DR227 Flower & Sons Ltd, Brewers 1828 – 1966
- DR315 Frederick Morris Papers, with details of F. Kendall & Sons, Brewers' Chemists 1775 - 1974
- DR608 Papers of Albert F. Cobbold, Cooper at Flower's Brewery 1901 - 1959
- DR641/2 Arthur Locke Collection: Photographs & Miscellanea re: Flower's Brewery
- DR1059 Flower & Sons Ltd, Brewers 1776 – 1993 - Further Papers
- DR1179 Yorke, Harper & Harvey, Architects – Robert Harvey's clients – Flower's Brewery 1954 - 1982
- SC23 Walker Photographic Ltd 1930 – 1959 – including survey of brewing processes

Further collections can be viewed online at: [http://collections.shakespeare.org.uk/?\\_ga=1.83903769.1849583918.1485166197](http://collections.shakespeare.org.uk/?_ga=1.83903769.1849583918.1485166197)

The Trust holds the world's largest Shakespeare-related library, museum and archives and also cares for the Royal Shakespeare Company's archive and an extensive local history archive of Stratford-upon-Avon and South Warwickshire, with records dating back to the 12<sup>th</sup> century. Further information from: [scla@shakespeare.org.uk](mailto:scla@shakespeare.org.uk)

# A Ride on Tornado (Plandampf) on Valentine's Day

**Robert Mason**

A winter's daybreak on a cold northern railway platform is not where you would expect to find a crowd of people on Valentine's Day. But that was where I and a few hundred others were – on Appleby station waiting for the first scheduled mainline passenger train to be hauled by steam locomotive for nearly 50 years.

Unlike the numerous steam excursions that take place throughout the year, this was a regular service train. The only difference was the three-coach diesel, multiple unit was replaced by a steam locomotive hauling nine carriages. And with Britain's newest mainline steam locomotive 60153 Tornado in the starring role, TV crews and reporters were out in force.

I was standing on top of the station's very windy footbridge trying to get a glimpse of *Tornado* waiting in a distant siding when a photographer from the Press Association asked whether he could take a picture of me holding my ticket. I obliged despite reservations that my valuable pass for the 8.25am train would be blown away. And before my journey was over this picture was already appearing on the websites of the BBC, ITV, Daily Mail and The Guardian.

There was one reason I was especially keen to be on this train. I was christened on 11 August 1968, the day of the last British Railways mainline passenger train to be hauled by steam locomotive. Known as the *Fifteen Guinea Special* the service ran from Liverpool Lime Street to Carlisle and back via Manchester Victoria and the Settle-Carlisle line.

I was constantly reminded of this by my late father as he claimed he would rather have skipped church to say goodbye to steam. A 50 mile drive up Wensleydale could have seen him at Garsdale station, but duty prevailed. My father grew up after World War II when a large number of children were loco spotters. In 1961 my father left the UK to work in East Africa, spending his last afternoon in London photographing locomotive movements at Paddington Station before heading to Heathrow. By the time he next visited these shores in 1965, steam was in its death throes. Then, when he returned with me in 1968, the last remaining steam locomotives were confined to a few sheds in the north. Fortunately, there was still steam in East Africa, where I grew up. So, naturally, I became an enthusiast.

The 8.25am from Appleby to Skipton on 14 February this year was the first of three days of a *Plandampf* operation. In German *Plandampf* means *scheduled steam* and given to running steam-hauled timetabled trains on the main line. *Tornado*, which was completed in 2008, 48 years after British Railway's last locomotive Evening Star emerged from Swindon works, was a fitting engine for the trip, although a class 67 diesel was also required to provide power for the modern Mark 2 carriages.

The mood on board was buoyant, with seats filled not just by ordinary passengers but also by film crews, British Transport Police, and representatives of organisations like the Friends of the Settle-Carlisle Line. In the 1980s the Friends had campaigned to save the line and now act as a user group to improve facilities and services for passengers along the 72-mile line.

Travelling tender-first on its southbound trip *Tornado* coped smoothly with the ascent up to Ais Gill Summit, which at 1,169 feet above sea level is the highest point on a main line



10.30am, 11 February 1961, Paddington station. 6010 King Charles I. © E. Ian Mason



Robert Mason and Tornado © Sian Lewis

in England. With clear visibility the 'roof of England' provided a spectacular backdrop with snow-covered peaks occasionally obscured by long drifts of white smoke as the engine worked hard.

By the time we reached the iconic Ribbleshead viaduct, legions of photographers were lining the trackside while above the modern phenomenon of drones were tracking our progress. Our train then eased down through Settle and arrived right on time at 10.08am in Skipton where large crowds were out in force to greet us.

So now the *Fifteen Guinea Special* can no longer claim to be British Railways' last steam train. And the price of my ticket? A bargain at just £15.00!

**Further information:**  
**Friends of the Settle-Carlisle Line**  
[www.foscl.org.uk](http://www.foscl.org.uk)

**A1 Steam Locomotive Trust (owner of Tornado)**  
[www.a1steam.com](http://www.a1steam.com)

# The Sea-Coal Trade and the Introduction of Steam

*A report of a lecture by John Dobson to Newcomen North East*

**Robin Brooks**

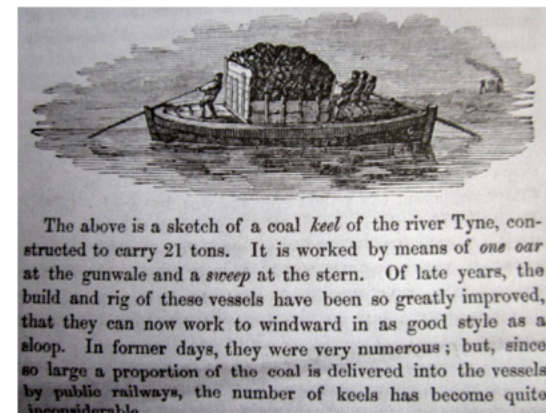
John Dobson began his excellent lecture by reminding us that the Port of Tyne is today the second largest importer of coal in the UK. However, for many centuries, it was ships from the River Tyne which exported huge quantities of coal from the North East, particularly to London. This activity was endorsed



by the fact that one thoroughfare in the City of London was known as Seacoal Lane until it was recently renamed Limeburner Lane. Seacoal Lane was

named because of its links with the unloading of sea borne coal and ran alongside the then un-culverted River Fleet where coal barges were brought up from the River Thames. It is gratifying to see that the new plate naming the street refers to its previous heritage.

The logistics of transporting coal from the North East mines to the seagoing, wind powered, collier ships of the early 1800s were explained. From the mine, the coal was moved via chaldrons (a container for coal and also a measure of volume) on wagonways to staiths at the river edge where loaded keel boats transported the coal to the collier ships moored in the river or harbour. The coal was then manhandled from the keel into the collier. Transferring the coal from the mine to the seagoing collier required numerous manhandling stages, which



The above is a sketch of a coal keel of the river Tyne, constructed to carry 21 tons. It is worked by means of one oar at the gunwale and a sweep at the stern. Of late years, the build and rig of these vessels have been so greatly improved, that they can now work to windward in as good style as a sloop. In former days, they were very numerous; but, since so large a proportion of the coal is delivered into the vessels by public railways, the number of keels has become quite

Keel Boat



Collier discharging, 1829

in turn 'damaged' the coal; small coal had very little value. Keel boats carried 21 tons and a sailing collier, typically 350 tons.

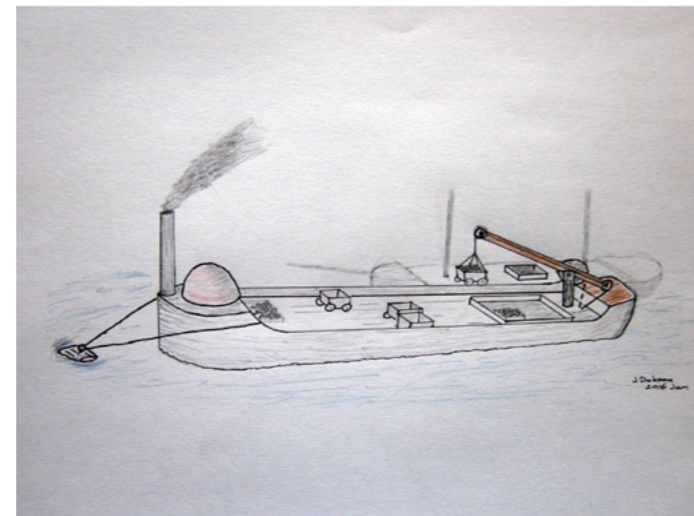
As the collier ships were sailing vessels, they were entirely dependent on the weather. Hence, if there was little or no wind, ships were unable to put to sea and thus would block the port. This resulted in total congestion for both colliers and keel boats. The first use of steam power to alleviate this problem was in 1818 when an enterprising steam packet owner advertised his boat's availability to tow collier boats, *Up, or down the River Tyne, and also to Sea, if required.*

A further move to improve efficiency and reduce manhandling, was the introduction, in 1820, of 'coal drops' which used gravity to part load a collier directly from the river bank without the need for a keel and its attendant keelmen. Loading was dependant on the condition of the river and having a safe draft to navigate down to Shields Harbour. It has been claimed that keel numbers dropped from about 600 to 300 as coal drops were introduced.

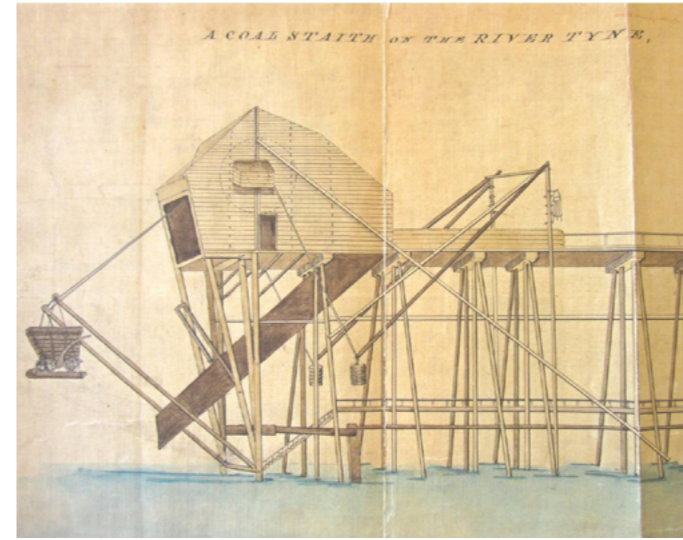
The River Tyne and River Wear traditionally embraced similar coal handling techniques. However, William Paterson, the Wear based Lambton Colliery agent, developed a new style of loading keels. Instead of the keel being filled with a mass of loose coal, the mineral was held instead in 8 iron containers each holding 2.6 tons. Lambton Colliery loaded its keels with containers about 4 miles up-river from Sunderland harbour, but once taken down river to the harbour, these were unloaded by steam crane directly into the hold of the collier. The keelmen, seeing the writing on the wall for their jobs went on strike over this innovation!

The development of floating cranes to transfer the chaldron loads from keel to collier including the development of the vessel *Bedlington* was also explored in the lecture. This vessel was designed specifically to transport coal from the River Blyth down the coast to South Shields on the River Tyne. The steam driven *Bedlington* was launched in March 1842 and was a shallow draft vessel able to carry 40 chaldrons, but as it had its own onboard crane, it was able to unload directly into the hold of any collier moored alongside. As no existing illustrations of the *Bedlington* have yet come to light, John Dobson showed his interpretation of what the vessel may have

An interpretation of the *Bedlington* of 1842



Newcomen Links 241 March 2017



Coal Staithe

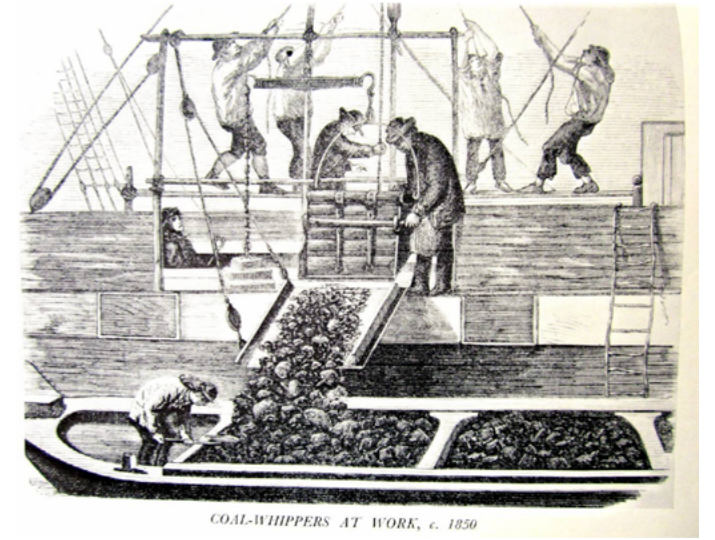
looked like. Contemporary with this development in the 1840s, was the further increase in the use of bank/dock side staiths (or coal drops) for loading.

The next stage in the development of the sea coal trade between the North East and London was introduced by describing the commissioning of the steam collier John Bowes, the background and heritage of the influential mine owner John Bowes Esq. and the inherent problems with the unloading of coal at London. John Bowes (1811-1885), who was the inspiration behind the Bowes Museum at Barnard Castle and also its chief benefactor, was part of the Bowes-Lyon family and the illegitimate son of John Bowes (1769-1820) the 10<sup>th</sup> Earl of Strathmore. Although he did not inherit the title from his father, nor his Scottish estates, he was granted the family's English estates which included its North East coal mines. In about 1840, he formed a partnership with his step-father William Hutt and the mining engineer Nicholas Wood to form the Marley Hill Coal Co. Later, the businessman and coal fitter Charles Mark Palmer, who had been consulted by the company on coke production, was made an additional partner in the company. In 1847 the Marley Hill Coal Co. was renamed John Bowes Esquire & Partners with Palmer being the managing partner.

Before explaining the commissioning of the John Bowes, John Dobson briefly described the conditions under which coal was traded in London. Having reached the Thames Estuary, the master of a collier would get his vessel noted at Gravesend where a number was issued. The vessel then entered a wait-in-turn queue with other vessels to travel in stages the 26 miles to the Pool of London (which was the stretch of river between Limehouse and London Bridge). Once there, colliers were moored in tiers on both sides of the river, thus causing a serious constriction to other vessels attempting to pass along the Thames. Having arrived in the Pool, the master or agent would sell the cargo through the services of a Factor who operated at the Coal Exchange where coal prices were settled. The price of coal was a contentious issue – the sellers complained it was too low, while the users said it was too high. The Factors also controlled the berths from which the colliers could unload. Having sold the coal, it was discharged. It was weighed by men called whippers while being transhipped from collier to a lighter moored alongside. A note, issued by the whippers, was used to calculate the Coal Tax due to the City of London.

In order to make unloaded vessels manageable, they were obligated to pay for and load solid ballast before leaving the Pool; this operation was administered by Trinity House. Alternatively, low value ballast cargoes of chalk or sand could be bought to be sold on arrival on the Tyne. These were used for making chemicals or glass, but if the sand was unsuitable

Newcomen Links 241 March 2017



Coal Whippers 1850

for glass making, it could be used in the building industry.

Charles Palmer, having an eye to increase the output of the John Bowes mines, sought ways to circumnavigate these restrictions. John Dobson was confident that Palmer would have been fully conversant with the Coal Turn Act (CTA) which controlled the loading of coals in Newcastle and Sunderland, in a similar way to that in which the unloading was controlled at the London end. Palmer avoided the CTA by erecting an additional staithe at Jarrow-on-Tyne, outside the jurisdiction of the CTA. He would also have been aware of the collier QED, launched in July 1884 and fitted with an auxiliary steam engine to get the vessel in and out of port. The vessel used water as ballast which could be pumped in or discharged as required.

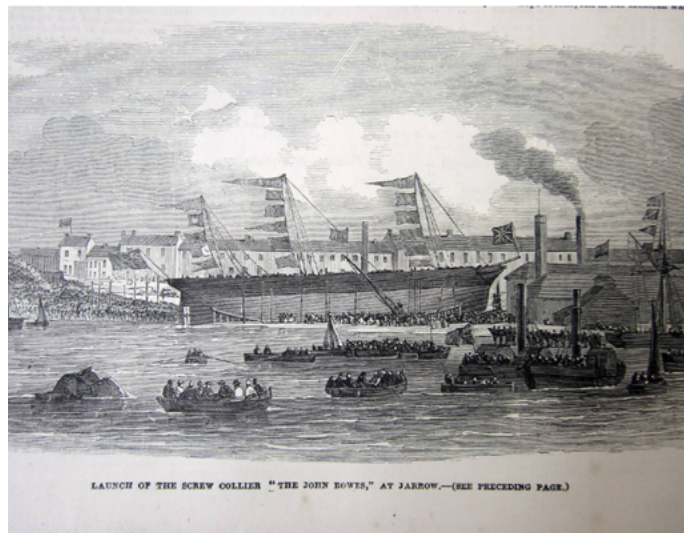
Palmer, with his grasp of all the conditions controlling the North East/London coal trade and the increasing threat from the railways, sought ways to improve the movement of



Steam Screw Collier QED 1844

coal from source to the metropolis. One improvement was the construction of a wharf on the Thames at Bow Creek where colliers could discharge without going into the Pool of London. However, Palmer saw that the vagaries of wind powered colliers were at the root of his problem.

Despite not being a shipbuilder, Palmer established a shipbuilding business at Jarrow-on-Tyne with his brother and with the backing of John Bowes. The second vessel built was the *John Bowes*, a purpose built steam powered collier designed specifically for the Tyne to Thames trade. Although conceived as a prototype, the vessel ticked all the right boxes for her anticipated role. She had a large hatchway for speedy



Launch of the John Bowes 1852



John Bowes. Image: © Tyne & Wear Archives, with kind permission

loading and discharge and a capacity of 650 tons, she also used water for her ballast. Palmer was likened to the present day Sir Richard Branson in the way he publicised and promoted his business – for example, the launch of his new vessel in June 1852. The *John Bowes* left the Tyne on 29th July 1852 for her maiden voyage. She docked at the new Collier Dock of the East & West India Company at Bow with their revolutionary Armstrong hydraulic cranes which facilitated swift unloading. The Collier Dock also had direct access to the railway for further transshipment. Coal Duty obviously still needed to be paid, but it was calculated on the weight declared on the loading certificate issued at the Tyne. Using this facility, Palmer avoided the use of meters or the use of whippers. The pioneering initial round trip was accomplished in 5 days 6 hours, a huge saving on the previous timings.

The water ballast system used at first proved problematic, but a double bottom arrangement using McIntyre tanks was eventually adopted. The prototype *John Bowes* design was vindicated and Palmers and other shipbuilders built vessels like it in their hundreds from the mid 1850s onwards. Despite Palmer's improvements in transporting coal from the North East to London, he never fulfilled his ambition to sell Bowes' coal directly to the consumer. The Coal Exchange and other City interests still retained their monopolies over the final London stages. Thwarted in this ambition, Palmer branched out into transporting general cargo to and from London as well as coal. He successfully developed his shipyard into building larger iron ships from raw iron ore through to complete vessels.

If ever an industry benefitted from the introduction of steam technology to assist its progress, the Sea Coal trade proved to be a prime example!



Palmers Advertisement, 1853



Palmers Shipbuilding Advertisement

All images, unless stated otherwise, are from John Dobson's collection.

# Can we solve a Nordic Mystery?

## The disappearance of Dr. Albert Petersson



Dr. Albert Petersson together with his wife Leonie who died in childbirth in 1910



Clockwise from top left: The steamship *M/S Ullensvang*, the last place where Dr. Petersson was seen; Odda with the fjord - and the factories in its early years; From Alby United Carbide Factory in Odda: The factories in Odda. Images: ©The Norwegian Museum of Hydropower and Industry

### Knut Markhus

Alby United Carbide Factory and North Western Cyanamide Company were both based at Winchester House in Old Broad Street, London in the early 1900s. Alby United Carbide Factory ran an important carbide plant in Odda, Norway, and North Western Cyanamide Company had a cyanamide factory in the same town.

The carbide production and the subsequent production of cyanamide began in 1908 after the Tyssedal hydropower plant was operational to provide the necessary electricity for the arc furnaces. The plant was one of the largest in the world at this point, and the first hydro facility in Northern Europe to be built using the *modern* principles of a high fall supplying pressurized water to the plant via a tunnel or pipeline.

Odda/Tyssedal was in the frontline of the development of hydropower in combination with carbide and cyanamide industry. It was an international stage. The Swede, Dr. Albert Petersson (1870-1914) was the director of both the Odda factories, and one of the most prominent personalities there at the time.

The mystery began on the evening of 18th August 1914 when Albert Petersson left Odda aboard the steamship *M/S Ullensvang* bound for London via Bergen. He was going for a meeting with the owners in London. But he never arrived in Bergen or London. During the night he disappeared from the boat. Somebody heard a splash, but Petersson was never found.

The World War I had started a couple of weeks before, and Petersson was a highly respected scientist on carbide. The war industry needed carbide.

Did somebody make him disappear? Or did he commit suicide? These are the puzzles we, at The Norwegian Museum of Hydropower and Industry, would like to solve.

We want to explore information in Britain, or elsewhere, that can bring light to this mystery. Archives from the two companies in London could be useful, or historians who have knowledge of this period? In a way we are acting like detectives in this cold case, and along with that we will collect historic information on a broader theme.

**Please send any suggestions to:  
Knut Markhus at km@nvim.no**

### The Norwegian Museum of Hydropower and Industry

is a technical-industrial heritage site and also a cultural history museum. The main themes are history related to rivers, hydropower production, electricity, power-intensive industry and the industrial society. The museum preserve, manage and present knowledge about the national heritage Tyssedal hydropower plant. The Museum operates 32 buildings altogether. It is situated in the inner part of the Hardanger fjord in



The hydropowerstation Tyssø 1, the main site and the Tyssø 1, turbine hall.

the west of Norway. The main site is in Tyssedal, where the impressive Tyssedal hydropower plant is the jewel in the crown, and a variety of guided tours are offered. An exciting history is told: from the beginning of last century till today, the history of waterfalls that changed Norway.

There is a cultural programme throughout the year and a number of guided tours available for groups: a hike to the site in Lilletopp; the installations in the mountainside high above the fjord, at the end of the waterpipes (30-40 min walk/hike); the 12 houses can only to be reached on foot. Groups can book a tour through the old watertunnels and the rest of the installations.

**The Norwegian Museum of Hydropower and Industry  
Naustbakken 7,  
5770 Tyssedal,  
Norway  
www.nvim.no**

# Obituaries

Kenneth Mersey Brown

Ken Brown had an unsurpassed knowledge of the Cornish cycle engine in all its forms, from mine drainage throughout the world, to water supply in London. Retirement allowed him to move to Cornwall and immerse himself in his research. He was highly delighted to become a Bard of the Cornish Gorsedd, taking as his title *Covathor Jynnys* (Recorder of Engines), a rare honour for a non-Cornishman.

His childhood was spent in Exeter, where his father was Professor of Mathematics at the University College of the South West of England. He was a pupil at the King's School, Bruton before moving on to the Dolcoath Technical School in Camborne. It was here, while out walking in the war-time darkness, that he first saw a Cornish cycle beam engine working, and plucked up courage to go inside the enginehouse. Unofficial opportunities to monitor, then drive the engine followed. He had found his life's passion.

After National Service in the Royal Engineers, he moved to London and worked for the Great Western Railway and for Foster, Wheeler before joining the staff of the magazine Engineering. He stayed in technical journalism for the rest of his working life, retiring from Construction News in 1988. He joined the Society in 1956. Working in London allowed him to play an active role; he was a Member of Council for ten years, was on the Publications Committee and organised the London Visits programme for many years. He also became a volunteer on the restoration of the Crofton Pumping Station, moving on to the Kew Bridge station as it was made ready for operation of its unique collection of Cornish cycle pumping engines in 1974/5. And he owned a steam-roller of his own!

Although he was a hands-on restorer, his great legacy at Kew is the 62 issues of Kew News covering the first 23

years of the Kew Bridge Steam Museum, the text of the early guide books and the many articles on these engines and others that he contributed to a wide range of journals. His account of the evening in November, 1975 when the 1820 Boulton & Watt engine was moved by steam for the first time in 31 years, wonderfully evokes the mysterious urge that motivates such dedicated volunteers.

In Cornwall, he edited the Trevithick Society Journal and provided much of the raw material that formed the successful bid that resulted in the Cornish Mining Areas being inscribed as a World Heritage Site in 2006. He was a frequent and fluent speaker, though he never actually gave a paper to the Society. With the late John van Riemsdijk he wrote 'The Pictorial History of Steam Power', published in 1980. With Bob Acton and Damien Nance he wrote several books on Cornish mines and mining; with the late Jan Verbruggen, he compiled an enormous data-base of all known Cornish cycle engines.

His journalistic career led to much foreign travel, which also allowed great opportunities to pursue his Cornish interests, and led to a world-wide circle of correspondents. All this he meticulously filed and preserved. The mining material is now held by the Trevithick Society, the water supply content is in the archive at Kew Bridge.

Those of us who knew Ken will always be grateful to him for teaching us how to handle the demanding Cornish non-rotative engine; and for researching, recording, preserving and sharing his learning. His work on the Cornish cycle engine, a key driver of British engineering history, is his monument.

**John Porter**

- sometimes with bizarre consequences. Les took it all with equanimity!

Les had a cheerful disposition and that was a great asset - most particularly on those occasions when things could be pretty hectic. One such occasion was the so-called "Great Mailing". In those now distant days we could not rely on members having email accounts, so in early September each year we would collect together a group of volunteers and collate the bumper mailing to all members. This involved many individual tasks - photocopying, collating, envelope-stuffing, stamping and ultimately carrying away the fruits of our labour - GPO sacks of Father-Christmas-like proportions - to the local sorting office! Les was a wonderfully calming influence in the Office which I very much valued.

Les and I would often have lunch together and I very much enjoyed our wide-ranging conversations.

**Dick Swann**

Leslie Dixon

The Society has received the sad news that Les Dixon, a long time member of the Society, died on 19 December at the age of 89.

The Society has much to thank Les for. He was a stalwart of the small group of volunteers who helped the Executive Secretary with the many day-to-day tasks involved in running the Society. Les worked with several Executive Secretaries. They came and went but Les just kept plugging on! As one of those transient Executive Secretaries, I would also like to record my personal thanks for Les's help over the years.

One of the many tasks in the Office was dealing with the Society's membership records system. Les grappled manfully with the computer system I inherited, which in truth had many faults. He did this with great perseverance and good humour. Although the most patient of men, he was once or twice heard to utter mild expletives when, for the n-th time that morning, our more than usually trying IT system had crashed

## Rocket Man with Cousin Jacks

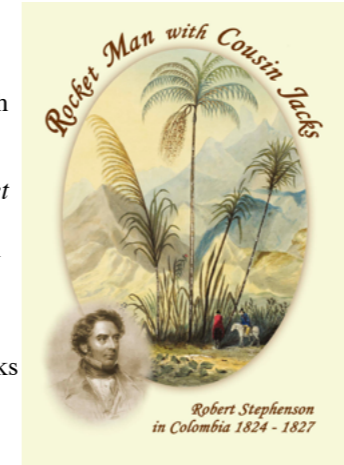
### **Robin Brooks**

Michael Taylor, a member of the Robert Stephenson Trust (RST), gave Newcomen North East an a pre-publication 'exclusive' at its November meeting. The book was *Rocket Man with Cousin Jacks* by Bob Longridge, the Chairman of the RST. The Trust was responsible for restoring part of Robert Stephenson's 1823 Forth Street Locomotive Works in Newcastle upon Tyne.

The illustrated talk, which was a synopsis of the book's contents, was ably delivered by Michael Taylor. As he explained, until now, Stephenson's career between 1824 and 1827 has been shrouded in a bit of a mystery to all except a few resolute Robert Stephenson devotees. The book is a detailed account of this three year period in Stephenson's life and the influence it had on his future following his return to England.

In summary, the 19 year old Robert Stephenson, within a year of having established and become Managing Partner of the Forth Street Locomotive works, appeared to abandon his father George Stephenson to go to South America to be the engineer for a speculative silver mining company. The exact reasons he did this are unknown, but Mr Taylor suggested that the £500 per annum salary (equivalent to £500,000 now), his poor health and his domineering father may have been factors.

His work was primarily in Columbia, mainly in mines first started during the Spanish occupation, but some new sites were also established. There were London based financial backers for this venture and Richard Illingworth, was his boss in Bogatá. Much of Bob Longridge's research was dependent

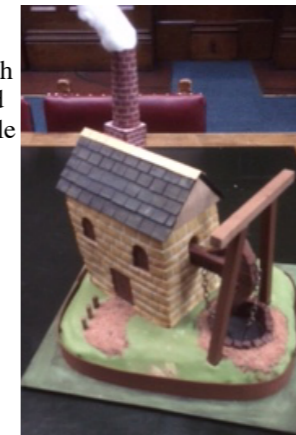


## A Newcomen Engine Cake

### **Dave Byrne and Alan Auld**

On Thursday 5th May 2016 an evening meeting was held at Neville Hall, the home of the North of England Institute of Mining and Mechanical Engineers in Newcastle upon Tyne, to celebrate the launch of the book, *The World of William Brown, Railways – Steam Engines – Coalmines* by Les Turnbull. Les is the author of a number of publications related to the history of coal mining in the north east of England.

William Brown was known as the "father of the coal trade" and recognised as an authority on railways and steam engines. He played a major part in the development of the Great Northern Coalfield in the mid eighteenth century, an event of great



*The Cake. Image: Les Paul*

on Stephenson's letters to Illingworth over the three years. This previously unstudied correspondence had been archived at Indiana University, Illinois, USA.

Other contemporary writings by Stephenson's English companion and translator, Charles Empson, were a source of further information which has enhanced the comprehensiveness of the book. Empson was also a talented artist and some of his paintings have been included in the publication.

If Stephenson sought to improve his health by moving to warmer climes, he did not succeed, as he suffered regular bouts of illness over the period. He also did not have an easy ride with his immigrant, Cornish miners and it is not hard to imagine their reaction to being supervised by a 20 year old from Newcastle! Because of their contracted wage agreement, it seems the miners' motivation to go the 'extra mile' for Stephenson was sorely lacking. However, Stephenson did show management skills and proved to be a good administrator. The book further looks at the situation from which the Cornish miners came and the reasons that persuaded them to sign up to travel so far from home.

Michael Taylor showed, with maps, the extent of Stephenson's journeys across the wild terrain of South America and explained the terrible conditions he must have endured. Further frustrations for Stephenson were the wrong equipment being sent from the UK and the London based Mining Company's constant questioning of his judgement. It is often said that out of adversity comes strength; if anyone was to show that this is true, then Stephenson's life, once he returned to England was such confirmation. Within two years of his return in 1829, Stephenson won the Rainhill Trials with his locomotive Rocket which was the catalyst for his continuing and improving engineering successes.

One part of the book's title, *Rocket Man*, obviously alludes to Stephenson himself, but as to who the Cousin Jacks are, the book must be read to find out!

**A 4 minute film has been produced in association with the book which can be found on YouTube:**  
[www.youtube.com/watch?v=zGKkZ2d8YHg](http://www.youtube.com/watch?v=zGKkZ2d8YHg)

economic significance not only for the landed aristocracy he served but for the country at large.

A large part of the successful development of the Great Northern Coalfield was due to the introduction of Newcomen pumping engines which enabled the mines to be dewatered to access the coal beds at deeper levels. The front cover of Les Turnbull's book is shown below together with two illustrations from it showing Newcomen pumping engines.

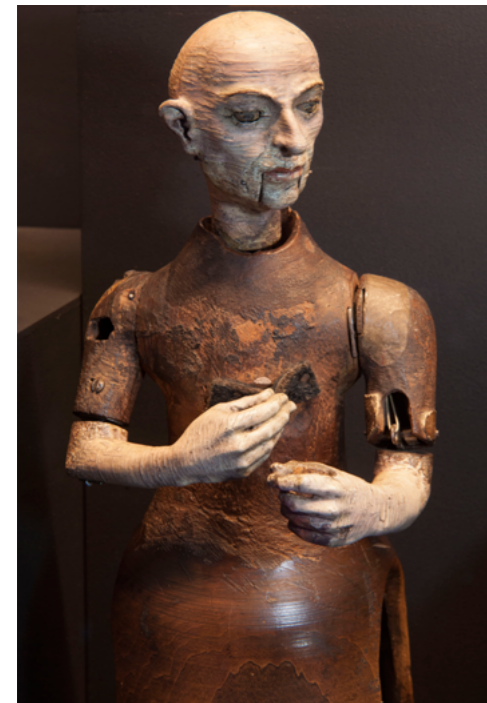
The tradition is that when Les Turnbull launches a book at the North of England Institute of Mining and Mechanical Engineers a party is held and at all parties a cake is needed. Les has a good friend, Alan Williams, who is a professional archaeologist and an excellent cook. Alan has taken it upon himself to design and cook various cakes including a waggonway cake and, in this instance, the Newcomen engine cake. Both were greatly appreciated by the audiences.

*The World of William Brown, Railways – Steam Engines – Coalmines* by Les Turnbull (£15), can be obtained from the North of England Institute of Mining and Mechanical Engineers. [www.mininginstitute.org.uk](http://www.mininginstitute.org.uk)

# Robots at the Science Museum

**Robots at the Science Museum, London**  
**8 February - 3 September 2017, then on tour:**  
**Museum of Science and Industry, Manchester: 19**  
**October 2017 to 15 April 2018**  
**Life Science Centre, Newcastle: 26 May 2018 to 2**  
**December 2018**  
**National Museum of Scotland, Edinburgh: 18 Jan**  
**2019 to 12 May 2019**  
[www.sciencemuseum.org.uk](http://www.sciencemuseum.org.uk)

A sense of unease goes to the heart of our long relationship with robots and is explored in this exhibition at the Science Museum, London. On display is a beautiful Astrolabe, made in France in about 1300 and the oldest astronomical instrument originating in western Europe. These clockwork machines provoked ideas about the human body as a machine, leading to the creation of the earliest robots.



One of only three in the world, this automaton monk is attributed to Gianello Torriano, Toledo, Spain, c.1560. National Museum of American History Inv. 197.1191. Image: ©Trustees of the Science Museum, all rights reserved.

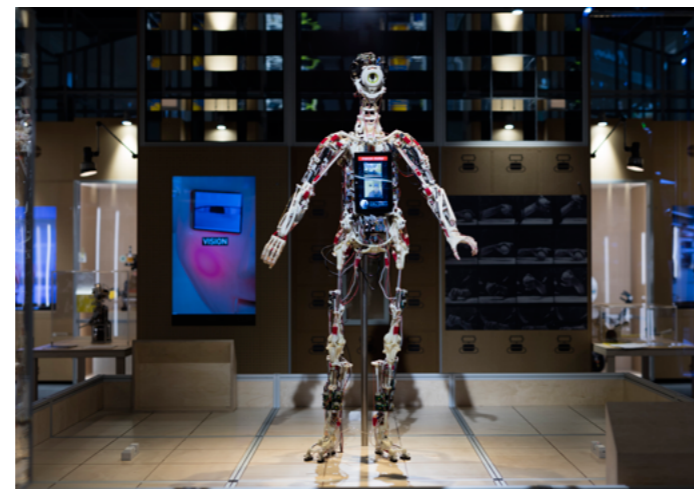
Objects like the automaton monk, built around 1560 and one of only three in the world, were expressions of faith, and also of the desire to amaze, enthrall and wield power. The monk is attributed to Gianello Torriano, in Toledo, Spain, c.1560. He walks across a table top while moving his lips, raising a crucifix and rosary, and beating his breast in contrition. He was built as an offering on behalf of King Philip II of Spain, in thanks for his son's recovery from a head injury.

The incredible Silver Swan, a life-size clockwork automaton built in 1773, will be on display until 23 March 2017. It is on loan for the first time from the Bowes Museum. As the only one of its kind in the world, the Silver Swan uniquely illustrates the fascination to replicate living things in mechanical form. Eric, a modern recreation of the UK's first robot; Cygan, a 1950s robot with a glamorous past; and a T800 Terminator used in the film Terminator Salvation are all on display.

The Silver Swan is on loan from the Bowes Museum. Image: ©Trustees of the Science Museum, all rights reserved.



Some of the articulated artificial limbs on display. Image: ©Trustees of the Science Museum, all rights reserved.



ROSA has face-tracking software and motors which allow its neck and eyes to follow visitors. Image: ©Trustees of the Science Museum, all rights reserved.

The challenges of recreating human abilities, such as walking, in mechanical form are explored, through the intricate mechanisms of the Bipedal Walker and Honda's P2, which are two of the first robots to 'walk' like humans.



Honda's P2, two of the first robots in the world to walk like humans. Image: ©Trustees of the Science Museum, all rights reserved.



The animatronic baby. Image: ©Trustees of the Science Museum, all rights reserved.

Inhka, once a receptionist at King's College London, will be answering questions and offering fashion advice; Zeno R25 replicates facial expressions; and Rob's Open Source Android (ROSA) moves its camera 'eye' and 'head'. Every 20 minutes Kodomoroid, the most life-like android of its time, reads robot-related news bulletins. RoboThespian does vocal exercises and gives a theatrical performance. Nao, the most widely used humanoid robot in the world, stands (or sits if tired) to tell a story exploring how robots make decisions. The use of automata and robotics in the development of artificial limbs is also covered. Robots are not forgotten in the age of CGI, AI and other new technologies. The animatronic baby is a mechanical, human baby and was commissioned for the exhibition and is now part of the Museum's new Human Robotics Collection. It was made by a special effects company, which make animatronic machines for films. The baby makes only pre-programmed movements - sneezing, breathing and moving its arms and legs.

**Robots: The 500-year quest to make machines human, edited by curator Ben Russell, expands on the themes and stories explored in the exhibition through a series of newly commissioned essays with photographs of key exhibition objects.**



## Electricity: the spark of life at the Wellcome Collection

**Electricity: The spark of life at the Wellcome Collection, 183 Euston Road, London, NW1 2BE, UK**  
**23 February 2017 - 25 June 2017**  
**Then touring to:**  
**The Museum of Science and Industry, Manchester**  
**Teylers Museum, Haarlem.**  
[www.wellcomecollection.org/electricity](http://www.wellcomecollection.org/electricity)

For centuries electricity has captivated inventors, scientists and artists alike, and in the modern era it has transformed our world. From the first breaths of Frankenstein's monster to the brutal simplicity of the execution chair, this exhibition contemplates the contradictory life-giving and death-dealing extremes generated by electricity, and traces the story of how humanity has striven to understand, unlock and gain control over this invisible yet all-encompassing force, which continues to mystify and amaze.

Three celebrated artists have been commissioned to create three new artworks for this exhibition: John Gerrard has taken inspiration for his commission from Luigi Galvani's famous experiments into bioelectricity; Bill Morrison explores historical footage from the Electricity Council archive to consider the movement and networks of electricity and its profound interconnectedness with our daily lives; and Camille Henrot considers our energy-dependent lifestyles, as well as the relationship between humans, technology and the environment.

## THAMES RIVER CROSSINGS

A conference organised by the  
Docklands History Group

Saturday 13<sup>th</sup> May 2017



Waterloo Bridge from Westminster Stairs, 1821, by Charles Deane (c.1790-1878).  
Courtesy and copyright of the Museum of London

Saturday 13<sup>th</sup> May at the Museum of London  
Docklands, West India Quay, London E14 4AL.  
For full details, please visit the Group's website  
at [www.docklandshistorygroup.org.uk](http://www.docklandshistorygroup.org.uk)



Engineering Heritage Australia invites you to participate in the 19th Australasian Engineering Heritage Conference in Mildura, Victoria.

The theme of the conference is **Putting Water to Work**: from the steam power that opened Australia's inland waterways to navigation in the 19th century to the nation-building irrigation and water supply schemes that capitalised on Australia's most precious resource.

### Why Mildura?

Mildura is situated in the heart of the Sunraysia district in north-west Victoria on the River Murray, Australia's longest river. The river provides water for its plentiful wine and citrus crops and many tourist and recreational activities in a year-round sunny climate. The town is the centre of a rapidly-expanding municipality with a population of more than 50 000.



[www.visitmildura.com.au](http://www.visitmildura.com.au)

### Conference Program

The program will consist of three full days (Tuesday 10 -Thursday 12) of papers and presentations on the theme and other topics relating to engineering heritage, conservation, and practice. The conference will open with an informal welcome event and conclude with a relaxed dinner. The free evenings will provide plenty of opportunity to sample Mildura's restaurants, wines, and local produce.

A post conference coach tour on Friday 13 will visit engineering heritage sites in Victoria's Sunraysia and South Australia's Riverland and conclude with a country barbeque at the Psyche Bend Steam Pumping station – a unique opportunity to see the historic Chaffey-designed Tangye pump lifting water from the Murray into the lagoon as originally designed.

### Getting there

**Fly.** Mildura has regular flights from Adelaide (1hr 5mins), Melbourne (1hr 5mins) and Sydney (2hr 10mins); flights from other capitals connect through these cities.

**Drive.** As part of the conference package, we will provide self-drive engineering heritage tour itineraries from Adelaide, Canberra, Melbourne and Sydney. The direct travel distances by road are: Adelaide, 393 km; Canberra, 800 km; Melbourne, 542 km; Sydney, 1016 km.

### For more information contact:

[www.engineersaustralia.org.au/Conferences-And-Events/Conferences/Heritage-2017](http://www.engineersaustralia.org.au/Conferences-And-Events/Conferences/Heritage-2017)

*We look forward to welcoming Newcomen members from outside Australia and to the possibility of paper presentation proposals.*

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into the future.**

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history of railway locomotives and railway operation worldwide.



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[www.stephensonloco.org.uk](http://www.stephensonloco.org.uk)

#Stephenson\_loco

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The January 2017 issue of the Engineering Heritage Australia Quarterly Magazine is now online and can be downloaded free from the Engineers Australia website at: [www.engineersaustralia.org.au/engineering-heritage-australia/activities-publications](http://www.engineersaustralia.org.au/engineering-heritage-australia/activities-publications)

This link not only gives you access to this latest issue of the Magazine, but also to all past issues of EHA Magazine, to EHA Newsletters which preceded the Magazine, and to many other activities and publications of Engineering Heritage Australia. This issue has stories about the Murtoa Stick Shed in Victoria's Wimmera and its restoration, the Woolloomooloo Finger Wharf in Sydney and more.

Join the  
Newcomen Society at

[www.newcomen.com](http://www.newcomen.com)



## NEWCOMEN SUMMER MEETING

10-14 JULY 2017

## THE CENTRAL BELT OF SCOTLAND



Queensferry crossing. John CCBY-SA4.0



PS Waverley. Dave Souza CCBY-SA 2.5



New Lanark. mrpbps



Falkirk Wheel. Sean McClean CCBY-SA2.5

A large part of Scotland's industrial development took place in the Central Belt. In the 18<sup>th</sup> century the textile industry dominated but when raw cotton became unavailable during the American Civil War, Scottish industries were forced to look in other directions. With its large stock of coal the area diversified and became a centre for engineering that included shipbuilding and locomotives.

This year's Summer Meeting includes visits and talks that cover some of the history of Scottish engineering and modern developments. Sites to be visited include:

- The UNESCO World Heritage Site of New Lanark
- The very new Forth Replacement Crossing
- The Falkirk Wheel
- Biggar Gasworks
- Bonnington & Falls of Clyde hydro-electric plants
- Riverside Transport Museum
- National Mining Museum to see the most powerful steam winding engine in Scotland
- The "Maid of the Loch" the last paddle steamer built in the U.K.
- A demonstration of the last working steam slipway in the U.K.
- A cruise "Doon the Watter" on the World's Last Seagoing Paddle Steamer, Waverley.

There will be evening talks by:

- The 'Celebrating Watt Group' who will discuss the life and times of Scotland's most famous engineer
- Prof. Gordon Masterton on the unique Falkirk Wheel and its associated structures and the challenges of their design and construction (followed the next day by a visit to the Wheel)

The Meeting is based at a comfortable modern hotel within a few minutes' walk of Glasgow Central Station for easy access by rail.

The price is from £575 per person, full board and includes all visits Tuesday to Thursday. Monday afternoon and Friday morning visits are optional.

Places are limited – book early to avoid disappointment

The Meeting is organised by Heritage of Industry. Full details and booking forms are available in the Members' Area of the Newcomen website: [www.newcomen.com](http://www.newcomen.com)

and at Heritage of Industry: [www.heritageofindustry.co.uk](http://www.heritageofindustry.co.uk)

Email [info@heritageofindustry.co.uk](mailto:info@heritageofindustry.co.uk)

Phone: 01235 352275

Please check the Events pages on the website for updated information: [www.newcomen.com](http://www.newcomen.com)

## LONDON

**Please note change of venue.** Lectures are held in the The Dana Studio, The Dana Centre, 165 Queens Gate, London SW7 5HD. Time 17.45. Visitors welcome, admission free.

### 2017

7 March. The Presidential Address, Michael Grace: "Stuffed in attic trunks and the minds of aging scientists" Reflections on Technical History and the History of Technology.  
12 April. Deborah Jaffé: Frank Hornby & Mechanical Toys - Britain, Germany & the USA.  
10 May. Dr Ralph Harrington: The bulldozer in post-war Britain: on the tracks of a modern machine.

## MIDLAND

Meetings are held in the Thinktank Theatre, at Birmingham Science Museum, Millennium Point, Curzon Street, Birmingham, B4 7XG. Time: 19.00. Visitors welcome, admission free.

### 2017

1 March. Paul Belford: The Brooke Family of Coalbrookdale.  
5 April. Julia Elton: The Thames Tunnel.

## NORTH EASTERN

Meetings in the Carpathia Room, Tyne & Wear Discovery Museum, Blanford Street, Newcastle upon Tyne NE1 4JA Times vary. Paid parking available on site.

### 2017

21 March at 14.00. Deborah Jaffé: Frank Hornby & Mechanical Toys - Britain, Germany & the USA 1880 - 1950.  
19 April at 18.00. Dr Fred Starr: ICI Billingham and Steam Reforming – The Catalyst that Saved British Gas

## NORTH WEST

Meetings are held at the Museum of Science and Industry, Liverpool Road, Manchester M3 4FP. Time 18.30-20.15 unless specified otherwise. Visitors welcome, admission free. Members meet at a nearby restaurant from 17.00.

### 2017

21 March. Dr William Craig: Marine Anchors: Development, Perceptions And Reality.  
25 April. Robert Steeds: Film Evening.  
26 September. AGM followed by Doug Bateman: John 'Longitude' Harrison – what did he actually achieve?  
24 October. Bob Gwynne: The Famous *Flying Scotsman*-Marketing, Circumstance and Chance. A joint meeting with The Stephenson Locomotive Society.  
28 November at 6pm (earlier strat time). Professor Stephen Furber: A call to ARMs. A joint meeting with The Computer Conservation Society.

## SCOTLAND

Events are usually held at the National Museum of Scotland, Chambers Street, Edinburgh EH1 1JF.

### 2017

9 March at 14.00. Ian Marchant, Dunelm Energy and former CEO of SSE: History of the Hydroelectric Industry in Scotland.

## SOUTH YORKSHIRE

Meetings usually held at Kelham Island Museum, Alma Road, Sheffield S3 8RY at 18.30-20.15, unless otherwise indicated. Visitors are welcome and lectures are free. Free parking at Kelham Island Museum for up to 40 vehicles. This is split between the onsite parking and the Museum car park next to the Fat Cat pub. There are 3 accessible spaces at Kelham Island Museum.

### 2017

13 March. Professor David Perrett: Mr Ford and Mr Morton, Steam Engine Collectors Extraordinaire.  
24 April. Professor Barry Chambers: Stealth - its history and technology.

INTERNATIONAL EARLY ENGINES  
CONFERENCE 2017

NEWCOMEN & COLLEAGUES'  
ACHIEVEMENTS  
UNTAINTED BY THE SMOKESCREENS  
OF WATT

THE IRONWORKS, ELSECAR,  
SOUTH YORKSHIRE

11-13 MAY 2017

*see page 28 for details and  
booking*



NEWCOMEN  
SUMMER MEETING

10-14 JULY 2017

THE CENTRAL BELT  
OF SCOTLAND

*see page 25 for details  
and booking*

Newcomen Lectures  
are on You Tube

Some Newcomen Society lectures are available on You Tube, including those given at the Swords into Ploughshares Conference; and the lecture on Steam Under the Sea, Chris Hodrien to Newcomen Midlands.  
Go to: [www.youtube.com](http://www.youtube.com) and search for Newcomen Society

## SOUTHERN

The meetings are planned to be held in lecture room PO1-11 in the University of Portsmouth's Portland Building on St James Street commencing at 6.30 p.m. .

### 2017

21 March. Clive Kidd: Aspects of the development of Naval wireless Telegraph.  
25 April. Roger Davies: Constructing the Severn Tunnel.

## WESTERN

Meetings are usually held in Room 1, BAWA, 589 Southmead Road, Bristol, BS34 7RG, 7:30-9:30 pm.

### 2017

23 March. Meeting with Royal Aeronautical Society (Bristol), at BAWA (Ballroom). Dr Hugh Hunt: Engineering Behind Famous Feats of WW2 - Dambusters, escape from Colditz etc. *NB this is a change from Newcomen Western's usual pattern of meeting on the 3rd Thursday of the month.*  
20 April. Bryan Lawton: R101 Disaster and the Broken Elevator Cable.  
18 May. Victoria Owens: James Brindley and the Duke of Bridgewater.

VISIT TO MELLOR MILL

SATURDAY 29 APRIL

Dr John Glithero is leading Newcomen North-West's visit to the archaeological dig site of Samuel Oldknow's cotton mill at Mellor Mill, Marple.

We will gather for lunch at the Roman Lakes Tea Rooms and visit the site in the afternoon.

There will also be an opportunity to see other features nearby, including the Marple aqueduct on the Peak Forest Canal. The site can be reached by train or car.

Further details and travel directions contact:  
[jonathan.aylen@manchester.ac.uk](mailto:jonathan.aylen@manchester.ac.uk) .



Copy dates  
for  
Newcomen Links

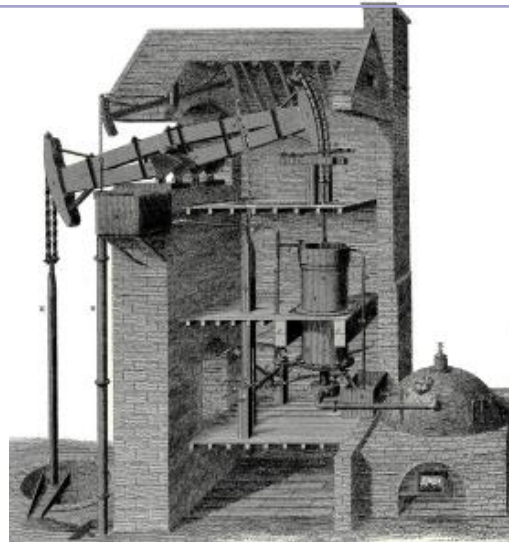
*1 May for June  
1 August for September  
1 November for December*

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## FIRST INTERNATIONAL EARLY ENGINES CONFERENCE

The Ironworks, Elsecar, South Yorkshire, UK

11<sup>th</sup> – 13<sup>th</sup> May 2017

### OUTLINE PROGRAMME

#### Thursday 11th Morning

12.00 Welcome & Conference Opening - buffet lunch

*Geoff Wallis:* Restoring the Elsecar Newcomen Engine: high ideals, deep mysteries

*Phillip Hosken:* Cui Bono? Inventors & the beneficiaries of their endeavours

*John Hunter:* Pumping Engines at the Sheffield and Attercliffe Collieries in the 18<sup>th</sup> century

*Tony Coverdale:* John Padmore of Bristol and his use of a water commanding engine – 1695

*John Kanefsky:* Analysis of numbers of UK Newcomen engines built prior to 1776

*James Greener:* Yorkshire's first engine: Austhorpe 1714

*John Tanner:* Elsecar Ironworks followed by guided tour

**Local visits** to *The restored Newcomen Engine in action, Elsecar Heritage Railway workshops, Hemingfield Colliery*

19.00– Hot Buffet at the Market Tavern, Elsecar

#### Friday 12th

*Rick Stewart:* John Smeaton & the Fire Engine

*James Greener:* Bromsgrove Revisited – The events leading to Newcomen's 1712 engine

*Suhail Rana:* Henry Beighton's influence on and contributions to Newcomen's work

*Richard Lamb:* Watt's analysis of the performance of the Ranter engine, Wednesbury and others

*Victoria Owens:* James Brindley's steam engines,

For full titles of the papers see IIEC website. Delegates fee includes Conference attendance, catering, visits and proceedings is £110. Partner and day rates also available. For local hotels etc. see link on the website.

**Full details & booking form at: [www.earlyengines.org/ieec-2017-conference/](http://www.earlyengines.org/ieec-2017-conference/)**

Facilities and support are by Barnsley Museums, Barnsley Metropolitan Borough Council. The Newcomen Society is lead sponsor. Historical Metallurgy Society, the Northern Mine Research Society and the South Gloucestershire Mine Research Group SGMRG are also sponsors. Papers from the conference will be published in the Newcomen Society's journal.

#### Lunch

*Peter King:* George Sparrow and the spread of the steam engine in the north Midlands

*Bernard Champness:* Fairbottom Bobs, review of evidence

*David Perrett:* Henry Ford & Herbert Morton's 1928 engine collecting endeavours

*Mike Nevell:* Power & Innovation: Excavating pre-1812 steam engines in Manchester area

*John Barnatt:* Investigating the 1794-5 Newcomen Engine at Watergrove Mine, Derbyshire

TBC– Short paper

18.30 Coach to Wortley Top Forge for tour + evening mea

#### Saturday 13th

07.45 Coach Trip to Rockley Engine House & Furnace (Extra charge of £7)

Conference Welcome,

*Les Turnbull:* William Brown's Giant Tyneside Engines

*David Hardwick:* Surveying the UK's oldest complete Newcomen Engine House, Brislington 1740

*Steve Grudgings:* Discoveries and dilemmas: Excavating the 1791 Serridge Engine House

*Ken Pointon:* Constructing a Newcomen Engine in the 21<sup>st</sup> Century

TBC – Short Paper

12.00 Closing Address