

WARWICKSHIRE

Industrial Archaeology Society

NUMBER 31 June 2008

PUBLISHED QUARTERLY

THIS ISSUE

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FROM THE EDITOR

My editorial in the March 2008 edition of this Newsletter concerning possible changes to its format brought an unexpected number of offers of practical help. These included the offer of a second hand A3 laser printer at a very attractive price; so attractive as to be almost too good an opportunity to ignore. So thank you to all who came forward. Despite none of these offers having been taken up (yet) they were all very much appreciated.

However, after discussion by the Committee, it has been decided that the current format of the Newsletter continues to fulfil the perceived need it originally sought to address. That is to ensure all Society members are kept informed of the activities of the Society, whether or not they can attend meetings regularly, the intention being to ensure all members feel included by the Society. In addition there has developed a secondary publicity role for the publication, as a copy is sent to local institutions such as libraries and to the AIA.

The inclusion of photographs

it was felt would do nothing to further these aims and might detract from them, as if the current four page layout were retained, images would reduce the space available for text and possibly compromise the meeting reports.

This does not mean that images will never appear in the Newsletter. If all goes to plan, this edition will be something of a milestone since it will be the first to contain an illustration; a diagram appending the report of the May meeting. Hopefully, similar illustrations will be possible in future editions, where appropriate and available, as the technology required to reproduce them is now quite straightforward. The inclusion of photographs is not entirely ruled out either. The option of printing these on a separate insert has been considered and will be employed should the need arise.

The one aspect of the Newsletter that might be reconsidered to advantage is the means of distribution. Until now, distribution has relied upon collection at the meeting following publication, with a copy being sent to those not at that meeting. Lately, this posting out of copies has not been particularly efficient, relying as it does on an accurate record of who has, or has not, picked up a copy from the meeting. This record is something that is difficult to maintain particularly if, as is increasingly common, I am unable to be at that meeting. Therefore, with each Newsletter also being posted on the Society

web site, and Internet access becoming more commonplace amongst the Society membership, what might be the feelings of members be towards stopping the practice of posting copies to those unable to collect them? Does this represent a conflict with the main stated aim of publishing a Newsletter, namely that of making all members feel included in the activities of the Society?

Mark Abbott

PROGRAMME

Programme.

The programme through to December 2008 is as follows:

September 11th

Mr. Lawrence Ince:
Engine-Building at Boulton and Watt's Soho Works.

October 9th

Mr. Michael Derby: *Coke Quakers and Charcoal.*

November 13th

Ms. Gillian Bardsley and Rev. Colin Corke: *Car-Making at Longbridge.*

December 11th

Mr. Malcolm Hancock: *The Rise and Fall of Rugby Radio Station.*

Subscriptions

Members are reminded that subscriptions for the new 2008/2009 season will become due from September 2008. The amount, subject to the outcome of the AGM, is likely to remain at £10.00 per person or couple and should be paid to Treasurer Richard Hartree. Please make cheques payable to Warwickshire Industrial Archaeology Society.

NEWSLETTER

Meeting Reports *by Arthur Astrop*

March 2008: Mr. Tony Green and Mr. Steve Walker

Mapmaking: Past Present and Future

The advent of digitization combined with GPS brings the imminent possibility of 'a single national seamless database for maps *without edges or corners*'. As a result, no longer will the very place you want to visit be on the extreme edge of a map, meaning that you probably need to buy at least two sheets; or in a corner, when you may need to buy four!

So predicted Tony Green and Steve Walker, both of whom have many year's service with Ordnance Survey behind them, in a presentation which traced the highlights of that famous organization from its foundation in 1791 to the present day. In fact they looked a little beyond 2008, for while the OS's 'single seamless database' is within sight it is not quite here yet.

It was the threat of invasion by Napoleon which triggered the formation of Ordnance Survey and Green and Walker described the early methods of surveying, by triangulation, the use of chains for accurate linear measuring, and the first mechanical theodolites. One of those early instruments was in fact displayed by the speakers, a masterpiece of 19th century precision engineering, but totally dependent on graduated scales, verniers, and therefore on the acute eyesight and interpretive skill of its operator to produce accurate readings. The speakers compared this instrument with its 21st century counterpart by demonstrating a computerized laser device which provides the operator with digital readings of much higher accuracy almost instantaneously with an observation being taken.

Ordnance Survey originally had its headquarters in The Tower of London, but in 1841 a fire forced its removal elsewhere and it settled in Southampton. The 20th century, with its periods of war and peace, brought an unprecedented demand for maps from OS, not least for artillery purposes on the Western front in WW1. In the interwar period, OS grew substantially, employed hundreds of highly skilled cartographers as well as surveyors, and had its own extensive map-printing facilities. In the same period, in 1938 to be precise, OS 'went metric'.

A year later, with WW2, the services of OS were once more in constant demand by Britain's armed services, and remained so until 1945. It was during that war that OS's headquarters at Southampton were heavily bombed. The Service therefore removed to premises in Chessington, Surrey, where it remained until new buildings were ready for occupation, once again in Southampton. But it is modern technology in general, and digital

technology in particular, which in the last 20 years or so has totally transformed the working practices of OS. Both those technologies have enabled massive relational data bases to be built which not only speed up map making but also allow so-called 'attributes' to be incorporated into maps. Moreover, such maps can now be displayed in various ways including 3-dimensionally, based on data gleaned from aerial photography.

Such attributes on maps provide the detailed and specialised data required by different users such as fire brigades, ambulance services, and the police etc. to be called up and displayed on screens, including Sat-Navs. Much of such highly detailed data is now also captured by OS through the use of simple portable 'targets', carried atop poles, which are recognised by GPS systems. The plotting of maps from digitised data is now also automatic, so that the number of cartographers used by OS is but a small fraction of that formerly required. On the other hand, the number of people needed for field work, and to deal with and manage such data, has to a large extent taken their places.

Bridges Under Threat

From the CPRE Warwickshire Annual Review 2007-8 comes news of the threat of demolition for two early railway bridges in North Warwickshire.

The two structures concerned are on the now freight only branch between Whitacre Junction and Kingsbury. They date from around 1838 and are built of local sandstone, to a classical design, and are rare examples of structures built at the end of the Georgian era, and the opening of the railway age. This line was once part of the Birmingham and Derby Junction Railway opened in 1839. Network Rail has sought to demolish and rebuild the bridges to allow high containers to reach the Birch Coppice Birmingham International Freight Terminal, and is apparently unaware that the structures are listed. Meanwhile, a local public meeting has passed a motion to oppose the demolition and North Warwickshire's planners have asked the railway management to reconsider the demolition proposal.

Roger Cragg hopes to take a look at the two bridges, and to investigate if any further similar structures still exist on the Stonebridge Railway, the now abandoned part of this route which took the B. & D. J. R. from Whitacre, to the London and Birmingham Railway at Hampton in Arden.

Mark Abbott (With thanks to Toby Cave)

Railway Preservation

April 2008: Mr. Roger Cragg

Operating a Preserved Railway

The first steam railway to be preserved in the UK by voluntary initiative was the Talylyn line, which was saved from almost certain closure in 1951 following the death of its owner Sir Haydn Jones. Today, the total number of preserved railways in the UK is no fewer than 153, of which 61 are standard gauge, 36 narrow gauge, 51 associated with museum and steam centres, and five are tramways. And the number of preserved steam and diesel locomotives associated with these railways is no fewer than 2,569.

Preserved railways range at one extreme to those with only one loco, a mile or two of track and a turnover of just a few thousand pounds, to relative 'giants' with many locos, substantial rolling stock and turnovers running well into six figures or more. By the same token, the magnitude of the tasks involved in operating a preserved railway is equally diverse, although the problems faced by those running them are remarkably similar. Who better to give our Society an outline of what is actually involved in operating a preserved railway than WIAS member Roger Cragg, who for over 30 years has been intimately involved with the preservation and running of the Welshpool & Llanfair Light railway in Wales.

Roger started by looking first at the men and women involved in these ventures, both volunteers and paid staff. In the volunteer sector there are (a) the 'pioneers', who tend to move on when a line on which they have worked is 'back in action', and (b) those whose passion and interest is in the actual day-by-day running of a railway. And today, the lady volunteers are no longer content just to staff the tea rooms: they want to be on the footplate as well. Volunteers, of course, are the backbone of any preserved railway and are 'cheap', but being volunteers they cannot be coerced, whereas paid staff, Roger said, although far fewer in number, can at least be 'ordered' rather than 'asked'!

An important first step for any railway preservation society is the acquisition of the powers required to operate a public passenger service, and leasing or purchasing the freehold of the line is essential. For this purpose a Company is usually formed which holds the lease or freehold. There are advantages for a line to acquire charitable status, but a separate company must then be set up to look after the line's 'trading' activities, if profits (however small) are made.

Roger dealt with the various levels of staff needed to run a line, from drivers and firemen to signalmen,

guards, maintenance engineers, track layers, booking clerks, refreshment and gift shop staff, and so on. A line offering a public service requires a timetable to be issued (and adhered to) and that implies complex rostering work for someone! A General Manager is also essential (usually a paid member of staff), and there is also a Deputy GM (often paid as well), who has responsibility for day-to-day operations and the running of the shops and tea rooms. Another crucial appointment is the Track Supervisor, whose duties are self-evident.

Structured training programmes for locomotive staff and signalmen must be introduced and will represent a 'ladder of progress' for volunteers working in those areas of activity. In short, a preserved railway which offers a public service must eventually have a structure which is in effect a scaled-down version of that used by its bigger, more famous brothers.

Roger finished his talk on a lighter note, namely the need for most preserved railways to mount 'special events', including for example *Thomas the Tank Engine Days* and *Santa Specials*. These occasions, he observed, are usually loathed by the serious steam loco volunteers but, they have to admit (albeit through gritted teeth), they are very lucrative and often make a major contribution to a line's annual income.

Looking Back

Looking back..... Working Life

Leamington Spa Art Gallery and Museum have a collection of objects from local businesses in the 19th and early 20th centuries. But they tell only a part of the story and an appeal has been made for memories which will help to bring the collection up-to-date.

Vicki Slade, from the Royal Pump Rooms, Leamington Spa, gave a short presentation to our May meeting on the project, which invites answers to such questions as: *What did you do for a living? How did you train for your job? What was your working day like? Did technology change your working life? Was your social life linked to your work?*

Vicki is especially interested in memories of 20th century working lives at Ford Foundry, Pottertons, Flavels, Automotive Products, Eagle Engineering, Cherry Orchard Brickworks, etc. But also, of course, in many other local businesses. So, have you any stories and memories about your working life you would like to share?

London Docks

May 2008: Mr. Martin Green

The London Docks

“I have seen the Mississippi. That is muddy water. I have seen the St Lawrence. That is crystal water. But the Thames is liquid history”. John Burns 1858-1943.

The scheduled speaker for our May meeting was unfortunately indisposed by illness and Martin Green stepped in to take his place at a mere 24-hour notice. As members have come to expect from our Chairman, he did so not just with aplomb but with a splendidly detailed grasp of his subject. His topic, he announced apologetically, would perforce be merely a short history of London Docks, an area possibly unequalled as a source of industrial archaeology in the Capital. What followed, in fact, was a fascinating and detailed account of how London’s docks, its associated warehouses, shipbuilding yards, and all the infrastructure required to support them, developed throughout the 19th century, reached its apogee in the early part of the 20th century, and sadly declined virtually to nothing from the 1960s onwards. The whole illustrated by photographs of the highest quality.

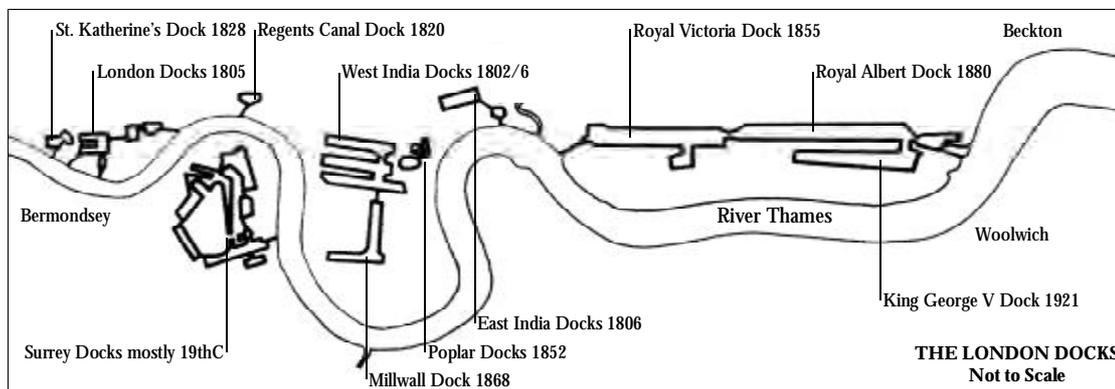
The West India dock was the first to be built on the Thames, in 1802, and the last was the George V, ultimately finished in 1921. In the intervening years a maze of world-famous docks, including the three ‘Royals’ (Victoria, Albert and George V), St Katharine’s, the East India, Millwall, Surrey and Tilbury docks, was developed along a relatively short stretch of the Thames, each striving to outdo its predecessors in design, facilities and efficiency. Many in fact comprised a pair of docks, side-by-side, one for imports and one for exports. The former, incidentally, was invariably larger than the latter, reflecting the fact that Britain had a balance of payments deficit long before it became a well-known modern political problem!

The accompanying illustration shows the layout of the London Docks as they were between the world wars. They employed thousands of workers, many on a ‘casual’ basis, and some of the dock owners made considerable fortunes. But the construction of some docks caused great hardship to those whose houses were demolished to make way for them. Building St Katherine’s Dock alone, for example, is recorded as having ‘displaced’ no fewer than 11,300 east-London residents.

The early docks in the complex were known as ‘Legal Quays’, were governed by the Port of London, and all trade had to pass through them. As the complex developed, problems arising from congestion arose, as did the level of pilfering. The latter eventually became such a problem that ‘enclosed’ docks were required, encircled with brick walls 20 or 30 feet high, and even in some cases with moats. By the end of the inter-war years, London Docks were fully developed (pictured below), but were to prove appallingly vulnerable to air attack. Consequently they suffered cruelly in WW2, German bombers merely having to follow the course of the River Thames to find their targets.

There was a brief post-war revival but then London’s Docks gradually went into terminal decline. Much of the area has now been bulldozed and redeveloped into extremely prestigious (and expensive) office and residential occupation, but some remnants of Dockland’s most historic buildings, also a few cranes, still stand as symbols of past glories. There is also an excellent Dockland Museum which is worthy of many more visitors than it currently enjoys, and our Chairman strongly commended it for a visit.

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WARWICKSHIRE INDUSTRIAL ARCHAEOLOGY SOCIETY

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- Meetings programme
- Meeting Reports

FROM THE CHAIRMAN

Under new management

In what we hope will be a seamless transfer, responsibility for the production of the Newsletter has passed from Mark Abbott to Mike Hurn, and this issue represents the first production under new management. We are very grateful to Mark for his efforts over a long period of time, and delighted that Mike felt able to step in the breach. This responsibility comes in addition to Mike's willingness to co-ordinate the production of the monthly meeting reports produced so assiduously by Arthur Astrop over the years. I feel that it is imperative that we have a team of members willing to write up reports to help Mike, and I repeat my plea that anyone wishing to be involved should contact Mike or myself. My experience is that it really does concentrate the mind during a talk and ultimately means that one gets a lot more from it, as well, of course, as benefiting the members.

Publications

The process of transfer has had the side-effect of concentrating the minds of your Committee on the issue of the Society's publications. Taking a hard look at the work of the Society reveals that – with a few notable exceptions – we have not been very prolific in terms of published material. Those with long memories will recall the days of RETORT! – an (increasingly) occasional publication produced by the Society with myself as editor. This tried to fulfil several – perhaps too many? – functions and was replaced by the Newsletter which was launched to ensure that members would indeed receive regular information about

the Society and reports of the monthly meetings. What it does not do is to provide a vehicle for the publication of members' research of particular topics or specific sites in Warwickshire.

This is being given careful consideration by your Committee and the current feeling is that we should continue with the production of the Newsletter, perhaps with the inclusion of photographs and a brief section devoted to an individual site in Warwickshire. This latter opportunity would mean that a member might like to take a site and write it up for the Newsletter and thereby contribute to a longer list of the industrial archaeology sites of Warwickshire. Topics such as location, history, significance, current condition, access plus a photographic record would be such a useful addition to the work of the society.

In addition, we feel that we should make a real effort to try and produce more substantial Occasional Papers which might in time be included in a larger volume on the industrial archaeology of the county. The Occasional Paper has the added advantage of bringing the work of the Society to a wider audience, and the possibility of stimulating response and further research. Industrial archaeology societies elsewhere in the country provide many examples of such papers, with varying degrees of size, print quality, binding, illustration, photographs and all these matters would need to be carefully considered.

Twenty Years of WIAS

The Society was launched in the summer of 1989 and held its first meeting in September 1989. There are several members who have been with us from day one, and they will re-call the early days of meeting in a classroom at Warwick School with less than twenty in attendance.

Much has happened since then, but it is encouraging to report that membership and meeting attendances are at record levels. The Committee feels that the 20-Year Anniversary should be marked in some way and various options have been suggested. Perhaps the most useful step would be to produce the first Occasional Paper – 'An introduction to the Industrial Heritage of Warwickshire' – with a general article followed by the specific research that members have done over the twenty-year period. This would also be an effective use of the available funds that the Society has accumulated. It would be on sale to the general public, as well as being available to members. Food for thought ...

Martin Green

PROGRAMME

The programme through to June 2009 is as follows:

December 11th

Mr Malcolm Hancock: *The History of Rugby Radio Station.*

January 8th

Members' Research Evening.

February 12th

Mr Nicholas Billingham: *The early industrialisation of Stratford upon Avon.*

March 12th

Mr Brian Ellis: *Blinman: a nineteenth century South Australian copper mine and its environment.*

April 9th

Ms Joanne Gloger: *'There is more to a needle than meets the eye': Needle-making in Redditch and beyond.*

May 14th

Dr Jim Andrew: *The Smethwick Engine.*

June 11th

AGM followed by *The Chairman's Lecture.*

Summer Break

NEWSLETTER

Meeting Reports *by Arthur Astrop and Mike Hurn*

June 2008: Mr John Burton

Nineteenth-century Industry in the Nuneaton and Bedworth Areas

In his latest address to our Society, John Burton took a novel approach to the subject of 19th century industry in the Nuneaton/Bedworth areas by linking it with the life, times and works of novelist Mary Ann Evans (1819-80), aka George Eliot.

As a child, Mary Ann Evans enjoyed a lower middle class life. Her father, Robert Evans was agent to the large Newdigate estate and since she often accompanied him on his duties she was in a position to observe details of the lives of workers in the district's agricultural, mining, quarrying and weaving industries. Much of what she saw was to re-appear later in her novels and remains a valuable historical record. Her home life was deeply religious and her observations on clergymen were also to appear in her writing, although latterly not always in a complimentary fashion.

The Nuneaton and Bedworth areas, including their attendant villages, were rich with the industries mentioned above, and while agriculture, mining and quarrying were important it was weaving which, in the 19th century, provided the greatest employment opportunities. John Burton dealt extensively with the proliferation of home-based hand looms, predominantly used to produce single-width silk ribbons in an dazzling variety of designs, and he used many quotations from George Eliot's writing to describe the conditions of the loom workers. Each loom was, in effect, a 'family business', often operated by a mother and, once they were old enough, by her children as well. Weavers' children, and those of parents in other local industries, had little formal schooling, being needed to play their part in producing income for the family.

In the 19th century, ribbons were widely used for trimming ladies' dresses, were produced in enormous quantities and different designs, and the weavers of Nuneaton and Bedworth prospered. But ribbons were also victims of fickle changes in fashion, some advantageous some not, and demand could change almost overnight. The weavers were also highly independent folk, and when the trend towards multi-ribbon looms and the grouping of weavers into factories grew they resisted such changes vigorously. The advent of the Dutch engine loom and the Jacquard loom was likewise treated with suspicion and anger, yet competition from overseas was increasing.

The gradual and inevitable shift away from independent weavers with one hand-loom per house to large efficient factories with workers clocking on and off could not be resisted, despite the protests of weavers, and culminated ultimately in the establishment of a small number of large firms each with hundreds of looms. A compromise was attempted (in 1850) with the building of a so-called Cottage Factory. The idea was to provide facilities for a number of independent weavers each to operate a loom in the same building, taking power to run it from pulleys driven by a single

steam engine. The initiative did not prosper, however, largely because of the cost of needing to run the engine constantly regardless of the number of weavers who were at their looms.

The mining industry around Nuneaton and Bedworth was also a very important employer, and included the Charity Coal Mine from whose funds contributions were made to build almshouses in Bedworth. Robert Evans had a hand in designing these houses, which were built in 1839 for the sum of £9,000.

George Eliot's novels remain to this day as invaluable records of industrial life in Nuneaton and Bedworth in the 19th century, and in fact represent one of the few first-hand accounts of the conditions of the time. There is a thriving George Eliot Fellowship (of which John Burton is chairman), and a website at www.george-eliot-fellowship.com.

July 2008: AGM and HP

The AGM

The Annual General Meeting of WIAS was held in the Sixth Form Centre at Warwick School - a return to old haunts - because of problems over room hire at the very end of a busy summer term. This has prompted the Committee to decide to hold next year's AGM in June, and for the Society not to meet in July and August.

The Chairman reported on the healthy state of the Society - as judged by membership numbers and meeting attendances. Much of the energy of the Society is devoted to the monthly meetings, and the range of issues covered - both local and national - had generally been well received.

Richard Hartree, newly appointed WIAS Treasurer, reported on the (satisfactory) financial state of the Society and explained how this had followed very much the pattern of previous years. Subscriptions were held at £10 per head, with a rise to £12 for joint membership. Meeting fees were held at £1 for members, but raised to £2.50 for non-members.

The new membership secretary is Sue Hammon, and the Chairman reported that the Newsletter Editor (Mark Abbott) and the Meeting Reports Editor (Arthur Astrop) both wished to hand over their responsibilities to others for the 2008-9 season. Replacements would be urgently sought!

Opportunity was then given to members to discuss any matters they wished to raise.

Warwickshire Industrial Archaeology Society Newsletter: Number 32

September 2008: Mr Laurence Ince
Engine Building at Boulton & Watt's Soho Foundry

No Longer ... Made in Brum

For the second half of the meeting, the Chairman explored the history of three Birmingham-made goods that were British icons known throughout the world - Bird's Custard, Typhoo Tea and HP sauce. Shortage of time prevented examination of all three, and the Chairman concentrated on the rise and fall of HP sauce in Birmingham.

It was the decision of Edwin Samson Moore to set up a vinegar factory in Aston in 1875 that began the story, and he concentrated on making a high quality product, so much so that he claimed his Midland Vinegar Company had "the largest and most complete vinegar brewery in the world". Precisely how he got hold of the HP sauce recipe from Gartons of Nottingham in the 1890s is a matter of dispute, but once acquired, he and his son - Edwin Eastwood Moore - set about creating a sauce that would be popular with all. Further premises were acquired with the purchase of the Vulcan brewery in 1902. The company's marketing techniques were unusual - and ambitious - for the time, and success came quickly. The Moores also soon turned to export markets, with HP sauce sold to Canada in 1903, to New Zealand in 1905, and to the USA in 1913 - and, famously, to French troops in the First World War!

In 1924, the company was floated, and a period of growth and diversification occurred, with successive expansion of the Birmingham premises in the subsequent years. From the 1960s, the company eventually went through a series of changes of ownership ... Imperial Tobacco ... Imperial Foods ... amalgamation with Smedleys ... Hanson ... Danone ... Heinz. The current owners - Heinz - closed the factory in 2007 despite vociferous protests, and it was demolished in the same year, with production shifted to mainland Europe.

What issues are raised by this saga of the rise and fall of an iconic product? Certainly, there is a critical entrepreneurial role played by the Moore family, with both father and son blessed with great energy and business acumen. To some extent, the location of the factory in Birmingham is 'accidental' - Birmingham has no specific locational advantages for the production of vinegar - but the ambition, hard work and foresight of the Moore family meant that HP became a household name. Branding played a vital role in this success, and many advertisements were shown to illustrate this. Ultimately, however, the process of de-industrialisation took its toll and the power of multinational companies to decide the most appropriate location for their factories worked against the Birmingham operations. The buildings have all now disappeared, including, of course, the vinegar pipeline that used to cross the Aston Expressway.

Members wishing to learn more of the story might wish to consult 'The Road from Aston Cross: An industrial history 1875-1975' by Louise Wright.

It is a matter of lasting regret (some may even say of national shame), that only a few fragments of Boulton and Watt's historic works survive to this day; not least of their Soho Foundry, a pioneering purpose-built steam-engine building factory.

One of the most comprehensive research projects on Boulton & Watt in recent times, and in particular on its Soho Foundry, was carried out by Laurence Ince, and he brought the subject to life in his address to our September meeting. In 1769, James Watt was 33 years old, and heavily in debt, when he journeyed south from Scotland seeking support for his work on steam engines, on which he held valuable patents. *En route*, he visited the Soho Manufactory and there he met its owner, the already successful 41-year old Matthew Boulton. The entrepreneurial Matthew Boulton could recognize a business opportunity when he saw one, and Watt needed to look no further. From then on, he and Boulton were destined to form a formidable business partnership which, in time, was carried on by their sons.

Boulton's Soho Manufactory was highly successful before he met Watt, producing a wide range of relatively small items in different metals and in large quantities. So the sizes of the components in a Watt steam engine, and the materials from which they were made, must have been well outside Boulton's experience at the time. Nevertheless, undaunted he gave Watt all the technical support, manufacturing facilities, financial backing and encouragement he needed to develop his ideas, and eventually to make their Company Britain's leading producer of industrial steam-powered engines.

For a long time, indeed up to the point where Watt's patents were due to expire, the Company virtually had the field to itself. Not that competition was entirely absent. There were those who were experimenting with engines using 'high-pressure steam', a concept against which Watt firmly turned his face, considering it inherently highly dangerous. He held that view implacably, but the need to meet increasing demands for more power meant that his low-pressure steam engines were forced to incorporate cylinders and pistons of ever greater diameters. The problems associated with casting and machining these very large components were formidable.

Inevitably it became obvious that Soho Manufactory was simply inadequate for volume production of large steam engines. It was then that the specialized factory known as Soho Foundry was built. This factory, opened in 1796, was designed from scratch to suit engine building, and was equipped with what must have been the finest range of extremely large metal-cutting machine tools in Britain, if not in Europe. Britain's leading technical Journal *The Engineer* described this factory in detail in its issues of the time, and recorded many of its machines in a set of drawings unparalleled in their excellence. (Many of these drawings are reproduced in a book by W Steeds entitled *A History of Machine Tools 1700 - 1910*, Oxford University Press, 1969).

Matthew Boulton died in 1809 and James Watt 10 years later, but their sons ably continued the business. By the middle of the 19th century, however, Matthew Boulton Junior was ready to retire and James Watt Junior sought directors from outside the firm, including one H W Blake. Blake was eventually to head the Company, to which he was undeniably dedicated. But he also had a great admiration for I K Brunel which sometimes led him (even in the face of opposition from his fellow directors), to be unwisely drawn into some of the latter's less successful ventures, including engines for his giant ship *The Great Eastern*, for example.

James Watt & Co (as the firm was ultimately known) eventually embraced high-pressure steam technology for its engines, but its fortunes gradually declined. It built its last steam engine in 1885, and although there then followed a brief period of revival when it operated as a Mint, producing cupro-nickel coins of low denomination, it closed in 1895 and its works were taken over by Birmingham-based W & T Avery, weighing machine and scale makers of international renown. Today the Company is American-owned and is known as Avery Weigh-Tronix.

October 2008: Mr Michael Darby

Coal, Quakers and Charcoal:

Coalbrookdale and the Society of Friends from Ironworks to Museum and World Heritage Site.

There was a real sense of living history as Michael Darby, a direct descendant through eight generations, of 'The' Abraham Darby took us through the beginnings of the Industrial Revolution.

It was salutary to be reminded of how much was owed to Non-Conformism and to the Society of Friends or Quakers. Many Quakers were practical men, craftsmen and tradesmen. The river Severn played a central role, linking the various groups of 'Friends' from Chester to Bristol who met regularly for mutual support and to assist those suffering hardship or in need of education.

Michael Darby's journey began at Dolobran, near Welshpool, with the Lloyd family, who not only nurtured iron making but a later family member founded the bank of the same name. The first Lloyd in the story was imprisoned in Welshpool gaol for ten years because of his open observance of Quaker practices and whilst in prison met a number of people who were later associated with Abraham Darby I.

A small friends' meeting house near to Dolobran, which remains in use and in the Lloyd family's possession, was also home to John Kelsall, who was first employed as the school teacher but in 1713 was offered the 'clerkship' to the ironworks at Dolgellau under Abraham Darby I. In 1715 Kelsall went to the Coalbrookdale furnace but returned to Wales after Darby's death as clerk to various new forges set up around Dolobran and Dolgellau.

We followed the career of Abraham Darby I from his apprenticeship to W. Freeth, a malt mill maker in Birmingham through partnership in the Bristol Brass Works and a patent for iron bellied cooking pots in 1697 to his lease of the Coalbrookdale furnace in 1698 and the smelting of iron with coke in 1709 thus giving better quality and higher yields than smelting with charcoal.

Darby's choice of Coalbrookdale was probably due to a combination of factors: Quaker connections, Broseley was a flourishing Quaker centre; Shadrach Fox, a previous lessee of the furnace, had produced coal-run iron for shot ordered by the Board of Ordnance; Darby probably knew of coal usage in the brass industry and also that cementation steel had been produced at Madeley in the 1640s. Interestingly, Darby did not take out any patent on coke-run iron; possibly Fox or others had used coke for smelting as early as 1695 and thus established a prior use of the process.

The Quakers dominated the early iron industry. As pacifists the manufacture of armaments was an anathema to them but notwithstanding some 3,000 guns were cast at Coalbrookdale for use on merchant ships. However, there is later evidence of a refusal to cast cannon for use in the American War of Independence.

The Darby family was deeply involved in social welfare, sponsoring parks, housing, allotments and schools together with poor relief and food subsidies. Adult education was important and in Coalbrookdale a substantial building was provided to house an Institute for Design and Art - it is still in use as a hostel. The Darby connection with Coalbrookdale was broken in the 19th century when Abraham Darby IV moved to Ebbw Vale.

The rise of interest in Industrial Archaeology in the mid-twentieth century led to the creation of what is now a World Heritage Site at Coalbrookdale but in the 1940s the original furnace lay buried under the debris of later buildings. The history of the site was known to some specialists but few visitors came to view the industrial remains.

The area of the furnace, which was fortuitously intact, was cleared and we saw some evocative slides taken in the early 1950s around the time that the Shropshire Archaeological Society was bluntly advised that 'it was too late for anything to be done for the furnace ... preservation was impossible.'. Fortunately, others were less pessimistic and the work of preservation began.

In 1957 Allied Ironfounders, who then owned the site, funded the creation of a museum recognising the importance of the site and acknowledging that not much was then known about 18th century iron founding. The museum and the original furnace were opened to the public in 1959 celebrating the 250th anniversary of Darby's first coke-run iron and preparations are now in hand for commemorating the 300th anniversary in 2009.

WARWICKSHIRE

Industrial Archaeology Society

WIAS

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FROM THE CHAIRMAN

Anniversaries Abound

The opportunity to celebrate an anniversary inevitably becomes more popular as the years go by, but the industrial archaeology world probably has greater justification than many for identifying and celebrating such events or personalities. Certainly, festivities concerning some of the greatest engineers and industrialists have come thick and fast over recent years with Brunel and Telford leading the way – though not necessarily in that order!

2009 is no exception, with, our own twenty-year anniversary. 2009 also marks the Bicentenary of Matthew Boulton's death, with a range of celebrations, many of which will take place in Birmingham. A major exhibition, *Matthew Boulton – selling what all the world desires*, focussing on Boulton's life and times will be held at Birmingham Museums & Art Gallery, 30 May – 27 September 2009; *The Art of Making Money*, dedicated to Boulton's Mint, will be held at the Barber Institute of Fine Arts, Birmingham University, May – December 2009; The University of Birmingham and the University of Central England will co-host a major academic Boulton conference from 3-5 July 2009. Readers are referred to the Bicentenary website for details of these and other events – www.matthewboulton2009.org.

The society has tried to keep pace with these anniversaries and is extremely grateful to Roger Cragg for his input on the life and works of several of the engineers. 2009 also marks 150 years since the death of Robert Stephenson and Roger is preparing a talk on Stephenson for a WIAS meeting at the end of the year.

Other anniversaries are, of course,

of a much more modest and local level. For example, the Centenary Celebrations of Johnsons, the coach company based in Henley in Arden. The Society has never really explored the history of bus services of the county, and attention of readers is drawn to two transport books *Stratford Blue* by Robert L. Telfer and *Midland Red* by Malcolm Keeley.

Martin Green

Warwickshire's Civil Engineering Heritage

This is the first of an occasional series by Roger Cragg highlighting some of the Civil Engineering heritage of Warwickshire. All the structures featured are registered as Historic Engineering Works by the Panel for Historical Engineering Works of the Institution of Civil Engineers.

Bearley (Edstone) Aqueduct

This aqueduct, which carries the Stratford upon Avon Canal is the second longest cast iron aqueduct in Britain.

There are fourteen spans of about 34 feet with brick piers and a cast iron trough containing the canal giving a total length of about 498 feet. The aqueduct crosses over the road from Bearley Cross to Little Alne, the North Warwickshire railway line between Wootton Wawen and Stratford (opened in 1907) and a stream, a tributary of the River Alne.

The waterway trough is constructed from cast iron plates with flanged edges, connected with bolts, which form the sides and base of the trough. The one inch side plates are some 14 feet long and the base panels are half this length. The transverse joints in the sides and base are staggered. The base panel is extended on the east side to form the towpath which is therefore level with the base of the trough. There is an upstand 1 ft. 10 in. high at the side of the towpath to retain the filling which forms the towpath surface.

The brick piers taper from the base and have a stone capping at

the top. Each span has two cast iron beams to support the trough. There are brick abutment walls which are curved in plan and there are steps down to the road from the towpath at the south end of the aqueduct.

The Stratford Canal was built in three distinct phases, starting at the north end at Kings Norton. Bearley Aqueduct was constructed as part of the third phase of building from Kingswood to Stratford, being completed in 1816. The designer was William Whitmore (c. 1748 – 1816) who was appointed as Engineer to the Stratford Canal in 1811. His son continued to work for the canal company after his father's death two months after the opening of the canal.

Whitmore's design, described as 'idiosyncratic' was somewhat old fashioned. The placing of the towpath level with the base of the trough is similar to Thomas Telford's design for Longdon upon Tern Aqueduct on the Shrewsbury Canal, the progenitor of cast iron aqueducts, completed in 1795. However, Telford, in his design for the later Pontcysyllte Aqueduct of 1805, placed the towpath level with the top of the trough, the waterway extending underneath it and thus providing a wider trough which reduced the drag on boats crossing the aqueduct. Either this improvement was unknown to Whitmore or he chose to ignore it.

There are two smaller cast iron aqueducts on this section of the canal at Wootton Wawen and Yarningale.

Roger Cragg

PROGRAMME

March 12th

Mr Brian Ellis: *Blinman: a nineteenth century South Australian copper mine and its environment.*

April 9th

Ms Joanne Gloger: *'There is more to a needle than meets the eye': Needle-making in Redditch and beyond.*

May 14th

Dr Jim Andrew: *The Smethwick Engine.*

June 11th

AGM followed by *The Chairman's Lecture.*

NEWSLETTER

Meeting Reports *by Mike Hurn*

November 2008: Ms Gillian Bardsley & Rev Colin Corke
Car-making at Longbridge

Industrial Archaeologists have a very broad range of interests but there was probably more common ground covered in this presentation than in many we have enjoyed. Apart from the wide variety of end products shown, our speakers illustrated and talked about manufacturing processes, buildings and architecture, social history, war-time priorities and adapting to new conditions and then post-war recovery culminating with some inglorious financial engineering that led to the demise of a once proud business.

Gillian Bardsley is the archivist at The British Motor Industry Heritage Trust, now located at Gaydon, and Colin Corke is the Vicar of Longbridge and was also one of the Chaplains to the factory. Between them they brought us an unusual and stimulating examination of the Longbridge story.

Gillian opened with a review of the BMIHT from its small beginnings in 1975 at Studley Castle to its present position covering historical collections from over 100 companies from 1896 with an archive and reference library that is almost as broad and to which access by appointment is open to all. This led to the early history of Herbert Austin, his experiences in Australia with the Wolseley Sheep Shearing Machine Company, who he tried to interest in car manufacture but left in 1905 to start his own business in a disused tin printing works at Longbridge. We had an insight into his 'business plan' through a handwritten page outlining his start-up cost estimates, and his source of financing, one Frank Kayser. A first anniversary luncheon menu carries their two signatures and an indigestion provoking list of dishes.

Austin prospered as WWI approached and an evocative series of slides showed the transformation of a car factory into a weapons producer and, most notably, the employment of large numbers of women in skilled roles. The range of munitions produced was extensive including: shells, guns, aeroplanes and engines, lorries and armoured cars. To alleviate the housing problem the 'Austin Village' of 200 flat-pack timber houses from Michigan was built near to the factory. Austin was knighted for his contributions to the war effort but his only son was killed in action.

The post-war slump hit Austin and the firm was put into administration in 1921 but the instant success of the Austin 7 saved the company which then prospered through the inter-war years. A constant feature of the company's publicity was the theme 'as dependable as an Austin' which typified their cars and other products which included a successful tractor cum stationary engine. In 1937 the Aero Factory, later known as the East Works was built as part of the shadow factory programme following Herbert (now Lord) Austin's appointment as chairman of the 'shadow aero engine committee'.

The factory was distinctive for its interior space which minimised the use of pillars. The first aircraft built were the Fairey Battles which proved disappointing in service. Smaller planes could be flown from the factory's old flying ground but larger aircraft such as the Stirling bombers were

made as kits and transported by road to the nearby Elmdon airport for assembly and flight test. As well as aircraft a wide variety of wartime products came out of Longbridge between 1939 and 1945, from military vehicles to jerrycans. Lord Austin died in 1941 and thereafter the Company was effectively run by Leonard Lord who had been recruited in 1938 following a disagreement with Lord Nuffield.

The early post-war years were characterised by the drive for exports using the slogan 'Austins for Dollars', the major landmark launches of the 'Mini' and the Austin-Healey and the 1952 merger with Morris. However, the problems of badge engineering spread scarce resources too thinly and a badly weakened company was merged in 1968 with lorry builder Leyland under the auspices of the Wilson Government to form British Leyland.

A highlight of the evening was a compilation of archive film material, including some colour war-time footage, that illustrated the gamut of production at Longbridge from cars and aeroplanes in 1915 through to the robotised body assembly line for the Metro in 1980. The film also gave some fascinating glimpses of many of the personalities involved in the history of Longbridge.

Colin Corke then gave a very personal and enthusiastic review of the architecture of the Longbridge site. From the original White & Pike tin printing works we followed the expansion during the first war and subsequent consolidation through the second war shadow factories to the innovative CAB 1 (Car Assembly Building) of 1950; all glass and hope. A new exhibition hall in 1956, the largest multi-story car park in Europe in 1961, the new commercial vehicle showroom 'the Elephant House' in 1965 and thence to the beginning of the end with the demolition of the old water tower in 1998.

Colin also introduced us to a wide cross section of Longbridge people, illustrating the great sense of community that existed in much of British industry between the 1920s and the 1980s but which has since lapsed. This led into the concluding shots of the events following the final collapse of Rover in 2005. Stalled production lines then empty shells of buildings which the Heritage Motor Centre was allowed to record before final demolition.

It remains to be seen what will arise next on the Longbridge site, St Modwen, the property developer which now owns it, face a challenge in these very testing times. Will a Longbridge Technology Park and Heritage Trail lead to the revival of the area? Certainly more will be needed than the assembly of a few obsolescent MG sports cars.

Transport Open Day - Saturday 25 April 2009

Warwickshire County Record Office has many records to do with Warwickshire's transport history, including maps, plans and photographs. On 25 April from 2pm to 4pm some of the original records on transport, canals and railways will be available for inspection at the Record Office in Priory Park, Warwick. Tickets £5.00. Spaces are limited so booking is essential. Telephone: 01926 738959

December 2008: Mr Malcolm Hancock

A Short History of Rugby Radio Station

Malcolm Hancock is a rarity - he worked for forty years, from leaving school in 1964 until retirement in 2004 as its manager, at the Rugby Radio Station. Who better then to tell its history. A story that served to remind us of the technical debt that is owed to the General Post Office in it's several guises. In particular to the development of wireless technology. It is all too easy only to equate radio with the BBC and Malcolm gave us a most eloquent reminder that it was the GPO which pioneered many radio services that today we take for granted. Telephones, teleprinters and time signals, ship-to-shore and even spacecraft communications all began under the GPO.

When President Lincoln was assassinated in 1865, it took Reuters twelve days to convey the news to Europe. The next year saw the laying of the first transatlantic cable over which telegraphic signals in morse code could be transmitted and in 1891 a London to Paris telephone cable was opened. In 1901 Marconi made his first, historic transatlantic radio transmission. After the first war the need for an imperial wireless network strengthened and in 1924 the GPO acquired 900 acres, including the old Hillmorton Airfield outside Rugby as the site for its first Radio Station.

Historic slides and some old Pathé newsreel footage gave us a good idea of the problems in raising the twelve 820 foot high masts which supported the original aerial array. Other buildings housed the transmitter, at that time the world's most powerful using thermionic valves, giving Worldwide coverage, offices and the BTH generating plant. On 1 January 1926 the Long Wave service opened.

The transmitter, with a power of 350kW, was designed and built by the GPO and was gradually improved over the years. It suffered fire damage in 1943 but a partial rebuild and further improvements saw it continue through to 1965 when it completely replaced by a new three valve, 'latent heat of steam' cooled transmitter. Over this period the traffic moved from commercial telegrams to ships and diplomatic news broadcasts, to Air Ministry weather forecasts and finally played an important part in the Cold War for the Royal Navy.

In 1927 the first radio telephone service from the UK to the USA began. Later this service could carry a maximum of two telephone calls. The cost of a call, during the first year of service was £15 for three minutes, about £600 at today's prices.

Although circuits on Short Wave were not quite as reliable as Long Wave, the transmitters needed much less power and smaller aerials. This reduced costs and increased demand for short wave circuits. Therefore, a second building (Rugby 'A') was opened in 1929 and by 1935 Rugby was capable of transmitting many, mainly telephone, circuits to any country anywhere in the world.

The demand for long distance, point-to-point, radio links continued to increase. Rugby Radio peaked in 1955 when the third building opened. The size of the site was increased from 900 acres to 1600 by the purchase of land on the other

side of the A5. A new building, Rugby 'B', was opened in July 1955. Rugby now had 57 transmitters and was the biggest radio transmitting station in the world. In the mid 1960s Circuits at Rugby were set up for use by NASA on the Mercury and Gemini space flights.

When the first transatlantic telephone cable opened in 1956 some of the traffic started to move away from Rugby. Over the next ten years Rugby changed from carrying the high density telephone traffic of North America and Australasia into providing better telephone and teleprinter services to countries in areas that had no direct cable access. These countries, in Africa, South America, Asia, Iceland etc., only required a small number of circuits. Press services for Reuters and London Press Service continued with teleprinter news and picture transmissions.

With the advent of satellite communications, Short Wave International land based, point-to-point, radio services continued a slow decline between 1975 and 1987. Other Radio Stations closed, as the remaining services were concentrated at Rugby. Between 1987 and 1992 the station was converted to carry an improved long range maritime service.

Finally even the ship services started to transfer to satellite. The number of transmitters required reduced and the 'A' Building closed as a radio station in the early 1990s. The ship distress system moved over to satellite and maritime services finally closed at the end of April 2000. This left only two, telegraphy and the Time Signal services.

The contract for the remaining two telegraphy services, one of which was GBR, ceased on 31 March 2003 and eight of the twelve 820ft masts were demolished on the evening of 19 June 2004.

Time Signal Services were always an important function at Rugby, from 1927 to 1986, time signals were transmitted enabling ships anywhere in the world to synchronise their chronometers for navigation purposes. This service was run on behalf of the National Physical Laboratory. The time source improved over the years from Royal Greenwich Observatory land line, to local "Essen Ring" crystal, to Rubidium and finally to a Caesium Atomic frequency standard in 1976. The service moved to Anthorn Radio Station near Carlisle on 1 April 2007 bringing, after 80 years, an end the transmission of Time Signals from Rugby.

A temporary "Loran C" navigation service started in mid 2005. This used an American transmitter and a new "T" aerial, straddling the building, between two of the old 820ft masts. This temporary service ceased on 4 July 2007 and was the last radio transmission from Rugby Radio Station.

The remaining four 820ft masts were demolished on Thursday 2 August 2007 and the site awaits redevelopment - 6,200 new homes are a possibility.

January 2009

Members' Research Evening

This Members' Research Evening covered much ground - two local reviews, one of Victorian train accidents, the other of the little known airfields used by the Automobile Association's Flying Section; an unusual parade of steam-powered road vehicles and an historic canal tunnel; an American home movie record of a trip to England in 1934; the fields to factory to houses saga of a Wolston small-holding; and the untimely end of an experimental aircraft in another field near Broadwell.

Richard King teased at the beginning with a slide of a local man-hole cover which appeared to include several lines in an Eastern language but then drew on local newspaper sources to examine a number of accidents on the Victorian railway lines around Leamington between 1856 and 1895. His hand-drawn maps brought the various locations clearly to mind and the descriptions reminded us of both the mechanical frailty of the equipment and the hardship suffered by the dependants of the railway employees who died. A few pounds raised by a public subscription was the best that could be expected. Inadequate track maintenance also has a long history in the railway industry. Of the nine major accidents over the 40 year period under examination, three were due to mechanical failures, three were down to track defects and three to human failures.

Chris Barney reviewed the saga of Bluemels of Wolston. A factory was built in 1898 by Joseph Cash of Coventry on a small-holding to produce filaments for electric light bulbs from artificial silk but production ceased after only two years and the three Bluemel brothers purchased the works in 1902 and moved their successful business manufacturing umbrellas and walking sticks from Stepney. They expanded their product range to cater for Coventry's fast developing cycle and motor industry with a range of celluloid parts including mudguards, chainguards, handles and tyre pumps. From a small start the workforce had grown to some 200 at the time of the last Bluemel's death in 1938. Wartime production of small engineering components saw numbers rise to a peak of 800 and in 1949 Bluemels introduced steering wheels made from bakelite as a new product range. Sadly, the business underwent a series of takeovers in the 1960s and 70s and after making its highest profits of some £2 million in 1977 it went into receivership in 1985 blaming a lack of markets. The land subsequently became a 40 unit business park which in 2004 became a housing development.

Thelma Gee examined the crash in May 1949 of the experimental 'flying wing' Armstrong Whitworth AW 52. Field-walking for Roman remains had uncovered modern metal parts and thus sparked further investigation. Following a glider prototype, two jet-powered aircraft were built in 1947 expressly to evaluate laminar flow wings which promised much reduced drag but ultimately were beyond manufacturing capabilities. The aircraft had a 90 ft wingspan, a ceiling of 45,000 ft and a speed of 495 mph. The aircraft involved in the crash suffered uncontrollable wing flutter and the pilot, Flt Lt Lancaster an ex-RAF bomber pilot, became the first to use a Martin Baker ejection seat in an emergency. He landed safely near to Long Itchington

and the pilotless plane crashed into open fields half a mile from Leamington Hastings towards Broadwell. The second prototype was eventually scrapped.

Roger Cragg provided some highlights from the Bridgnorth Steam Festival in July 2008. Notably, the nearly completed replica of 'Catch Me if You Can' together with a number of other steam powered road going vehicles. These included the 1801 'Puffing Devil' owned by the Trevithick Society, another replica Trevithick chassis with an extraordinarily high mounted coach body that needed a ladder for access, Hancock's 1833 steam coach and a genuine 1801 Grenville steam cart. He then took to the water for the 150th anniversary celebrations of the opening of the Nether-ton Canal Tunnel on 20 August 2008. Designed by James Walker, the second President of the Institution of Civil Engineers, the 3027 yard long tunnel has a 17 ft waterway flanked by two 5 ft towpaths. Fully brick-lined and originally gas-lit, the tunnel took 2 ½ years to drive and was needed as a relief for the old Dudley tunnel (which took 7 ½ years to build). The celebrations were enlivened by many participants in period costume and the presence of the steam-powered narrow boat 'President'.

Derek Billings introduced a film 'My Trip Abroad' from the Bill Gibbons' collection. This recorded the 1934 visit of an American family to England and especially to Leamington Spa where a house (still extant) named 'Oversley' in Radford Semele featured prominently. Shot in black and white we followed the family's journey, first on the liner *Berengaria* then on the train to Leamington Spa and to Oversley and its extensive gardens. The film-maker recorded many local scenes as well as family events. An evident highlight of the visit was a trip to London which allowed us to see the old Leamington and Paddington stations and a tour that included many historic vehicles and landmarks, a completely scaffolded Palace of Westminster was notable as was Buckingham Palace, St Pauls, Ludgate Hill and Marble Arch. Returning to Leamington we toured the Jephson Gardens, Warwick - the town and the castle - before departing on the train to Southampton to embark on the *Majestic* for the voyage to New York. Southampton docks, including the massive floating dock and the scenes of arrival and docking in New York provided, as did the film throughout, much of industrial archaeological interest.

John Brace brought the evening to a close with information on a subject of which many must have been quite unaware. The Automobile Association with its motorcycle patrols is very familiar but the AA's Flying Section is less well known. Light aircraft must have been popular in the inter-war years because the AA produced a register of flying grounds that could be used by its members. The published data sheets were remarkably comprehensive and included details of topographical and other hazards such as the possibility of sheep or cattle as many seem to have been located on farmland. Photographs of some of the old hangars, some still in use as farm buildings, showed them as the forerunners of the well known RAF structures. Locally there were AA Flying Section airfields at Leamington Spa, Rugby, Stratford upon Avon and Banbury.

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FROM THE CHAIRMAN

Store, scan or scrap ... what will happen to those boxes of slides?

It was very disappointing that the AIA's Affiliated Societies April Conference was cancelled due to insufficient response from local societies, particularly as the theme for the Conference was the nature and destiny of resources held by Societies. WIAS has no responsibility for any industrial sites, but shares with many societies in the number of records (and memories) that individual members possess.

The most common form in which the photographic resources are held is the 35mm slide. There are several members who have been interested in industrial history and industrial archaeology for many years, and have amassed a large collection of slides. These are stored in a variety of ways, and probably have a varying degree of information attached to them. Some members will have been meticulous about naming, describing and dating their slides, others I suspect less so, with the Chairman residing very much in the latter group!

What will become of all these slides? Their importance lies in their role as components of the factual record of the industrial heritage of the County, and it would be of considerable value to know what exactly had been recorded and how they might best be made available to Record Offices/ Archives/Libraries as well as to a wider audience. From my own point of view, I used to think that I would jealously guard the copyright of some of my more significant photographs, but the information revolution has changed my thinking on this.

Many groups are seeking to deal with this matter, and the discussion at the March meeting demonstrated the range of possibilities available.

Chris Barney has written to me on this theme, and has listed a range of issues:

- How 'permanent' are digital images?
- Scanning – what level of resolution would be advisable?
- Format for storage – CD, memory stick or other?
- Copyright concerns?
- Labelling, referencing, indexing – is there an 'agreed' system?
- Funding – where might we secure funding to assist in the process?
- Responsibility and co-ordination?
- Could WIAS develop a system that might be useful to others?

This provides much food for thought. Any input from members about a potential way forward would be greatly appreciated. For the moment, I hope the presentations in the December 2009 Meeting – Twenty Years of WIAS – will provide a taste of the wealth of photographic material that exists within the membership.

Martin Green

The Association for Industrial Archaeology Annual Conference 2008.

The 2008 Conference at Luckham in Wiltshire was reviewed for us in February by the Chairman and John Selby.

The Rolt Memorial Lecture on the Industrial Archaeology of the Cold War reflected the considerable military activity to be found in the area. Other Wiltshire IA included the usual suspects of transport, especially steam locomotion, and civil engineering.

John Selby visited three very different venues, The Invicta Car Company in Chippenham, Ratcliffe & Sons in Malmesbury and Moulton Developments in Bradford-on-Avon.

Invicta is an early British sports car manufacturer. Initially, based in Cobham (1925/1933), then in Chelsea (1933/1938) and finally in Virginia Water (1946/1950). More recently, the name has been revived for a new sports car which

is being built in Chippenham. Much memorabilia of early sporting triumphs was in evidence including pictures of Donald Healey's winning car from the 1931 Monte Carlo Rally and Raymond Mays' Shelsley Walsh hill climb car. Today's car caused some envious sighs, quickly extinguished by the £150,000 price tag.

Ratcliffe & Sons began life as a foundry, in 1896. In the 1930s the business flourished as a Morris car dealer and, although the type of work has inevitably changed over the years, Ratcliffe still undertakes light agricultural machinery repairs using original machinery driven by a belt and pulley system. In addition, today an artistic blacksmith also works on the premises producing work such as gates for the Prince of Wales' Highgrove estate.

Alex Moulton needed no introduction as the inventor of the revolutionary rubber suspension for the Morris Mini. But it was his grandfather who introduced the rubber industry to the town of Bradford-on-Avon and Moulton was a well established vehicle suspension engineer before the Mini was launched. The Moulton estate houses a fine model collection and a greenhouse museum contains examples of many of the Moulton bicycles which are still in production.

PROGRAMME

May 14th

Dr Jim Andrew: *The Smethwick Engine.*

June 11th

Peter Bones: *The restoration of Chesterton Windmill.* followed by *The Chairman's Lecture.*

September 10th

David Close: *Chedham's Yard* Followed by AGM.

October 8th

Steve Bagley and Damian Kimberley: *Three Cycling Pioneers of Coventry – James Starley, William Hillman and George Singer.*

November 12th

Roger Cragg: *Robert Stephenson.*

December 10th

1989-2009: Twenty Years of WIAS A presentation by members.

NEWSLETTER

Meeting Reports *by Mike Hurn*

February 2009: Mr Nicholas Billingham

The Early Industrialisation of Stratford upon Avon.

Nicholas Billingham is steeped in the history of Stratford upon Avon. He was born and raised in a bargees' pub, now demolished, alongside the Stratford Canal. He has thus seen many changes in the town, its industry and its people. He gave us a comprehensive review of the industrial developments in the town from the early 17th to the turn of the 19th century.

The story begins with the contrasting lives and activities of the Royalist William Sandys, and the Roundhead Andrew Yarranton.

William Sandys' (1607-1669) principal fame was as the engineer who improved the Warwickshire Avon and the River Wye, and who was involved in several other river navigation schemes. He was born at Fladbury and after attending Oxford University he became a barrister of the Middle Temple. He left London in 1633 to live at Fladbury where he improved his own lands at Tewkesbury and Strensham, notably with lock building at Fladbury. In 1635, Sandys was authorised to improve the river Avon. Within a few years, he had made the river navigable at least to Stratford upon Avon, and possibly beyond. This was done by constructing 'sluices', which seem to have been pound locks (not flash locks as often supposed). The navigation was complete to Stratford by 1640, but its cost had stretched his resources and his estates and the navigation passed into the hands of his creditors.

Sandys also had a patent to farm a new duty on coal exports but the project was a failure and he surrendered the grant. During the Civil War he acted as a Royalist agent purchasing munitions at Dunkirk. After the Restoration, he was again elected to the House of Commons where his interests included the promotion of navigation schemes.

Andrew Yarranton (1619-1684) was an important English engineer in the 17th century who was responsible for making several rivers into navigable waterways. He was born at Astley and was apprenticed to a linen draper in Worcester, but left after a few years. During the Civil War he served in the Parliamentary army. After the war, he speculated in forfeited crown and royalist estates. He set up a blast furnace at Astley but he is also known for a project to make tinfoil. He was commissioned to go to Saxony to find out how tinfoil was made. On his return, experiments were undertaken, including rolling. This was sufficiently successful to encourage two of his sponsors to set up a mill for the process on the Stour at Wolverley.

Yarranton is mainly remembered as a navigation engineer. His first interest in this was a proposal in 1655 to make the River Salwarpe navigable from the Severn to Droitwich. His second was on the River Stour where the proposal was that coal should be brought down railways (known as footways) and loaded on to barges for transport down the river. Several attempts were made to improve the river, but each time money ran out, either before it was finished or before a trade could be got going.

Yarranton's work on a third navigation, the Warwickshire Avon, was far more successful. William Sandys had improved the river in the late 1630s, but it had passed into the hands of William Say and then to James, Duke of York, later King James II, who sold them to Lord Windsor in

1664. The navigation had languished under its previous ownership and needed substantial further investment. Lord Windsor retained the Lower Avon (below Evesham) himself, but employed Yarranton to maintain it, and also to rebuild Pershore sluice. The Upper Avon Navigation (above Evesham) needed much more to be spent on it, and he took partners, including Yarranton. Within a couple of years, the river was again navigable, and remained so for over two centuries above Evesham, and ever since below that town.

Yarranton had been a leading Roundhead before the Restoration and was imprisoned several times during the 1660s. At the end of his life he was involved in pamphleteering and also published a book in 1677, *England's improvement by sea and land, or how to succeed against the Dutch*, describing some of his achievements and suggesting various other improvements, including river navigations, *inter alia*, canalising the Warwickshire Stour and Cherwell to create a route to London.

As regards Stratford upon Avon, the town had stagnated since the Black Death in the 14th Century when the population sank from 5,000 to 2,000, where it remained into the 1670s. Furthermore, the country was in deep recession following the Civil War. Nonetheless, Yarranton had a blueprint for Stratford which included brickworks, textiles (spinning and bleaching), timber and coal yards, and especially granaries for which he planned a nationwide network and transport system to balance good and bad years. Yarranton had many other ideas that were ahead of his time: he was active in promoting the growth of clover, a fodder crop which also fertilises the land; he saw the need for credit for farmers, but with no existing valuation process he proposed a land registry and a central Bank of England. Always a forthright man he died violently after a brawl and being thrown into a hogshead of water.

Stratford, however, had changed little by the 18th century but with the shifts in attitude to a more 'can do' outlook new activities developed. Most especially to exploit Stratford's potential as the birthplace of William Shakespeare. The first tourist Jubilee was held in 1769 with the focus of interest on Shakespeare's grave rather than the properties associated with his life. Nevertheless, the idea was born that tourism could be profitable. Nick Billingham closed by bringing the industrial history of Stratford into the modern era with the development of the Stratford Canal built by William James, another visionary who also introduced the railway age with the Stratford Tramway which led to the Stratford Midland Junction Railway. He used a series of slides from the archives of the Shakespeare Birthplace Trust to illustrate the range of industrial activity in the town at the turn of the 19th Century. These included: Cox's Mill, Scott & Co., the lock at Wilmcote, Flower's Brewery (worth a lecture on its own?), and a variety of canal-based activities.

Stratford upon Avon has never been an industrial town and with the decline in the importance of the canal it has relied increasingly upon tourism as its industry. It occupies an important place on the National scene and seems likely to remain a significant place on any tourist's itinerary.

March 2009: Mr Brian Ellis

Blinman - A Nineteenth Century South Australian Copper Mine and its Environment.

Brian Ellis was drawn to Industrial Archaeology through geography - what stories do landscapes tell? He suggested that a Darwinian approach to the subject requires an examination of extinctions through the fossil record which can also reveal the development and evolution of a species. A recent visit to South Australia gave Brian the opportunity to record the remains of the short-lived copper mine at Blinman and to entertain us with its history.

The story of Blinman has to be seen against the background of the exploration and development of Australia. In 1802 Flinders had first charted the coastline, followed in 1830 by Sturt's navigation of the Murray River which in turn led to the foundation of South Australia (by colonists not convicts) where settlement began in 1836. In 1837 the Adelaide City Plan was drawn up. By 1860 the settlement had expanded into the wheat lands to the North and the opening up of land was controlled by the government. By the early 1860s most of good farmland had been sold and the Government came under pressure to extend settlement northward into more arid lands. General George Goyder, the Government surveyor, was charged with assessing the feasibility of northward expansion.

An earlier survey made in 1856, which estimated the amount of rainfall from the type of vegetation, had led to the 'Goyder line' south of which rainfall was deemed reliable enough for agriculture but north of which it was deemed suitable only for grazing. Brian used a series of slides to illustrate the history of a large sheep grazing station founded in 1851 by the third son of an Irish Earl, who took out leases which were the beginning of the Kanayaka station (he sadly drowned in a creek flood). Then one John Phillips took over and built the homestead, woolshed and surrounding dwellings. The station now extended to 360 square miles, carried 50,000 sheep (about 400/square mile), and employed 70 men plus their families. Between 1864 and 1867, 20,000 sheep were lost in a drought and the station was temporarily abandoned. Phillips later returned with 20,000 sheep but only 15 single men and the land was subdivided into smaller units. In 1888 Kanayaka was finally abandoned. Not only because of drought, but also due to changes in economic circumstances in South Australia.

In 1862 John McDougal Stuart had made the first South to North crossing of Australia thus opening up the feasibility for similar links. In 1870 - 1872 Charles Todd (Government Astronomer and Telegrapher) oversaw the construction of the first overland telegraph from Port Augusta to Darwin (and thence via Java and India to London). This endeavour required 1800 miles of galvanized wire, had repeater stations every 120 to 180 miles, was powered by glass batteries, and needed 'countless' telegraph poles of Callitris pine which is resistant to white ants and other insects. In 1878 construction of the Old Ghan Railway began and by 1891 it was open well to the north of South Australia and is relevant to the Blinman story. We saw some splendid examples of railway history in the restored stations on the line, plus a bullock-shoeing pen.

Minerals were an alternative source of economic activity with the importance of copper being realised early.

Fortunately, the basic geological conditions for copper deposits were present and these were exploited in a series of small, and short-lived, mines. In 1859 a copper outcrop was discovered by a shepherd on the Angorichina Sheep station, one Robert Blinman. In 1861 a lease was granted to Blinman and three others and a mine called 'Wheal Blinman' was born.

In 1862, the lease was sold for 150 times its purchase price, one of the few profitable events in its history, and in 1873 the mine closed for the first time. It was reopened, better capitalised by the Tasmanian Mining Company, in the 1890s with substantial investment in mechanisation, pumping, electrification and transport (none of which was recouped) and was worked until the copper was exhausted in 1918. A total of only 10,000 tons of copper was produced during the lifetime of the mine, the majority during the First World War.

Brian's pictures of the few remnants of the mine's infrastructure allowed us to get a feel for the workings and the nearby township. In 1863 there was only a tented settlement but by 1864 the government surveyor laid out 62 allotments (house plots) about 3 km. from the mine. By 1868 the population had grown to 1500. The first school opened in 1869 together with shops. There was a regular water supply from the mine but the inhabitants suffered many problems; notably relating to transport, water supply, fire wood and dust which led to lung problems and the failure of many pregnancies.

As the name, Wheal Blinman, suggests there were probably Cornish workmen employed and there remains 'The Captain's House'. The industrial archaeology of the mine has been partially preserved with some interpretation boards for visitors, including pictures of the mine in 1907. We saw the evidence for the shaft and head works, an adit, the foundations for the ore crushing and sorting plant, the location of the circular buddle, tailings and slurry pond, and the foundations for the furnaces, stokeholes and boilerhouses together with the slag heap. Most of the archaeology is from the mine's heyday at the end of the 19th century up to 1918.

Mule trains were the means of moving rock and supplies within the mine complex and also for transporting the refined ore to the Old Ghan Railway line at Parachilina some 25 km. away. Exporting the ore was always a problem, and before the Old Ghan railway was built the ore was taken 200 km. to Port Augusta (Adelaide) by bullock cart.

Today, water from the mine still appears to be the water supply to the remains of the village, which is now much reduced in size. There is some historic evidence in buildings which remain from the mining days. We saw evidence of restoration, including the Blinman Memorial Hall and what appeared to be a genuine 1850's miner's shack made from split logs and flattened tin cans.

Some of the old houses have been modernized. The community is active in trying to develop tourism, as is typical of the whole marginal pastoral area exploiting its spectacular scenery. The Old School House is typical, housing a cafe and an arts and crafts shop. Copper may no longer be mined in Blinman, but the name lives on.

April 2009: Ms Joanne Gloger

"There is More to a Needle than Meets the Eye". Needle Making in Redditch and Beyond.

Joanne Gloger has been Keeper of the Forge Mill Needle Museum in Redditch for twenty years. It is salutary to think that for many of the needle makers in the 19th century, this was also about their working life-span.

Joanne opened with a review of Redditch's industrial heritage which has its roots in the Cistercian Bordesley Abbey, where evidence of metalworking can be traced to around 1175. In later years some 90% of the world's needle production was centred on Redditch. An associated product using many of the same techniques was fishing tackle. What is a fish hook if not a curved needle with a barbed point? Well known names including Millwards, John James and Samuel Alcock made both products. Also produced in Redditch were springs, notably by Terry (whose iconic Anglepoise lamp was created in 1933), and Royal Enfield motor cycles.

The origins of the Redditch needle industry are uncertain but there is evidence that Queen Elizabeth 1 sought self-sufficiency for England and Nicholas Throckmorton of Coughton Court, her ambassador to France, brought back Huguenot artisans who established the industry. Later, during the Commonwealth, needle making was concentrated in London with severe Guild restrictions over the craft. People 'escaped' to establish the nucleus of the Midland's needle industry and its associated users - carpet makers in Kidderminster and glovers in Worcester to name but two. Finally, the Victorian transport revolution gave a boost to Redditch. Sadly, today only a few small manufacturers remain and the world now buys its needles from Czechoslovakia and India.

The Needle Museum is housed in the listed Forge Mill which dates from early Victorian times and tells the fascinating and sometimes horrific story of the needle maker's trade. A water colour of the Mill in the 1800s shows little change from the building as it is today. However, what went on inside would give 'Elf n safety' nightmares.

Steel wire from Sheffield was hand-drawn to the size required. A wire-drawer could usually be identified by the lack of several fingers and other injuries caused when the wire snapped and sprang back.

The wire was then cut to double the length of the finished needle using a large, body-operated set of shears. These blanks required straightening at a low, dull red, heat before pointing. Pointing was one of the most highly skilled and hazardous operations. A pointer sat crouched over a dry grinding wheel and sharpened a handful of needles at a time. His lungs were attacked by the dry dust mixture of grit from the wheel mixed with metal and his eyes and face were vulnerable to larger fragments, especially if a grindstone fractured.

Pointer's Rot was the popular name for damaged lungs and most were dead by the age of 35 from silicosis. However, the local lore said that anyone suffering from something in the eye should seek out a pointer since they

had great skill in extracting foreign bodies from that organ! With the risks came high rewards and pointers could earn 2 to 3 guineas a week and strikes against the introduction of safety equipment which would have reduced output and thus income are recorded.

After pointing, the initial impression for the eye was created using a 30 lb kick-stamped drop hammer at a rate of 50 strokes per minute. Clearly physical fitness was a necessity for that job! Women and children then pierced the eyes using a small fly press. A more modern machine combines these two operations.

The needles were then sent to out-workers for 'spitting' or threading two bars through the eyes before the flash was filed off, and the needles divided in a process known as 'heading and cheeking'. The eyes were then cleaned out and made smooth using fine copper wire.

Next, the needles needed to be hardened and tempered. Initially the process of heating to cherry red and quenching in water resulted in some 30% of the needles being curved. The curvature was corrected by another out-working group known as 'cruck-straighteners' who used a hammer and small anvil. However, to the anger and concern of the cruck-straighteners, it was found that quenching the needles in whale oil gave a straight needle that needed no rectification. Progress always disadvantages someone!

Finally, the needles needed cleaning and polishing, the process in which the Forge Mill specialised with its water-powered scouring beds. The mill took in needles from all the local manufacturers, some three million every week, for finishing. Needles, all of the same size, were bundled into heavy cloth 'setts' with a mixture of soft soap and powdered stone. The setts were then placed under a heavy reciprocating platten (powered by the water-wheel) which rolled them on a fixed bed thus cleaning the individual needles with a lapping action. The needles were then polished in the same process but olive oil and putty powder were substituted for the soft soap and powdered stone. Later, nickel plating replaced the polishing process. After polishing the needles were dried in barrels of sawdust, weighed (the scourers were paid by weight) and returned to the original factory for packaging.

To make threading a needle easier, the eye was often gold-plated, a process involving the use of potassium cyanide in open vats with the obvious risks to the operators! Joanne closed with another gruesome reference to early surgical needles - surgeons preferred to use glover's needles because the triangulated points cut through flesh rather than tearing it.

Amongst the Industrial Archaeology uncovered in the nearby Cistercian Abbey was a huge oak timber trough which formed part of the 12th century mill sluice. This timber, which resembles a long, narrow dug-out canoe, has been preserved by the Mary Rose Trust and can be seen at the Visitor Centre.

WARWICKSHIRE

Industrial Archaeology Society

WIAS

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FROM THE CHAIRMAN

The start of a new season of meetings provides the opportunity for some reflection on the progress and prospects for the Society. It is also the occasion when WIAS will be 20 years old, and that in itself is something worthy of celebration. After an initial meeting addressed by Barrie Trinder in St. John's Museum, Warwick, in 1989, the Society began its regular monthly meetings with a small number of enthusiasts gathering in a classroom at Warwick School. With various changes of venue within Warwick School over the past 20 years, the meetings now held in the Pyne Room regularly attract between 50 and 60 people. Indeed, some of those members who established the Society in its infancy are still members, regularly attending the monthly meeting. Talking to the secretaries of other societies, I realise that our meetings are extremely well supported, and that we have a very high percentage of our membership that regularly attends the meetings.

As mentioned in previous Newsletters, the Society has embraced industrial history, heritage and archaeology, always seeking to combine local interest with sites further afield, and to draw on the expertise of members as well as outside speakers. Publication of material has not been the strongest element in the Society's activities – with some notable individual exceptions. The fact that little has been published is a matter of some regret, but in my view has been compensated by the interest and enthusiasm of the membership at our meetings, including the number and range of questions posed to our speakers.

The December meeting will be an occasion for a fuller reflection on the Society's work and, as the main part of that meeting, a presentation will be made on sites that have been lost, sites that have converted to other uses, and sites that have been retained over the past 20 years. To this end – and to follow up issues raised in previous Newsletters – any member who would like to investigate a particular site (information, photographs, illustrations, references) and present these findings to the meeting, please get in touch with the Chairman as soon as possible. This could even

become the starting point for a small 'Archive Group' that would gather these findings in a format that might be published and presented to members and possibly to Libraries/Record Offices as a permanent record. This would include a suitably digitised copy of those slides that many of us possess.

Journals

As a result of subscriptions and the generosity of John Selby, the Society now has a (virtually) full collection of *The Industrial Archaeology Review* (and its predecessor *The Journal of Industrial Archaeology*) 1964 – 2009, a full collection of the magazine *Archive – the Quarterly Journal for British Industrial and Transport History* 1994-2009, and copies of many of the *Newcomen Society Transactions* 1978-1998. The index to each of these journals is available on line, and should any member wish to borrow a copy then please get in touch with the Chairman.

Conferences

Many members will recall the presentation made by Michael Darby to WIAS earlier in the year. An extended version of this talk was the opening address of the *Fe09 Footprints of Industry Conference* held at Coalbrookdale in 2009 to commemorate the 300th Anniversary of the first commercial use of coke to smelt iron. It was a joint conference between the Association for Industrial Archaeology, the Historical Metallurgy Society, the Newcomen Society and the Society for Post-Medieval Archaeology. There were 40 papers presented - a test of stamina for some! - and the Chairman hopes to report on some aspects of these in the latter part of forthcoming meetings.

The Annual AIA Conference is to be held in Lincoln this year, with the last day of the Conference coinciding with our first meeting of the year. A small number of members will be attending and we look forward to their reports back to the Society.

Annual General Meeting

The AGM of WIAS will be held in the latter part of the September meeting. I am glad to report that all officers have agreed to stand again, and no change is planned for the subscription and meeting charges. In

fact, the cost of the hire of the Pyne Room has risen, but we hope that a high level of subscription renewal and full attendances at meetings will enable us to cover this.

Officers

President: Toby Cave
Chairman: Martin Green
Secretary: Dennis Crips
Treasurer: Richard Hartree
Membership Secretary: Sue Hammon
Newsletter Editor: Mike Hurn
Committee members: Roger Cragg, John Selby

Reviews

An additional feature of this Newsletter could be a regular review of recently published books and articles, plus reviews of websites of interest to members. Again, contributions from individuals would be most welcome – please contact the editor of the Newsletter.

PROGRAMME

September 10th 2009

David Close: *Chedham's Yard*
Followed by Annual General Meeting of WIAS

October 8th 2009

Steve Bagley and Damian Kimberley: *Three Cycling Pioneers of Coventry - James Starley, William Hillman and George Singer*

November 12th 2009

Roger Cragg: *Robert Stephenson*

December 10th 2009

A presentation by members of the Society: *Twenty Years of WIAS 1989-2009*

January 14th 2010

Dr Amelia Pannett: *Warwick Gas Works*

February 11th 2010

Richard Hartree: *The Aluminium Works at Banbury 1929-2009*

March 11th 2010

A joint meeting with the Leamington Society: *The works of William Louis de Normanville*

April 8th 2010

Dr Malcolm Dick: *Matthew Boulton (1728 – 1809) and the celebration of industrial technology*

May 13th 2010

Peter Coulls, Adrian Foote and John Willock: *Willans Works*

June 10th 2010

A presentation by members: *Industrial Archaeology Abroad*

NEWSLETTER

Meeting Reports

May 2009: Dr Jim Andrew
The Smethwick Engine

Jim Andrew's absorbing presentation on the history of the Smethwick Engine was a fine example of industrial archaeology in practice. He demonstrated a passion for his subject, painstaking thoroughness in researching archive material in old company accounts, maps and local historical sources, and hands-on trowel (or hydraulic drill) archaeology when required.

In 1897 a steam engine was preserved because it was old but its preservation was justified by some pretty dubious stories. It is now known that it was put to work at the end of May 1779 and worked for a hundred and twelve years. It was erected by the Birmingham Canal Company to return water up the locks at Smethwick, and the Canal Company archives have yielded the best set of accounts and costs for any eighteenth century steam engine - there is even an estimate of the cost of the alternative proposal of a reservoir. The engine was used by James Watt in 1779 to evaluate the effect of expansive working. It gave a 14% saving in fuel, leading to details of how to get this saving being circulated to Boulton & Watt's engine erectors. The Canal Company preserved the engine in 1897 and in 1959 the British Waterways Board presented the engine to Birmingham Museums & Art Gallery. Funding for relocation and installation was a problem but the engine was steamed for its bicentenary in 1979, becoming the world's oldest working steam engine, and it was put on regular public view from 1983. In 2001 it was again moved when the industrial collections moved to Thinktank, Birmingham Science Museum, where it can be steamed or demonstrated in a gentle way by a hydraulic system.

Dr. Jim Andrew's lecture detailed the engine's history and how it contributed to the Birmingham Canal. The work to extract the engine's costs was described together with how the engine worked and the results of the tests on expansive working. In the 1980s the original site of the engine was identified, leading to the excavation of the half of the engine house which remained below ground and a greater understanding of the construction of engine houses at that time. Finally, the talk outlined the way the move to Thinktank allowed the restoration of the engine closer to its original layout, giving better performance on steam, but also explained why the engine cannot be run representatively off load yet must not be operated under load - an interesting conundrum. Maybe the most startling point to emerge was that the engine, which lifted the equivalent of 1,500 buckets of water each minute allowing 250 boats to pass through the locks every week, cost about £2,000 in 1779, between half and three quarters of a million pounds today, yet it only delivered 28 horsepower, some half the power of many small cars today. Could we seek a better illustration of the desperate need for reliable power at the start of the Industrial Revolution.

Looking at the engine and its purpose in more detail we learned that originally, it was one of two engines used to pump water back up to the 491 ft summit level of the Old Main Line (Birmingham Canal) canal at Smethwick, not far from the Soho Foundry where it was made. The second

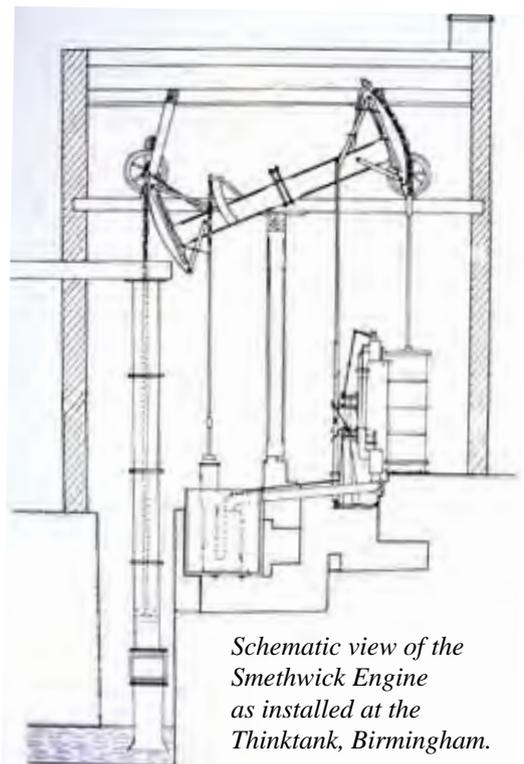
engine, also built by Boulton and Watt, was at the other end of the summit level at Spon Lane. In 1804 a second Boulton and Watt engine was added alongside the 1779 engine.

The engines were needed because local water sources were insufficient to supply water to operate the six locks either side of the canal's original summit. The locks could have been avoided if a tunnel had been built, but the ground was too unstable for a tunnel to be built using the techniques available at the time. In the 1780s, a cutting was constructed by John Smeaton, enabling three of the six locks on each side to be removed.

In the 1820s, Thomas Telford constructed a new canal parallel to the old in a deeper cutting, at the 453 ft Birmingham Level, creating the largest man-made earthworks in the world at the time. It was spanned by the Galton Bridge. The engine was still needed, despite both these developments, and Thomas Telford constructed the Engine Arm Aqueduct carrying the Engine Arm branch canal over his New Main Line so that coal could still be transported along the arm to feed the Smethwick Engine.

In 1892, a replacement engine was built in a new pumping house, now Grade II listed, next to Brasshouse Lane, as the original Smethwick Engine was considered uneconomic to repair. This new pumping house is now part of the nearby Galton Valley Canal Museum. The original Smethwick Engine was then removed to British Waterways Ocker Hill depot where it remained until acquired by Birmingham City Council.

The engine house was demolished in 1897. Its original site and foundations, which are a Scheduled Ancient Monument, can still be seen on Bridge Street North in Smethwick, just north of the junction with Rolfe Street.



Schematic view of the Smethwick Engine as installed at the Thinktank, Birmingham.

June 2009: Peter Bones

The Restoration of Chesterton Windmill

Peter Bones is a (Morris-dancing) restoration engineer with Warwick County Council who was in charge of the repairs required to Chesterton Windmill after a stock broke during the open day demonstrations on 9 September 2006, causing one of the sails to crash to the ground. Fortunately without seriously injuring anybody. He gave us great insight into the mill, its history and its restoration.

Before detailing the latest repair programme, Peter described the history of the building. The ornate limestone structure with decorative sandstone features was built in 1632. It was commissioned by Sir Edward Peyto, Lord of the Manor of Chesterton and a member of a prominent Roman Catholic family. A staunch Royalist, he was Governor of Warwick Castle from 1630 until his death during its siege in 1642.

Peyto was a flamboyant mathematician and astronomer also a friend of Inigo Jones, whom he may have accompanied on a visit to Italy and who may have had some responsibility for the design. Certainly there is an Italian influence to the building with elements of the dome and columns of St Peter's being recalled. The building appears to be unique although a Round Tower built in America at Newport, Rhode Island has strong similarities. (If members care to Google Newport Round Tower they will uncover a wealth of interesting material including references to Chesterton)

There remains speculation as to the original purpose of the building. Was it an astronomical observatory? A working mill? Or simply a folly? Other classical cylindrical buildings usually had eight (or multiples of) columns whilst the Chesterton building has only six. This has reinforced the suggestion that its original purpose was as an observatory with the sight-lines between pairs of columns aligned to the solstices. Certainly, it soon became a working mill and continued as such, with major work on the machinery being recorded in 1776 and 1860, until 1910 when it ceased working.

The mill was derelict in 1965 when Warwickshire County Council, who have since been made custodians of the mill, were asked to undertake restoration by the Ministry of Works. The Society for the Protection of Ancient Buildings undertook with Warwickshire County Council to restore the machinery. Work was finally completed in the spring of 1975 and a Civic Trust Heritage award of Exceptional Merit was made to the County Council. The first public open day was held on 30th October 1971.

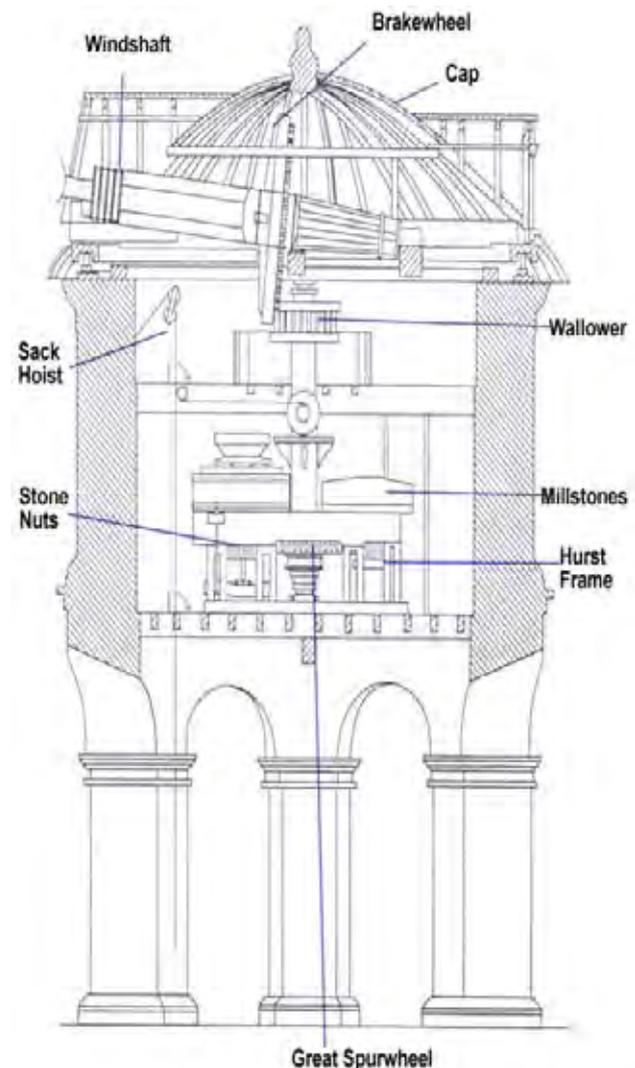
Peter used a model of the Mill's working parts to give us a very detailed explanation of the mechanism. Members now know about sail-cloth frames, whips, inner and outer stocks, the canister as well as brake wheels, windshafts, wallowers and Hurst Frames. Some of these features are unique to the Chesterton Mill.

Between 1999 and 2001 many of the components of the four sails and the stocks that carry them were replaced. However, an attempt to replace the routine inspections, that would have been made by the miller, of the security of the

wedges used to secure the inner stocks in the canister (by bolting the wedges to the stocks with steel coach screws) led to the disaster of 2006. The screws corroded and caused rot to weaken the stocks leading to one fracturing soon after the sails began to rotate. So much for modernity! Happily, Peter has devised a much more elegant solution for wedge security that will not compromise the integrity of the new stocks.

At the same time as repairs were being made to the sail mechanism the opportunity was taken to replace joists and other timbers of the working floor that were in poor condition. Siberian red pine, pressure treated after drilling and machining was used for the new stocks and the woodwork is finished with a linseed oil-based paint. In the future the mechanism will be monitored with quarterly inspections.

Chesterton Windmill will be open during the Heritage Open Days in September.



A cross section of the Chesterton Windmill

June 2009: The Chairman's Lecture

The Olympic Games Site

The decision to award London the 2012 Olympic Games was met with a range of responses, from unparalleled delight amongst sports enthusiasts to utter dismay from those seeking to preserve the unique atmosphere of this little known part of London. It also attracted the interest of industrial archaeologists, as this site is – and has always been – an area of industrial activity and public works provision. The scale of the project and the limited time available meant that any recording took on great urgency, and this need was reflected in the subsequent archaeological surveys.

The Olympics site is in the Lower Lea Valley, originally marshland, but now traversed (in a broadly north-south direction) by a series of natural and man-made water courses. These have been utilised for water supply, navigation, flood control and as a source of power. Names such as Three Mills River, Waterworks River, and Pudding Mill River give an indication of the importance of water to the economic activity of the area. Improvements to these water courses in terms of access, navigability and environmental quality is an important component of the Olympic Plan, although some of the more ambitious plans for the use of water as a means of transporting materials have had to be reduced in scale.

The water courses have been crossed by road and rail routes, often creating enclosed pockets of land which have taken on their own particular identity and usage. They have been the location for a multitude of industrial activities, many of them in the 'less attractive' category, with very little of the area devoted to residential accommodation.

This pattern has continued through to the recent past, and the sites had become occupied by an eclectic mix of manufacturing, storage and distribution facilities, bordering the often neglected waterways. It would be difficult to justify the retention of many of these on industrial heritage grounds, but archaeological investigation of what may have preceded them certainly does.

All the firms have been given the opportunity for re-location. Some have chosen to move further afield, whilst others have remained in the area, perhaps the most notable example being H. Forman (purveyors of smoked fish) established in London by immigrant Aaron Foreman in 1909. Stratford, of course, has long been an important railway centre, and the incorporation and development of rail links via Stratford is an important ingredient in the Olympic Plan.

There are already two highly significant sites that occupy locations close to the south of the Olympic Site – namely Three Mills and Abbey Mills Pumping Station. There have been mills on the Three Mills site for a very long time, and the 'Three' referred to are House Mill, Clock Mill (both of which still stand) and a (now demolished) windmill. Both House Mill and Clock Mill were tidal mills, and House

Mill contains much of the machinery and fittings associated with the milling process. It is Grade 1 listed, and run by the River Lea Tidal Trust.

Abbey Mills Pumping Station is another well-known site. Constructed in the 1850s as part of Bazalgette's monumental scheme for the installation of London's sewer system, it quickly earned the title of 'Cathedral of Sewage'. Various sewers feed into the pumping station which then lifts the water into the Northern Outfall Sewer which carries it - by gravity – to Beckton for treatment. The Northern Outfall Sewer is itself a magnificent feat of engineering and its path can be easily traced over the area. It now forms a cycling/walking route 'The Greenway', currently being upgraded in time for the Olympics.

Elsewhere on the site, the archaeological investigations is being/ has been carried out by the Museum of London Archaeological Services (MOLAS) and PCA Pre-Construct Archaeology (PCA) under an extremely tight timetable. Various sites have been unearthed – for example extensive remains of Sayne's Mill beneath a site later occupied by the box factory for the Yardley Perfume Company. A small part of the Yardley site has been retained, with the Yardley flower girl advertisement a welcome respite to the rather bleak and busy Stratford High Street.

One of the most interesting recordings has been of an unusually complete Edwardian group of buildings known as King's Yard. This comprised the manufacturing premises of Clarke Nickolls and Combs (Clar-ni-co), the confectionery suppliers formed in 1872. One of the buildings has been retained for posterity on the site which is now largely given over to the Olympic Energy Centre.

As well as industrial activity, the area has long been a location for recreational activities, and – given the nature of what is to be created – one might anticipate these being greeted with open arms. The problem, of course, is the loss of the individuality of the area, and many bemoan the loss of Hackney Greyhound Stadium, the Eastway Cycle Track and simply the opportunity to walk, observe and enjoy a splendidly isolated part of London. Even more resentment has surrounded the relocation of the Manor Garden allotments, originally created by three Old Etonians for local people, but now very much a symbol of local identity and independence.

There has been much talk of 'The Legacy' of the Olympics, with an area dramatically transformed and hopefully rejuvenated. There will have been casualties, but - with a few notable exceptions - the harsh reality for the industrial archaeologist is that there were in fact few sites worthy of retention, although investigation and recording are important. Prospects for the area have been enhanced and perhaps the Olympics has stimulated far more interest in the history and archaeology of the area than would otherwise have been the case.

WARWICKSHIRE

Industrial Archaeology Society

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FROM THE CHAIRMAN

Annual General Meeting ... and beyond

It was good to be able to report at the AGM in September that the Society had experienced a successful year, with membership numbers and meeting attendances both revealing some encouraging statistics. The treasurer reported that the financial position was also healthy and a very modest surplus had been generated over the past year. On this basis he saw no reason why subscriptions should be increased and that these would remain at current levels for the next twelve months. The major expenditure of the Society is the of hiring of the Pyne Room and speakers' expenses, and given the high proportion of members taking to the floor in the coming twelve months, it seemed likely that a similar surplus would emerge in twelve months time.

The Society operates with a small number of officers and committee, and Richard Hartree agreed to do the Treasurer's job for three years. At the end of the coming year he will have completed his term of office and we shall be looking for a replacement. This is a crucial responsibility within the Society, but it is not a hugely onerous task, and Richard would be very willing to talk to any member about what is involved.

Looking back over the past twelve months, I feel that we have had a good variety of meetings, we have maintained our contact with outside organisations (particularly the AIA) and knowledge of the Society is growing. Instrumental in this is the role of the web site. Never has information been so accessible for us to explore industrial history and

archaeology sites via the internet, but others can, of course, seek information about the industrial archaeology of Warwickshire from our own website. Webmaster has done – and continues to do – an excellent job in updating the site. However, he relies very much on the contributions of others, and several members have been generous in their donation of time and information.

Linking this with the practical difficulties of publishing written material in pamphlet or book form, I feel that the current year could be an occasion for boosting the amount of material on the WIAS website. Writing text and inserting new digital images or scanning photographs taken in the past on film strikes me as being an easy, cheap and efficient way of boosting the stock of material available on the website. More significantly, perhaps, it can be downloaded and printed by others with the costs of that printing carried by the user and not by the Society. Many societies similar to our own have a list or database of sites which can be accessed by all.

This step requires an acceptance of the impact of the information revolution, and that knowledge and photographs, once on the website, are accessible to all. Not all may be happy with this – particularly with regard to treasured photographs – and it may be possible to explore issues of copyright, but there really is a strong case for WIAS to contribute to the amount of material on Warwickshire that could be available to others. Indeed as I write these notes, the fact that the WIAS Newsletter will be available not just to the membership but, once on our website, to a potentially vast audience is an exciting prospect.

Inland Waterways Association – Urgent Action Required

The importance of the internet as a means of communication is brought home with the arrival of an e-mail from Jo Gilbertson (IWA Campaigns and Communications Manager) via Derek Billings concerning the potential sale of British Waterways' assets. An extract from the e-mail reads:

The Government is seriously considering taking British Waterways' assets and selling them in a Treasury 'fire sale' to raise cash - a decision will be taken in the next few days. Selling off its assets would mean that BW would be £85 million short of the £120 million it needs to run the canals and waterways of this country. That will mean inevitable decay and disrepair and will undoubtedly lead to closure as the organisation contracts to preserve a core network.

An e-petition is available - Please sign up as soon as possible!!

<http://petitions.number10.gov.uk/protectourcanals/>

PROGRAMME

December 10th 2009

Roger Cragg: *Robert Stephenson*

January 14th 2010

Dr Amelia Pannett: *Warwick Gas Works*

February 11th 2010

Richard Hartree: *The Aluminium Works at Banbury 1929-2009*

March 11th 2010

A joint meeting with the Leamington Society: *The works of William Louis de Normanville*

April 8th 2010

Dr Malcolm Dick: *Matthew Boulton (1728 – 1809) and the celebration of industrial technology*

May 13th 2010

Peter Coulls, Alain Foote and John Willock: *Willans Works*

June 10th 2010

A presentation by members: *Industrial Archaeology Abroad*

NEWSLETTER

Meeting Reports

September 2009: David Close, Charlie Gilbert, Heather Cox
Chedham's Yard

The members of Wellesbourne Parish Council must have felt as though they were holding the proverbial tiger's tail when the BBC chose their conservation project for Chedham's Yard in the heart of the village as a contestant in the 'Restoration Village' programme in 2006.

The story, however, begins a few years earlier and provides a good example of industrial archaeology in practice. Chedham's Yard is a purpose-built, but unlisted, wheelwright's workshop and blacksmith's forge within the Wellesbourne conservation area. It is located at the end of a narrow lane, in an area of predominantly historic buildings, many of which are listed, and largely surrounded by residential property.

The Chedham family's association with the site dates from 1813 when Thomas Chedham moved to Wellesbourne and began to work as a wheelwright, renting a yard and accommodation. The business remained in the Chedham family from that time and operated as a wheelwright, blacksmith and general agricultural engineer until the late 1960s when the Yard ceased to be used commercially. It then entered into a state of suspended animation until 2002 when Bill Chedham, the last owner of the Yard and who had started work there in 1942, approached Wellesbourne Parish Council (WPC) in November 2001 and offered to sell the property for £10,000.

David Close was Chairman of WPC at the time and after setting the scene with some of the history surrounding Wellesbourne Hastings and Wellesbourne Mountford, which included links with Joseph Arch and the agricultural workers movement, he explained how the Parish Council approached this unusual offer. From the outset it was driven by the belief that in Chedham's Yard there was something worthy of preservation and whose loss would have been regrettable. WPC, therefore, purchased the Yard in February 2002.

A working party was established which included members of WPC, neighbours to the site, other residents of Wellesbourne and, critically, experts from the Warwickshire and Worcestershire Museums. The working party soon had a clear vision of what they wanted to achieve. This included: the preservation of the existing atmosphere, the maintenance of the Yard in the context of Wellesbourne, the creation of a lively working environment, the enablement of the wider community to understand and enjoy the work of historical crafts and the inclusion of the Yard into the broader tourist aspect of Wellesbourne.

To achieve this vision, a specialist consultancy, PLB, was appointed. PLB offers a complete range of heritage consultancy and design services and soon produced a conservation statement which concluded that Chedham's Yard was a time-capsule of rural craft skills dating back over the centuries. When work at the Yard ended the workshop, benches and equipment remained untouched for decades. With over 7000 original tools, it was a nationally significant collection of rural life and trade.

In 2004 English Heritage became involved, beginning with a preliminary photographic record and subsequent site visits and culminating with a Statement of Significance in November 2004. This concluded that, in terms of the local context, there was no doubt that Chedham's Yard was highly significant in representing the community's rural past and the type of small-scale craft industry that stood at the centre of village life and the local rural economy and as such was well worth preserving.

With this endorsement behind them, WPC moved to

appraise its options. To repair and preserve the site for research or to move the buildings to another site were rejected but it was agreed that to create a visitor attraction for traditional crafts and to re-use as workshops could be a viable option. By early 2006 WPC had spent some £100,000 (largely funded by English Heritage) and PLB was estimating that upwards of £1,000,000 would be needed to achieve the objective. Furthermore, the issues of management and an ageing membership (a familiar refrain) only added to the problems now facing WPC. It looked as though moth-balling was the only option when the BBC announced that it was seeking entrants for a new series of 'Restoration'.

An application was duly submitted, the BBC representative sent to investigate had 'never heard of this place' but thought that it held possibilities. This led to a hectic round of interviews, open days, exhibitions and local media interest for the Midlands Heat which was won, thus leading to a place in the final. This resulted in much more of the same promotional activity plus managing the growing local concern at the invasion of Wellesbourne by so many outsiders.

At the final in September 2006 it was felt that Chedham's Yard was an also-ran but when Griff Rhys Jones interviewed the feisty Iris, a lady in her mid-80s who knew Bill Chedham and had a wealth of anecdotes, then interest ignited, the telephone lines grew hot with supporters' votes and Chedham's Yard ran out the surprise winners with access to £1,000,000 of funding.

WPC now had to set up a steering group and put in hand essential repairs, submit the application for Heritage Lottery Funding and organise contracts and briefs for further work. Clearly, some outside help was needed and after interviewing three possible consultants PLB was reappointed to manage the process of writing the necessary policies, supervising the archaeological and bat surveys, updating the conservation statement and much else. All the 7,000 tools had been removed for cleaning and restoration before the site was flooded in July 2007, fortunately without causing any serious damage to the buildings.

Charlie Gilbert and Heather Cox brought us up to date with the activities of The Friends of Chedham's Yard and vividly demonstrated the trials and tribulations facing an amateur and volunteer organisation when it is thrust into the national spotlight. Some sixty members, of which only twenty five are active, were responsible for the organisation needed for the BBC programme. They now are preserving and cataloguing the artefacts as well as producing the newsletter *Chedham's Chatter*. Any new members will be very welcome.

Whilst the frantic pace has settled down, much is still to be done and the workload will accelerate again now that planning permissions have been granted (announced mid-November) which will lead to the release of funds for the preservation work and the construction of visitor amenities in anticipation of an opening in October 2010. Four working groups are in place covering: garden, website, collections and Chedham's on the Move. Other possible activities are a book based on the history of the Horse and Chedham's Yard, a shop and educational visits to schools.

It would be very sad if the work and enthusiasm of the Friends of Chedham's Yard were not to have concrete results but during the discussion following the presentation members voiced concerns about the future of the project and its long-term viability. The unfolding story of Chedham's Yard will indeed be watched with great interest.

October 2009: Steve Bagley*Three Cycling Pioneers of Coventry - James Starley, William Hillman & George Singer*

Steve Bagley, the Head of Collections, and his colleagues at the Coventry Transport Museum have delved deeply to unearth the extensive links that bind together three pioneers of Coventry's cycle industry - Starley, Hillman and Singer.

The research had been prompted because, whilst much has been written about the Coventry cycle industry, there were many errors and inaccuracies that could only be resolved by going back to the original sources. These included: census returns; birth, marriage and death records; wills and not least trade directories.

The story began with James Starley (1830-1881) who was born in Albourne, West Sussex but moved to London where he worked as a gardener to John Penn, a marine engineer with works in Greenwich (and well known to some members). Starley developed a reputation for his abilities with mechanical devices and when Penn bought a sewing machine for his wife which broke down, James effected a repair and devised improvements to the mechanism.

Penn knew Josiah Turner, one of the makers of the machine, and Starley was taken on at the London factory. In due course, Turner and Starley moved to Coventry, where workers employed in the failing watch industry were considered able to adapt to the intricate work of sewing machine production, and started their own sewing machine company in the early 1860s. First called the European Sewing Machine Company, later the Coventry Machinist's Company.

William Hillman (1848-1921), as evidenced by the census returns, lived close to Starley in Lewisham and was also apprenticed to Penn. He is then found in 1871 in Coventry in partnership with Starley making their first bicycles and registering numerous patents.

The last member of the triumvirate, George Singer (1847-1909) also lived in Lewisham in the 1860s and was apprenticed to Penns. He is found listed as a bell ringer and unsurprisingly on the same programme is one W Hillman! Early evidence of the social contact between the men which continues when Singer moves to Coventry in 1871 and is found lodging with Hillman.

Looking in more detail at the development of the cycle industry Bagley first traced the progress of Starley, known today as 'the Father of the Cycle Industry'. Starley had been captivated by this new mode of transport, and began making improvements to its design. Before long he decided to work for himself, making sewing machines and working up designs for cycles in collaboration with William Hillman in St John Street where he is recorded as a 'machinist' employing 4 men and 2 boys. There is evidence of advertising for the 'Ariel' cycle, the first all-metal cycle fitted with 'Lever Tension' wheels, which was a vast improvement on the previous French designs.

Hillman, who married in 1873, left to pursue his own future but Starley carried on the business until he teamed up with W. B. Smith in 1873 as Smith & Starley - located on a site in St Agnes' Lane where Coventry Transport Museum now stands. This enterprise lasted until 1878 when Starley began working for a cycle business that he helped to establish with his sons - Starley Bros.

James Starley was one of our great inventors with many patents to his name including the Coventry lever, the open differential (still used in some tricycles and ready and waiting when the car needed the device) and tangent spokes. The Aerial Velocipede will always be associated with him. Starley died in 1881 and is buried in the London Road cemetery and has a memorial statue at Warwick Green.

William Hillman, after leaving Starley, joined forces with William Herbert (brother to Alfred) in 1875 and in 1876, together with a racing cyclist named Cooper, founded the "Hillman and Herbert Cycle Company", later renamed the 'Premier Cycle Co'. in 1891. In the 1880s the Sparkbrook Cycle Company was purchased. Hillman developed the 'Kangaroo' cycle which was safer than the Penny Farthing and was both successful and profitable. It led to the foundation of the Auto Machinery Company for which the Museum has Minute Books from 1891. In that year the census shows Hillman as the Managing Director of a Cycle Works living in Stoke Green at Abingdon House (still extant). That the business prospered is evidenced by him building Keresley Hall (now the Royal Court Hotel) in 1894.

The boom years of the 1890s continued for Hillman who indulged his love of golf by turning land behind the Hall into 'The Golf Field' and setting up his brother-in-law, Henry Brockas as a golf ball manufacturer.

Hillman moved with the times and was early into the motor industry with the formation of the Hillman-Coatalen company with the Breton, Louis Coatalen, as designer and chief engineer. The works were located in the grounds of Pinley House, owned by Harold Smith, one of the Coventry business men behind the nascent motor industry. However, after a disagreement purporting to relate to one of Hillman's five daughters, Coatalen left in 1909 to join the Sunbeam Car Company.

Hillman died in 1921 and is buried in St Thomas' Churchyard, Keresley. His gravestone marks the family's connections with other motor industry pioneers, the Wilks of Rover and the Blacks of Standard, with the burials of two grandsons, John Spencer Wilks and John Black.

The third of the trio, George Singer (1847-1909) was born in Dorset and moved to Coventry in the late 1860s. Working under Josiah Turner and James Starley at the Coventry Machinists Company, Singer gained a wealth of experience in the new cycle trade.

In 1873 he left the Coventry Machinists for a higher position at the Paragon Cycle Company, a much smaller business but one that was concerned completely with cycle production.

Singer met and married Elizabeth Stringer the following year, and in 1875 established his own cycle business - Singer & Co. Ltd. in partnership with father-in-law James Stringer making 'Ordinary' or 'Penny-Farthing' type cycles as well as tricycles of high quality under the 'Challenge' name. As an example of the close-knit cycle industry Singer held the important DHF trademark jointly with Hillman.

Singer seems to have been more involved with civic and religious matters than the others. He was a Deacon in the United Reform Church and sat on its finance committee. He donated £200 and laid the foundation stone of Brownhill Chapel. Through the 1880s he became increasingly wealthy and by 1890 he had a grand house, Coundon Court, built for him and his growing family. In 1891 he became Mayor of Coventry, a position he held for a further three years.

Singer sold the business in 1896 for £543,000 but retained the Managing Directorship at a salary of £1,500. Very considerable sums indeed. He died at Coundon Court in 1909.

Steve Bagley showed us what a wealth of information is contained in the source documents available to us all. It does, however, require dedication and perseverance to build up the picture that he presented of the pioneering days of Coventry's cycle industry.

November 2009: John Crossling

Warwickshire Breweries - Past & Present

Darling Buds, Enigmatic Variations, Hog Goblin, Autumn Bliss, Barristers and Gavel Bender, Newton's Cream and Davy's Glow, Gold and Ubu are but a few of the names created by Warwickshire's real ale brewers. Equally varied are the names of the breweries, but more of these later.

John Crossling, looking every inch the welcoming landlord, but in reality a geologist turned local government official via the museum service, gave us a whirlwind survey of Warwickshire's breweries and brewers (plus the occasional brewster). No doubt some members were more familiar than others with the product but by the time John had finished the scent of hops, malted barley and fermenting mash was almost palpable. Sadly, no samples were available but there is the prospect of a WIAS commemorative bottle - for which an appropriate name would be welcomed by the Chairman.

John's interest in the development of the brewing industry began in Derby. His research showed that a graphic picture of social development could be drawn from the records of meetings in public houses and taverns for events such as bear-baiting, cock-fighting and the like. Similar information was found in Warwick. John also has a practical interest in brewing and beer through his active role over fifteen years in the organisation of the Harbury Beer Festival, which now has a national following.

Reviewing a list of the mid-Victorian brewers that preceded the Warwick & Leamington Brewery was reminiscent of a roll-call of local solicitors as various combinations of individual names evolved over relatively few years. Such amalgamations continued and the industry eventually became what it is today, dominated by a few giants and often ultimately non-British. However, and happily, there has been a resurgence of small, local breweries around the country and Warwickshire seems to have been especially blessed in this regard.

What we are seeing is indeed a reversion to an earlier business model. In earlier times most towns had a brewery and many taverns also had their own brew-house. The Victorians created the phenomenon of the large central brewery with a network of outlets, either brewery-owned or tied-supplied. Improved distribution channels undoubtedly assisted this process. In the recent past the Campaign for Real Ale (CAMRA) has campaigned successfully for the introduction of guest beers into previously tied houses and this has greatly helped the development of small breweries, notably the trend to micro-breweries since the 1970s.

Before looking at some of the breweries in more detail it is useful to have a brief resumé of the brewing process. Malted barley is added to water in a mash tun where the enzymes are extracted. The resultant hot liquor is transferred to a copper (now stainless steel) tank and wort and hops added before boiling for 1 to 2 hours and then sieving into a fermenting vessel via a heat exchanger (cooler) ready for the addition of yeast. After 2 to 3 weeks fermentation the brew spends a further week in a conditioning tank before being racked off into barrels for distribution. In an interesting parallel with

the Highland malt whiskey industry, the characteristics of the local water is an important factor in the finished brew. For example, the gypsum-infused aquifer under Burton-on-Trent was ideal for brewing pale ales and London became the specialist area for porter.

John's well illustrated tour of Warwickshire's small breweries showed many common themes as far as equipment was concerned, although the premises varied widely - from old slaughterhouses to large garden sheds via some impressive purpose-built units and even the former laboratory of the Studley Needle Works. The equipment showed a propensity to recycle, often from other industries and especially from the dairy field where large stainless steel tanks are commonplace as are the modular plate-type coolers that seem to predominate in the micro-breweries. Tank insulation was prominent and varied from quilted lagging to elegant slatted wood finishes reminiscent of early steam engine cylinders. Proper storage for ingredients such as hops is important and cool conditions were found in chill cabinets and large refrigerators. Hops now come from many sources beyond Kent and Herefordshire, and America, Europe, New Zealand and Japan may flavour your next pint.

The breweries are classified by their output measured in barrels per day with a barrel containing thirty-six gallons or 288 pints. Warwickshire's breweries vary from one and a half barrels to thirty-eight and incidentally up to an extremely strong 17.5% ABV! Brewing recipes are closely guarded by their owners and sadly, can be lost when a brewery fails or, more likely, is absorbed into a larger business.

It would be invidious, and probably boring, to repeat John's lengthy list of breweries but a number of conclusions can be drawn. It is particularly sad to note the short life of many of the breweries reviewed. Whilst some were forced to move premises for various reasons and others survived after a change in ownership, all too often pressure from 'the big boys' and restrictions on outlets seems to have led to the failure of a fragile business model. In contrast, one of the local success stories is led by two marketing men from Bass who have emphasised innovation and quality for a limited range of beers. Funding has been secured from DEFRA for new plant and eco-friendly reed beds are used to filter effluent in a sustainable manner. A French brewer is employed and a very attractive visitor facility has been created. It must also be said that visitors are welcomed by all of Warwickshire's brewers but please telephone ahead to avoid disappointment.

What of the future? The small brewer of real ale caters for the discerning drinker through a network of specialised public houses. Thanks to earlier changes in legislation, guest beers do feature increasingly in the mainstream houses and there is a thriving programme of beer festivals across the country. Nonetheless, the enthusiast for real ale who decides to branch out into commercial brewing faces many challenges but fortunately there are enough such brave individuals to ensure that we can enjoy a tasty, local pint throughout the County.

WARWICKSHIRE WIAS

Industrial Archaeology Society

NUMBER 37 February 2010

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FROM THE CHAIRMAN

Diverse contacts, diverse sources

This Newsletter is due to be published on the occasion of a joint meeting with the Leamington Society. This is the first time that WIAS has done a joint meeting, and it caused me to reflect that this has perhaps been something of a missed opportunity. There are a number of local history societies in Warwickshire from whom we have had visiting speakers, but the actual opportunity of members of WIAS and another history group meeting on the same occasion has not been tried before.

One of the issues is, of course, that having our meetings in Warwick makes it difficult for joint meetings to take place other than for very local groups. Discussions are currently in progress about trying to get a joint meeting with the Warwick Society on the subject of the Warwick gas works.

There is, of course, an overlapping membership between WIAS and other local groups, and knowledge and expertise is shared in this way. Similarly, my own visits to various local groups to talk on the Industrial Heritage of Warwickshire always generates items of interest from the audience. Several of these groups attract those of retirement age, and many in the audience frequently have experiences that supplement our knowledge of local sites. It is a real pleasure to be able to show a set of slides of local sites, many taken in the 1970s, and to be bombarded with responses about work experiences or local knowledge of these sites – yet another reminder of the importance of local history.

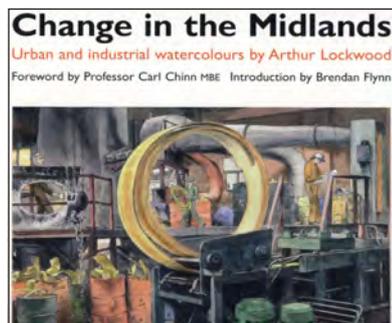
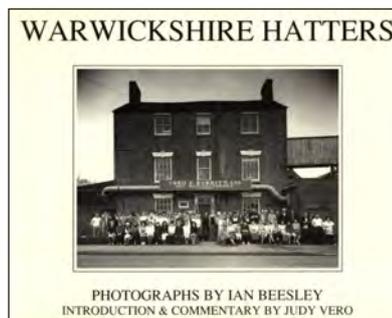
One of the most encouraging features of our Society is the very high proportion of members who attend meetings. This is unusual, and other groups admire us for this. I would like to believe that one of the reasons for this is the liberal interpretation of the industrial archaeology/history/heritage theme, and that a diverse range of subjects can be accommodated in the programme – from detailed analysis of technological change through to the social history of industrial

communities, with the content drawn from local, national or overseas examples.

This produces some blurring at the edges over what can be included but I regard this as a strength of the Society. Some of the items that creep into the last twenty minutes of some of our meetings defy classification anyway!

As I have written about before, the range of sources also seems to expand as time goes by. Earliest representations of industrial scenes relied on the skill of the artist, to be subsequently replaced by the photographer. Much archaeological recording requires photographs or drawings that present an accurate factual picture. Occasionally, collections emerge that add a great deal more to the vision of industrial experience than mere recording can achieve. Two examples are particularly appealing. One published in 1989 is *Warwickshire Hatters* (Ryburn Publishing) by Judy Vero and Ian Beesley. Judy Vero wrote the text, and Ian Beesley – who has done much photographic work on Yorkshire mills and foundries, particularly in the Bradford area – was commissioned to produce a photographic record of the last working days of Vero and Everitt, the Atherstone hat-making firm. The result is a wonderfully evocative record of the atmosphere within the works – the noise, the smell of warm damp wool, the steam of the hat-making processes – and of the lives of those who worked there. Once Vero and Everitt shut down, this left Wilson and Stafford as the only hat-making firm in Atherstone, and this, in turn, closed in 1999. A short video recording – another vital resource – of the last days of felt-making at Wilson and Stafford was made, but the (deteriorating) buildings adjacent to the Coventry Canal remain unoccupied eleven years later.

Painting has not played a significant role in the recording of industrial sites in the twentieth century, but one exception to this is the work of Arthur Lockwood. Twenty years ago Arthur Lockwood began painting scenes of the changing industrial and urban landscape of the Midlands. His paintings have been gathered



in a collection entitled *Change in the Midlands* (Sansom & Co. 2007), and – in the same way as Ian Beesley's photographs – the results are a wonderfully evocative record of times past.

Included in the collection are paintings of Coventry Colliery and the Homefire Plant – not every artist's dream location!

Both books are highly recommended, both for the skills of the artists concerned, and for their contribution to the record of our industrial heritage.

Martin Green

PROGRAMME

March 11th 2010

A joint meeting with the Leamington Society: *The works of William Louis de Normanville*

April 8th 2010

Dr Malcolm Dick: *Matthew Boulton (1728 – 1809) and the celebration of industrial technology*

May 13th 2010

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June 10th 2010

A presentation by members: *Industrial Archaeology Abroad*

NEWSLETTER

Meeting Reports

December 2009: Roger Cragg

Robert Stephenson, His Life and Works

Roger Cragg ended our year in style with his review of the life and works of Robert Stephenson, a fact-filled story of one of Britain's foremost engineers, the 150th anniversary of whose death was commemorated in 2009. Roger concentrated on Stephenson's work as a civil engineer but he also examined his substantial involvement in what would now be termed mechanical engineering.

Regarding Stephenson's early life, we learnt that he was born in October 1803, but erroneously celebrated his birthday in November. The only son of George Stephenson, he attended a private school in Newcastle, commuting by donkey. In 1819 he was apprenticed to the Viewer at Killingworth Colliery learning mine surveying and the design and operation of machinery. However, his father's career was developing and as his son's assistance was needed Robert left Killingworth and, effectively became apprenticed to his father who was rapidly developing a name in what was to become railway building.

In 1821 George Stephenson was commissioned to re-survey the route of the proposed Stockton and Darlington railway with a view to the use of locomotives on the line and he was subsequently appointed Engineer for its construction. The opening of the Hetton Colliery line in 1822 and that of the Stockton & Darlington in 1830 established him as a consulting engineer, much in demand for advice on early railway schemes.

In addition to his work on colliery wagonways, George had also been developing his skills as an engine mechanic, making improvements to winding engines and installing new engines. In all this work he was ably assisted by Robert, one of whose useful talents was that he could write clearly!

William James, an early railway entrepreneur, discussed with the Stephensons the use of locomotives on his proposed Central Junction Railway. James had undertaken the first survey for a railway from Liverpool to Manchester, a project with which the Stephensons were to become very involved and Robert accompanied James on a further survey of the route.

In 1822 Stephenson went to Edinburgh University. During his short time there he met George Bidder who became a close colleague throughout his working life. Returning to Tyneside in 1823, he commenced his professional career alongside his father. One of the first tasks which he undertook on his own was the survey and design of a branch of the Stockton & Darlington Railway and he proudly signed the drawing 'R. Stephenson, Engineer'.

In June 1823 George and Robert Stephenson, together with three others, founded the firm of Robert Stephenson & Co. with Robert as the managing partner, a huge step for one so young. The purpose of the company was to develop the mechanical engineering side of the Stephensons' business.

Roger then explored the rather mysterious period in Stephenson's life when in 1824 the Mexican Mining Company consulted the Stephensons with a view to re-opening gold and silver mines in Mexico and Colombia. Stephenson was invited to go out to supervise the work. Although his partners were reluctant, they agreed that he could go for about one year but unknown to them at the time he had contracted to go for a three year period. The discovery of this fact did not please his colleagues!

Nevertheless, Stephenson sailed in June 1824 accompanied by a party of Cornish miners who were to work the mines. He was engaged on a number of projects including the surveying of a route for a 7 mile railway which he advised was not possible owing to the mountainous terrain. From Caracas he went, by mule, to Bogota and thence to the Sanata Ana silver mine. He also undertook a 1,100 mile tour of the interior. The work was trying and there were problems with drunken miners but it did develop his managerial skills. In 1827 he travelled to Cartagena to take passage home. There he met Richard Trevithick who had fallen on hard times and Stephenson provided the funds for Trevithick's passage to England. Robert eventually returned to

England after a brief tour of the United States.

On his return he was engaged in the two tasks of managing the factory of Robert Stephenson and Co. and working alongside his father but now as an equal rather than as a subordinate. To facilitate this a new company was created, George Stephenson & Son with George and Robert appointed as Chief Engineers with 18 employees.

Stephenson first assisted with the design and construction of the Liverpool and Manchester Railway. However, his major contribution to that railway was the Rocket locomotive. George Stephenson had been active in locomotive design and his engines were already at work on the Stockton & Darlington railway. Robert's task was to develop these slow and ponderous beasts into something more useful for a major public railway. The rival merits of stationary engines against locomotive haulage were being debated. The Stephensons argued forcibly for the use of locomotives and it was decided to hold trials at Rainhill in October 1829. Several locomotives were entered for the competition but on the day only five were available and of these only three were serious competitors; Novelty, Sans Pareil and the Rocket. In the trials Novelty and Sans Pareil suffered mechanical failures and only Rocket performed the tasks set satisfactorily.

The Rocket was a major step forward in locomotive design with inclined cylinders driving directly on the crank pins of the driving wheels, enabling the driving wheels to be sprung, and its multi-tube boiler vastly increased the heating surface. The ultimate development of the Rocket type locomotive appeared shortly afterwards in the shape of the Northumbrian in which the cylinders were placed horizontally and a separate firebox was incorporated into the boiler, thus setting the pattern for all steam locomotives to the end of steam in the 1960s.

Meanwhile Stephenson had taken over responsibility from his father for the completion of the Canterbury & Whitstable Railway. Already he was making use of assistants although his absences from the works was the subject of some criticism by the Directors of the company.

From this time on Stephenson was involved in many schemes but Roger was only able to highlight some of the more outstanding projects. These included the 16 miles long Leicester & Swannington Railway, whose mile long tunnel at Glenfield near Leicester survives *in situ*, and the winding engine from the Swannington incline is preserved at the National Railway Museum at York. Another was the London & Birmingham. Several different routes had been suggested and in 1830 George and Robert Stephenson were appointed as joint Engineers to survey the line and prepare a final scheme. Robert appeared before the parliamentary committee to defend the proposals and acquitted himself well, impressing many people with his skill in dealing with many hostile questions.

At this stage his father dropped out of the project and Robert was appointed sole Chief Engineer for the railway at a salary of £1,500, later raised to £2,000. At this time he was not quite 30 years of age and solely responsible for the building of a railway with an estimated cost of £1,701,000, equivalent to many millions of pounds today and probably on the scale of the channel tunnel rail link. Some responsibility for one so young!

Roger highlighted two of the major difficulties which Stephenson had to overcome at a time when railway building had hardly started and little experience had been gained. First was the great cutting at Roade. The contractor failed and the work was taken over and finished by the Company. However the problems at Roade were dwarfed by the difficulties encountered in the driving of the tunnel at Kilsby where quicksands were encountered and the tunnel flooded. Again, the contractor was released from his obligations and Stephenson took charge. Unsurprisingly, there was a huge cost overrun, from £98,988 to £291,030! Of the workforce of about 1,300 men, 26 were killed during construction.

That these difficulties were successfully overcome, was

largely thanks to the qualities not only of Stephenson but also his subordinate staff which included many who went on to become eminent engineers in their own right, such as John Birkinshaw, Thomas Gooch, Charles Fox and George Buck. Generally, Stephenson's policy was to appoint young aspiring engineers to junior posts, trusting them with more responsibility as they proved themselves.

From this point a chronological view of Stephenson's career becomes impractical because of the sheer volume of his activities and Roger used a few of his more prominent projects to give a flavour of his career and of the man himself through his private and business life.

It was indicative of the status of the Stephensons that in 1835 they went to Brussels to meet with the King of the Belgians to discuss the creation of the Belgian State railway system, and by 1840 the Newcastle factory was sending locomotives all over Europe including France, Belgium, Austria, Germany, Italy, Russia and also to the United States.

In 1832 Stephenson agreed to act as Consulting Engineer to the Stanhope and Tyne Railway which was to build a line over the moors. It incorporated on its various sections; horse traction, locomotives and stationary engines and had three miles of inclined planes – almost every method of traction possible on one line! Economically the line was a disaster and unfortunately Stephenson had accepted five £500 shares in the company in lieu of his fee. When the company collapsed he discovered that, as the company had never been incorporated, he had an unlimited personal liability for its debts which eventually cost him £20,000.

Stephenson enjoyed a good relationship with his near contemporary Isambard Brunel who was only three years younger. Although they had different views on some aspects of railway development, the track gauge and the atmospheric system being two, they always had a high regard for one another and corresponded on friendly terms. Brunel wrote: "*despite our very bitter contests I have a great regard [for him]*".

The 1840s were perhaps the greatest years of Stephenson's career and included: Consulting Engineer to the London & Birmingham Railway, Engineer to the South Eastern Railway, Chief Engineer to the Eastern Counties Railway, Engineer in Chief to the Chester & Holyhead Railway, Chief Engineer of the Midland Railway, Joint Principal engineer to the North Staffordshire Railway, Chief Engineer to the Shrewsbury & Birmingham Railway and many others.

The Chester & Holyhead Railway included one of Stephenson's less successful structures. The coming of the railways had led to bridge building on an unprecedented scale; whereas most previous bridges had been of the stable arch type, railways needed adequate headroom and width which favoured the horizontal beam. Cast iron was the preferred material but engineers were well aware of its brittle nature, especially when subjected to tensile stresses.

The trussed compound girder became a popular solution this problem. Large numbers of these beams with spans of up to 70 ft. were built in the 1840s including a bridge carrying the Chester & Holyhead Railway over the River Dee. In early 1847 one of the spans of the bridge collapsed and five people were killed and sixteen injured when the train fell into the river. Stephenson took full responsibility for the bridge design at the inquest. The whole matter of trussed compound girders was the subject of a Royal Commission enquiry. This led to the rapid strengthening of existing girders and, by the late 1840s the abandonment of cast iron, trussed or not, for railway bridges.

The Chester & Holyhead Railway also saw the introduction of another new form of bridge design – the wrought iron tubular bridge. Thomas Telford had solved the problem of crossing the Menai Straits for road use with his suspension bridge. However, suspension bridges were not considered suitable for railways and after much experimentation the riveted, wrought iron tube was developed.

Two such bridges were built on the Chester & Holyhead. The first bridged the river Conwy with twin 400 ft. long tubes crossing the river at a low level. The 1,000-ton tubes were built on dry land and then floated out on pontoons and raised onto the supporting abutments by hydraulic jacks. The Britannia Bridge was a much greater challenge with four twin spans. Again, the tubes were floated out and jacked into place. The tubes of the spans were joined to give a continuous beam and the trains ran through the tubes instead of above them.

Other tubular bridges built by Stephenson included two over the River Nile and the Victoria Bridge over the St. Lawrence River as part of the Grand Trunk Railway which linked Toronto with Quebec. The Victoria Bridge was the world's longest bridge. It overcame the winter freezing of the river which gave rise to large quantities of ice coming down river in the spring thaw by incorporating large sloping cutwaters into the upstream side of the piers.

Two other bridges nearer to home that stand out are the High level Bridge at Newcastle and the Royal Border Bridge at Berwick upon Tweed. The former is unusual in that it is a two level bridge which carries the railway line along its upper deck and the road on the lower. There has been some controversy as to who designed the bridge but although Thomas Harrison was asked to prepare a design for the bridge he wrote that "*...the designs are not mine but my friend Mr. Robert Stephenson's.*" The latter is a bold masonry arch structure above the River Tweed and Stephenson was again assisted by Harrison.

Stephenson's professional life was widely recognised, he had joined the Institution of Civil Engineers in 1830 and was its President between 1856 and 1858. In 1857 he had received the honorary degree of Doctor of Civil Law from Oxford University. He was a founder member of the Institution of Mechanical Engineers when it was created in 1847 and became its President in 1848. In 1849 he was made a Fellow of the Royal Society. Also in 1847, rather surprisingly he became a Member of Parliament, being elected for the constituency of Whitby, a role which he continued until his death. He appears to have taken little part in Parliamentary proceedings although in 1857 he did speak in the House against the Suez Canal – one of his rare errors of judgment.

Stephenson remained in great demand as one of the leading civil engineers of the day but his health was beginning to suffer as was that of his friend and rival Isambard Brunel. The pair took a cruise to Egypt in 1858 in Stephenson's yacht *Titania* to recuperate as both were suffering from Bright's disease. Returning to London in February 1859, his health seemed improved and he returned to work but he soon relapsed and made one last voyage in *Titania* to Norway to take part in the opening of a railway which he and George Bidder had engineered. He returned to London but died on 12 October 1859 at the age of 56.

Stephenson was one of the greatest engineers of his day and arguably one of the greatest of all time. He was buried in Westminster Abbey. One of the pall bearers was his old colleague Joseph Locke who had succeeded him as President of the Institute of Civil Engineers.

What of Robert Stephenson the man? Roger fittingly closed with a quotation from Samuel Smiles' biography of 'The Chief' as he was invariably known to his associates:

"... he was eminently practical and yet always open to the influence and guidance of correct theory. ... He inherited his father's kindly spirit and benevolent disposition ... He will be judged by his achievements as an Engineer ... by the immense practical services which he rendered ... to civilisation through ... the railways constructed by him in all parts of the world."

Robert Stephenson was a truly great man and one to whom we owe a great debt of gratitude.

February 2010: Roger Hartree

The Aluminium Works at Banbury, 1929-2009

The 'Ally' was for many years the industrial heart of the old market town of Banbury and Richard Hartree gave us a very personal view of the plant and its products which resulted from his thirty-six year career with the Northern Aluminium Company and its successors. Richard joined the graduate training programme as a metallurgist in 1954 and retired in 1990 when working in Vancouver. He was based in Banbury for most of the 1960s and 70s and saw much change during this time.

The Banbury plant was located one and a half miles North of Banbury. It was always a processing plant for the aluminium ingots provided by the parent company from which rolled and extruded products were produced. However, the processes involved required a high degree of competence and attention to detail to ensure the quality demanded by customers which ranged from the burgeoning aircraft makers to hollowware spinners.

The Northern Aluminium Company (NACo) was a subsidiary of the Canadian giant Alcan which had an existing warehouse in West Bromwich, where aluminium sheets from North America were cut to size or blanked into discs and a small extrusion press produced trim sections. In 1929 Alcan decided to build a sheet rolling plant in the UK which would be the largest in the group. 40 acres of land were purchased in Banbury, a central location with good road and rail links plus a reliable electricity supply. Interestingly, the choice stemmed from a chance meeting on an Atlantic liner between an Alcan engineer and the brother-in-law of the Banbury Town Accountant. It was suggested that Alcan look at Banbury where Samuelsons, an agricultural engineer and a major employer had just closed and the Town Council was anxious to attract another major employer.

That the Council was anxious is shown in the final deal that was struck. An asking price of £12,000 was met with an offer of £10,000 from NACo who upped this by £200 after a local banker, Gillet put up £1,000 and the Councillors personally contributed £800. Banbury wanted NACo to come!

Construction was completed in 1931 and sheet shearing and blanking plant was moved from West Bromwich and local labour hired and trained. By 1932, 300 people were employed on two shifts. The extrusion press with its associated die-making facilities was moved in 1933 and a Paste and Powder Plant located away from the main buildings because of the explosion hazard.

In the mid-30s the plant was expanded substantially, not least to meet the increasing demand from the aircraft industry which was changing from wooden to metal airframes. A notable technical advance was the development of 'clad' aluminium whereby a pure outer skin was bonded onto a copper-rich core to combine strength with corrosion resistance especially for aircraft. More sophisticated heat treatment and re-rolling equipment were also installed.

Given the dangerous nature of some of the manufacturing processes it is not surprising that safety was given a high priority; even extending to the title of the work's magazine - 'Safety First'. The Safety Committee was also the name of the first regular joint management/workers forum. Nonetheless, accidents did occur with foot injuries being quite frequent. Safety shoes were available for purchase but their use was not compulsory.

Labour relations hit the national press in 1936 when a strike over pay occurred. However, the underlying cause was over union recognition and there were some unpleasant incidents at the work's gates over 'blacklegs' entering the site which

resulted in a police presence. The dispute was resolved in about a week (ed: pretty swift by later industrial relations standards) with 5% wage increase, from 10 1/2d to 11d per hour for a 50 hour week and a 'shift bonus' of 12.5%.

In 1938 a major expansion programme doubled both sheet and extrusion capacity to meet growing demand resulting from the rearmament programmes of the RAF. A new office block and Alcan's first research laboratory, both now listed, were built.

Two new extrusion presses came from Germany, and the installation engineers who were still on the site at the outbreak of hostilities were interned. At this time Banbury was the largest aluminium sheet and extrusion plant in England and as such was one of the first to be camouflaged and 'dummied' some two miles to the North.

The need for aircraft put huge demands on the aluminium industry as production rose from 2,828 units in 1938 to 15,049 in 1940 and over 26,000 by 1944. NACo built and operated a major 'recycling' plant near Adderbury to process aluminium from both British and German crashes.

On 3 October 1940 the dummy plant was bombed and the German news later claimed the destruction of a munitions factory at Banbury. The damage was quickly repaired! 'Dummy Ally' was preserved as an address in the 1964 electoral register and the dummy gateposts survived until the 1970s.

Throughout the war the plant operated continuously and a high proportion of the workforce, which exceeded 4,000 at its peak, were women. Until new plant elsewhere came on stream in 1942, Banbury supplied between 50 and 60% of the needs of the aircraft industry. NACo provided technical assistance to these new plants.

After the war came diversification to find new uses for the greater capacity now in place. Banbury concentrated on small order specialist products including all aircraft sheet. Nevertheless, the plant remained the largest employer in the town and played an important part in its social life.

The installation of new plant in the mid 1950s led to the need for labour and Roger touched on the problems at that time of recruiting from among the newly arrived Caribbean immigrants. Within a few years a new productivity-based incentive scheme increased output and avoided the need for additional labour.

However, excess capacity existed in the industry and rationalisation was needed. In 1968, Alcan bought Delta Metals' 50% stake in James Booth Aluminium with the balance owned by Kaiser Aluminium. As a result, there was a major rationalisation across four sheet and extrusion plants with consequent redundancies (some 1,200 at Banbury but generous terms meant few were compulsory).

Plant modernisation continued through the 1970s and 80s but the workforce steadily reduced to around 750 when the 50th anniversary was celebrated in 1981. In 1986 the anodising plant was closed and by 1993 employees numbered but 528.

Alcan continued to rationalise, selling surplus land and then the business in 1966 to a merchant banking group which operated it under the name of British Aluminium until selling it on to Alcoa in 2000, who in turn sold it to the French company SAPA in 2007. SAPA finally closed the plant in 2008 thus ending nearly 80 years of the 'Ally' in Banbury.

The listed 1938 Office and R&D buildings remain together with the 1931 Gates and the Memorial Garden to the forty-one employees who died on WW2 service.

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WARWICKSHIRE

Industrial Archaeology Society

WIAS

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FROM THE CHAIRMAN

The final edition of the year gives me the opportunity to thank Mike Hurn for all his efforts in putting together the quarterly Newsletter of WIAS and for providing such a valuable record of the meetings and work of the Society. It is quite a responsibility and Mike carries out the task in a quiet, good-humoured and effective manner. Mike always welcomes contributions from members, and he is very grateful for those received. Thanks are also due to our former editor, Arthur Astrop. Arthur is unable to attend meetings because of his wife's ill-health, but maintains contact with the Society via his proof-reading of each edition of the Newsletter.

This final edition also enables me to give notice of the AGM of the Warwickshire Industrial Archaeology Society to be held on September 9th, 2010 at 7.30 p.m. in the Pyne Room, Warwick School. No major changes are planned for the working of the Society, although we will have a new treasurer, with Victor Lobb kindly agreeing to take over from Richard Hartree. Formal thanks will be delivered to Richard at the AGM, but it has been very reassuring to know that the Society's finances have continued in such good health under Richard's careful stewardship.

The full programme of meetings for next year will be delivered in the annual mailing over the summer, but the mix will again be that of industrial archaeology, history and heritage, covering local sites and those further afield, with speakers drawn from within the Society as well as outside speakers. I really do believe that contributions from members are vital to the long-term success of the Society, and this has been fully reflected in the excellent talks delivered by members over the past twelve months.

The programme for the remainder of 2010 is shown below. The December meeting will be a talk by those WIAS members who attended the AIA Conference in Cornwall in September. Although we have enjoyed several fine talks on Cornwall over the years, the AIA conference gives access to some areas and sites not normally open to the public. In addition, this year is the 100th anniversary of Tom Rolt's birth, and in his memory - and in place of the traditional Rolt Memorial Lecture at the Conference - there will be a symposium on the theme *'Remembering Tom Rolt'*, and members hope to be able to report and reflect on the content of the symposium.

Martin Green

Shrewley Horse Tunnel

'Continuing the series of occasional articles on historic civil engineering works in Warwickshire by Roger Cragg.'

At Shrewley the Warwick & Birmingham Canal (later part of the Grand Union canal system) passes through a 433 yard tunnel under a ridge of high ground. The tunnel was opened in 1799 and, as was the manner at that time, there is no towpath through the tunnel. Consequently the towing horse would need to be unhitched from the boat and led over the hill to rejoin the canal at the other end of the tunnel.

Although the canal tunnel itself is not particularly remarkable, the distinctive aspect of this tunnel is that at the west end the towpath, after rising from the side of the deep cutting leading to the canal tunnel, passes through a short tunnel of its own high above the canal before emerging to reach the village of Shrewley. This feature is believed

to be unique. At the entrance to the tunnel the towpath is about 15 ft. above the level of the canal.

The towpath tunnel is about 176 ft. long and 8 ft. high. It has vertical walls and a semicircular arched roof and rises on a steepening gradient. The width of the tunnel varies from 9 ft 6 in at its lower end to 8 ft 4 in at the upper end. Most of the tunnel is paved with brick with raised courses to afford a grip to the hooves of horses but the highest 32 ft of the tunnel has recent concrete steps. The towpath tunnel can be accessed down a narrow footpath between the houses on the west side of the main street.

The horse path crosses the village street and continues down a footpath to rejoin the canal at the east end of the tunnel.

National Grid Reference: SP 214673

Roger Cragg

PROGRAMME

September 9th 2010

Annual General Meeting of the Warwickshire Industrial Archaeology Society.

Followed by *'The Last Picture Show'*: a showing of 35mm slides by members to reflect the work of WIAS over the past 21 years

October 14th 2010

Mike Glassson, curator of the Walsall Leather Museum, and author of several books on the leather trade: *The Walsall Leather Industry*

November 11th 2010

Sarah Chubb, borough archivist for Sandwell Community History and Archives Service:

Chance Brothers – glassmakers of Smethwick

December 9th 2010

WIAS members who attended the AIA Conference in Cornwall: *'Aspects of the industrial heritage of Cornwall'*

NEWSLETTER

Meeting Reports

March 2010: A Joint Meeting with The Leamington Society

Matthew Rhodes and Bernard Perkins: *Past and future renewable energy from the Leam*

William Louis de Normanville was the Borough Engineer and Surveyor of Leamington Spa for 35 years, from 1882 - 1917. During this time he engineered the river, built the Mill, York and Adelaide Bridges, renovated the Pump Rooms building, laid out Victoria Park, created York Promenade, made the Mill Gardens, was architect of the Boat House and the Pump Room Swimming Baths with its unique roof. He also sorted out the town's sewage system. Today, most of de Normanville's buildings and landscapes are listed by English Heritage and the place where he lived, 6 Clarendon Crescent, is commemorated with a Warwick District Council plaque.

Janet Storrie, who wrote this appreciation of de Normanville for The Leamington Society, has chronicled his life and works in her book: *William Louis de Normanville: Engineer, Architect and Inventor, 1843-1928, and His Role in Creating Royal Leamington Spa* (Weir Books).

It was, therefore, very appropriate that the first joint meeting of The Leamington Society and WIAS should be concerned with an engineering aspect of de Normanville's legacy and Bernard Perkins & Matthew Rhodes of the Environmental Consultancy, Encraft explained the past and examined the future prospects for extracting renewable energy from the Leam.

Before looking at de Normanville's efforts to use the Leam to power a pump, Bernard Perkins reviewed the history of the site at Mill Road. There is a reference in the Domesday Book to 'Mills on the site of a weir' but the remains at Tamworth of an 8th Century horizontal wheel mill of a similar configuration to the Dounby Click Mill on Orkney and a 10th Century Anglo Saxon Charter for a Mill near to Stratford point to earlier uses of the Leam as a power source. The Domesday record is for 2 mills at 24 shillings in Lamintone.

Over the next 1,000 years there are references to mills in 1520, 1635 and 1684 and Bernard Satchwell (1732-1809) recorded a mill in a painting. Oldhams Mill 'a heavy building with tall chimneys' was built in 1832 on the South side of the present Mill Bridge and lasted until 1889. At the turn of the 20th Century, de Normanville produced a proposal to utilise the Leam to pump water to the reservoir on Campion Hills and in summer for the swimming baths.

The benefits would include: savings in coal bills, an improvement of the Mill Property and the opening up of the grounds to the Willes Road. Technically, the proposal would locate a turbine in the storm culverts of a new weir, charged via a penstock at its outlet end, with pumps fitted in an adjoining chamber in the abutment. An output of 3½ - 18 Horse Power (2.6 to 13.5 kW) would pump 9,700 gallons/hour (44,000l/hr) at 28 rev/min.

In 1902 S Owens & Co of Whitefriars, London tendered de Normanville (referred to as 'Waterworks engineer') for a turbine and pumps to be manufactured by Gilkes of Kendal, 'the whole delivered and fixed Leamington for the sum of £335.00'. When Encraft approached Gilkes during the feasibility study process, Gilkes were able to recognise the reference and believed that original paperwork still existed in their archives. By 1903 the turbine was finished and a grand opening ceremony took place on 23 February with a full report in the Leamington Spa Courier. The next year saw some heavy rain and flooding, fortunately with no permanent damage to the installation. Its maintenance passed into the hands of the Waterworks Committee and is recorded in the Borough Engineer's Handbook (1887-1933).

Coming up to date, the story of the current Restoration Project was taken up by Matthew Rhodes. The project also includes work on the second Leamington mill site, the weir at Princes Drive, which will involve an Archimedes screw installation. Matthew concentrated on the Mill Bridge where a number of studies have been undertaken, partly in conjunction with the restoration of the Jephson Gardens, to utilise the Leam again for some useful power.

The proposal is to install new equipment inside the existing bridge abutments, but now for electricity generation not water pumping. A number of issues have had to be addressed, some

of which would be familiar to de Normanville. These include: variable water flows, fish protection, civil engineering, leisure use, environmental impact, grid synchronisation, flood defence and financing. As Matthew noted, de Normanville has already done a lot of the difficult technical work and the chambers and sluices are all in place, as is the weir.

The principle issue today is how to produce electricity economically for as much of the year as possible given the very variable seasonal flow of the river. Cost considerations mean that the proposed design will have two 13.5 kW Kaplan turbines which will operate together for 20% of the year and one only for a further 20% of the year, giving a typical generating season from October to February. The estimated annual output is 110 MWh (sufficient for 30 households) from Mill Bridge only and the combined annual output of Mill Bridge and Princes Drive is 200 MWh.

Encraft have carried out a preliminary Environmental Impact Assessment, and will commission a full report before proceeding although a scheme producing less than 500kW, such as this one, does not legally require an EIA. Amongst the criteria for consideration are: residual flow, conservation and biodiversity, pollution, water quality (turbidity), fish protection (screens and bypass over weir), townscape and visual heritage, traffic and access, public safety, noise, climate change, the community and jobs and not least, health and safety.

Another important consideration is flood defence. It is necessary to plan for possible flooding to half a metre above the Mill Bridge deck. Totally waterproof electrical rooms are needed and the scheme must allow for additional control and water paths for at least 10 cu. M/s and to add a controlled sluice to the boat bypass. However, if serious one in 125 year floods occur (as in 1998) Encraft consider that the weir structures become redundant and lost in a wider picture of flooding.

The Environmental Agency have detailed models for upstream and downstream flows which will be used to evaluate the scheme and, if necessary, to suggest extra control measures before proceeding with the scheme which will require 4 licenses from the Agency.

As with any project of this nature, the list of bodies to be consulted is lengthy and includes: The Environment Agency; Warwick District Council as the relevant planning authority and as landowners; statutory environmental bodies such as English Nature and the Countryside Commission and non-statutory bodies like Warwickshire Wild Life Trust; fisheries bodies or those with an interest in fisheries (e.g. angling clubs); Severn Trent; Central Networks; The Leamington Society and local residents.

There is also the small matter of financing the project whose total cost (including Princes Drive) is £380,000 of which the Mill Bridge is £235,000. A grant of £250,000 has been applied for from Natural England and one of £35,000 from Advantage West Midlands. The total value of the output, net of maintenance costs (£12,500 p.a.) and feed-in tariffs is £30,000 to £40,000 (indexed-linked). This would give a payback with grants of 2 to 3 years or 10 to 15 years without grants for a project with a life of 50 to 100 years. It is worth noting that the payback includes the costs of possible flood defence measures which are not normally accounted for in this way.

The present position can be summarised briefly. Await the outcome of the grant applications, after which the main stakeholder, Warwick District Council, has to decide on the preferred project structure. The balance of funding has to be raised; possibilities include loans, a community bond and public subscriptions (just like the Victorians). Agreement will be needed on the allocation of income; free electricity to Jephson Gardens, a community energy efficiency fund for free/cheap local insulation measures, general environmental projects or possibly returns to community bond holders.

All who attended thought the meeting set an excellent precedent for further joint events on subjects of mutual interest. As regards the proposal for a new micro-generation installation, the outcome will be looked at with much interest.

April 8th 2010: Dr Malcolm Dick

Matthew Boulton (1728 – 1809) and the celebration of Industrial technology

Malcolm Dick is the Director of the Centre for Birmingham and Midlands History at the University of Birmingham. His talk showed not only his grasp of the great issues at play in Britain at the onset of the Industrial Revolution but also his feel for the character of one of its leading players - Matthew Boulton. It was not by chance that Dick subtitled his collection of essays on Boulton *A Revolutionary Player* and described him as an industrialist, landowner, scientist and a contributor to transport development and the arts.

Boulton's importance was examined through his biographical details, how he was viewed by his contemporaries and colleagues and the environment and cultural milieu of his times. In particular Malcolm Dick's key theme was celebration; the celebration of Soho and manufacturing, the celebration of managing labour and the celebration of steam power.

Matthew Boulton was born in Birmingham in 1728, the son of a local manufacturer, and died in 1809. In partnership with James Watt, he developed the reciprocating and rotative engines which improved the quality of steam technology and stimulated its adoption into the British and world economies. In 1762 he opened the Soho Works, on the outskirts of Birmingham at Handsworth, which produced high-quality metal work, including buttons, ormolu and silverware, and became, reputedly, the largest factory in the world. Soho changed manufacturing by concentrating production under one roof. There were stores, drawing and design rooms and manufacturing units. Boulton moved into Soho House, a Georgian villa but no palace, close to his factory in 1766. It was one of the meeting places for the Lunar Society and the core of a landscaped estate. In 1787 Boulton established the Soho Mint and in 1795 the Soho Foundry in Smethwick, which was the first purpose-built plant to manufacture steam engines.

Boulton's educational background is unknown but he seems to have had no higher education and worked for his father from an early age. He was clearly both talented and ambitious and able to tap into the rise of Birmingham as an industrial centre with its focus on advanced technology and processes. He was also successful socially, marrying two sisters, each of whom brought a welcome dowry that he used to expand his business empire. Successful as Boulton was, his ambitions always outstripped his resources and his businesses were chronically undercapitalised. He demonstrated a desire to manage his image through the carefully chosen portraits painted at different times of his life and by exploiting Birmingham's place on the 'industrial grand tour' by potential customers.

Boulton lacks a proper biography, especially when compared to his Lunar Society contemporaries such as James Watt, Josiah Wedgwood, Erasmus Darwin and Joseph Priestley all of whom are arguably better known. There is a huge amount of archive material available on Boulton's activities which would present a daunting task for any potential author. Fortunately, James Watt and James Keir each wrote short appreciations of Boulton shortly after his death and a more detailed biography was written later by Samuel Smiles.

The Lunar Society was a centre for intellectual ideas and its members formed a network that extended from the Midlands to London, the Continent and the USA. It has been described as one of the most extraordinary and influential groups of late-eighteenth-century England. Collectively, its members comprised a clearing house for the ideas which transformed their country materially, socially, and culturally within a generation. Their major mutual interest was the sciences, pure and applied – particularly concerning the problems of industry. Exposure to such stimuli must have been exhilarating to a man of Boulton's temperament.

Dick used a selection of contemporary illustrations of the Soho Manufactory and its setting to give a vivid impression of Boulton's vision as well as the practical elements such as the complex arrangements for providing water power to the machinery which remained in use even after the installation of Watt's steam engines.

The Manufactory's classical facade echoed the nature of much of the product range. Erasmus Darwin, writing in 1768 praised a place which united landscape, production, elegance, technology, profit, chemistry, art and amusement.

Turning to the celebration of the management of labour, Dick emphasised Boulton's achievements in applying pioneering techniques in the division of labour. A button, for example, passed through the hands of ten people; each workman being responsible for only a small part of the process. A number of visitors to Soho have recorded their impressions, often remarking on the degree of mechanisation and 'the management of machinery' which led to the stimulation of production. Whilst the employment of female and child labour was observed, comment on social conditions was usually absent except that it was cheap and so reduced the need to employ scarce and expensive skilled men.

In 1767 Dorothy Richardson described Soho as a sensual and intellectual learning experience which connected beauty, elegance, spiritual enlightenment, science, commerce and education. Ten years later, an Italian, Carlo Castone made a comment that has a surprisingly modern ring. He said that the substitution of technology for skilled labour reduced industrial espionage: 'the consequence of letting the machines do the work is that the artisans do not know completely the whole process of work and cannot pass on the idea of how to design the products. The artisan is not able to pass on details of manufacturing to anyone else, because he does not understand the whole process.'

Celebrating steam power was one of Boulton's passions. Not only was it the most commercially successful of his many ventures but it justified his support over many years for the manic depressive Watt. The oft repeated, and paraphrased, comment, 'I sell here, Sir, what all the world desires - POWER', could serve as the motto for Boulton & Watt's partnership as well as one of the earliest of publicity slogans. Thanks largely to Boulton's insistence, Watt developed a rotary motion version of the engine that transformed manufacturing by freeing factories from the vagaries of water power. Interestingly, and giving the lie to any suggestion that Boulton lacked mechanical aptitude, he contributed the design of a vital link associated with the revolutionary sun and planet gearing of the rotative engine.

Erasmus Darwin celebrated Boulton's use of steam power poetically. In *The Economy of Vegetation* (1791), he transformed the engine into a giant of masculine energy which raised water and dug ores from the feminine earth, filled bellows with air to smelt metals, supplied towns with water, ground corn and released the copper from the mines of Anglesey which was then transformed into coinage at Soho.

Boulton's application of steam power to his ground-breaking coining machinery allowed the last of his great enterprises to flourish. The Soho Mint showed the way to produce coinage in high volumes (30 to 40,000 coins per hour) that was so accurate and consistent that forgery was virtually impossible. A flourishing export trade developed as a result.

Malcolm Dick concluded that Matthew Boulton was an enterprising promoter of industrial production who was communicating, literally, on an industrial scale. According to the evidence, those who visited the site absorbed positive messages about the quality of the Soho complex, the efficiency of labour management and the power of steam. Boulton established a set of markers of how to view industrialisation. These were dominant perspectives for the growing industrial *bourgeoisie* and others outside this class who welcomed industrialisation as a positive transforming force, but they were not the only ones. Industrial activity could be viewed intellectually as dimensions of the new sciences of economics, geography and geology (Adam Smith or James Keir) or it could be viewed critically – a dimension that was represented by conservative critics (Anna Seward or William Wordsworth) and radicals (like Thomas Spence or Robert Owen).

This talk was a fitting tribute to a great man.

May 2010: Peter Coulls, Alain Foote and John Willock *Willans Works*

Many members were surprised to learn the history of Willans & Robinson, a steam engine builder at the turn of the twentieth century whose products set the standards for others to try and emulate but of whom few of us had heard.

Thanks to the present management of Alstom in Rugby a significant archive of Willans & Robinson material has been deposited in the Warwickshire County Record Office, Warwick consisting of photographs, glass plate negatives, engine index books, drawings, commercial documents and much more - invaluable primary sources. Peter Coulls, Alain Foote and John Willock have been cataloguing this treasure trove and the first fruits of their labours was a fascinating and profusely illustrated review of this little known, but very important engineering company in Rugby.

Established in 1880, at Thames Ditton, Surrey, Willans & Robinson manufactured a unique series of high speed steam engines incorporating the patents of Peter Willans. Designed specifically for electrical power generation, Willans & Robinson central valve engines, at their peak, powered 68% of Britain's installed electrical capacity. In 1916, weakened by poor financial control, the company was consolidated into the Dick, Kerr Organisation which then became part of English Electric in 1919. English Electric at Rugby became GEC Turbine Generators in 1968 and in 1989 this became GEC Alsthom and later Alstom.

Peter Coulls began by outlining the lives of the two partners. Willans (1851-1892) was the engineering brain whose life was tragically cut short by an accident. He is commemorated by a plaque placed in Thames Ditton church by the workforce. An alumnus of Penn of Greenwich (a name that has occurred frequently in recent talks), Willans took out a series of patents for valveless engines for steam launches, and joined forces with Mark Robinson (1844-1923) to exploit them. Robinson seems to have been a very well connected administrator with a background in the Admiralty. He succeeded Willans as chairman but retired due to ill health in 1909. Robinson, however, was treasurer of the I Mech E for many years and also Vice President of the Institution.

Prior to the formation of Willans & Robinson, launch engines had been manufactured by sub-contractors including Tangye and Hunter & English, but never satisfactorily to Willans high standards. In 1880 the Ferry Works site in Thames Ditton was acquired and a comprehensive, vertically integrated factory created. Clearly capital was available for this and soon 400 people were employed producing engines for the launches of wealthy patrons including one Gordon Bennett, editor of the New York Herald. Patronage might have been secure but luck never was and in 1888 the works were destroyed by fire; rebuilt to higher standards including a very early example of flow-line production, they were severely damaged in devastating floods in 1894.

The archive has a wealth of photographic material covering these early years. We saw the full extent of the production process, including the use of jigs and fixtures, the staff and management and the wharf location. The works continued to be used after Willans & Robinson relocated to Rugby in 1896 for some component manufacture and subsequently it was bought by AC Cars and used until 1980 when car production ceased and then redeveloped for light industrial use. Some of the original structure survives to this day.

Rugby was chosen because of its central location, good and developing communications and particularly for an available pool of skilled labour. Further evidence of the capital available to Willans & Robinson is seen in the quality of the buildings of the Victoria works (echoing the Gothic architecture of the town and Rugby School) and the size of the workforce - some 950 at the outset. Again, the archive provided a wide range of photographs to illustrate the new works, its offices and other departments and it was particularly interesting to see the quality and ornateness of the interior fittings. Scagliola ionic columns are not common in drawing offices nor gothic stone staircases in entrance halls. The

welfare of the workforce was not neglected with a dining room and on-site bathrooms for the foundry workers.

A good example of the international nature of the business was shown in a group photograph commemorating the visit by the American Society of Mechanical Engineers in 1907.

John Willock then took us through the technicalities of the central valve steam engine. Its essential simplicity combined with scaleability allowed for a wide range of outputs from a few horsepower to 2,000 hp. This was vividly illustrated by a photograph of a workman holding a small piston and conrod alongside a large example that must be two and a half times his height. The Willans engine claimed to give great economy of steam together with durability and silent running at high rotative speeds. Durability was enhanced by having all the moving parts working in compression with no reversal of forces at any time.

The engines were designed to operate at near constant speed and steady loads and so were ideally suited for electricity generation. The development of the public electricity supply industry was good for the Company and there were many examples of engines coupled to generators in a wide variety of applications; base-load power stations and standby generation in department stores, clubs and offices. A 2,000 hp engine was shown at the Paris Exhibition of 1900 and others provided power for the first electrified London Underground train system.

Patents filed in 1890 and 1892 for forced lubrication in steam engines by the forerunner of Bellis & Morcom, a competitor of Willans & Robinson, allowed the development of the double acting steam engine which became a serious competitor to the central valve engine. Willans & Robinson were forced to consider their options and around 1900 the board decided that the steam turbine was the future.

Alain Foote then took up the story with the appointment of H F Fullager, who had worked with C A Parsons on steam turbines. He soon departed over differences of opinion on mechanical design and the board concluded a rather restrictive licence with C A Parsons in 1905. The licence authorised Willans & Robinson to build steam turbines in the UK only and not for marine propulsion. The licence fee was £1,000 with a royalty of 1/6 per kW of output if coupled to an electrical generator. Notwithstanding these conditions, a number of Willans-Parsons generating sets were produced for municipal authorities.

It was clear that any long term future depended on circumventing the Parsons restrictions and in 1906 attention was turned to the impulse turbine and experimental disc & drum and Curtis turbines were built. Eventually, the disc & drum type with a Curtis wheel at the high pressure end was adopted as a standard and many steam turbine powered generating sets were produced, often for export.

The early years of the twentieth century saw several other attempts at diversification, usually under licence despite the earlier experience with Parsons, and usually unsuccessful. These included: oil engines, condensers, various pumps, the Niclausse boiler, Vanadium alloys (which gave rise to the Izod impact testing machine, now a standard piece of materials testing equipment in laboratories around the world), high grade iron castings and even a boat disengaging gear. Perhaps the oddest venture was the Heilmann (steam-electric) locomotive which was an overweight and underpowered failure.

During WW1 the works manufactured a wide variety of items for the war effort including the Salmson aero engine. In some ways this engine typified the loss of technical direction that had followed the death of Peter Willans in 1892. A water-cooled radial engine with poppet valves it was an attempt at an advanced engine but not a 'first division' product. It is, perhaps, no surprise that Willans & Robinson failed to survive as an independent business but its legacy remains in Rugby with parts of the Victoria works now incorporated into the Alstom factory and known as Willans' Works and still involved with the manufacture of steam turbines and associated components.

WARWICKSHIRE

Industrial Archaeology Society

WIAS

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FROM THE CHAIRMAN

Annual General Meeting

The Annual General Meeting of the Society was held in the first part of the September meeting, and involved the election of officers for the year 2010/2011 and the receipt of both the Chairman's and Treasurer's reports.

In terms of the primary role of the society, the holding of monthly meetings to stimulate interest and research into industrial archaeology and industrial history, the Chairman reported that 2009/2010 had been a success with a variety of well attended meetings. These had involved both talks from members of the society and a range of outside speakers, and that this formula had been retained for the planning of the 2010/2011 season.

The Chairman expressed thanks for the support of the officers and committee of the Society, and of those with specific responsibilities such as membership, the newsletter, refreshments, the bookstall and the website, together with continued support from members for the monthly meetings.

After the presentation and acceptance of the treasurer's report, the formal transfer of the role of treasurer from Richard Hartree to Victor Lobb took place. Richard has done an excellent job as our treasurer, performing his duties in an effective, unobtrusive way, and, as he himself reported, hands over the finances in a very healthy condition. Victor has very much been 'treasurer-in-waiting' and we thank him for taking on this important role for the society.

No changes were made to the rates for membership subscription and meeting fees, although the outgoing treasurer did warn that a modest rise would need to be considered for next year, principally because of the rise in fees charged by visiting speakers and the slight increase in the charge for room hire. The charges have not changed for many years and it would be prudent of us to keep pace with inflation!

The meeting also heard that George and Lis Sayell had decided to end their duties as organisers of refreshments. The Chairman recorded his - and

the Society's - thanks to them both for performing this role in such an efficient way. Enthusiastic volunteers are being sought to fill this gap - perhaps in some form of rota.

Outside the formal meetings, the invaluable contribution of individual and group research on specific sites and company histories continue to take place and we look forward to the presentation of the results at a monthly meeting or as part of a members' evening at some stage in the future.

WIAS continues its links with the Association for Industrial Archaeology, and four members had attended the recent conference in West Cornwall. One important announcement at conference was the confirmation of the appointment of WIAS member Chris Barney as Affiliated Societies Officer, providing links between local societies and the national organisation. It will be interesting to hear of the issues faced by other local societies, and may provide us with useful guidelines for the future.

Future Directions

It was the AIA conference and the arrival of the notice for the AGM of the Greater London Industrial Archaeology Society (GLIAS) that prompted me to air a few thoughts about the future direction of WIAS. The GLIAS letter highlighted the fact that the Society was run by a few members of the committee, and that the committee had changed very little over many years. Where was the next generation of the committee to come from?

WIAS might be characterised as occupying a similar position, and, indeed, has fewer officers than many societies. For example, many local history/industrial archaeology societies have a meetings secretary separate from the Chairman, and someone responsible for walks and visits. This seems to be a fruitful direction for us to travel. Getting more people involved with highly specific but limited tasks could add a great deal to the society, as well, of course, as providing enjoyment and a sense of achievement for those involved.

Some aspects for potential development

There are a number of issues that

we could seek to address. Perhaps most important is the development of the recording of industrial archaeology and industrial history for Warwickshire, and I am increasingly convinced that the website and digital recording provide the way forward.

In many instances, the first contact from outsiders with the industrial archaeology of Warwickshire comes via a search of the internet for a website. The WIAS website has been developed by our webmaster and he gives a good deal of time and expertise to providing an attractive and informative site. He reports that much of the material on the site depends on contributions from members, and we have been discussing ways in which we might develop this into a more formal and structured coverage of the IA sites of Warwickshire. I shall be reporting back to subsequent meetings - and via e-mail - of the suggested way forward, and there will be plenty of opportunities for members to be involved.

Other aspects for future development might be the formation of a group to work on the techniques of oral history and the creation and editing of subsequent recordings, and an individual (or small group) who might take on the responsibility for organising (a small number of) visits and/or walks, mainly for the summer months. Members may have other ideas for the development of the Society and I hope to be able to return to some of these themes at our monthly meetings, once they have been discussed within committee.

Martin Green

PROGRAMME

October 14th 2010

Mike Glassson, curator of the Walsall Leather Museum, and author of several books on the leather trade: *The Walsall Leather Industry*

November 11th 2010

Sarah Chubb, borough archivist for Sandwell Community History and Archives Service:

Chance Brothers - glassmakers of Smethwick

December 9th 2010

WIAS members who attended the AIA Conference in Cornwall: *Aspects of the industrial heritage of Cornwall*

NEWSLETTER

Meeting Reports

September 2010: *The Last Picture Show - Some 35mm Slides from WIAS Members*

The interests of the membership of our Society are very wide-ranging as was evidenced by the content of 'The Last Picture Show'.

The following selection of subjects attempts to encapsulate those interests and, as with the presentations, has to suffer from space constraints. Apologies are, therefore, due to everyone whose special interest has been omitted and to those who have little or no interest in the subjects that have been chosen.

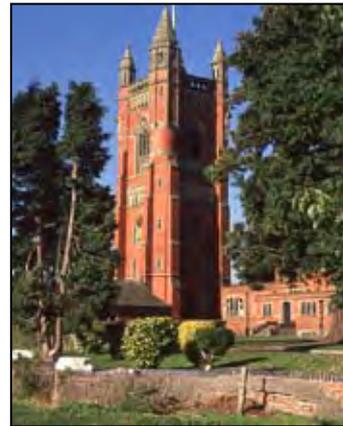
Roadside furniture is frequently used to illustrate the work of local foundries as well as different design styles. Typical examples are fingerposts and milestones or markers.

Buildings encompass many aspects of Industrial Archaeology and a wide variety of industrial processes are involved in their construction. Not only do we get a sense of period and purpose from the architecture but also of manufacturing technologies from brick-making through glazing and furniture to the production processes that took place within the building.



The cast iron Finger post to Myton Hamlet was made in 1938 by Richards (Leicester) Limited and is in good condition apart from a missing finial.

Photograph: Richard King



Princethorpe College chapel built on the site of the former St Mary's Priory in Ruabon Red Brick to designs by Pugin.

Photograph: Peter Chater

The Milemarker on Pittern Hill near Kineton was cast by the prolific local foundry of Glover & Sons in Warwick and is a good example of this ubiquitous item.



Photograph: Peter Chater

The former Nelson Dale Gelatine Works known as Emscote Mills, subsequently the home of English Rose Kitchens and now a furniture store.



Photograph: Richard King

Behind St Mary's Church in Leamington is an example of the early prefabricated buildings offered by many manufacturers and widely used as churches, village halls and clubhouses.



Photograph: Richard King



The restored bridge load warning plaque on the Lighthorne road at Kineton. originally erected by the Stratford on Avon and Midland Junction Railway

Photograph: Richard King

The town livestock market has largely disappeared in Warwickshire, together with many of the buildings, but Rugby held on longer than most. Shown here is one of the sales rings at Rugby Market.



Photograph: Martin Green

Industrial Archaeology can rub shoulders with conventional Archaeology, often to mutual benefit. Whilst engineering innovation is of great importance it is often useful to examine how earlier 'engineers' solved similar problems, especially in the realms of civil engineering.



Stare Bridge at Stoneleigh, built by 13th Century Monks is a splendid example of Medieval architectural and building practice.

Photograph: Peter Chater



Needle making has always been a relatively small-scale industry in Warwickshire. The Minerva Works in Alcester were unusually large and are now converted to multi-occupancy.

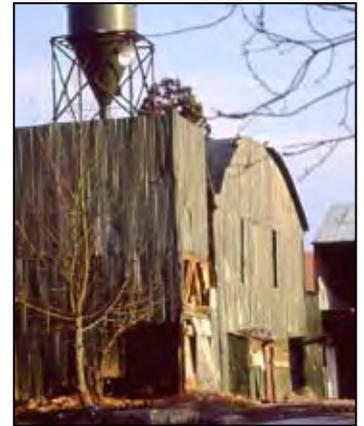
Photograph: Martin Green

One of Warwickshire's most famous land marks, Chesterton Windmill, attracts visitors from all over the world. On this occasion, the visitors were members of the Greater London Industrial Archaeology Society.



Photograph: Martin Green

Small scale industry, often with an agricultural connection, has always been an important part of Warwickshire's economic activity. Sawmills are one such example. Shown here is the (now demolished) Cubbington Sawmill.



Photograph: Martin Green

In every subject there is a place for a miscellany of examples that do not fall into any clear category. These two arbitrary selections give some idea of the wide range of potential subjects that can catch the eye.

A major part of the work of any Industrial Archaeologist is the preservation, if only as a pictorial record, of our industrial past.



The Potterton Works site in Leamington had long been associated with engineering. It has now been replaced by housing, offices and a medical centre.

Photograph: Martin Green



The evocative sculpture by Peter Hollins over the entrance to the Birmingham Gun Barrel Proof House.

Photograph: Peter Chater

Warwickshire's association with the motor industry has suffered serious decline in the past 25 years. The once-proud frontage of Automotive Products, Leamington Spa, is now just a memory.



Photograph: Martin Green

The unusual wicket gate at the entrance to a churchyard in Upper Shugborough. Combining the skills of blacksmith and carpenter or joiner it must have presented some challenges to those who used it.



Photograph: Peter Chater

June 2010: Bernie Cope

Toye Kenning and Spencer

Not a slide to see all night, but what a feast for the eye was Bernie Cope's survey of the products of Toye, Kenning and Spencer, by appointment to Her Majesty the Queen suppliers of gold and silver laces, insignia and embroidery.

The name of Toye, Kenning and Spencer has long been synonymous with quality, craftsmanship and service. For over 300 years members of the Toye family have been skilfully creating identity products for civil and military markets. The firm's founder, Guillaume Henri Toyé, arrived in London in 1685, a penniless Huguenot refugee who began weaving gold and silver laces for the military. Today, the family tradition is unbroken and although the Toye Group of Companies has grown and diversified, the original aim is unchanged - to design and manufacture the highest quality identity products.

TKS craftsmen and women are experts in weaving, gold and silversmithing, enamelling, screen printing and in hand and machine embroidery. Traditional skills and computerised technology are combined to design and create individual items or a range of products to promote an organisation's identity.

These activities are undertaken at a number of locations in the UK. The main textile factory is in Bedworth where a huge variety of ribbons are woven, now using computer-aided design, and exquisite hand embroidery is created. In Birmingham's Jewellery Quarter are found hand-painted enamelling and machine engraving whilst at Ogmere Vale in South Wales there are die-sinking and presses for high relief medals. Machine embroidery at Preston, hats and caps at Weston in Hertfordshire and ties and scarves at Bury St Edmunds complete the Toye Group's manufacturing facilities. A shop in Great Queen Street, London alongside the Masonic Rooms caters for those seeking regalia and other items.

Bernie Cope is the production director of TKS and after over 30 years with the company there seems to be little about it that is unfamiliar to him. As a result we were treated to a virtual tour of the business, illustrated by a bewildering display of its product range.

Bernie also gave us considerable insight into the difficulties faced today by a long-established British-based company with long serving employees, many with unique skills, competing against overseas suppliers from Pakistan to China. Not the least of the problem appeared to be the attitude of major customers, such as the Ministry of Defence, who issue a high specification for tender, then give the contract on price without checking the quality that comes with a low price! As a result TKS have lost out on some long established contracts. In addition, the overseas competitors are improving their quality all the time.

Fortunately, TKS themselves are winning substantial export business, notably from Commonwealth countries and especially where the very best quality is required. Bernie explained that the two shuttle looms at Bedworth are weaving the best ribbons in the world and his samples included a special watered silk Masonic ribbon and many examples using gold and

silver threads. These ribbons have many uses including: braces, watch straps and medal ribbons where quality is paramount. Colour matching is very important with repeat orders and TKS is able to refer back to original specifications and patterns, some going back to the early twentieth century. However, the UK's specialist dye houses are a disappearing breed, again through the fall off in demand.

Another problem facing manufacturers like TKS is the loss of machinery from the UK as British firms move equipment to lower labour cost countries such as Pakistan. If you can't beat them, join them! However, not all machinery skills have gone from the UK and Bernie was justly proud that TKS had restored the shuttle loom that can be seen in the Herbert Art Gallery in Coventry and, moreover, the accompanying video is of a similar loom working at Bedworth.

Examples of hand embroidery, especially a large coat of arms, impressed greatly but served to provide another salutary tale. Thirty years ago TKS regularly employed 30 to 40 women at this work but today most of their requirements are bought in from Pakistan! The fate of the company's traditional outworkers is the same, declining from 80 to less than ten today. It is difficult to train up new skilled people when the available pay rates are close to the minimum wage. However, all was not gloom and TKS continues to be a Royal Warrant holder and the samples included a medal cushion produced annually for Prince Charles, horse cloths and trumpet banners.

Another product line with plenty of interesting examples came from Western Cap; sporting headgear jostled with military and police caps but this business is also suffering from reduced demand and serious overseas competition.

Machine embroidery uses sewing machines having up to 15 needles and an automatic colour change mechanism to produce school badges on shirts, badges on hatbands and similar applications. Ties have been manufactured in the past but now only a few are made in the UK because of overseas competition. For example, a silk tie costing £8 made in the UK is only £3 when sourced in China. Screen printing is used on mugs and other substrates.

Bernie closed his talk with examples of hand painted enamelling including the insignia of various Orders of the British Empire which also featured ribbons woven at Bedworth. Other examples of the very best of workmanship were elaborate pole tops where there is a good export market in developing countries.

An extended question and answer session gave Bernie plenty of opportunity to expand on his earlier comments and we were left with few illusions about the difficulties, the trials and the tribulations of being a specialist manufacturer in the UK today. Fierce, low cost competition from overseas, customers who issue high specifications for tender but place the order with the lowest price. There are plenty of examples of contracts won by overseas suppliers at prices below TKS's cost!

Nonetheless, Toye, Kenning and Spencer had a turnover last year of some £8.5 million and are quietly confident about the future. There is certainly a long and proud history to be continued by future generations of the Toye family.

WARWICKSHIRE

Industrial Archaeology Society

WIAS

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FROM THE CHAIRMAN

With the onset of New Year, thoughts inevitably turn to the prospects for meetings, conferences, and visits that may lie ahead in 2011, and I thought it would be appropriate for me to mention the City Safaris run by Heritage of Industry. This is a small, friendly company which has been organising specialist industrial history tours to many parts of the world including the UK, Europe and further afield for more than 21 years. I give the tours a special mention in this Newsletter because one of the City Safaris for 2011 is to the Heart of England, based in Coventry, from 24 to 27 March. Full details are on the website www.heritageofindustry.co.uk.

Heritage of Industry is also the exclusive overseas tour provider for the Association for Industrial Archaeology, and they have organised some magnificent overseas trips. They plan to go to South Australia and Tasmania in November 2011 to coincide with the 16th Engineering Heritage Australia Conference in Hobart, Tasmania.

There are members of WIAS who have been on these domestic and overseas trips, and I am sure they would be happy to pass on their experiences to any interested parties.

WIAS has more modest targets, but plans to try and increase the number of visits it makes to industrial sites and premises, some of these directly linked to our monthly meetings.

All that remains is for me to send best wishes for the New Year to all members and supporters of WIAS. I do hope that the Society can contribute to your enjoyment of industrial archaeology and industrial history during 2011.

Martin Green

Umberslade Hall Drive Bridge

Continuing the series of occasional articles on historic civil engineering works in Warwickshire.



A detail of the main arch of the bridge, note the fine quality of the stonework

Just to the east of Tamworth in Arden the route of the Birmingham & North Warwickshire Railway from Tyseley to Stratford upon Avon crosses over the driveway leading to Umberslade Hall. The bridge which was built here is a superb example of late skew masonry arch bridge construction. The bridge has three spans on an acute skew angle, the arches being semi-elliptical in form and built in finely dressed ashlar sandstone. A small stream flows through the easternmost arch. The first three courses of masonry in the arches are horizontal, above these is a single course of blocks cut twice the normal size and notched to receive the skew blocks which comprise the remainder of the arch. The centre span is 39 ft and the side spans 31 ft on the skew. The bridge dates from about 1908, the railway having opened on 1st July of that year. The Engineer was H. D. Smith, the Resident Engineer for the GWR and the contractor was C. J. Wills & Son. The bridge is built to a much higher standard than most of the other bridges on the line, presumably for the owners of Umberslade Hall.

The Birmingham & North Warwickshire Railway was authorised in 1894. This line was projected privately as a direct route from Birmingham to Stratford upon Avon but did not make any progress until 1900 when the GWR took over the project and built the line in its present form from a junction with the GWR main line at Tyseley direct to a junction with the Great Western Hatton to Stratford line at Bearley. This route, together with a line between Honeybourne and Cheltenham, opened in 1906, gave the Great Western a new direct route to Bristol largely independent of the Midland Railway.

National Grid Reference:

SP 119709

Roger Cragg

PROGRAMME

January 13th 2011

Sarah Chubb, Sandwell Borough Archivist:

Chance Brothers: glassmakers of Smethwick

February 10th 2011

Peter Cross-Rudkin:

The life and works of John Rennie (1761-1821)

March 10th 2011

Anthony Leahy and Martin Green:

Nelsons of Warwick – gelatine and a great deal more

April 14th 2011

Tim Booth:

Warwickshire Mills, news of research and updates on the state of various mills in the county

May 12th 2011

Members Evening:

a chance for several short contributions from members

June 9th 2011

Damien Kimberley, of Coventry Transport Museum:

The Coventry motor-cycle industry

NEWSLETTER

Meeting Reports

October 2010: David Mills

The Walsall Leather Industry

Unfortunately, Mike Glasson the Curator of the Walsall Leather Museum was unable to speak to us but he was represented by the Assistant Curator, David Mills. David has spent 21 years with the Museum and authored many publications about Walsall, its people and its industries.

He began by setting Walsall's industrial history into context. The Walsall Arboretum Lake is the remains of an old limestone mining site and served to illustrate the extent of the local mining industry. A view of the High Street in the 1840s showed what recent rebuilding had destroyed – and the rebuilding leaves much to be desired. However, at that time, Walsall's leather industry was about to take off from an interesting base.

Whilst there is no reference in the Domesday Book to the town, it can trace its history for over 1,000 years and evidence of metal working in Walsall exists from as far back as 13th century. This is not surprising in view of the fact that all the necessary raw materials were available locally: iron ore, limestone, charcoal and later, of course, coal. By the 15th century the lighter metal trades, in particular the making of small items in iron and brass were well established. Some of these manufacturers were already specialising in horse furniture. Three Walsall loriners occur in 1435 and thereafter the trade is often mentioned. A century later, in 1540, the antiquary Leland noted that "Ther be many Smithes and Bytte Makers yn the Town".

A Loriner makes and sells bits, bridles, spurs, stirrups, saddle trees and the minor metal items of a horse's harness. The word Loriner is derived from the Latin *lorum*, a thong, bridle or reins, and seems to have entered the English language, from the French, as *Lorimer*. The craft has long since disappeared from the City of London but the Worshipful Company of Loriners is one of the oldest of the City Livery Companies and national centre of the craft today is mainly in and around Walsall.

Before the Industrial Revolution, bits, spurs, stirrups and buckles would have been hand forged and produced in small family workshops, mainly in the back yards of the loriners' dwellings. Walsall products were reaching a wide market by the mid 16th century. By the late 17th century, the saddlers' ironmongery trade was becoming highly specialised and articles could include parts made by several different craftsmen. A variety of patterns were produced, as evidenced by Robert Plot in the 1680s when he noted several designs of spur, five types of snaffle with six varieties of end, six types of bit, four sorts of stirrup, and other ironwork including curbs, chains, bolts, rings, swivels, saddle-bars and plates.

The industry continued to prosper in the eighteenth century as life in Britain became more affluent and improvements in the roads led to an increase in horse-drawn transport. A list of trades in 1770 includes nineteen spur and spur rowel-makers, eleven stirrup-makers, five bit-makers, eighteen snaffle-makers and ten saddlers' ironmongers.

Against this background, together with the railway boom which saw many hundreds of trains daily passing through the town, one Thomas Newton (1810-1889), an established Loriner, saw the opportunity to develop a saddlery business which offered better returns than lorinery. Newton is considered the father of the commercial saddle trade and recruited many skilled leatherworkers to his burgeoning business.

Any survey of Georgian/Victorian England will show that horses were an essential part of Victorian economic and social life. The working horse was still the chief means of power on most farms, the military were in constant action abroad and the local transport of people and goods depended on horsepower. In total there were something like 3.3 million horses in late Victorian Britain. All needed saddlery, collars, harnesses and other equipment, and Walsall could supply everything.

In the last decades of the 19th century the Walsall leather trades entered upon a 'Golden Age' of unprecedented prosperity. Exports boomed and Walsall firms sent their products to most parts of the British Empire. Foreign wars provided a particularly lucrative source of trade.

The Walsall manufacturers were swift to adopt new methods and the first sewing machines were in use by the 1860s. However, suspicions about the quality of machine stitched saddlery persists to this day but anecdotally, the difference between the so-called top and the better quality products is said to be none but only dependant on the purchaser's wallet.

The coming of the internal combustion engine began the inevitable decline for Walsall's leather and lorinery industries which had employed some 7,000 people. Albeit in a mass of tiny and often primitive backyard workshops, intermingled with a handful of factories each employing perhaps two or three hundred people. At the turn of the 20th century Walsall was home to nearly a third of Britain's saddlers and harness makers. Some diversification was attempted into such products as dog coats, bags, gloves and belts but the glory days were over by the 1930s.

Turning to the Leather Museum itself, this is housed in the 1891 building of J Withers & Sons, Manufacturers of Horse and Carriage Mountings, Spurs, Bits & Stirrups. Rebuilt, restored and extended, today visitors can discover why Walsall became the British leather goods capital in a working museum which seeks to celebrate that great tradition and to reflect the achievements of the leather craftsmen and women of Walsall.

In atmospheric, recreated workshops skilled leather workers demonstrate the process of hand-crafting leather goods such as wallets and purses. The displays around the museum tell the stories of the Walsall leather trade and feature splendid examples of local craftsmanship past and present, including saddles made for the Royal Family and exciting contemporary designs.

Walsall is still home to over ninety leather companies between them making an astonishing variety of items which are exported to most parts of the world.

November 2010: David Bright & John Brace

Water in Warwick

David Bright opened this members evening with the second instalment of his work on the Mill and Engine House at Warwick Castle. He preceded the detail with an account of how he became an archaeologist; thanks to accompanying an American visitor to the Castle and noticing the water wheel. A subsequent discussion with the then Manager led to David assisting in the development of the story of a neglected aspect of the Castle's history – domestic electricity generation.

A preliminary investigation of the mill area found that whilst the building had already been practically stripped out fortunately the relevant Castle papers were already in the possession of the County Archives.

David's datum for his presentation was the floor of the Engine House and he dealt with those elements that lay beneath it. Maps by Speed (1610) and Fish & Buckman (1711) showed possible water sources or leats for a wheel but the tunnels under the engine house had been bricked up at some time in the past. There was evidence of a turbine pit but no machinery.

A most useful piece of evidence was Lady Louisa Greville's painting of 1763 showing the Castle from across the river with the Mill House and wheel in the foreground. This view is at 90 deg to that of the Canaletto painting of the Castle.

From the archives came evidence of the original turbine. This was supplied by Gilkes of Kendal whose invoice dated 21 November 1894 showed that a Thompson Vortex Turbine was delivered and erected for the sum of £482.18.0. From this and the other residual evidence it had been possible to deduce all the elements of the 13 HP (10Kw) machine arousing the possibility of new power generation as part of the project.

More detailed investigation of the original layout drawings showed the inclusion of an eel trap alongside the water wheel. This aroused the interest of the Castle's present owners, The Tussauds Group, and the involvement of one Bernie Hall, an eel catcher. Any redevelopment would need to include some form of eel rack.

Returning to the technology of the generating plant, the turbine was supplemented by gas engines as the load increased together with a bank of storage batteries. A particular point of interest, and one of the weaknesses of the installation, was the 'chevron' or 'herring-bone' gear wheels incorporated into the drive mechanism from the water wheel. David had found similar mortise and tenon gear wheels at an old mill in Totnes as well as a technical article on moulded helical gears which showed the extraordinarily high foundry standards that were available at the turn of the 19th Century.

In 1983, consulting engineers Mander Raikes & Marshall were commissioned to report on the water flows of the River Avon. Water driven turbines need a steady flow and cannot cope with low summer levels nor winter floods. Furthermore, an inconsistent demand pattern makes planning very difficult. Various alternatives are being examined including the AUR Water Engine, an ingenious Warwickshire Industrial Archaeology Society Newsletter: Number 40

device that converts water flow into a reciprocating movement, the Kaplan Turbine and 'pod' turbines.

David left us with the promise of Part Three: 'Gas Engines, Dynamos and a Hole in the Roof' to come.

John Brace then entertained us with 'The Taste of Water' a wry look at the Warwick Syphon, not some receptacle for carbonated water but an integral part of the town's new (1876) water supply system. After reviewing the use of siphons by the Romans to carry water supplies over a hill John offered some contemporary views on the state of Warwick's water.

"So bad has been the state of the town water this week that no one, unless driven by sheer necessity, would use it for domestic purposes."

Warwick Advertiser 17 February 1866

After a tumbler of town water has stood for 30 hours. "It is yellow, muddy and so opaque that I cannot see one object in the room through it, nor can I define the outline of a strong gas light."

Warwick Advertiser 17 February 1866

"Its present condition [That is of the town water] is scandalously filthy - throughout the town it is regarded only suitable for water closets and watering gardens." "Being softer than any other water it is also used for washing but is so often muddy that white things cannot be washed in it." "Wherever possible it is not used for drinking - where so used let it stand till it gets clear or tie a piece of muslin over the tap to catch the creeping things that are sometimes 3/4 inch long." "While water from some pumps was perfectly transparent; that from others contained fibres and floccule; whilst from a few it was so thick and foul that even the town's water was drunk by preference."

E. Pritchard 1876

Pritchard was a consulting engineer with a need to promote his business which, at that time, was to improve the water supply to Warwick. He had even published a book on the subject before completing the project. His difficulty was to connect the source, between Hatton and Haseley, with the town but a hill lay in between. Unfortunately, the hill consisted of sand and gravel and could not be tunnelled or cut. Pritchard, consequently, proposed a siphon and vacuum pump solution and a drawing exists of waterwheel driven air pumps.

A search for precedents of such siphons had found none until a description of a flood control system on the Ouse near to Lynn in Norfolk was unearthed. Contemporary illustrations showed work on a coffer dam behind which was the dam proper. Other pictures of the dam showed details of pipes that were siphons. Could this have been the precedent for Pritchard?

John's pamphlet, *The Warwick Improvement Works* is a fuller account of the efforts to improve Warwick's water supply.

December 2010: Simon Topman MBE

Acme Whistles

A slightly nerve-jangling start (for the Chairman) was resolved around 7.45 when the speaker emerged from the kitchen behind a large box muttering about mis-directions from the car park. Thereafter, Mr Whistle, Simon Topman MBE did not disappoint and gave us a most memorable evening; instructive, informative, hilarious, noisy and above all imbued with the confidence that comes from being in total command of his subject.

Birmingham is many things to industrial archaeologists, but to few can it be 'the whistling capital of the world'. Simon's company, The Acme Whistle Company, is 140 years old and the sole survivor of the seven companies that made, over the years, some 1,000 million whistles between them. Acme's contribution being around half of the total. Interestingly, at the company's premises in Birmingham's Jewellery Quarter, can be found complete records and much of the production tooling for all products made since 1900, a treasure trove for historians and most useful for repeat orders.

In 1870, Joseph Hudson, a farm worker from Matlock moved with 17 members of his extended family into four back-to-backs in Ladywood. Hudson was a resourceful toolmaker and together with his mechanically-minded brothers rented a small workshop for 3/- a week. Amongst other things he made were whistles. This turned out to be the right product at the right time.

The Metropolitan Police force needed to replace the policeman's rattle with something less clumsy but which demanded attention. Tradition has it that Hudson was inspired by the sound made when he accidentally dropped his violin. The breaking strings 'let forth a dying breath' with a jarring discordant note which he set about replicating. The resultant whistle was tested by the police on Clapham Common and found to be audible at a range of over a mile.

The police liked the sound and promised Hudson a large order. He returned to Birmingham a happy man but became worried at hearing nothing for several months. He went back to London to find that the police had mislaid his address and had given an order to another manufacturer to produce whistles to Hudson's pattern. Happily for Hudson he prevailed on both parties to cancel the arrangement and he secured an order for 21,000 whistles. He even obtained an advance of £20 as working capital! Incidentally, the London Bobbies expressed a preference for the old rattle as it was a more effective weapon than the small whistle. However, the rest, as they say, is history.

The new policeman's whistle generated a lot of publicity with questions in Parliament and letters to the Times usually asking whether others could use the new whistle. As the use spread in the UK so there opened up the possibilities of 'Empire Trade'. Within a year Hudson was employing some 50 people in the jewellery quarter. All this was good, but how can a sound be advertised?

A brilliant solution was provided by the Pall Mall Gazette, a newspaper always looking to break new ground opened a special telephone line on 22 March 1884 to allow

the public to hear the new police whistle being blown. The 'official whistler' was exhausted after six busy days! Today, prospective purchasers can hear all the different Acme whistles on the company web-site.

Hudson was a prolific inventor and a good business man with a restless spirit that was forever seeking new users for his whistles and new ways to produce a different sound. Sports referees needed something authoritative and the introduction of the pea (never the dried pea of legend but a cork pellet) gave birth to the legendary Acme Thunderer.

Hudson's success allowed him to move to the more salubrious surroundings of the village of Handsworth where he became involved in the development of the Heathfield Estate surrounding Heathfield House, the former home of James Watt.

As the owner of the 53rd motor car registered in Birmingham, Hudson was more aware than most of the many cyclists for whom he devised 'the cyclist's road clearer' which is still made today as a sound effect as is the Acme Song Whistle, fondly remembered by fans of the Clangers.

Simon Topman is a brilliant raconteur with a huge sense of humour. His recollection of an early radio phone-in when he was asked where the peas for the whistles came from – answer – grown by ourselves on 16 acres of pea fields around the factory was typical. When challenged by a listener from Hockley who could not recollect any such fields he responded that thanks to genetic modifications all their requirements could now be grown in a few window boxes.

Other examples included the saga of the Titanic whistles and the missed opportunities to exploit the success of the film wherein a genuine surviving example from the ship was used. Kate Winslett demanded \$5 million to use a gold replica at the Oscars ceremony. An order for 7 million whistles for the Iraq army that took 18 months to complete. Incidents at international trade fairs that challenged diplomatic relations – a French competitor took exception to a rendition of the Marseillaise on a duck caller and many more. The Loch Ness Monster caller and the wartime lion roarer to scare Japanese defenders of Pacific Islands were but two others.

Hudson's technical expertise lived on through his sons and subsequent generations of management. Today, Acme has more than 40 active patents in place and exploits a range of modern manufacturing technologies. The company has a policy of introducing two new products a year which, together with a strong brand image, keeps them ahead of the competition.

As well as running Acme, Topman devotes much time to a special school charity which receives all the proceeds from his talks. Members purchases on the night added some £400 to his fee.

Finally, who could ever forget the tale of the vote of thanks at the WI meeting? As the voice at the back of the hall was heard to say: 'whatever shall we put in the minutes?'

Your reporter knows the feeling well!

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