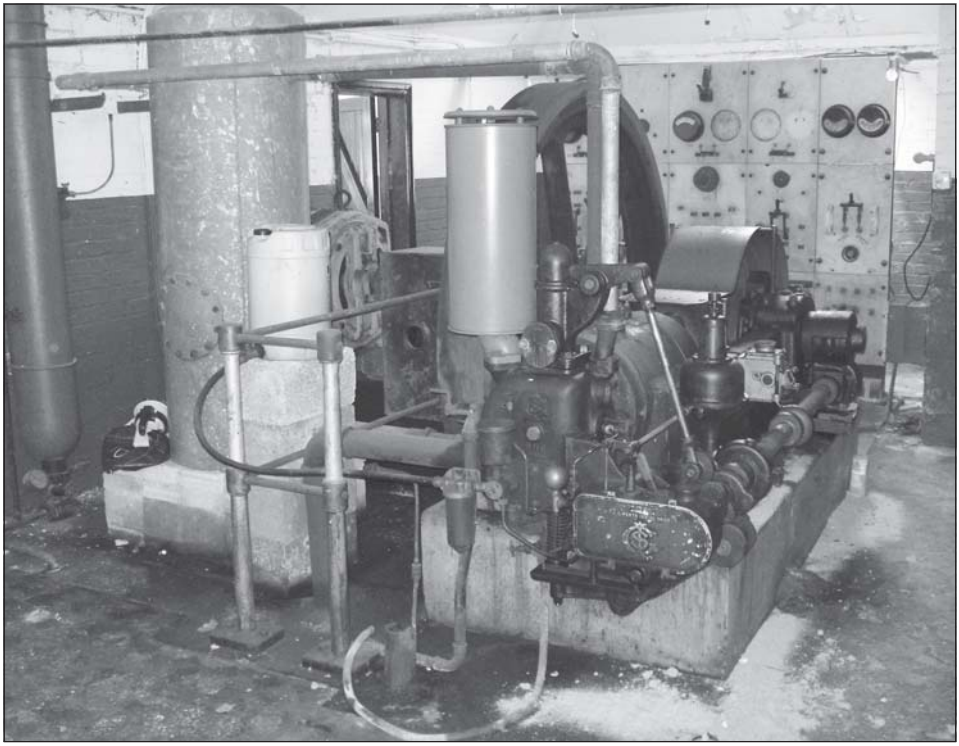
Sussex Industrial Archaeology Society Newsletter

Number 135 **July 2007**



The diesel powered Gardner generator in the pump house at Lavington Park. Visited by members of the society as part of the recent IA mystery tour.

ISSN 0263 516X

Registered Charity No. 267159

Newsletter 135

Contents **July 2007**

FORTHCOMING EVENTS

Pat Bracher

Tuesday 28th August at 7pm. 'A Basinful of History'
A walk led by Alan Green. Meet at Chichester Canal Basin by the Waterside Inn (SU 858 043). New discoveries about the Electricity Generating Works and the early days of the Gas Works. Also a Limekiln in a garden.
Contact Alan Green 01243 784915.

Saturday 25th October at 7.30pm at West Blatchington Mill Barn. A talk by Maurice Kelly on 'Steam in the Air'.

Saturday 24th November at 2.30pm at West Blatchington Mill Barn. AG.M followed by films on the CVA factory presented by Peter Groves.

EVENTS FROM OTHER SOCIETIES

Malcolm Dawes

Detailed below are events organised by other societies, which may be of interest to our members. If you have details for future events please send these to: Malcolm Dawes, 52 Rugby Road, Brighton, BN1 6EB
or e-mail to *malcolm.dawes@btinternet.com*

Saturday 28th – Sunday 29th July. 10am to 4 pm. *Working weekend at the Brede Steam Engines.* Classic vehicles, steam engines and model railway. Situated 6 miles from Hastings on A28 to Ashford. 01323 897310.

Sunday 5th August. *Classic Microcar and Scooter Rally, bubble cars, three-wheelers and scooters.* Amberley Museum. 01798 831370.

Association for Industrial Archaeology Conference. 10th to 16th August. To be held at Central Lancaster University, Preston. Programme of visits to industrial archaeology sites. Further details from AIA Liaison Officer, School of Archaeological Studies, University of Leicester, Leicester, LE1 7RH, aia@le.ac.uk. Programme and booking forms can also be obtained from www.industrial-archaeology.org.uk.

Saturday 11th – Sunday 12th August. *The 125th anniversary of the opening of the Bluebell Line.* Weekend of celebrations. Large number of engines in steam, vintage vehicles, steam fair, beer festival. Locomotive shed tours on the Sunday.
Bluebell Railway. 01825 720800.

Wednesday 15th August, 7.30pm. *RAF air/sea rescue.* Sussex Military History Society talk by David Cary. £2. The Royal Oak, Station Street, Lewes. 01323 487170.

Thursday 16th August, 8.00pm. *Smallpox in Sussex.* Wivelsfield Historical Society talk by Diana Crook, Wivelsfield Village Hall. £1 visitors. 01444 233937.

Friday 17th August, 7.00pm. *Hailsham Old and New.*
Polegate and Willingdon Local History Society talk by Arthur Hill. £1.50 for visitors. St.Johns Church Hall, High Street, Polegate. 01323 485971.

Friday 31st August – Sunday 2nd September. *Ale at Amberley.* Beer festival with over 20 different beers, half of them from Sussex microbreweries. There will also be displays of buses, fire engines & stationary engines etc. The festival will run into the evenings on Friday and Saturday. A subsidised bus service will pick up from Brighton, Portslade, Shoreham & Worthing with another bus picking up from the Henfield area. Amberley Museum. 01798 831370.

Saturday 8th – Sunday 9th September. *Heritage Open Days 2007*. Access to buildings normally closed to public – many Sussex buildings open during the weekend. *www.heritageopendays.org.uk*

Saturday 8th – Sunday 9th September, 10am to 4pm. *Heritage Open Weekend at Brede Steam Engines.* Situated 6 miles from Hastings on A28 to Ashford. 01323 897310.

Saturday 8th September, 10am. *Walk the Portsmouth & Arundel Canal.* A 4 mile walk, allow 4 hours and bring a packed lunch. Organised by SIAS. 01243 576701.

Sunday 9th September, 10am to 4pm. *Poyntz bridge operating day.* Opportunity to cross the unique, cast iron, Poyntz canal bridge, just south of Chichester canal basin. SIAS event. 01243 576701.

Sunday 9th September. *Wood from the trees, woodland trade crafts and steam-driven timber yard*. Amberley Museum. 01798 831370.

Tuesday 11th September, 7.30pm. *Narrow Gauge Railways.* Kent & East Sussex Railway, Sussex Area Group talk by Dave Vaughan. Westham Village Hall, nr Pevensey. 01323 845108.

Friday 14th September, 8.00pm. *Keymer Tile Works.* Burgess Hill Local History Society talk by Fred Avery. £2. Cyprus Hall, Cyprus Road, Burgess Hill. http://burgesshillmuseum.co.uk.

Saturday 15th- Sunday 16th September. *Open House weekend in London.* Opportunity to visit over 600 buildings across London – many normally closed to the public. www.londonopenhouse.org

Saturday 15th- Sunday 16th September. Shoreham Air Show. Shoreham Airport. www.shorehamairshow.com

Sunday 16th September. *Amberley Bus Show.* Ride on early Dennis and Tilling Stevens buses. Amberley Museum. 01798 831370.

Saturday 22nd – Sunday 23rd September. Miniature Steam and Model weekend. Over 60 model steam engines in action. Amberley Museum. 01798 831370.

Monday 24th September, 7.45pm. *The Newhaven to Dieppe Story.* Locomotive Club of Great Britain talk by Trevor Cox. £2. London Road Station, Brighton. 01273 703489.

Monday 24th September, 10am. *Lewes-Eastbourne turnpikes.* An illustrated talk by Peter Longstaff-Tyrrell on his research into the turnpikes. St.John's Hall, High St, Polegate. 01323 487170.

Thursday 27th September, 8.00pm. *The Austin Car story.* Eastbourne Historic Vehicle Club talk by Alan Hodges and Reg Brook. Red Lion Public House, Stone Cross nr Pevensey. 01323 843202.

Sunday 30th September. *Craft day, traditional skills and crafts*. Amberley Museum. 01798 831370.

Tuesday 9th October, 7.30pm. *Slam door electric trains.* Kent & East Sussex Railway, Sussex Area Group talk by Keith Carter. Westham Village Hall, nr Pevensey. 01323 845108.

Sunday 14th October. *Autumn vintage vehicle show.* Vintage cars, motorcycles buses and lorries. Amberley Museum. 01798 831370.

Wednesday 17th October, 7.30pm. *The Great War.* Sussex Military History Society presentation by Geoff Bridger. The Royal Oak, Station Street, Lewes. 01323 487170.

Saturday 20th – Sunday 21st October. *Giants of Steam weekend*. Tours of locomotive sheds on the Sunday. Bluebell Railway. 01825 720800.

Sunday 21st October. *Industrial trains day.* Industrial locomotives and rolling stock in action. Amberley Museum. 01798 831370.

Thursday 25th October, 8.00pm. *Volks Electric Railway.* Eastbourne Historic Vehicle Club talk by Ian Gledhill. Red Lion Public House, Stone Cross nr Pevensey. 01323 843202.

Thursday 25th October, 7.30pm. *The Wey and Arun Canal.* World Ship Society Talk by David Start. Southwick Community Centre**,** Southwick Street, a short walk north of Southwick Railway Station. Contact philip.simons@lrfairplay.com.

Looking further ahead – for the first time Amberley Museum will be open at weekends during November. Details 01798 831370.

Do please check details before travelling.

The details of these meetings and events organised by other groups, are only included as a guide and as a service to members: inclusion here is not intended to be seen as an endorsement.

A Failed Rehousing Scheme in Brighton by the London Brighton and South Coast Railway

by David Roberts, Sussex Archaeological Collections, Volume 144, 2006

John Blackwell

By 1897 the goods yard of the LB&SCR at Brighton needed to expand. To achieve this 171 houses would be compulsory purchased, four streets would disappear and housing on the west side of New England Street would be replaced by a long brick perimeter wall. One hundred and ten years later the same area has recently been re-developed as the New England Quarter. By the late nineteenth century government legislation required that an equivalent number of new houses be erected, ostensibly to re-house those displaced. Building land was just as hard to find as today and the site eventually bought was on the then northern edge of the town, namely Compton Road and Inwood Crescent. The buildings were of a higher quality than required by legislation but strangely they initially had no running hot water or baths. They are certainly of little architectural merit. On completion only three of the families displaced moved in, the rents being disproportionately higher and the distance too far from the centre of town.

Our member David Roberts has meticulously researched the scheme and produced a concise and readable account with relevant maps and illustrations. In fact it is a model work and anyone intending to produce an article for Sussex Industrial History would do well to consult. A minor error is the caption to an illustration, it shows the west side of Compton Road not the east; the error is unfortunately repeated in the text.

The Sussex Archaeological Collections are available in all main libraries.

Members Interest Update

Your Committee tries to provide a wide range of visits, talks, and articles that are of interest to members. To assist with this, we are compiling a list of members' interests. If you joined more than five years ago or your interests have expanded or changed it would be helpful if you could let us know your current IA interests by either e-mail to the Chairman, johnblackwell@ntlworld.com or by letter to the Membership Secretary (address inside back cover).

Index to Sussex Industrial History Issues 1-37, 1970-2007

Our editor, Brian Austen, has produced an index to the articles in this publication which will be available on the Society's website at www.sussexias.co.uk or a hard copy is available to members on application to the General Secretary (address inside back cover).

An IA Mystery Tour

Martin Snow

On Saturday 24th June fifteen members joined together to experience some of the mysteries in West Sussex of IA in and around Petworth ably organised by Ron Martin.

We started off, in hard hats, with a visit to the pump house of Lavington Park, now occupied by Seaford College, drawn and described in SIH 37. Although the pumps and diesel DC generator are now longer used the bore hole still supplies the water for the college complex and until last year the Graffham village. The recent control gear and chlorination plant are housed in huts outside.

Then it was on to view the Limekiln at Duncton, provoking members to avidly discuss details of lime making and use.

Next it was to the former Petworth Station, now a classy B&B with three - soon to be four - Pullman coaches adapted and used for bedrooms, the modern equivalent of the former camping coaches that were once to be seen at various rural stations.

Lunch was a free time, which conveniently enabled some members to visit the pump building at Coultershaw and shelter during one of this summers thunderstorms.

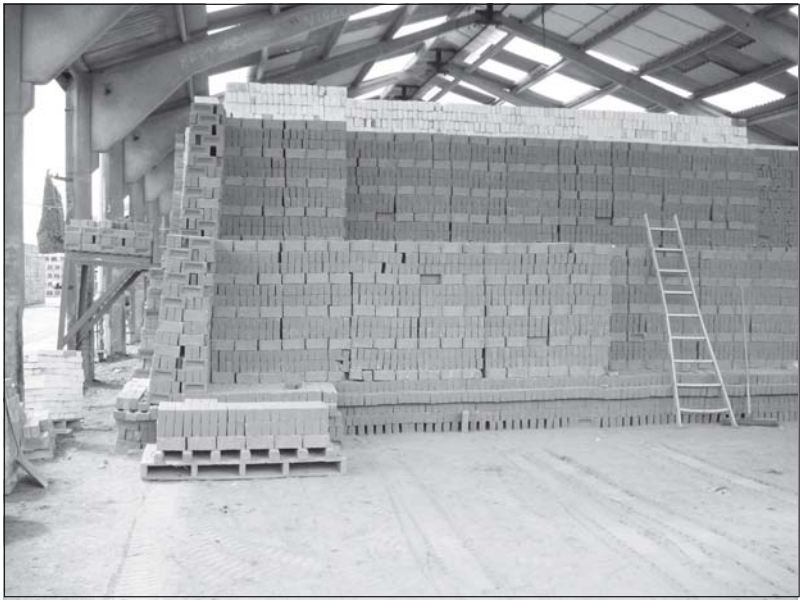
The afternoon started with a visit to Petworth House to see the Icehouse This sizeable structure is featured in SIH 13, also see : http://www.icehouses.co.uk/petworth.htm Members were then able to visit the house courtesy of the National Trust.

A few hardy souls then went on to Ebernoe Common to view the limekiln and brick kiln.

An excellent day out enabling members to see and have explained various IA features. Thanks to Ron for his efforts.

The usual suspects viewing the Limekiln at Duncton, on the IA Mystery Tour

The Limekiln at Duncton, visited on the IA Mystery Tour



Brick Clamp at Chailey Brickworks visited by members on 3rd July

SERIAC 2007 Report

John Blackwell

This years SERIAC, hosted by Berkshire Industrial Archaeology Society, was held at the University of Reading and consisted of the usual mix of lectures and socialising.

Paul Sowan was his usual entertaining self as he enlightened us on *Chalk Mines and Underground Quarries in Berkshire*. He described those at field Road, Reading, well known because of the subsidence caused by the removal of the waterproof layer of clay, which was used for brick making, and the resulting slow dissolving of the chalk roof of the earlier mine. Also in Reading is the one at Emmer Green, an impressive mine in good condition 75 feet below ground worked by the pillar and stall method where 75% of the chalk is removed, the remaining 25% being left as a supporting pillar.

Alan Thomas outlined the history of the water supply and electrical power generation to the complex of five *Mental Institutions in Epsom* built between 1892 and the 1920's and accommodating some 8,000 patients. The well was 550 feet deep and cost £5,500 which was three times the cost of the pumps. It supplied 84,000 gallons per day. The generating station was built in 1901/2 primarily for lighting but with electric motors driving the pumps to lift the water to a storage tank on the pumping station roof with a capacity of 35,000 gallons. Most of the hospital complex has been demolished but the boiler house has been converted to a gymnasium and the cooling pond to a swimming pool. The well pumps have been restored and kept as historical artefacts within the sports centre.

David Buckley outlined the progress of the *European Route of Industrial Heritage*. This project provides a virtual link of industrial sites in Great Britain, The Netherlands, Germany, France, Belgium and Luxembourg. The website, www.erih.net has had 34,000 hits in the last 15 months and it is hoped that it will increase tourism to these sites. The usual marketing ploys of logos and signage are to the fore. The drawback is that the sites have to pay and it is difficult to see how museums such as Amberley could justify the outlay. Take a look at the site and see for yourself.

Following the lunch break Dick Greenaway explained the importance of *Woodland (Industrial) Archaeology.* The remains have survived because woods are not ploughed, are usually private and are difficult to explore. Much industry was based in the countryside for example foundries, and gunpowder manufacture. Resources were being drawn from the surrounding area e.g. timber, charcoal and the extraction or mining of ores, clay, chalk and gravel.

Engineers in the Thames Valley in the Eighteenth and Nineteenth Century was the subject of a scholarly and well illustrated talk by Simon Capel-Davies. He included John Smeaton (1724-1792) whose waterwheel at London Bridge pumped water up

to the City, William Jessop (1745-1814) a pupil of Smeaton, and his West India Docks, John Rennie (1761-1821) whose many projects included the cast iron machinery for Albion Steam Mills and his three London Bridges, Isambard Kingdom Brunel (1806-1859) with his Great Western Railway, Sir John Hawkshaw (1811-1891), who completed the Clifton Suspension Bridge, and was Engineer to the South Eastern Railway and the Channel Tunnel, finally Sir Joseph Bazalgette (1819-1891), designer of the Metropolitan Board of Works sewerage system and the Hammersmith Suspension Bridge.

Martin Andrew rounded off the day on *The Information Explosion and the Nineteenth Century Printing Industry.* In addition to the day to day printing of theatre bills, proclamations, song sheets and execution sheets the industrial revolution fuelled the need for advertisements, invoices, shipping bills, trade cards and labels, letterheads and price lists. During the century the industry moved from book type to display type and by 1910 pictorial rather than text. Wood framed presses were superseded by iron with corresponding improvements to the technology culminating in the hot metal process.

Following the day's lectures I joined a party to see the Printing History Collection of the University's Department of Typography and Graphic Communication. Here Martin's enthusiasm shone through as he illustrated his lecture with rare machinery and old blocks and printed images of superb quality and detail.

Congratulations to Berkshire (initially ably assisted by our own Bob Allen) who have only 38 members, for a well organised conference; my only slight complaint is that the programme did not sufficiently emphasise the IA content which possibly deterred some of the usual SIAS attendees.

AIA Conference in Preston

Ron Martin

The Annual Conference of the Association for Industrial Archaeology is being held this year in Preston, between 10th. and 16th. August. A full programme of events and visits has been organised and these include visits to various mills, to Blackpool, Tower and to industrial sites in the Lune Valley, mills, canals and docks in Preston, the Lancaster canal and docks, Pilkington glass works, BAE aircraft works, the Rossendale Valley and East Lancs. Railway, Chorley Commercial Vehicle Museum, and the textile mills in the Weavers' Triangle.

Full details and Application Forms are available from me, which I can let any member have on request.

Electricity Supply Lecture
David Jones

In the last of this season's winter lectures on March 17th at West Blatchington Windmill Barn, Mike Hearn gave an illuminating talk on the history of the electricity supply industry from the 1880s to the present. Fittingly using up-to-date electronic technology in the form of a powerpoint presentation from a lap-top computer, and a very compact digital projector kindly loaned by Diana Durden, Mike outlined the pioneering Godalming supply of 1881, the Holborn Viaduct scheme in London, which was associated with the Pearl Street scheme in Lower Manhattan, New York and the Brighton scheme of 1882.

Details of the contribution of Brighton to the introduction of an electricity supply in the UK have been covered by Mike in Nos 133 & 134 of the SIAS Newsletter, so it was interesting to see further images of the contemporary Volks Electric Railway and Brighton A and B Power Stations, formerly known as Southwick A and B. Especially worthy of note were the internal views of both stations, of the turbine halls and control rooms, showing early instrument panels.

The Pearl Street Power Station in the shadow of the then almost complete Brooklyn Bridge, New York was opened by Thomas Edison in September 1882 to provide enough electricity to promote the use of his new incandescent lamp bulbs; this was relevant to the introduction of supplies in the UK as Edison had in early 1882 set up the Holborn Viaduct Station as a test bed for exporting his technology. There were no dynamos big enough to generate sufficient power from steam engines, so Edison designed his own 'Jumbo' version along with fuses and regulating devices at his Menlo Park laboratory.

The Godalming installation, pioneered by Messrs Calder and Barrett of London for the Town Council, was also of interest being initially powered by a single 13' 6" diameter undershot waterwheel in the mill of River Wey-based tannery, R. & J. Pullman Ltd. A picture was shown of the model of this built by SEEBoard apprentices that is normally on display in the Milne Museum at the Amberley Working Museum. The waterwheel drove a Siemens alternator supplying two circuits for the 34 Swan filament lamps and the seven arc lamps in the streets, shops and the mill itself. The 125th anniversary last year was commemorated by a display in the Godalming Museum. Mike emphasised that the development of these early electricity supplies was purely for lighting to replace gas, with no anticipation of its later potential for heating and to drive electric motors. Interestingly the final part of the talk covered the new Southwick Power Station which being gas-fired, links back to the beginning.

The talk also covered distribution and transmission, including the history and development of the original 132 kV National Grid or *Gridiron* as it was formerly called, and the later introduction of the 400 kV route, now a familiar sight across the countryside of Sussex.

This was a very interesting and professional presentation by a member of the Institution of Engineering and Technologies History of Technology Executive and the Local Sussex Networks Committee, a well known face at many transport society meetings in the Brighton area.

For a more detailed account of the pioneering Godalming scheme, members are recommended to read '*The Brilliant Ray*' by Francis Haveron, published in 1981 for the centenary and available from the Godalming Museum.

Volunteers wanted to join the Bridge Team

Working on sites on the Portsmouth and Arundel canal from Ford to Hunston, work can involve anything from archaeology to jungle bashing, brick cleaning and rust removal and painting, brick laying and general conservation works.

We meet on Saturdays usually from 8:30am to about 3:00pm or what ever time you can spare during that period.

For further information please ring Adge Roberts on 01903 773575 or on email adgeroberts@yahoo.co.uk

Tack Lee Bridge over the line of the former Portsmouth and Arundel Navigation, Yapton

What's in a Name?

Ron Martin

When I was gainfully employed as a Chartered Quantity Surveyor, in the course of producing a Bill of Quantities one had to ensure that the components that went into a building were accurately measured and described. This attention to detail I have carried through into my interest in IA. However, there are various terms and phrases which are used whose definition is unclear. The first two of these may have regional differences.

I have for years been using the word **"stollage"** to refer to a support for a barrel or tank, and this definition has been confirmed by several of our members, whom I have consulted; but the word does not appears in any of my dictionaries. On mentioning this to someone outside Sussex I was told that the word is "stillage" and indeed this is included in the dictionaries. Is it possible that this is a regional word in the same way that windmill sails in Sussex are called sweeps?

The next word which also appears to have a local usage is **"bungaroosh"**. This is apparently used only in the Brighton area to describe flint nibble walling, intermixed with some bricks and commonly used in boundary walls. The spelling is phonetic as the word was probably never written down. Has any member come across this term outside Brighton?

The second group is of words or phrases which are commonly misused.

One, which I have pontificated on frequently, is the use of the expression **cement mixer.** This is total nonsense. Cement as used in this sense is a material manufactured at a cement works and is a grey powder and is mixed with sand to make mortar or with sand and aggregate to make concrete. To imply that one can "mix" cement is rubbish. The correct terms to use is **concrete mixer** or **mortar mixer.** The analogy in the kitchen would be to refer to a food mixer as a flour mixer.

The other phrase which is subject to ambiguity is the use of the words **gambrel roof.** I once argued at length with the late Frank Gregory, who insisted that this is a roof with two pitches, the lower one being steeper than the upper. I have no doubt that he may be correct as this use of the words goes back a long time; however this is where confusion occurs, as most of the dictionaries and building encyclopaedias define a gambrel roof as one with a hipped end and a small gablet at the top of the hip and the US meaning of the two pitch version. Here this is normally called a **Mansard roof,** named after Francois Mansard, (1599-1666), a French architect who popularised this style. To avoid ambiguity I always prefer to use the latter expression.

The last group is of building features for which I do not know the correct expressions.

It is common 19th century practice to place a stone or cast iron fender at the corner of building or at jambs of openings to prevent the wall from being damaged by cart wheels. They are normally in the form of a truncated cone with rounded top, some 2 ft high, 6" diameter at the top and 10" diameter at the bottom with one quadrant cut away to fit around the corner of the wall. To use the word bollard for this feature implies that it is free standing and a rubbing strake suggests something along the face of the wall. Any suggestions?

Walls of flint rubble or of "bungasroosh" tend to be weak in tension due to the nature of the materials. To assist in binding them together it is normal to provide brick or stone quoins and dressings to all angles. A coping of brick-on-edge is also frequently used. It is also usual to divide the wall up into panels with vertical strips of brickwork, flush with the faces of the wall, usually 9" to 18" wide at about 10 -15 ft centres. I cannot find an expression for these. The words "pier" or "column" imply a free standing support to something. The words "buttress" and "pilaster" suggest support to the wall but projecting from the face of the wall. I have been calling them "flush pilasters" but that is a contradiction. Any suggestion?

It is common to use wrought iron bars threaded through a building to tie the external walls together. These normally have cast iron ends, sometime decorative. Do they have a specific name?

Visit to Nutley Windmill and Sheffield Watermill 26.5.2007

Peter Holtham

After a lot of trouble taken by the Mill Group there was a disappointingly poor response to this afternoon visit, only three members turning up. You missed a chance of a leisurely tour of the lovely old Nutley windmill and some wonderful views across the Sussex country side. Sadly there was not enough wind to turn her sweeps. The intended visit to Hempstead Mill had to be cancelled at short notice. However, we were fortunate in being able to visit the Sheffield Watermill situated in a beautiful valley close to Sheffield Park. The proud owners Mr & Mrs Dyball, showed us over the interesting recently renovated mill building and opened the sluice to set the wheel turning. Most of the machinery was intact although much in need of replacement or repair. There is a wooden lay shaft and one wooden clasp arm spur wheel and two pairs of stones, one peak and the other burr. To finish the visit we were treated to a welcome cup of tea and a piece of cake.

Thanks Peter Hill, Bob Bonnett and Bryan and Robert Pike. Sorry we couldn't attract more members. Where were you all?

Happy Birthday Telford!

Alan H. J. Green

There can be few, if any, who failed to be aware that 2006 was the 200th anniversary of the birth of Isambard Kingdom Brunel, bombarded as we were with television documentaries, articles in the press and even commemorative coins in our pockets. This year however sees the 250th anniversary of the birth of another – and arguably greater – engineer whose name few on the infamous Clapham omnibus would even recognise; an anniversary that is not being marked very much outside the civil engineering profession. That man is Thomas Telford.

Members of SIAS *will* of course have heard of Telford and also be aware that he produced no known works in Sussex, but nonetheless, such is his importance his anniversary deserves to be marked by a tribute in the Society's annals.

A portrait of Thomas Telford (1757-1834) by Samuel Lane. In the background the artist has included Pontcysllte Aqeduct which Telford considered to be his finest achievement. (Institution of Civil Engineers)

In the beginning…

Unlike I. K. Brunel, who as the son of an engineer was born with a proverbial silver spoon in his mouth, Thomas Telford was of humble birth, entering the world on 9 August 1757 as the son of Dumfrieshire sheep farmer. However, from this inauspicious beginning he rose to become the first president of the Institution of Civil Engineers in 1820, an honour that reflected a distinguished career following the professions of civil engineering and architecture.

Brought up in his native village of Glendinning, Thomas Telford worked as a shepherd until 1771 when he became apprenticed to a stonemason. He showed considerable skill at this trade, and in 1780 moved to Edinburgh to work on the building of the New Town where, since all the buildings were of stone, good masons were much in demand. This magnificent city sparked an interest in architecture, of which he made a study in his spare time, and also a change in his career; in 1782, aged 25, he set off for London with the intention of becoming a town planner and architect.

He was given an introduction to the architect Sir William Chambers when he gained employment as a journeyman mason on his Somerset House project, and there Telford continued his study of architecture. Such was the advance of his skills that he was

appointed in 1784 to supervise the construction of the new Commissioner's House and Chapel in Portsmouth Dockyard[1] (the nearest he got to Sussex!) and whilst there he studied the construction of the docks themselves, thus sparking another branching of his career, this time into civil engineering.

The Commissioner's House at Portsmouth Dockyard , the construction of which was supervised by Telford between 1784 and 1786. (Author, courtesy of H M Naval Base, Portsmouth)

His professional career really took off in 1788 when, under the influence of the county's MP William Pulteney, Telford was appointed as Surveyor of Bridges in Shropshire. There, as well as reconstructing many of the county's bridges, he executed the construction of Shrewsbury Gaol, and designed and built a new church, St Mary's, at Bridgnorth, the first of his many ecclesiastical buildings.

Infrastructure works

At this time the country was being transformed by the construction of what we would now call transport infrastructure, and so it is hardly surprising that Telford should thither turn his attentions. In 1793 he was appointed Chief Engineer[2] to the Ellesmere Canal, and in 1801 he took up the same appointment for the Caledonian Canal, a venture that was to occupy him for over 20 years. Canals also took him overseas, for in 1806 Count Von Platen engaged him to design and build the Göta Canal across Sweden to link the North Sea to the Baltic.

James Brindley, of course, was the canal pioneer and his Trent and Mersey Canal involved a lengthy tunnel through the difficult geology of Harecastle Hill. Brindley's tunnel was 2897 yards (2650m) long and took 11 years to build. Unfortunately it was of narrow bore with no tow path which severely restricted traffic flows, so in 1824 the canal company employed Telford to build another tunnel alongside. This took only three years to build and is still in service today.

The new infrastructure involved great road-building projects, generally in connection with turnpike trusts, and here too Telford directed his engineering skills to solving seemingly intractable problems. Between 1803 and 1821 he built 750 miles of new roads in the

Harecastle tunnels today. In the foreground is Telford's new tunnel whilst the earlier one by Brindley, now abandoned, can be seen in the background. (Author)

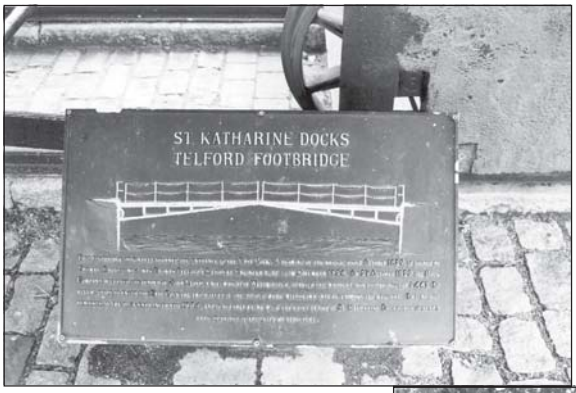
Scottish Highlands, a government project intended to open the region and provide much-needed employment, and in 1816 he began the improvement of the Glasgow to Carlisle road.

His road construction methods offered a considerable advance over what had gone before, his carriageways were built to a camber with heavy metalling[3] and efficient cross and side drains. In rugged terrain, requiring heavy earthworks he cut the roads into sidelong ground using stone retaining walls on the downhill side. Telford's roads were built with a ruling gradient of 1 in 30 which, by calculation and experiment, he found to be the most efficient for horse-drawn wagons.

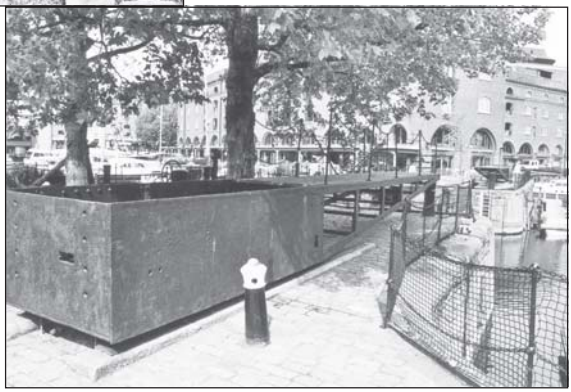
His greatest highway scheme was the construction of the Holyhead Road to which he was appointed Engineer in 1815. This road, the Georgian equivalent of a motorway, was built to link London with Dublin via the sea crossing from Holyhead, and was completed in 1829.

His study of docks at Portsmouth led to several harbour works in Scotland, beginning in 1801, but his greatest achievement in this particular field came in 1825 when he was appointed by the St. Katherine Dock Company as Engineer for a new dock complex near the Tower of London. The works consisted of two large docks served by an entrance basin linked to the river via a 180 foot (55m) long lock that could be filled in only 5½ minutes. Telford's docks have survived, as has an interesting retractable iron footbridge designed by his Resident Engineer, Thomas Rhoades, which makes an interesting comparison with our own Poyntz Bridge of a only few years earlier. Unfortunately it is not in its original position nor is it operational, having been fixed above ground level.

Surprisingly perhaps Telford did not take an active role in the construction of the early railways, but he did so indirectly in his role of advisor to the Exchequer Loans Commission who were funding major infrastructure projects at this time.



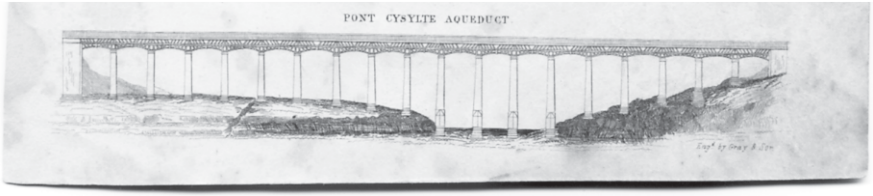
A plaque at St Katherine's Docks illustrating the "Telford" footbridge in use.
The two halves rolled back into slots in the wharf. In the background can be seen the flanged wheels and rails of the actual bridge. (Author)



One half of the footbridge at St Katherine's Docks, now fixed above ground level.
The box housed the counterbalance weights and the flanged wheels on which the bridge rolled . (Author)

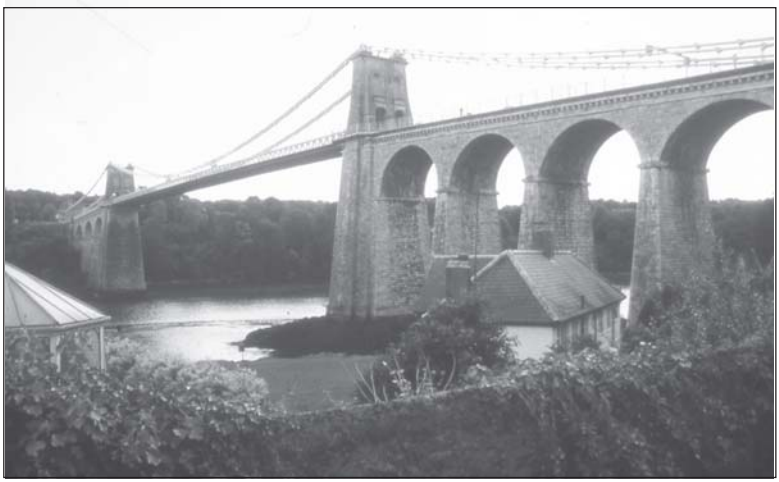
Bridges

It is as a bridge builder that Thomas Telford was most inventive, and in the course of his career he was responsible for the construction of over a thousand such structures. The majority of these were associated with his infrastructure projects and the most famous – and rightly so – is his Pontcysyllte Aqueduct, built as part of the Ellesmere Canal. Telford made inventive use of cast iron in his larger structures taking forward the torch that had been lit by the third Abraham Darby with his iconic 1781 cast iron arch at Coalbrookdale.



An early 19th century engraving of Pontcysyllte Aqeduct which shews the nature of the obstacle posed by the Dee Valley (Author's collection)

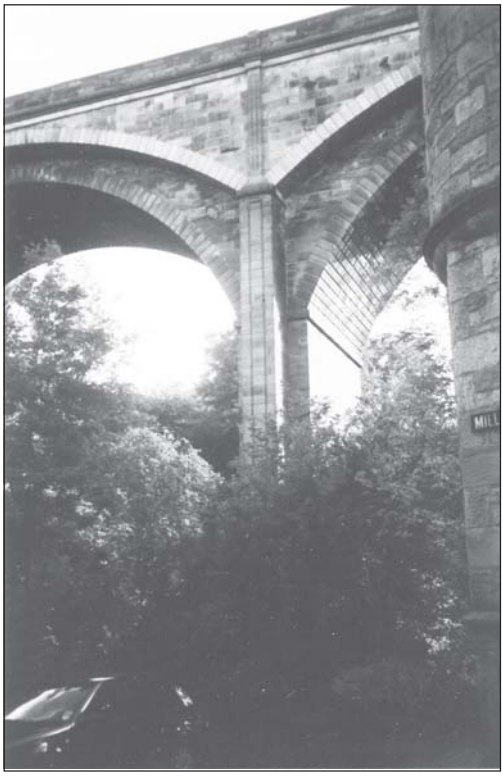
When it came to crossing river valleys the standard practice of canal engineers was to descend the valley side by a series of locks, cross the river on a short, low aqueduct and then lock back up the other side. The construction of the Ellesmere Canal necessitated crossing the deep and wide valley of the River Dee near Ruabon, and Telford took the bold decision to cross the gap on the level with an aqueduct some 1000 feet (305m) long. The resultant structure was, and still is, breathtaking; its 19 spans stride boldly across the valley with a maximum height above the valley floor of 121 feet (37m). The elegantly-tapering piers are of stone, but the superstructure consists of a trough formed from bolted cast-iron sections. Construction started in 1795 and it was opened with due pomp in 1805, a major engineering triumph of its day and one which Sir Walter Scott described as being the greatest work of art he had ever seen.



Telford's suspension bridge across the Menai Straits. (Chris Bryan)

The Holyhead Road had to cross the Menai Straits near Bangor in order to take the road onto the island of Anglesey. The narrow straits were very busy with shipping and also beset by strong tides and vicious winds, so Telford was faced with a rather different challenge. Once again his solution was bold; to leap the waterway with one span which was high up so as to be out of the way of shipping. Telford's structure was a suspension bridge spanning 580 feet (177m) between massive masonry piers on either shore, with the soffit of the deck being 153 feet above high water. The 16 suspension chains were formed of wrought iron eyebars nine feet (2.7m) long from which hung the timber deck. Construction started in 1819, and on completion in January 1826 it was the longest suspension bridge in the world and another feather in Telford's now-aging cap. It is still in use, as is its smaller sibling at Conwy, but the deck and chains have since been replaced in steel.

Telford's masonry bridges could be no less elegant and my particular favourite is Dean Bridge in Edinburgh, built in 1832 just two years before his death. It was constructed to take the new Queensferry Road across the picturesque wooded ravine of the Waters of Leith at the west end of Princes Street. Although only of four spans the depth of the ravine meant that the highest arch was 100 feet (30m) above the water.



A detail of Dean Bridge in Edinburgh. The shallower arches carrying the footways are part of Telford's original design and not a later modification as might be thought. (Author)

The Institution of Civil Engineers

It was in 1818 that the young engineer Thomas Palmer, who was working for Telford at St Katherine's Dock, proposed to a meeting of like-minded men the idea of forming the professional body that was to become the Institution of Civil Engineers. Two years later he invited Telford to become the first president, a post which he accepted and held every year up to his death in 1834. It is important to remember that not only was Telford the first president of the ICE, he was the *first* president of the *first* professional institution in the world.

It was in this role that Telford almost came to Sussex as it was proposed that the insoluble contractual claim between the Portsmouth and Arundel Navigation Company and their contractor Dyson and Thornton be referred to him as arbitrator, but there are no records of this having come to pass. He had, though, been consulted earlier over the Exchequer Loan for the P&AN, and approved the £40,000 advance – not, with hindsight, one of his best decisions!

Envoi

Not only was Thomas Telford a brilliant engineer and architect he was also a very nice person to know, the Poet Laureate, Robert Southey, wrote of him *a man more heartily to be liked and more worthy to be esteemed and admired, I have never fallen in with…* In other words he was a thoroughly good egg, in contrast to Brunel who could be arrogant and something of a bully - obviously a sufferer of what we now recognise as SMS - *Small Man Syndrome*! When Telford died in 1834 he was further honoured by burial in Westminster Abbey, and the Annual Register carried the entry:

> His works are so numerous all over the island, that there is hardly a county in England, Wales or Scotland in which they may not be pointed out.

So why is it that, with all these achievements (and no failures) Telford's name does not ring a bell with everyone whereas Brunel's does? Well to start with it must be *that* photograph; Brunel, a Victorian, was working in the age of photography and he used it to full effect in the famous portrait of him beside those chains. Telford, being a Georgian, did not have recourse to such "spin-doctory", and had to be content with Samuel Lane's painted portrait that few outside the Institution of Civil Engineers (where it now hangs in pride of place) ever see.

The other major factor is the pitifully constricted National Curriculum, under which history is now taught in selected bite-sized chunks instead of as a continuous story. Unfortunately Georgian Britain is not one of those chunks[4] whilst the Victorian era is, hence no chapters on Thomas Telford appear in the text books.

So, good members of SIAS, help to put this imbalance right; begin by putting a note in your diaries against the 9 August to remind you to raise a glass in honour of the 250th birthday of a most remarkable man, a *truly* Great Briton.

Acknowledgments

I would like to thank Mike Chrimes, Head of Knowledge Transfer at the Institution of Civil Engineers for permission to reproduce the portrait of Thomas Telford, Richard Adam of the ICE Panel for Historical Engineering Works for his guidance, Commodore David Steel RN for arranging for me to gain access to photograph the Commissioner's House in Portsmouth Dockyard and Chris Bryan for the loan of his slide of the Menai Bridge.

Reference Sources

Chrimes, M, Skempton, Sir A, and others *Biographical Dictionary of Civil Engineers in Great Britain and Ireland 1500-1830.* Thomas Telford, London 2002.

Colvin, Howard *Biographical Dictionary of British Architects 1600-1840*, John Murray, London 1978.

Upton, Neil, *An Illustrated History of Civil Engineering* Heinemann, London 1975.

Shepherd, Thomas, *Modern Athens! Edinburgh in the Nineteenth Century* Jones & Co, London 1831.

Paxton, R, Cross Rudkin, P S M, and others *Thomas Telford 250 Years of Inspiration* Institution of Civil Engineers Proceedings Vol. 160, London, May 2007.

Watson, J. G. *A Short History of the Institution of Civil Engineers*, ICE, London 1982.

Pearce, Rhoda M, *Thomas Telford, Lifelines 10* Shire Publications, Princes Risborough, 2001

(Footnotes)

[1] It is sometimes assumed that Telford designed the Commissioner's House, but this is not the case; it was actually designed by Samuel Wyatt.

[2] His actual job-title was much more impressive, namely; *General Agent , Surveyor, Engineer, Architect and Overseer of the Canal.*

[3] *Heavy metal* is – so I am given to understand – a term used in the sphere of popular music. The use of the term here refers solely to the robustness of the carriageway.

[4] It is nothing short of an outrage that the era that was the Age of Enlightenment, saw the birth of modern democracy and the first 100 years of the Industrial Revolution should be dismissed by educationalists as irrelevant. School children are now being brought up to believe that the Industrial Revolution was a Victorian phenomenon!

Ron Martin

Please note that Ron Martin has a new e-mail address for Society business.
sias@ronmartin.org.uk

Published quarterly in January, April, July and October.
Contributions for the next Newsletter should be sent to the Editor by the 8th September 2007.
Opinions expressed are those of the respective authors and do not necessarily reflect the views of the Society unless specifically stated.
Subscribing to the Sussex Industrial Archaeology Society gives automatic membership to the Sussex Mills Group. The Sussex Mills Group also produces a Newsletter that is sent to members with this Newsletter.
Printed by PLANAHEAD, 42a Commercial Road, Eastbourne.

Sussex Industrial Archaeology Society

President : Air Marshal Sir Frederick Sowrey,
Home Farm, Heron's Ghyll, Uckfield.

Chairman : J. S. F. Blackwell,
21 Hythe Road, Brighton. BN1 6JR (01273 557674)

Vice-Chairman : Brig. A. E. Baxter,
9 Madeira Avenue, Worthing. BN11 2AT (01903 201002)

General Secretary : R. G. Martin, E-mail sias@ronmartin.org.uk
42 Falmer Avenue, Saltdean, Brighton. BN2 8FG (01273 271330)

Treasurer, Membership Secretary and Archivist : P. J. Holtham,
12 St. Helens Crescent, Hove. BN3 8EP (01273 413790)

Chief Editor : B. Austen, 1 Mercedes Cottages,
St. Johns Road, Haywards Heath. RH16 4EH (01444 413845)

Newsletter Editor : M. B. Snow, E-mail news@sussexias.co.uk
32 Orchard Avenue, Worthing . BN14 7PY (01903 208975)

Programme Co-ordinator : Pat Bracher,
2 Hayes Close, Ringmer, Lewes. BN8 5HN (01273 813902)

Committee :

C. Bryan	M. H. Dawes	Diana Durden
A. H. J. Green	C. C. Hawkins	P. J. Hill
Claire Seymour	M. B. Snow	R. L. Wilson

Area Secretaries : Eastern Area : R. F. Jones – 3 Nutley Mill Road,
Stone Cross, Pevensey. BN24 5PD (01323 760595)
Western Area : Brig. A. E. Baxter – Address above
Central Area : J. S. F. Blackwell – Address above
Northern Area : E. W. Henbery, 10 Mole Close,
Langley Green, Crawley. RH11 7PN (01293 406132)

Website www.sussexias.co.uk