

WARWICKSHIRE

Industrial Archaeology Society

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FROM THE CHAIRMAN

A recent WIAS meeting looked at the history of brewing in Warwickshire, including the rise (and in some cases, fall) of a variety of micro-breweries in more recent times. These were themes explored in a national context at two recent events at the National Brewery Centre in Burton on Trent.

Saturday March 12th marked the launch of a report on England's brewing heritage prepared by Dr. Lynn Pearson and the Brewery History Society as part of English Heritage's SHIER (Strategy for the Historic Industrial Environment Reports) programme, and on the following Thursday a conference was organised to look at some of the issues raised by the potential regeneration of old brewery buildings.

I could not attend the Saturday conference but managed to squeeze myself into the regeneration seminar, and greatly enjoyed the experience of listening to professionals talking about some of the issues raised by potential regeneration. The AIA was well represented with Tony Crosby (Chairman, AIA) and Amber Patrick (Endangered Sites Officer, AIA), who had already done much pioneering work on the recording of maltings), with Keith Falconer (Head of Industrial Archaeology at English Heritage) delivering a keynote address on the brewing industry's SHIER.

There was much talk of funding, and one of the workshop groups sought to explore ways of raising money in a period of economic austerity. Other groups looked at the specific problems associated with the fabric of brewery buildings that made adaptive re-use more or less difficult. Issues such as 'the need for compromise', 'the new economy', 'localism', 'co-operative ventures', the 'Big Society' all received an airing, as well as much discussion of the role and future of the micro-brewing sector.

Also of great interest was a presentation by Cordelia Mellor-Whiting, curator of the National Brewery Centre, and the efforts involved in trying to make the Centre a going concern after a two-year period of closure. The land, buildings and many of the artefacts are all owned by the parent US brewing company – Molson Coors – and they lease the Centre to the current operators – Plant Solutions Ltd (a company specialising in visitor attractions). With the site in private hands, this presents interesting issues over funding – Heritage Lottery funds, for example, would be difficult to secure because those funds need to be directly linked to public (rather than private) benefit. As with so many museums of this type the skill of the curator not only lies in making the museum itself an attractive option to a range of potential visi-

tors (from dedicated industrial archaeologist to casual passers-by), but also in utilising the facilities of the site for a variety of other activities in order to boost revenue. The original museum was very much related to the Bass company, and one of the issues discussed was the possibility of bringing historical material from other breweries onto this site in order to develop the concept of a national brewing centre.

The Centre deserves our support as visitors, and I would heartily recommend it to you. At lunch, I also met a volunteer from the (nearby) Claymills Victorian Pumping station – and she argued strongly for a dual site visit to make the most of a day trip to Burton on Trent! www.nationalbrewerycentre.co.uk. 01283 532880 and www.claymills.org. uk.+ 01283 509929

Martin Green

PROGRAMME

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

January 2011: Sarah Chubb, Sandwell Borough Archivist

Chance Brothers: glassmakers of Smethwick

Sarah Chubb, of the Sandwell Community History & Archives Service, gave us a new perspective on Industrial Archaeology, that of a professional archivist. Whilst amongst members there is a considerable amount of knowledge concerning the activities of Chance Brothers of Smethwick and their expertise in many fields of glass manufacture, few have had experience of the behind the scenes work needed to preserve company records for posterity. And the Chance Brothers archive is undoubtedly an important record.

Sandwell is one of the four Black Country Authorities and includes the towns of Oldbury, Rowley Regis, Smethwick, Tipton, Wednesbury and West Bromwich. Consequently, there is a rich industrial past that needs to be conserved. Engineering, chemicals, brewing and steel as well as glass-making have all taken advantage of the area's natural resources and skilled workers.

The Chances were a yeoman family whose members included both farmers and craftsmen. In 1824 Robert Lucas Chance, bought the glassworks of the British Crown Glass Company in Spon Lane, which specialised in making blown window glass.

Prior to this, Chance had worked at the Nailsea glassworks near Bristol, owned by his father William Chance where he was affectionally known as a twelve year old as *the little master in the jacket*. John Hartley, a crown glass expert, became a partner of the company in 1828 after being brought from the Nailsea glassworks. Robert's brother, William became a partner three years later. In 1832, Chance introduced the blown glass cylinder method for the production of sheet glass and opened a chemical works at Oldbury in 1835 to supply the chemicals required for glass manufacture. Following the death of John Hartley in 1833, the company was renamed 'Chance Brothers'.

The early Victorian era saw an explosive growth amongst the aristocracy and wealthy for ostentatious glazed buildings to house exotic plant collections and to provide year-round fruit for the table. Joseph Paxton's great glasshouse at Chatsworth was the forerunner of the Crystal Palace built in 1851 to house the Great Exhibition. Chance Brothers secured the glazing contracts for both buildings from which flowed other prestigious work, including glazing for the new Houses of Parliament (the opal glass for the four faces of the Westminster Clock was unique to Chance) and the ornamental windows for the White House in Washington. Other products included stained glass windows, ornamental lamp shades, microscope glass slides, painted glassware, glass tubing and other specialist types of glass.

Chance Brothers exhibited at the Great Exhibition and the archive includes copies of the catalogue. The exhibits showed their expertise extending from ultra-thin glass for microscope slides to complex lenses for lighthouses. This expertise owed much to Frenchman Georges Bontemps and his fellow countrymen who had come to work in Smethwick. Their skills were closely protected and only passed down from father to son.

However, James Timmins Chance, who had joined the firm in 1840 at the age of 26 was a prolific inventor and engineer who was responsible for many advances. He took a particular interest in optics and the Lighthouse Works was created in 1851 to meet the demand from around the world – especially from the maritime traders of the British Empire – for better aids to navigation and safety. Chance capitalised on the work of Fresnel in France to develop better and larger lighthouse lenses and eventually supplied

some 2,400 lenses to over 80 countries.

Chance created a coloured and ornamental glass department in 1848 under Bontemps although this lasted only until 1866. A licence was taken out in 1852 for the use of the Mason and Conqueror machine to produce rolled glass. Chance developed the process into a double rolling machine for the lamination of glass between rollers and using a second pair of rollers to imprint a pattern on the glass. This double rolling process was used to create a range of white and tinted figured/cathedral glasses.

As with many of their contemporaries, the Chances became involved in civic affairs and in 1900 a baronetcy was created for James Timmins Chance.

Advanced technology was never neglected; using the pioneering work of Sir William Crookes, Chance perfected optical glass that blocked harmful UV rays and indeed used the Crookes name as a trade mark into the 1960s. Chance also developed, in the 1930s, the manufacturing technology needed for cathode ray tubes – just in time for their widespread use in radar during the war. A 22" tube was exhibited at the 1938 Berlin Radio Show.

Chance played an important role during WW2 supplying optical glass for telescope and binocular lenses, Aldis lamps, Crookes UV lenses and special dark-lensed goggles for night fighter crews. Many of these items were produced in a shadow factory jointly owned with Pilkington.

In 1945 Pilkington acquired a 50% shareholding in the company but the Chance operation continued to be largely separately managed and a factory was established in Malvern, Worcestershire in 1947 to specialise in laboratory glass. The operation was incorporated as an arms-length subsidiary under the old name Chance Brothers Ltd. In 1948 the Malvern plant produced the world's first interchangeable syringe. When plastic disposable syringes displaced glass in the late 1960s, the range of its precision bore product was diversified.

By the end of 1952 Pilkington had assumed full financial control of Chance Brothers, but did not become actively involved in its management until later. Subsequently, the lighthouse works was sold in 1954, the optical division relocated to St Asaph in 1957, the Glasgow works closed in 1964, the rolled-plate division in 1976 and finally in 1981 the Spon Lane site was closed. The seven-storey listed building still stands alongside the M5 motorway but it is in a poor state of repair.

Sarah closed her talk with a review of the work undertaken by her department and shared some of the interesting finds that had been made. The extensive family papers, lodged in the Sandwell Borough Archive in 1990, confirmed the family's involvement in civic affairs. The bulk of the business archive had gone to Pilkington who eventually released the material to Sandwell where it now occupies some 30 cubic metres in 60 bays of shelving.

There are immediate issues to be addressed; original leather bindings have deteriorated badly plus cataloguing is being hindered by the random order in which the material has been stored. Of particular interest has been examples of pre-war glassware from the Orlac range, patents and trade mark applications, personnel records (including the notice of a drowning in Liverpool Docks and a knuckleduster made in the works). Not all available material is in the archive; at least two large photographic collections are known to be in private hands.

Finally, we in Leamington can see examples of Chance's ecclesiastical glass in three windows in the Parish Church.

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February 2011: Peter Cross-Rudkin

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

Given the scale and quality of his work, it is surprising that John Rennie is relatively unknown; at least, in comparison with Telford, the Stephensons and Brunel, to name but a few of his peers in the pantheon of British Civil Engineers. Peter Cross-Rudkin, himself a distinguished engineer, lecturer and author provided a necessary correction and opened many eyes to the range of Rennie's works. The forthcoming London exhibition in July to celebrate the 250th anniversary of Rennie's birth is awaited with interest. Evidently there is a wealth of material available, not least thanks to a bequest in the 1930s to the National Library of Scotland by a descendant of Rennie and also within the Boulton & Watt papers.

Rennie's was not a rags to riches story. He was born the ninth child of a reasonably prosperous tenant farmer at Phantassie, East Lothian. The family house still exists. His older brothers found success in other fields but John Rennie showed an early interest in things mechanical spending much time in the workshops of a local millwright, Andrew Meikle, for whom he subsequently worked.

Rennie set up in business on his own account in 1779. His first job was to rebuild Knowe Mill whose ruins still stand. Practising mainly as a millwright, he showed an early interest in fire engines. However, he also saw the need for more formal qualifications and enrolled at Edinburgh University for three years in 1780 to study natural philosophy, becoming the first civil engineer at the university.

In 1784 Rennie made a study tour to Birmingham and was offered a 7 year contract by Boulton & Watt who needed a millwright to supervise the construction of the Albion Mills in London. The mills became operational in 1768/9 but Rennie was allowed to undertake private work and set up his own manufactory in Southwark. A surviving testimonial letter recommends him as '*a country man of great integrity & of equal genius in the science of mechanics – he has not much fortune, but great knowledge as an Engineer*'.

After meeting John Smeaton, one of the leading engineers of the day, Rennie was introduced into the business of canal surveying and building and over the next twenty years worked on many projects all over England and Scotland. His notable, and lasting contribution has been a number of elegant bridges. His first major work was on the Lancaster canal, crossing the River Lune with the only bridge to bear his name. Another river crossing used a siphon to duct the river under the canal. In Scotland the Crinan canal is still used by 'Puffers'.

Rennie foreshadowed Brunel in his use of a post chaise as a travelling office. An extract from his diary gives some idea of his hectic schedule; '*Left London for Scotland on Friday Octr 17th. 94. Got to Fantasy Tuesday 21st. Was on the London Canal business till Friday 24th. Arrived Inverary on Monday 27th. Left Crinan on Saturday Nov15th. Stayed in Glasgow on ditto business till Wednesday the 19th. Got to Busbie (?) Saturday Nov 22nd. Was at Dunbar & Edinburgh on London Canal from 19th to 22nd.*'

Aqueducts on the Kennet & Avon showed his inventive architecture and the Calne Hill flight of 27 locks his determination. At the summit Rennie wanted a long tunnel but at Jessop's suggestion built the Crofton pumping station and a shorter tunnel with a watermill-powered pump at the Bath end in which Rennie pioneered the use of cast iron gearing.

Another example of Rennie's skills as a draughtsman was shown in the great detail included in the plans for the

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Rennie's first major work: carrying the Lancaster canal over the River Lune



Stoneleigh Abbey Bridge



John Rennie (1761-1821)

Act of Parliament drawing for the proposed Croydon & Rotherhithe Canal.

Other canal work throughout the British Isles has left us many examples of Rennie's bridges and their routes show his feeling for the countryside. His Boston Town footbridge was notable for its use of cast iron box-sections as if they were pieces of traditional masonry.

The bridge at Chepstow is not by Rennie, as is often said, but the confusion may be caused because he did submit a design. Two major bridges in London were his innovative Southwark bridge which nearly bankrupted the contractor and the impressive Waterloo bridge, similar to the earlier one at Kelso, which was opened by the Prince Regent in 1871. Rennie subsequently declined to accept a proffered knighthood.

In Warwickshire Rennie built the attractive balustraded bridge at Stoneleigh Abbey. However, his work was by no means confined to canals and bridges. He was extensively engaged in docks and harbour works, Grimsby, Sheerness with its innovative cellular walls and coffer dams, London Docks and harbours from Ramsgate to Peterhead and across the Irish Sea to Louth and Dun Laoghaire. Perhaps the most famous work at the time of his death was the massive breakwater outside Plymouth.

Rennie's involvement in the Bell Rock lighthouse remains disputed, Stephenson was the resident engineer but was not responsible for the design. Elsewhere, Rennie was involved in several East Anglian fen drainage schemes and water supply schemes for Manchester and London. A quarry at Stow on the Wold provided stone pipes, some relics of which can still be seen incorporated into a wall, but the joints proved unsuitable and cast iron was used instead.

Other works such as the sea walls at Reculver and the elegant cast iron pillars and trusses of the Dublin Customs House and steam ship schematics showed Rennie's mastery of different engineering techniques.

With such a body of work behind him, why is Rennie relatively unknown, especially compared with his contemporary Thomas Telford? Peter Cross-Rudkin suggested that Rennie was, in his time, regarded as pre-eminent but Telford survived him by 13 years and significantly became the first President of the Institution of Civil Engineers and, furthermore, had a body of work that has survived better than those of Rennie. Undoubtedly, the two men were serious rivals with very different attitudes to their profession. Rennie with his formal qualifications and consequent exposure to French engineering practices contrasted with Telford's attitude that a degree was unnecessary for an engineer.

Happily, enough of Rennie's work has survived for us to judge that he made a most significant contribution to our industrial and architectural heritage.

March 2011: Anthony Leahy and Sam Nelson:

Nelsons of Warwick – gelatine and a great deal more

An attendance of members and visitors totalling 134 stretched the Pyne Room facilities to the utmost whilst local historian Anthony Leahy and fifth generation family member Sam Nelson gave a fascinating presentation of the history of one of Warwick's most important family businesses.

The Nelson story involved much more than gelatine, ranging over food products, advanced manufacturing processes, cement works, the development of New Zealand's frozen meat trade, marketing methods used in Victorian times that are still used today, company housing and civic duty, photographic materials and finally a poignant explanation for the decline of a great family business.

Anthony Leahy led us through the Nelson history with a sure touch. George Nelson was born in Nottingham in 1800. After studying chemistry, he moved to Leamington and produced the first Leamington Salts by evaporation from the celebrated saline. He took out his first patent for the manufacture of gelatine in 1837.

George Nelson prepared his gelatine from buffalo hides. His vision was to create a product that was colourless, odourless and consistent. The sales of his gelatine product, increased rapidly, and the firm moved to Emscote Mills in 1841. George Nelson died in 1850, leaving five sons.

Thomas Bellamy Dale was the cousin and partner of George Nelson. He too had studied as a chemist and was involved in the business from its beginnings. He took an active part in local affairs, and was elected Mayor of Warwick on three occasions.

Gelatine softens and swells in cold water, but does not dissolve until it is heated; when the solution cools it solidifies to a firm jelly. Sources of gelatine are hides, calves' feet, and various animal tissues. Hides were used at Emscote. Gelatine was largely consumed as a food; blanc-mange, creams, table jellies, in extracts of meat, soups, and in many preparations of confectionary.

Emscote Mills are situated in Wharf Street on the Grand union Canal. The site was probably three times larger than today. The mills were largely self-sufficient, with all support trades on site. In 1899 there were thirty-eight steam engines on the premises pumping the wells, feeding the steam boilers, the filter presses, supplying power to the lifts and driving the endless belts and machinery.

Charles Nelson was the eldest of the five brothers, he started at the family's lime and cement works at Stockton. Thomas Dale ran the gelatine factory. Later Charles took a more active role in the gelatine business in partnership with his younger brothers, Edward Montague and George Henry. As in Warwick, Nelson constructed houses at Stockton, for their workers. The Village Hall and later the Nelson Club provided recreational and educational facilities. The Nelson Village in Warwick was a model development, containing work-men's cottages and two villas for the works managers. The village forms part of Charles Street and now, is all but lost in the expanse of the Percy Estate. In Charles Street stands the "Nelson Workmen's Club," opened in 1883 and is still in use.

George Henry Nelson devoted his life exclusively to the gelatine business. Despite his 40 years' service, very little is known about him as yet. For the most part he lived at the Lawn at Emscote which was home to the Nelson family from the 1840's up until the early 1920's.

The Nelson involvement in photography was established by 1880. Gelatine was one of the substances used to mount prints. It promised to replace collodion as the medium for forming the sensitive layer on glass plates. In 1896 the Warwick Dry Plate Company was formed to develop gelatine for improved photographic processing.

Nelson's advertised their products in many ways. One of the most popular being '*Nelson's Home Comforts*' a hard back cookery book, that was available for the cost of a stamp. Over

a million were distributed between 1880 and 1910.

The value of a celebrity chef's endorsement was also recognised and in 1882 Mary Hooper was commissioned to revise *Nelson's Home Comforts*. It is more than likely that Miss Hooper was sponsored prior to this engagement as all but one of her cookery books promoted Nelson's Gelatine exclusively. Mary began her literary career as a sub editor on the "Household Words" a weekly magazine edited by Charles Dickens.

Edward Montague Nelson had a head for business. He was a deal maker who became head of the Colonial Consignment and Distributing Company and of Nelson Brothers, New Zealand. He was the Charter Mayor of Ealing, a Sheriff of Middlesex, as well as a mayor of Warwick. He was knighted for services to the Australasian Colonies, and in recognition of his public services.

William Nelson, the youngest of the five brothers has left us a valuable document in his diaries. These describe his time in Warwick and New Zealand whither, in 1863 he and his brother Frederick went. After abortive attempts at sheep farming William returned to England and married before returning to New Zealand but returning again to England in 1872 with his family before making a final move back to New Zealand in 1879. He established a tallow and canned-meat factory at Hawkes Bay with his brother Frederick. William Nelson is known in New Zealand as The Father of Hawke's Bay and is commemorated with Parks in both Napier and Hastings.

Nelsons played a significant part in the history of the frozen meat trade. William Nelson managed the New Zealand operation where works and a village for workers were established on the same principles as in Warwick and Stockton. The first cargo of frozen meat was successfully shipped to London in 1882. The Nelson brothers had established a new industry and over the next decade dominated the frozen-meat trade.

We learnt little about the next generation, save that Walter Nelson was killed in action during WW1. Of the fourth generation, the important figure was Guy Nelson who became Managing director in 1924. Much involved in civic affairs and charities, he was an Honorary Freeman of the Borough of Warwick, Deputy Lieutenant of the County, twice Mayor and an Alderman. He served on the Warwickshire Police Authority, the County Council and as a JP. He was a long-serving Chairman of Governors of Warwick School and the Guy Nelson Hall is named after him.

Finally, representing the fifth generation, his son Edward Montague (Sam) joined the firm in 1953 after spending time in East Africa serving in the Kenyan police force. However, the business was not in the best of health, the workforce of some 600 in 1900 had declined to only 90 in 1950 and competition was intense from some 60 other gelatine manufacturers. In 1957 Davis Gelatine, brought in as a knowledgeable and natural partner, took a 51% controlling share in George Nelson Dale & Co.

In a lively discussion following the presentation Sam Nelson's response to the question; 'what happened to the business', was a very clear rationale for the decline of many Victorian family businesses. Bluntly, their families were too large. Several of the five brothers in the second generation had ten children, whilst the older brothers ran the business and their siblings found success overseas, the ownership of the relatively small business became fragmented over the generations. Couple this with family feuding, ending in an expensive court action, plus growing technical competition and the seeds of eventual decline were sown.

Many former employees and residents of the company village contributed reminiscences of the works and their homes ranging from health hazards, clogs and smells to the problems of painting the front door white (not the company colour) and the pugilistic achievements of the Turpin family. By common consent, members and visitors had greatly enjoyed the story of an important Warwick family.

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FROM THE CHAIRMAN

Thanks

I would like to thank members of the committee (particularly Peter Coulls, Victor Lobb and Dennis Crips) for running the Society so efficiently whilst I was away cycling from Land's End to Lowestoft, and also to thank all those who kindly contributed to the charities we were supporting.

Land's End to Lowestoft

The lasting impression of the route from Land's End to Lowestoft was the wonderful diversity of the English landscape and the pivotal role that transport and industrial heritage plays in it. We rarely had time to pause and spend time exploring the various sites, but it acted as a timely reminder of the need to return to these locations in the future, perhaps, next time, by motorized transport!

Sustrans have established a series of National Cycle Routes, and we were struck by the degree to which these employed former track-beds of railways and mineral tramways and (variously surfaced) canal towpaths. National Cycle Route 3 runs from Land's End to Bristol and Route 4 from Bristol to London's Putney Bridge. The gentle gradients of these train and canal routes were a welcome respite from some of the more challenging sections!!

In the early stages of route 3, the 'Camel Trail' from Padstow to the flanks of Bodmin Moor and The 'Tarka Trail' from Meeth via Torrington and Bideford to Barnstaple reminded one of the halcyon days of the Atlantic Coast Express when it was possible to leave Waterloo and reach these destinations on the northern coast of Devon and Cornwall by train. Both these former railway paths were enjoying intensive recreational use, with some sites portraying past glories of the line such as the converted station at Fremington

Quay. Access into towns and cities was also facilitated by the use of former railway lines e.g. the route from Whitchurch to Temple Meads, Bristol and the subsequent route out of Bristol and on to Bath.

Canals also featured heavily – even in the south-west – where two sections were incorporated in the route from Tiverton to Bridgwater – the Great Western Canal from Tiverton to Taunton, and the Taunton and Bridgwater Canal. How different an atmosphere – and history – these canals had compared with the industrial canals of the Midlands and the north. Most significant of all was, of course, the Kennet and Avon Canal from Bath to Reading, combining magnificent architecture and engineering to produce what must be England's most attractive canal route. Enjoying the intimacy of the canal as it passes through Bath, crossing the Dundas and Avoncliff aqueducts, viewing the pumping stations at Claverton and Crofton, and climbing the Caen Hill flights of locks into Devizes on a beautiful summer's evening surely stirs the spirit in anyone!

We followed the Thames Path into London and exited via the Isle of Dogs, on to the Regent's Canal and Hertford Union Canal, and then headed up the Lea Valley, a very fertile area for the industrial history of east London. Sadly, thunder, lightning and torrential rain kept us focussed on getting to our destination rather than stopping to explore the sites!!

We then entered (largely unfamiliar) Essex with unanticipated delights such as the Tiptree jam museum and the port of Maldon (complete with pie and eel shop) and then on to final sections in Suffolk including Woodbridge tide mill, Snape maltings and the Adnams brewery of Southwold.

Not all locations and industrial sites could be described as worthy of celebration, and there were many

instances where industrial decline and decay had taken a firm grip, with no obvious exit strategy. Current economic conditions were clearly not buoyant in our final destination – Lowestoft – and at the end of the trip it caused much reflection on the economic and social inequalities that are still so prevalent in our country.

Even so, what this trip demonstrated was that at every stage of the route, there seemed to be so much of interest – and so often the transport and industrial features were an integral part of that landscape, contributing to the unique character of our country. The over-riding feeling at the end was a desire to revisit, to explore and to learn more of England's industrial heritage and to press the case for care and preservation.

Martin Green

PROGRAMME

September 8th 2011

AGM and 'Industrial Shorts'. A programme of short presentations from members, each lasting no more than fifteen minutes.

Co-ordinated by Martin Green

October 13th 2011

Sally Hoban:

The history of The Birmingham Assay Office.

Sally Hoban is the newly appointed curator of the Birmingham Assay Office.

November 10th 2011

Roger Bailey:

Coventry Transport.

Roger Bailey is an expert on the history of Coventry's bus transport, and has published two books on the subject.

December 8th 2011

Peter Lee:

Nuneaton and Bedworth: coal, stone, clay and iron.

Peter Lee's expertise on the history of the Nuneaton and Bedworth areas is well known, and his talk will draw on his latest publication on the collieries and quarries of the area.

NEWSLETTER

Meeting Reports

April 2011: Tim Booth

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

Tim Booth's encyclopaedic knowledge of Warwickshire's wind and water mills provided a most interesting evening. Behind the descriptions of many diverse mills we learnt much of the often conflicting requirements of restoration and conservation. Is it better to leave alone or to compromise originality in order to have a working example?

Whilst these criteria certainly apply to the machinery of any mill, there is also the issue of the buildings. Conversion into an 'interesting' and no doubt expensive house may preserve some features but to 'prettify' machinery is surely a step too far. Better to keep the old machinery if only as wall-hung decoration.

Sadly, Warwickshire has lost more mills through demolition than almost any other county. Will it be possible to halt this trend? Unfortunately, as with many other parts of our industrial heritage, the answer is uncertain. What are the prospects for replacing a miller when the incumbent retires? There has to be some hope from the increase in the numbers of trained millwrights now emerging, but the future remains unclear.

As a former chairman of the Midland Wind & Watermills Group, Tim Booth has experienced most aspects of all these issues since he started to record Warwickshire's mills in 1969. He has now moved west into Shropshire where he has leased a mill.

Tim set the tone for the evening with two evocative illustrations; the now lost watermill at Weston under Weatherly and the Baxterley windmill which is sadly in decline. Retracing his early survey work revealed that in many instances little had been done in the intervening years, but it did allow Tim to explain some of the technology behind the mills and their development.

For example, the Blackford mill on the river Alne in Henley in Arden has a unique iron support frame for the machinery and millstones supplied by R Summers of Tamworth in Arden, a name unfamiliar to many members but which was to recur on a number of occasions during the evening.

Robert Summers started a millwrighting business in Tamworth in the 1830s. The buildings are now used as a garage but have also housed a foundry and a blacksmith. A trove of papers were found some years ago in an old desk; letters, time sheets and other material that would merit closer study and ideally, publishing. By the same token, other local businesses including Lampitts in Banbury, Glovers in Warwick and Bull & Horton in Stratford upon Avon all need work to be done on their records.

Another facet of water mills is the usefulness of their associated weirs and sluices as part of the river management system. If allowed to deteriorate or be demolished then the flood risks increase, surely a good reason for keeping them in a good state of repair.

Tim's catalogue of lost heritage and broken promises included Rock Mill, Milverton, where an agreement to leave the wheel extant on conversion was not honoured. The flour and provender mill at Broom Hills, which was a good example of mill growth through the 18th and 19th centuries, has been demolished. Maxstoke Mill was

complete but is now demolished, as is Murcott Mill which had a Summers wheel. Arbury Mill is still standing but is of no interest to the George Eliot Society and so may well not be recorded as it should be. Henwood Mill in Solihull has had a genteel makeover with the ironwork painted a baby blue! But the wheel has been repaired.

Tim gave us some more interesting details about Chesterton Windmill. He shares the opinion of many that it is a most important site. He believes that the Edward Peyto building has always been a mill from its 17th century beginnings, although there has been debate over its possible use as an observatory. The machinery was replaced during the 19th century. During the last survey by the Mill Group some graffiti was found of a windmill that could have been the forerunner of the present mill.

Chesterton Mill is a good example of the dangers of over-restoration and the need for proper maintenance – the serious accident in 2006 exemplified the perils of using incorrect materials. Tim would like to see dendrochronology used to date the Hurst frame to confirm, or otherwise, the believed construction date of 1632. Members might care to refer to Newsletter 35 for an earlier presentation on the mill.

Another windmill under threat is the one at Berkswell which contains some rare 18th/19th century timber gearing. The cap has been removed for some time and there is fear that this work may not be completed. Interestingly, there is evidence from the carpenter's joints in some reused timbers that they were originally supports for a post mill.

Wellesbourne mill was thought secure although in need of repair, but the millwright has moved on after a dispute leaving the future in doubt. Norton Lindsey has a mill with important features such as a very rare governor system that must be preserved, preferably by being left unrestored but protected.

Not all Tim's news was bad, The New Hall Mill in Sutton Coldfield, which was restored by Alfred Owen in the 1970s, remains a good example of a working mill. Similarly, Charlecote mill which was restored for the TV production of *Mill on the Floss* remains working but the miller is retiring and its longer term future may not be secure.

Some mills have been relocated: the Dansey mill from Tamworth has been rebuilt at the Avoncroft Museum but the mill from Temple Balsall also moved to Avoncroft has yet to be rebuilt. It is currently being assessed by the Midlands Mill Group but some parts are missing. However, the Museum Director would like to get a wheel rotating if funding can be found for the project.

Tim ended with an anecdote that summed up the perils of cold calling in the interests of surveying an interesting mill. The saga of Burton Hastings, which went something like: 'Me mother isn't in', 'I'll have to ask Jack', 'Jack says to research off', eventually led to the discovery of an 17th century mill inside a 19th century shell which, despite the terrible state of the machinery and a dreadful clutter of other equipment was still producing animal feed.

Tim made it clear that there was no sense in trying to replicate today the original Mill Group survey that had been done in the 1970s. So much has changed and it would be disheartening to try and rewrite the Warwickshire survey.

May 2011: Members' Evening

Dennis Crips opened this members' evening with the topological mystery of Bridge 126 on the Oxford Canal at Wormleighton. Before getting to the mystery, Dennis reminisced over 25 years spent walking the local canals and the IA paradise that they offered. The Napton to Banbury section of the Oxford Canal being a particular favourite and one which included Bridge 126.

The Canal reached Napton in 1774 and Dennis graphically outlined the problems facing the surveyors and builders in overcoming the watershed at Priors Hardwick, given the disinclination of James Brindley and his successors to undertake cuttings or embankments. By following the contour line between Napton and Fenny Compton the canal wanders through the countryside. Dennis highlighted the accuracy required in its construction – 1:700,000 plus an allowance for the earth's curvature in order to maintain a nearly level course.

It was thus a great surprise, and cause for mystification, to pause at Bridge 127 and to look back across the fields to Bridge 126 and apparently be looking down on it. The camera cannot lie but his slide clearly showed the track immediately beyond the crown of the bridge. The subsequent discussion failed to provide any clear explanation and the mystery persists.

New member John Berkeley introduced us to the 150 year old Brandauer company, founded by his wife's many times great grandfather who had fled from persecution in France and set up a 'Toy' business at 7 High Street, Deritend in 1782. Within two generations the business, now trading as Ash & Petit, was specialising in pens (nibs to the uninitiated) and prospering. In 1862 an arrangement was reached with Charles Brandauer of Vienna for additional finance, a condition of which was the adoption of the Brandauer name for the business.

A new factory was built in New John Street and expanded in the 1880s, by which time Brandauer had become one of the leading pen manufacturers in the UK with an output of over 1 million pieces a day and a thriving export business. The manufacturing processes were labour intensive (largely female and on piecework) but required tooling of great precision which then as now was produced in-house.

Brandauer was an early proponent of celebrity endorsement for its products. John showed examples of early advertising posters with splendid engravings featuring popular authors including Dickens, Collins and Thackeray.

The company operated from the same factory until 2000 and little had changed in 140 years, except that pens had been replaced by other high precision metal pressings made to tolerances of 2 to 3 microns. The old factory has been sold for redevelopment but a new factory in Bridge Street West, still in Birmingham's Jewellery Quarter, continues to serve a wide range of customers from push-fit plumbing parts and micro-switches to the Large Hadron Collider; indeed from pens to particle physics.

Roger Cragg talked about two innovative structures in Leamington by William de Normanville, the Mill Road Bridge and the Pump Room Swimming Bath Roof.

The 100 ft span of the Mill Road Bridge was unusual for its time. Not a conventional suspension bridge but a forerunner for today's cable stayed bridges with three rods on each side terminating on handrail uprights and forming trusses to support the roadway. The New Bridge at Ironbridge was cited as an example of a modern cable stayed structure.

The Swimming Bath, now Library, roof was completed

in 1890. It is 120 ft long and 60 ft wide, hipped at one end and with a five-sided apsidal structure at the other. The latter leads to complicated trusses elegantly resolved in timber and wrought iron. Two 2 inch diameter rods running the full length of the building relieve the outward thrust forces.

A move to dismantle the roof as part of the redevelopment process was resisted and, with Roger's involvement, it was registered as an historic engineering structure and remains in place today.

John Brace took a wry look at the improvements to the Stratford upon Avon Water and Sewage System between 1848 and 1906, if the term system can be applied to what passed for a service at that time. As with most mid-Victorian towns, Stratford had no water supply nor drainage; cesspits contaminated wells and cholera was never far away in the time of the 'Great Stinks'.

The 1848 Public Health Act precipitated many conflicts of interests between Parish, Town and Borough Authorities, any one of which could outvote the Local Board of Health. Public enquiries were held to try and establish needs, practicability and, not least, affordability for the proposals.

A source of soft water was needed for domestic and laundry purposes but the landowner of a potential spring source in Wilmcote refused to sell. Authority was granted to build a new sewer but not to put anything into it, and when this was resolved an attempt to tap the canal for water to flush the sewer was unsuccessful. The brewery also discharged waste into the sewer system clogging it up with 'cake'.

John traced the routes for various water supplies to Stratford and reminded us that wasted resources are nothing new; in 1890 the Trinity Church organ had an hydraulic motor fed by a 3 inch supply pipe. In its first year it used 900,000 gallons. Stratford's needs were only properly met when artesian wells were sunk and purification plant installed in 1923.

After the break, Richard King presented another Warwickshire Miscellany. He opened with the construction of the Meer End Mission Church, The Coventry Ordnance Works in Red Lane with its 1,000 ft bay used for the manufacture of naval guns but sold to English Electric in 1919, and the construction of the Leamington railway bridge in 1906/7.

A collection of lapel badges made during WWI by local companies for their workers in reserved occupations hopefully prevented the receipt of white feathers. A similar set from WWII reminded us of long lost local companies, including Warwickshire Aviation and Helliwells Aviation together with ARP and First Aid identification.

Other WWII reminders included derelict sluice gates in Coventry for a fire fighting pound, patched holes in a canal bridge where gun ports had been knocked through, bar and rod mesh roadway reused as fencing and concrete drums, some still with wooden runners, ready to be rolled into place as anti-tank defences.

Richard had found a series of painted signs on buildings including the Willes Road Corn Stores, the George Inn at Barford and the 1884 sign of W F Gossage on a Clemens Street pub for Chops & Steaks and Carriages.

To conclude the evening Martin Woolston reviewed a recent Newcomen Society conference in Manchester on 'The Piston Engine Revolution'. Some 22 papers were presented ranging from early attempts, unsuccessful, to use gunpowder as a fuel to a description of the first free piston engine. This last paper was presented in Italian but sadly the interpreter's attempts to explain the workings of the engine were a dismal failure.

The conference provided the opportunity to visit the Anson Engine Museum and a dinner was held in the Power Hall of the Museum of Science & Technology with running engines – a memorable experience.

June 2011: Damien Kimberley, Coventry Transport Museum

The Coventry Motor-cycle Industry

Damien Kimberley gave us a wide ranging survey of the 114 known businesses that produced motorcycles in Coventry over the 87 years from 1895 to 1982. Damien joined the Coventry Transport Museum staff in 2005 following a placement at the Museum whilst completing an MSc at Ironbridge and writing a thesis on the redevelopment of Coventry after WWII. His presentation complemented that given by his colleague, Steve Bagley, in October 2009 on the cycling pioneers Starley, Hillman and Singer whose names are inextricably linked with Coventry and its heritage.

The presentation was based on the collection of motor cycles at the Museum and on the research that Damien had undertaken to produce a book on 'Coventry's Motorcycle Heritage', sponsored by the Museum and the British Motorcycle Charitable Trust.

The archive material used to illustrate the talk together with the restored machinery on display will have made members aware of the wealth of material fortunately preserved for present and future generations. Industrial archaeology is about much more than the corner of a wall of some forgotten factory, although Coventry has a significant quantity of such material. Many of the illustrations were of buildings remembered by some but unknown to many and are now only an illustration in an old catalogue or advertisement. Probably very few could remember but a handful of the makers or the machines that were shown, but how evocative they were of the early days of powered personal transport.

The evolution of the cycle trade followed an interesting path. The early pioneers exploited a demand that seemed to cross barriers of sex and class for personal transport that allowed greater freedom of movement. As Damien notes in the introduction of his book; Coventry was the birthplace of bicycle production in England and at its peak in the early 1890s was producing some 300,000 units a year and employing around 40,000 people or around two thirds of the working population.

As soon as small, light petrol engines became available (Gottlieb Daimler fitted a vertical single cylinder petrol engine into a reinforced boneshaker frame in 1885) the smaller bicycle manufacturers began to disappear to be replaced by others producing motorised cycles. It was interesting to see that many of the early examples shown in the presentation incorporated both pedal and motor power.

Inevitably, commercial success depended upon the funding available. Those fortunate to secure substantial backing, for whatever reason (and one supposes that then as now the right contacts were important), prospered. The names Humber, Singer, Triumph, Swift, Rudge and Francis-Barnett are all associated with large, purpose-built factories and their names survive, whilst the opportunistic firms such as Aurora, Kingsway, Lancer and Wigan-Barlow flourished briefly and then failed after a few years.

We learnt about some more of the early personalities, not least Henry (Harry) John Lawson who, not satisfied with some pioneering bicycle designs, went on to try and dominate the nascent car industry by acquiring controlling patents. However, after a success with forming the Daimler company in England he was eventually found guilty of fraud and went to prison.

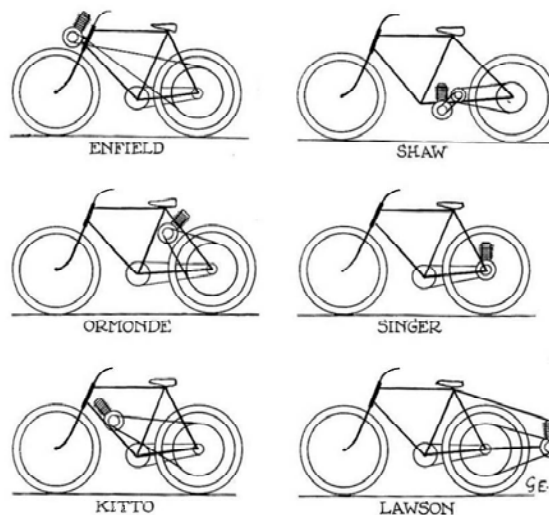
An eccentric American, E J Pennington 'talked the talk' and had some wild ideas for fire engines and armoured vehicles. He also advertised a powered bicycle that had 'jumped 65 feet over a river' startling onlookers.

Much more down to earth was Agnes Muriel Hind, reputedly the first woman in Britain to own and ride a motorcycle. She competed in national trials and races with great success, often overshadowing her male competitors. She also became a noted journalist. This led to contacts with the Rex Motor Manufacturing Company which wanted to break into the motorcycle market catering for ladies. Collaboration led to the 'Blue Devil' machine and marriage to Richard Lord, a senior manager of the company who was also active in motorcycle competitions. They lived for many years at Wall Hill Hall in Corley, a house that still stands today.

In 1928, a Rudge sales agent, Stanley Glanfield, embarked on a world tour on a 499cc Rudge motorcycle combination with sleeping facilities incorporated into the sidecar! Eight months and 18,000 miles through sixteen countries in four continents was some tour for the time, and excellent publicity for the reliability of the Rudge machine which is now a prized exhibit in the collection.

The archives of the Transport Museum provided a varied range of illustrations which charted the development of the cycle industry in its many manifestations. Of equal interest were some rarely seen views of early factory and office interiors. It was sad to see how little of these manufacturing sites remains today. Damien had searched diligently but found little. Coventry's cemeteries contain the remains of many of the industry's pioneers but the flamboyant Harry Lawson rests in a modest North London grave in Hendon.

Looking at the many photographs of motor cycles it was notable how similar were the designs of frames and fuel tanks although engine locations showed more individuality, as is seen below. Illustration courtesy CTM.



The associated component industry was only briefly touched upon but it clearly flourished as a result of the demand from many quarters.

The list of 114 Coventry manufacturers so far traced ranges from Accles to York with many familiar names in between. It is a tribute to the invention, industry and commercial acumen of many individuals, few of whose names are recognised today.

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Industrial Archaeology Society

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FROM THE CHAIRMAN

Two plaques: two causes for celebration of Warwickshire's industrial heritage

It was quite a coincidence that two plaques celebrating different aspects of Warwickshire's industrial heritage should be unveiled within 48 hours of each other. On Wednesday November 16th., the mayor of Leamington, Councillor Alan Wilkinson, unveiled a blue plaque commemorating the residence of Sidney Flavel (1819-1892) at his former home in Newbold Terrace, Leamington Spa. Sidney Flavel was the driving force behind the development of the firm of Flavels, specialist designers and producers of kitchen ranges.

The unveiling was attended by many local dignitaries, local history enthusiasts, representatives of Rangemaster (the modern successor to Flavels), Sidney Flavel's great grandson, Mike Wilmot, as well as a liberal sprinkling of members of the Warwickshire Industrial Archaeology Society. As the crowd gathered there was some debate about exactly which Sidney Flavel we would be commemorating, for father and son were both called Sidney and both had a significant impact on the company and the town!

Local historian, Dr. Christine Hodgetts, who had completed the research on the Flavel connection to the house, gave a short presentation before the plaque was unveiled, and subsequently in the Town Hall gave a fuller description of the Flavel company's history, raising some issues that she felt could merit further research. William McGrath, chief executive of Rangemaster, also spoke on the role of Sidney Flavel in bringing the name of Leamington to the rest of the UK and other parts of the world via his 'Leamington Kitchener'. Several items of Flavel memorabilia had been brought from the company's headquarters to add to the occasion. We hope to be able to arrange a talk to WIAS on Flavels next year, possibly by an outside speaker, or by a group

of members who have had a long interest in the company.

Two days later at Alstom in Rugby, John Willock and myself were fortunate enough to be invited to the ceremony marking the presentation of the Institute of Mechanical Engineers Heritage Award to the pioneering work of Peter Willans, and in particular, to the Willans Central Valve Steam Engine. This was the 68th. occasion that the award had been made, and the booklet containing the details of the other 67 recipients revealed what a prestigious award it was.

Alain Foote – Manager of Steam Turbine Service Engineering at Alstom, Institution of Mechanical Engineers' Industrial Liaison Officer, and a member of WIAS – organised the event, and began the day with a presentation on the importance of the Willans Central Valve Steam Engine in the history of steam technology. The development of the Willans engine was fundamental to the growth of electricity usage in Britain in the second half of the nineteenth century - in homes, factories and even ships - and was a crucial step in the country's ongoing industrialisation.

We then moved to the Training Centre where the presentation of the Award was made by John Wood, former President of the Institute of Mechanical Engineers, to Roger Beaumont, Managing Director of the Steam Turbine Product Centre at Alstom. John Wood spoke about the engine's significance and reminded us that so much of the work of these engines remained out of public view, working incessantly to maintain electricity supplies in a manner seen only by a few engineers. A beam engine or a water wheel are viewable items with the simplest of technologies which can be easily understood by the interested observer. The Willans engine was a far more complex, far less accessible item, but no less important in the history of technology.

The particular engine (recently refurbished by Alstom employees) was built in 1901 in Rugby, and

the 140 horse-power, three crank compound engine was in service for 57 years. In 1892 generators of this type accounted for 68% of all electricity generated in Britain.

These two examples reinforced the fact that Warwickshire does indeed have a varied industrial history, and the time spent in Rugby reminded me that the town has much to offer the industrial history/industrial archaeology enthusiast. We have hardly any members from the Rugby area and this is a matter we need to address, initially perhaps by trying to attract more speakers with expertise of Rugby's industrial history to make presentations at our monthly meetings. The next stage might be to take our message into Rugby – and indeed other parts of the county – to build up support for the importance of researching, recording and maintaining Warwickshire's industrial heritage.

PROGRAMME

December 8th 2011

Peter Lee:

Nuneaton and Bedworth: coal, stone, clay and iron.

January 12th 2012

Christina Evans, Archaeological Project Manager, WCC:
Warwickshire Environment Record and the 'Imaging Past & Present' project.

February 9th 2012

John Bedington:
Charlecote Mill

March 8th 2012

Graham Fisher MBE:
Jewels on the Cut (Stourbridge Glass Industry & the Stourbridge Canal.

April 12th 2012

Sam Collenette, Archive Service Manager, Warwickshire County Record Office:
From Bolton to Warwick.

May 10th 2012

Derek Hurst:
Droitwich Salt Production: the technology.

June 14th 2012

Jeromy Hassell:
Coventry Machinists & Coventry Victor.

NEWSLETTER

Meeting Reports

September 2011: Members' Evening

A programme of short presentations from members.

Chris Barney opened the evening with a review of the recent AIA Conference held in Cork, Eire. Some 80 delegates, including others from WIAS, attended the event held on the campus of the University of Cork, an interesting mixture of old and new architecture.

The visits programme opened at the now defunct Jameson whiskey distillery, once home to the largest still in the world and empty since production was moved in the mid-80s. Today it seems to be in an unchanging time warp with the huge corn store that once received annually the 5,000 tons of barley grown on 15,000 acres lying empty but fully maintained. A visit to a gunpowder works, in itself a pretty dull site, was enlivened by the guide's entertaining blend of social and historical comment. The copper mines at Bantry, visited via a quaint selection of the local house painting shades, showed a landscape familiar to Industrial Archaeologists. Copper had been mined from 2,000 BC, with production peaking in Victorian times and ending in the 1920s. A tour of Cork included the waterworks with its ornate brickwork chimney stack, the old lunatic asylum, the largest building in Ireland and the Shannon Hydro-electric works where an old insulator was being used as a flower vase. The works with their 100 ft penstocks were built by Siemens in the 1920s at a cost of £5 million as a statement of the Republic's independence. Finally, the huge natural harbour at Cobh, home to the old transatlantic liner terminal, the last port of call for the Titanic and the site of the sinking of the Lusitania.

John Berkeley then introduced us to 'The Flying Standards', reviewing the long history of aircraft building by the Standard Motor Company after setting the scene with the replica Bleriot monoplane at Birmingham Airport – a Spitfire was wanted but rejected as 'it might upset some passengers'!

Standards' Canley works were built specifically for aircraft construction during WWI when all significant motor car and furniture manufacturers were required to produce aircraft. Standard had other sites for sub-assemblies including one in Dormer Place, Leamington and one in Cash's Lane. Aircraft built included the BE12, not a pretty machine according to Lord Trenchard, and the exquisite little Sopwith Pup, regarded by many as the greatest aircraft of the period. Standard built some 850 Pups or half of all those made. After the war some went to Australia to found the RAAF. Standard also built 500 'Harry Tates', the RE8 2-seat reconnaissance aircraft designed at Farnborough, and just under 100 Bristol Fighters at the end of the war. In all 1,474 aircraft were produced by Standard.

The Company returned to aircraft manufacture in WWII. 750 Airspeed Oxfords were built at Canley and shipped by road to Anstey for final assembly and flight test. The road transporter for the fuselage complete with wing centre section and engines must have been a familiar sight to Coventrians, and something of a moving road block for the few motorists then around. The Oxford was followed by the wooden wonder, the De Havilland Mosquito, one of the great and very versatile aircraft from that stable of which 1,066 examples were built.

There are few survivors of the 'Flying Standards'. None complete, but a few remnants of a Standard-built Mosquito are in Australia's Camden Air Museum and some restoration is under way.

Martin Wolston continued the story from the March

meeting of the free-piston engine from the Newcomen Society conference in Manchester. In an era of technology a 'chalk and talk' presentation was nostalgic. The gas-powered engine under discussion was an interesting if fruitless diversion from the mainstream of prime mover development. As presented, the engine is upside down. A cast iron cylinder, which is bolted to the floor has a fuelling valve and ignition system at its base. A free piston, which has a long rack extending from it, runs inside the cylinder and meshes with a pinion that includes a freewheel mechanism and is attached to the driven shaft which carries dual flywheels either side of the cylinder. The expansion of the gas charge forces the piston up the cylinder. A partial vacuum is created below the piston which sucks the piston down on its power stroke, turning the driven shaft which can continue to turn between strokes thanks to the freewheel mechanism. Another ingenious but ultimately flawed concept to add to the list of engineering might-have-beens.

Rosalind Bolton next entertained with a self-confessed 'holiday snaps' tour of Sheffield's industrial past. Today, there is little to remind the visitor of industrial smoke and grime since the clean air acts of the 1950s led to the restoration of many buildings. Nonetheless, there is plenty to see around the City of old and new factories with some remarkable survivors, including some individual workshops as well as their successors.

Peter Bolton then led us towards Manchester Airport via Eccles where the remains of an arch of the Bridgewater Canal Aqueduct is built into a wall, and the swing aqueduct over the Manchester Ship Canal continues to operate. In fact we went to the first Manchester Airport at Peel Green, not the present one sited at Ringway. Peel Green, in 1922, was the site of the first flying club in the UK and soon Manchester Corporation acquired the land for the second municipal airport after Croyden. Today, only private aircraft operate at Peel Green but the control tower designed by Manchester City Architect, Mr Hill, remains standing as do a run of buildings that formed the earliest passenger terminal in the UK together with early hangars of various designs.

Peter also showed a pair of large hangar-like structures in Pucklechurch, Gloucester which purported to be WWII barrage balloon sheds, unless anyone knows differently.

Peter Coulls concluded the evening with a selection of photographs from the County Records Office of the products of Eagle Engineering of Saltisford taken between 1920 and the 1950s. Not only were the products interesting in themselves, but the backgrounds showed many local scenes of nostalgic interest to members. The Warwick Gas Works featured in a number of the pictures.

Eagle Engineering specialised in trailers and commercial vehicle coachwork with an emphasis towards municipal waste machinery, dust carts, street cleaning and gulley emptiers being typical. The trailers ranged from a 2-wheeler for Shipways Timber Merchants through a variety of pole trailers to a 100 ton, two-bogie monster for Norman Box Heavy Haulage Contractors. More specialised were a brush sweeper for RAF runways and tower wagons, the forerunners to today's hydraulic platforms. A unique, small-wheeled waste collection vehicle could negotiate narrow alleys and a row of side-loading Austin dust carts were remembered by many.

All in all, a very full evening that well demonstrated members' wide ranging interests and expertise.

October 2011: Sally Hoban

The history of The Birmingham Assay Office.

A very well attended meeting, including 10 visitors, learned much about the history and present activities of the Birmingham Assay Office from its newly appointed Heritage & Training Officer. Sally Hoban has brought a wealth of experience, both academical and practical, to her part-time role where she is responsible for bringing together the history and heritage of the Assay Office with its future development as a provider of high quality education and training for the professional jewellery trade and members of the public. Sally specialises in the history of design, especially the Arts & Crafts movement, and is currently conducting a research project at the University of Birmingham on 19th and early 20th century women jewellers and silversmiths in the City. She has also found time to author *Millers Collecting Modern Designs* and to Chair the Heritage Committee of the Birmingham Civic Society.

The Assay Office today is an integral part of the still flourishing Jewellery Quarter where in the 1880s, with no Guild restrictions, all that a budding jeweller needed was a leather apron, a bench, some modest capital and talent. The newly reopened J W Evans factory, left exactly as it was on its last day of trading, illustrates the will to preserve the heritage of the Quarter.

And what a heritage it is. Against the background of the history of hallmarking from its inception with the London Assay Office in 1327 and the development of the various marks for office, maker or sponsor, date and quality, we learned that the protection of both consumer and trader and law enforcement is ensured by hallmarking all items of gold, silver, platinum and palladium offered for sale. All such pieces are made of an alloy with, usually, copper added to the precious metal to give strength. The proportion of the precious metal cannot be determined without laboratory analysis and this can only be undertaken at an Assay Office. Interestingly, whilst this analysis used to take some three hours, the introduction of spectroscopy has reduced the time to a few minutes.

Sally was at one with many members in her enthusiasm for Matthew Boulton and his pioneering achievements in so many fields. Following the growth of his silverware business in the affluent years of the mid-18th century Boulton became increasingly unhappy with the need to send his pieces 70 miles to Chester, the nearest Assay Office. The risk of damage and robbery during the slow journey together with the opportunities for his designs to be pirated and the 'feckless carelessness' of the Chester Office all led Boulton to lobby for a Birmingham Assay office. In London Boulton lodged at the Crown & Anchor Inn in the Strand in the company of representatives from Sheffield on a similar quest. Both were successful and the story goes that a coin was tossed to decide which city should use the crown or the anchor as its mark. Birmingham took the anchor.

Whilst talking about Boulton, Sally interjected a fascinating possibility that his activities included pioneering work in photography. She is jointly researching with Jon Wood of Aston University for evidence. One suggestive clue is a picture of Soho House in Birmingham, owned by Boulton, which seems to show the building as it was before alterations in the late 18th century. Further information may be hidden in the massive archive of the Lunar Society papers in Birmingham Library.

The Birmingham Assay Office opened in 1773 on 31st August in a room over a tavern. It moved to its present location in Newhall Street in 1877. Today, it is the largest

assay office in the world marking a peak of some 13 million items in 2003/4. This figure has subsequently halved due to the recession and the rise in the gold price.

The Assay Office holds a remarkable collection of 'Birmingham Toys': snuff boxes of high quality, vinaigrettes often carrying topical local scenes, card cases, caddy spoons, toothpick and patch boxes from all the major Birmingham silversmiths. The second half of the talk reviewed these personalities and their wares as represented by some of the 3,000 items in the Assay Office collection.

Samuel Pemberton, who was also the Guardian of the Office from 1793 until his death in 1803, was renowned for his use of filigree, especially in spoons. Nathaniel Mills, first registered in 1803, specialised in card cases with stamped topographical scenes. His business was very successful and his son left a fortune of £30,000.

The Victorian grand style was exemplified by Elkington & Co, founded in the 1830s by Josiah and George Richards with their nephew G R Elkington and specialists in electroplating. A large factory opposite the Assay Office was complemented by a stylish showroom dedicated to marketing excellence. Leading designers used by Elkington included Schlick (Danish) and Christopher Dresser.

The Arts & Crafts movement, spearheaded by Ruskin, Morris and Burne-Jones, has deep Birmingham roots. The Birmingham Municipal School of Art was fundamental to its development and is now part of the City University. Edward Taylor introduced the concept of including practical skills as part of the course and his ideas were taken up and developed by the Glasgow School of Art whose alumni include Charles Rennie Macintosh. Training for girls was actively encouraged at Birmingham, so much so that in 1900 there were more girls enrolled than boys. Prominent amongst them was Florence Stern who was noted for her spoons. A major force in merchandising Arts & Crafts products was Arthur Liberty with his iconic Regent Street store, Liberty & Co which still trades today.

Elsewhere, Arthur Stansfield Dixon, who was a friend of William Morris and Philip Webb and an accomplished silversmith and copper worker, was prominent in the Birmingham Guild of Handicrafts and designed its building in Great Charles Street. The Guild provided workshop space on a co-operative basis similar to and rivalling Charles Ashbee's efforts in Chipping Camden. Another stalwart was Albert E Jones, the 'Metal Craftsman' of St Dunstan's Works.

The twentieth century saw the craftsman-based industry that had grown up over the previous 150 years begin to coalesce into larger units, typified by Adie Bros who produced the largest piece ever assayed in Birmingham with an 18ct tea set for King Farouk of Egypt. However, there is now a reversion to the traditional craftsmen such as Martyn Pugh who was commissioned to make a pair of 18ct water jugs to mark the Queen's Golden Jubilee. With such commissions the Assay Office is investing its profits to support Birmingham manufacturers and encourage young artists.

The Assay Office has also diversified and now comprises three main divisions: Safeguard, the largest jewellery valuation service in the UK, AnchorCert, for independent diamond and gem valuations and certification and the Laboratory at the Birmingham Assay Office—experts in precious metal analysis, but able to undertake a wide variety of test procedures from the fire-resistance of a teddy bear to textile colour fastness. Matthew Boulton would surely feel that his efforts to establish the Assay Office have been well rewarded.

November 2011: Roger Bailey
Coventry Transport.

Report by Arthur Astrop

Many UK cities began to establish their own public transport systems in the late 19th century, and Coventry was no exception. This was the era of 'Corporation' transport bearing distinctive 'liveries', and while the designs of trams and buses changed radically over the years many of the 'colours' they proudly displayed survived well into the second half of the 20th century.

All aspects of the history of public transport in Coventry have been a life-long interest for Roger Bailey, our speaker at the November meeting. Indeed, 'interest' is perhaps too bland a word to describe Roger's involvement with the trams, buses and coaches owned by Coventry, for his devotion to the subject ranks little short of a passion, as was immediately evident in his talk to our November meeting.

Roger's parents dedicated their working lives to Coventry's public transport system and Roger was thus involved with the subject from a very early age. So began an interest which today lies as much with the social history of the development of Coventry's transport system as it does with its technical aspects. The story starts in 1894 with the appearance of small steam-driven 'tugs' each pulling a passenger-carrying trailer, capable of speeds up to 5 mph and providing a public service between Bedworth and the City centre.

A few years later, the Corporation's first electric trams made their appearance on the City streets, open-topped, and taking current from overhead conductors by means of a swivelling arm. Soon, however, a very important modification to tram design proved to be absolutely necessary. In the interests of public decency screens were swiftly fitted all round the upper deck so that the ankles of lady passengers were no longer visible to voyeurs at pavement level!

As the tram services expanded, a network of tracks grew throughout the City and its environs, and while most roads had twin tracks the spaciousness of the Broadgate area allowed a 3-track layout to be installed. The outbreak of the first world war, and transfer of so many men to the fighting Services, saw the introduction of women to Coventry's trams. Working as 'clippies', they brought about a social change which was to be repeated in WW2. Tram design was also advancing, with more weather protection for drivers as well as for passengers, but as the network grew the narrowness of many of the City's streets increasingly presented problems. Many of the slides shown by Roger revealed just how close some of the trams were when passing each other.

The tram system remained dominant after WW1, and continued developing in scope and design well into the 1930s. But the shape of things to come appeared when, as a service for outlying districts, six feeder buses (by Maudslay), were provided to bring passengers within reach of the nearest tram routes. But an end to dominance of the electric tram as Coventry's principle means of public transport was in sight. The devastating air raids which the City suffered in the early years of WW2 did so much damage to the tracks and the conductor systems that, when the war ended, it was in fact impractical financially to restore them.

During WW2, buses of all types and makes, some drafted-in from other parts of the country, were used

to maintain a service for the City, and especially for the factory workers who were so essential to the war effort. Thus the once all-powerful and proud tram service was largely replaced by a somewhat motley collection of buses, all suitably modified to comply with blackout requirements. Headlights were fitted with beam-constricting grills, and white bands were painted on body work to improve visibility for pedestrians in the blackout. At one time, even the proud logo 'Coventry Transport' on the sides of the City's buses had the word 'Coventry' painted-out, lest any descending Nazi paratrooper should have no difficulty in discovering where he had landed!

But once the war ended, the re-development of the City on a massive scale was planned, and the era of the omnibus had truly dawned. It was at this point that Roger really hit his stride. His knowledge of the evolution of the bus services in Coventry must be unparalleled, as also must be his personal collection of photographs (extending to very many thousands), together with other public transport memorabilia, from tickets to ticket punches, from transport posters to route maps. He inherited the passion and loyalty to public transport of his parents and has preserved for posterity much of his knowledge and understanding through the publication of books on the subject.

His photographic collection alone, of which we saw only a brief selection, is a one-man archive of inestimable value, and not just to the City of Coventry. And it is not simply a dry record of trams and buses of different designs and liveries, with subtle differences in design which are of interest only to the single-minded expert.

Most, if not all, of his photographs contain 'backgrounds' which show not only areas and buildings once prominent in Coventry but now long gone, but also crowds of people, with dress and demeanour that are today only a memory. It is those aspects which Roger values as much as the numerous different trams or buses which take centre stage in each of the shots. The operating staff of the Coventry public transport system, especially from 1945 onwards, was close-knit and contained many different nationalities and cultures, sometimes including even erstwhile wartime enemies. All were very successfully integrated into what became a 'family', with loyalty to each other as strong as their loyalty to 'public service'.

Post-war, it was Daimler who gradually began to supply the majority of Coventry's bus fleet, and initially some problems were encountered. An early design had, in the driver's cab, what appeared to be somewhere for him to hang his coat. In fact, it was actually the starter control and when a coat was hung on it the engine fired up!

In another instance, one bus was inadvertently delivered with an 'ungoverned' engine, with the result that it was much sought after by drivers as the fastest in the fleet! The arrival of the first buses with the engine located at the rear also caused problems. Drivers familiar with the traditional 'engine at the front' had to get used to not hearing it running, and were thus unable to judge its revs.

The City also at one time ran coaches for longer trips, including those offering a 30-mile sight-seeing circular tour of Coventry and its surrounding areas aimed at providing 'afternoon outings for all the family'!

WARWICKSHIRE

Industrial Archaeology Society

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FROM THE CHAIRMAN

Dealing with twentieth century sites is not an easy task for the industrial archaeologist, and it is perhaps apt that the seminar preceding this year's AIA Conference in Essex will be upon *'The Archaeological Approach to Twentieth Century Sites'*. Indeed, the recent experiences of two of Leamington's most familiar landmarks illustrate both the importance and difficulty of dealing with the industrial archaeology of the twentieth century. The Ford foundry and Leamington Spa railway station stood at opposite ends of a large site once occupied largely by manufacturing and rail-related activities, adjacent to the old Great Western route from Birmingham Snow Hill to London Paddington. The original station was re-built in the 1930s, and has now become one of Chiltern's landmark stations, with the efforts of many contributing to the renovation, re-equipping and landscaping of the station. The Railway Heritage Trust, The Friends of Leamington Station, Network Rail, Department for Transport and Chiltern Railways have all helped in the restoration, and a recent cleaning of the external stonework has revealed the station in much of its former glory. The renovations have added much to the pleasure of travelling from Leamington Spa – and not just for the industrial archaeologist.



By contrast, further down the Old Warwick Road, the historic Ford foundry – after years of gentle decay since closure in 2008 – has finally been demolished. This was one of the few remaining links with the motor industry in the town. The demolition has revealed the large extent of the site, (best viewed from

the footbridge on Princes Drive). The tangled mass of ironwork and piles of concrete and brick rubble provide a sad end to this era of manufacturing on the site, but the closure had an inevitability about it, given the pace and pattern of change in car manufacturing in the UK and beyond. The difficulty for the industrial archaeologist is to identify the best way of recording sites of this type, where processes are involved and there is no possibility of converting to other uses.



Clearly, recording rather than any thoughts of preservation has been the priority. In this digital age, the (often illegal) activities of photographers keen to explore any derelict site mean that photographs of the site after closure – but before demolition – are readily viewable on the internet. Indeed, there seems to be quite a passion amongst intrepid trespassers for exploring derelict sites with camera in hand, and many such sites seem to be of an industrial nature.

Fortunately there is also the official version. A detailed photographic record of the Ford foundry buildings has been undertaken by the Worcestershire County Council Historic Environment and Archaeology Service under the direction of the Waterman Energy, Environment & Design. A copy of the final report will be submitted to, and made publicly available through, the Warwickshire Historic Environment Record (WHER). To view the report once it has been submitted, please contact the WHER on 01926 412734 or e-mail historicalenvironmentrecord@warwickshire.gov.uk. An on-line version of the WHER can be found at: <http://timetrail.warwickshire.gov.uk/>

In addition, the artistic eye of the professional photographers has also been applied to the Ford Foundry site. Ray Spence is a local photographer and lecturer in photography at the Birmingham Institute of Art and Design, Birmingham City University. His atmospheric studies of the Ford foundry site can be viewed on www.rayspence.co.uk

Both official and unofficial photographic recording at the time of closure is a starting point, but the nature of the processes utilised at the foundry and changes in those techniques over time merit careful recording. Oral history from workers with (hopefully long) memories of the site would be a starting point. There may be recollections and photographs from within the membership of WIAS that would add to this pool of information. The Society has had two site visits to my knowledge since 1989, and others may have visited on an individual basis. We hope in the course of the next series of meetings to have a presentation on the history of the site.

Finally, it is to be hoped that some permanent record of manufacturing on the site – something more imaginative, perhaps, than the familiar naming of a road or shopping mall – can be included in the public spaces of the new site.

PROGRAMME

March 8th 2012

Graham Fisher MBE:

Jewels on the Cut: Stourbridge Glass Industry & the Stourbridge Canal.

April 12th 2012

Sam Collenette, Archive Service Manager, Warwickshire County Record Office:

From Bolton to Warwick.

May 10th 2012

Derek Hurst:

Droitwich Salt Production: the technology.

June 14th 2012

Jeromy Hassell:

Coventry Machinists & Coventry Victor.

NEWSLETTER

Meeting Reports

December 2011: Peter Lee

Nuneaton & Bedworth: coal, stone, clay and iron

Peter Lee's review of the now lost extractive and processing activities that once provided full employment for the men and women of Nuneaton and Bedworth was both depressing and heartening. As industrial archaeologists we have to recognise the inevitability of product lifecycles: the history of Coventry, for example, has been one of industrial reinvention over many centuries and it has provided us with much material for examination. We may mourn the passing of once great names but others do rise up to replace them. And is the demise of hard, dangerous and life-destroying manual labour not to be applauded? Providing, of course, that there is an adequate substitute put in place. If pit cottages and brickworks are replaced with new commuter housing estates and country parks is that necessarily a bad thing?

Nonetheless, the statistics with which Peter opened his talk were startling. The one-time boom town has lost some 40% of its jobs in the last ten years. For example, Sterling Metals employed 2,700 and is no more, there is only one working coal mine left in the district, the many mills that employed a high proportion of women have closed, and no bricks or tiles are being produced. Today, the largest employer is Dairy Crest with only 350 on the payroll. On the other hand, a dormitory town has emerged with landscaped parks and other amenities available to the community.

Nuneaton and Bedworth knew four principal industries based upon coal, stone, clay and iron. Of these, coal mining was the most important followed by brick and tile manufacturing and quarrying. All benefitted from being close to the canal network that was followed by the railways.

The liberally illustrated talk included many glimpses of these industries. Whilst the preponderance of illustrations being of steam locomotives was explained by the efforts of enthusiasts seeking out survivors for the record and that few photographs had been taken of the earlier activities, there was often much of interest and of valuable evidence in the backgrounds. Picture postcards from the turn of the 19th century provided another aspect of the district's main features.

Coal had been mined in the area since the 1500s. Coal seams were close to the surface and one inn even had its cellar carved out of the coal. Distribution was by canal barge and some estates such as Newdigate had their own canal system linking into the national network. Similar local networks were used subsequently for railways. Loading railway wagons needed expertise to ensure that the coal was not reduced to slack by undue movement during its journey and adopting dry stone walling techniques was one answer to the problem. The last shipment of coal to power stations took place in the 1960s.

Peter's research has revealed something of the personalities behind the local industries. E F Melly JP (a cousin of jazz musician George) was a philanthropist and mining engineer who was killed in the 1941 blitz. Alexander Donald, a Glasgow merchant and slave trader owned the Haunchwood colliery in the 1730s. Victoria colliery employed the future Labour Party Secretary, Thomas Mann, who was born in a cottage on Victoria Farm in 1856 and aged ten was a trapper at the colliery and worked there until its closure in 1870. W H Boon JP owned a granite quarry and was Chairman of the Rural District Council.

We saw too few illustrations of actual colliery workings except for some hair-raising examples of miners being lowered down the shaft in buckets and of the atrocious conditions that prevailed underground. Perhaps the best

record found so far are the photographs commissioned by the owners of the Haunchwood colliery as evidence 'just in case' prior to nationalisation. Ironically, it seems that they made more money after nationalisation than before!

The roll-call of now forgotten collieries seemed endless; Bedworth, Charity, Collycroft, Coventry, Craven, Exhall, Griff, Grove, Haunchwood, Hawkesbury, Newdigate, Nuneaton, Oldbury, Stockingford, Swan Lane, Victoria and Wyken. Peter held the history of them all at his fingertips and most were the subject of an affectionate anecdote to go with a photograph of a now pensioned off or scrapped locomotive. Notable was his description of the white-knuckle ride down a 40° slope into a drift mine and the not infrequent accidents on the rail network included a group of laden coal wagons that had run away down an incline to the canal wharf and overshot into the canal, discharging their loads of coal into the cut trapping several full barges for some time.

Closely associated with the collieries was brick-making. From the beginning of the seventeenth century, the area now known as the Borough of Nuneaton and Bedworth was riddled with coal workings and brick kilns. Wherever coal was found, good brick clay was found alongside. As the clay was dug through to reach the coal-seams, it made sense to construct kilns to produce bricks for the pithead buildings, and to sell the surplus to the local building trade. Throughout the area are the remains of old buildings long since demolished and in the frogs of the bricks scattered about are the words Durex, Hardy, Haunchwood, Moorwood and Stanley Brothers among others. Frequently, the brickworks and colliery bear the same name.

The district's brick and tile industry enjoyed a world-wide reputation for excellence. Stanley Bros had seven separate brickyards and specialised in glazed bricks for which there was a good export demand. The business lasted until 1988 when it closed and its records were acquired by the Nuneaton Civic Society, rescued by Peter Lee from the company's new owner who was about to scrap them. They are now on permanent loan to Warwickshire County Records Office.

Happily, examples of Stanley products survive in Nuneaton town centre; the former Gate Temperance Hotel was built by Reginald Stanley in 1895 and incorporates many of the yards' best products as does the Nuneaton Liberal Club and the Theatre and Gate Hotel.

Haunchwood Brick & Tile enjoyed the reputation of being the best in the country with its blue bricks being especially praised. James Knox, one of the directors also built a house to showcase the company's products; the Chase off Higham Lane in Nuneaton still stands today as the Chase Hotel.

The company's old no.1 brickyard is today the site of Whittleford Country Park, a local wildlife sanctuary. One illustration, without a loco in sight, showed three Haunchwood ladies in the 1960s operating a brick press line where operator safety seemed to be of little concern!

Much high quality granite was quarried in the district, W H Boon has been mentioned above and other quarries included Mancetter and Judkins who took over the old Boon quarry in 1955.

Some illustrations of the National Coal Board laboratories housed in the old Tansey needle works in Nuneaton showed another aspect of local industry.

Bedworth did possess some iron works but today nothing remains, and even machine tool manufacturers Clarksons has gone the way of earlier industries.

All in all, a most interesting evening that gave much food for thought.

January 2012: Christina Evans

Warwickshire Historic Environment Record and the 'Imaging Past & Present' project

Christina Evans opened many eyes to the work being done by a small team based in Warwick and part of the County Council's Museum Service. The Warwickshire Historic Environment Record (HER) could play an increasingly important role in the future under proposed changes to the planning framework and potentially be of great interest and benefit to industrial archaeologists.

The HER is a record of all the known historic and archaeological sites and finds within the county. Its function is to maintain and enhance the record, to operate a public information service, to provide information to planning archaeologists, consultants and other interested parties and to promote local archaeology to the community. The HER team provides specialist archaeological advice and consists of the County archaeologist, who will be retiring at the end of March 2012 - and will not be replaced in the present climate - three people responsible for the historic environment record and a planning archaeologist.

Amongst the masses of information to be found at the HER are over 12,000 aerial photographs, historic and modern maps (including first and second edition OS), published and unpublished material (including local antiquarian and research groups and parish surveys), over 1,000 fieldwork reports often arising from development requirements, statutory designations, national and local journals and personal correspondence. Much of these data can be accessed through the Warwickshire Museum's 'Timetrail' website (www.warwickshire.gov.uk/timetrail).

This website has been designed to accept contributions from users and these are welcomed, especially photographs and descriptions of sites that are of historic and general interest. Visits, by appointment, are welcomed at the HER which is presently located with the Museum Field Services in The Butts, but the department is moving in the spring to Barrack Street in Warwick.

It was clear from Christina's presentation, and from subsequent questions and answers, that much of the future success of the HER as a force for the protection and preservation of the County's archaeological environment will depend upon input from outsiders. The present and likely levels of staffing are simply too small to do more than monitor the most prominent locations. An obvious example that could well overwhelm the existing resources is the impact of HS2 on Warwickshire. Whilst some sites of archaeological importance on the proposed route are known, there could be many minor, and especially industrial, ones, that need to be flagged up as early as possible. Clearly, WIAS could play an important role as an information provider, possibly co-ordinating input from members.

A number of publications is produced by the HER team, ranging from archaeological comics aimed at 7-11 year olds to the Local Studies Toolkit which was developed to provide guidance about how to undertake research into the history and heritage of the local area. It is specifically aimed at those who have little or no experience of undertaking personal research and who feel they need some support and advice. The toolkit was created with the help of a number of experts from the County including HER staff, Local Studies Librarians, and County Record Office archivists. Within the toolkit there is information on key primary and secondary sources, including a description of each, their main uses and where each is likely to be found. The toolkit also includes information sheets on the use of maps and care for historic documents and objects, as well as information on who to contact for further help and advice. The Local Studies Toolkit can be viewed at local libraries or via 'Timetrail'.

Another current project, led by the landscape archaeology group, is charting the development of Warwickshire's historic towns from the Roman period onwards. Externally funded, the project is due for completion in 2013. It seeks to show the development patterns, both social and industrial, in each town. In the case of Atherstone we saw how hat factories had been located on now covered streams and how the development of the Vero slipper works progressed over 100 plus years. It is likely that future similar projects will be of considerable interest to members of WIAS.

In the second half of her presentation Christina concentrated on the various ways that information could be provided by members of the public to the HER.

'Timetrail' has already been mentioned. It is complemented by the HER blog at <http://warwickshireher.wordpress.com>, where up to date information can be found on many issues. Currently, opinions are being sought on a new local history website for Warwickshire. Warwickshire County Council's Heritage and Cultural Services are compiling a bid for Heritage Lottery funding that includes a brand new local history website. Working in partnership with Warwickshire Local History Society, the website aims to be an online gateway that would enable organisations, groups and individuals to share their research and collections and to promote events. For more information visit <http://www.warwickshire.gov.uk/localhistorygateway>. Local archaeological societies are also being encouraged to join the partnership.

Local lists are being compiled as a way for a local community and local authority to jointly decide what it is in their area that they would like recognised as a 'local heritage asset' and therefore worthy of some degree of protection in the planning process. These could include buildings, monuments, sites, places or landscapes which currently have no protection in the planning process (i.e. that are not Listed or Scheduled). Typically, structures, landscapes, sites and spaces associated with a significant period in an area's history - for example the remains of industrial or agricultural activities, key public buildings such as schools, pubs, railway stations (and their associated structures) or bridges. Also, buildings or sites associated with a major event in the area or a group of buildings and/or open spaces which are typical of a local area and help create the area's character - such as a cluster of buildings with a particularly interesting design, street plans or the relationship between a group of buildings and an area of open space, buildings linked to figures of local importance (which can include those identified by commemorative plaque schemes).

Another method of inputting information that could be of particular use to members is the Warwickshire HER Flickr Project. Using the well-established social media site this offers a swift and simple way of capitalising on the wealth of illustrative material and knowledge within the membership of WIAS. Some reservations were expressed at the 'user friendliness', or rather the lack of same with Flickr, but nevertheless there seemed to be a clear need for industrial archaeological sites to be better represented in the HER. Members can join through either a Google or Yahoo account at www.flickr.com/groups/warwickshireher.

A lively question and answer session indicated considerable interest in and enthusiasm for the project. The ramifications of HS2 have already been mentioned and other areas of concern included the need for a visual record of old buildings, and of those no longer existing, for better industrial archaeological records generally and for ensuring that planners and developers were fully informed as to what the community considered important.

A thought provoking evening admirably concluded by the Chairman's slightly irreverent review of the London Olympic site's outer fringes.

February 2012: John Bedington Charlecote Mill

John Bedington, the tenant and miller at Charlecote Mill, gave us a rare insight into the joys and tribulations of real life industrial archaeology with his review of his tenure of this Warwickshire survivor.

The present mill is located on the river Avon between Charlecote and Hampton Lucy. Mills have been known here, or hereabouts, since the Domesday Book but differences over the exact parish boundary line mean that the early mill was in either or perhaps both parishes! It seems likely that the present mill is in a different location, albeit close by its earlier incarnations.

The earliest map in the County Record Office to show a mill on the present site at Charlecote is one by Fish of Warwick dated to 1736. Another record shows that in 1731, one John Osborne rented 74 acres adjacent to the mill from the widow of Stephen Lewis and there is another reference to repairs to a mill in 1732. It is thus possible that the mill is older. The 1791 map by Clarke of Evesham also shows a mill in the same location. John Bedington contends that both maps have the mill in the wrong orientation, it should be turned by 90°.

Sadly, the Lucy family archive at Charlecote House suffered considerable destruction in the 1890s but fortunately two deeds relating to the mill have survived. The first from 1772 shows that a lease of 21 years was granted in 1753 to a John Osborne (seemingly a relative of the Osborne referred to above). The date of 1753 was found engraved under the head race by John Bedington during some maintenance work. The deed included a provision that the landlord 'keep the mill in tenantable repair'. It also refers to the 'fletchers'. Not arrow-making but an old Warwickshire word for a weir.

The second deed covered a lease to two other Osbornes, possibly sons, and allowed them to remove certain equipment which they had installed, including dressing machines and sack tackle, at the end of their tenure.

Turning to the present mill, it is possible to date it to at least 1806 from a carved inscription recording the installation of the bed stone (the lower mill stone) at that date. The general style of the buildings also confirms such an age. A further pointer is that all the timber used is elm when oak would have been more usual; we know that the great ship-building programmes for the Napoleonic wars demanded huge volumes of oak.

John Bedington considered that a possible reference connecting the mill to one of the great civil engineers (Rennie?) is unlikely to be true, not least because the structure is so old-fashioned in many of its characteristics.

Today, the mill is very much 'as built' except for the rear roof elevation which has been changed to accommodate raised walls. A possible explanation is the provision of additional storage space for flour or grain at a time of rapidly rising prices at the beginning of the 19th century. Extra supports for the floor are a further indication of increased floor loading. War profiteering is nothing new.

Turning to the flat-paddled undershot waterwheels, there is clear evidence of modifications made in the late 19th or early 20th century. Cast iron hubs by Bell & Horton of Stratford upon Avon mate the original hexagonal shaft to a radial-spoked waterwheel which retains the original rims and paddles but replaces the former cross-over spokes.

The inefficiency of the undershot wheel concept was commented upon.

A review of some of the former millers at Charlecote produced some interesting anecdotes and nostalgic photographs. W Witherington left his name stencilled onto a wall and a beam whilst Samuel Gough's rent arrears are detailed in a surviving rent book which also showed his rent being halved to £44 per half year. The reason remains obscure but possibly linked to hard times following the introduction of reduction roller milling on an increasing scale. Traditional country mills did survive by milling animal feed but this work fell away when electricity came to farms and allowed small feed mills to be installed.

Harold Palmer ran several mills including Charlecote and from 1914 to 1929 brothers Oliver and Roland Baker who were remembered by a Mrs Gilbert (born in 1814) who lived in Avonford Cottage near to the mill. She had reminisced about milk and extra staff as well as collecting bran from the mill to feed her rabbits. In 1929 Newberry & Son took over the mill alongside their existing agricultural contracting business.

Amongst the old photographs were eel catchers on one of the weirs, a miller and his workers outside the mill, and a number of evocative views of the mill across the river.

Returning to the mill's history, in 1939 it seems that the estate refused to repair the waterwheels and there is evidence that the hammer mills were driven from a tractor power take-off. When John took over the mill in 1978 the internal shaft was still in place. The sack hoist was originally powered by the waterwheel and the tale was told of a miller who demanded that his labourer tied two sacks to the hoist and followed them upstairs with a third sack over his shoulder. There's productivity in a bygone age!

From 1959 the mill was unused until 1978 when John Bedington was approached by Sir Edmund Fairfax-Lucy with a view to putting it into working order again. John took on the lease and the repairs to such good effect that the mill was chosen by the BBC for a production of *The Mill on the Floss* which paid for much of the restoration work.

By 1989 there was the possibility of returning the mill to full time working. This needed negotiations with the various Public Health and Industrial Safety bodies; the early inspectors sucked their teeth and warned that 'the Boss' was unlikely to look favourably upon the project but in the event he proved to be very enthusiastic and supportive.

The mill is still grinding flour and just pays its way. Ten tons of grain is enough for five weeks production which now goes mainly to private individuals and a few specialist bakeries. An interesting development in recent times has been the milling of maize for some Asian supermarkets. It is very popular with the Punjabi community who rate it more highly than the imported flour.

In conclusion, John expressed his thanks to the many people who had helped him over the years, not least his own family. He hopes that there will be some young man who will be willing to take over the mill – perhaps another solicitor from Birmingham who hates offices and loves mills is waiting in the wings. There are other dangers, the proposal to canalise the Avon would destroy the mill's viability by raising the water level by nearly a metre. The outcome of the feasibility study is awaited with some trepidation.

WARWICKSHIRE

Industrial Archaeology Society

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FROM THE CHAIRMAN

The end of the current season of meetings finds the Warwickshire Industrial Archaeology Society in good health, with high attendances at meetings, involvement with local industrial heritage projects, and increasing contact with other industrial history groups and local history societies. In terms of involvement in projects, the society has pledged £250 in support of the Warwickshire County Record Office's application for funds from the Grants Scheme to catalogue a large collection (80 linear metres) of the Willans and Robinson collection. The project is known as 'Willans Works Archive: Boaters and Bright Sparks' and is a partnership project between Alstom (the depositor), Warwickshire County Record Office, Warwickshire Industrial Archaeology Society and The Friends of Warwickshire County Record Office. As part of that application, I wrote in support of the project and that letter included the following:

The place of the Willans firm in the development of the technology of electricity generation is highly significant and yet surprisingly undervalued, and the possibility of cataloguing this archive presents a unique opportunity to rectify this imbalance and to give the Willans Works an appropriate place in the history of the industry.

Future students and researchers will undoubtedly find this archive an invaluable resource in understanding the pace and pattern of technological change, and the importance of the firm locally, nationally and internationally. The fact that over 60% of electricity generation in this country was supplied by Willans equipment in the latter part of the 19th. century gives some indication of the importance of this technology and the need to place it in context.

There is a wider significance as well with the role played by Willans in the history of Rugby, and the continuing presence of the firm's

successors in the town. Rugby developed a strong railway and manufacturing sector during the nineteenth century and the causes and consequences of this growth remain a fascinating topic for study. There is much to be gained from improving our knowledge of the firm, its workers and the impact on the wider community.

In our view, there is a strong case for access to the archive, but this is not possible at the moment. Some of the photographic collection has been recorded, but there is so much more that could become available. Several members of the Warwickshire Industrial Archaeology Society have expressed interest, with two actively involved in the process, and I feel sure more volunteers would be forthcoming if the cataloguing project went ahead.

One of the earliest recording projects with which the Society became involved was the Fenny Compton brick kiln, and I am pleased to report that the renovation project mentioned in a previous newsletter continues to make headway. To that effect, I received an e-mail from James Clifton, Enterprise Manager, British Waterways, which included the following: *I am planning for the kiln to be at the heart of a wider project, potentially including archaeological surveys, circular walks, interpretation, work with the Butterfly Trust, volunteering and possibly heritage skill training for apprentice bricklayers – plus an element of education and, I hope tourism.*

We are linked with the Guild of Bricklayers, as you know, and hope to engage with a good range of local organisations, including WIAS. The kiln last fired bricks in 1917. It is our aspiration to restore it, ready to fire one load of bricks to celebrate the centenary.

John Selby (the author of an AIA Review article on the kiln and Fenny Compton tunnel) and I have been invited to attend a meeting in Fenny Compton in late June and we will keep members informed of

progress. This wider involvement of industrial heritage as part of local community projects seems to be an important ingredient of the task of preserving our industrial past.

The presence of WIAS at local history and archaeology events is an excellent way of both spreading the word and of building contacts and the society has invested in a set of display boards to help in this process. The boards had their first outing at the recent Leamington Local History Day, where the focus was the need to encourage recording of memories of local firms Ford, AP and Potterton. We hope to have these display boards available at our monthly meetings and members will be able to display notices and any projects with which they have been involved.

Notice of the AGM

This is formal notice of the AGM to be held in the Pyne Room, Warwick School on Thursday September 13th. 2012. I repeat the usual appeal that if you feel you would like to take on a responsibility within the society (e.g. oral history; summer visits programme) do not be afraid to come forward for a preliminary discussion, with the possibility of joining the committee.

PROGRAMME

September 13th 2012

AGM followed by 'The Industrial Archaeology of Essex'.

Co-ordinated by Martin Green. This year's AIA Conference will be held in Essex, and the chairman will present a report on the Conference and some detail of the sites visited.

October 11th. 2012

Dennis Crips:

A Living Dinosaur: From crystal sets to quantum computing in one lifetime.

November 8 2012

Ian Mackintosh (of the Stroudwater Textile Trust):

400 years of Stroudwater Textiles.

December 13th 2012

John Berkeley OBE:

From Pens to Particle Physics: the story of a Birmingham family business.

NEWSLETTER

Meeting Reports

March 2011: Graham Fisher MBE

Jewels on the Cut: The Stourbridge Glass Industry & the Stourbridge Canal.

Graham Fisher spoke for and from the heart of the Black Country with his evocation of the now lost Stourbridge Glass Industry and its place alongside both the River Stour and the Stourbridge Canal. 'Jewels on the Cut' is an inspired title, combining a sense of the exotic and romantic with the down to earth location of many an 'Enoch and Eli' escapade. Graham himself is uniquely equipped to tell the story. A devoted son of the Black country (his own words), a lifelong devotee of our inland waterways since he 'legged' through the Dudley Tunnel in the 1960s (and receiving the MBE in 2001 for services to inland waterways), a scientist, a journalist and a rock musician, a qualified skipper of the largest hotel-boat operating on the UK's inland waterways and now an ambassador for the Broadfield House Glass Museum and the fast vanishing industrial heritage it is seeking to preserve. He is also a most entertaining speaker with a ready anecdote or telling aside.

Our journey began with a lesson in geology which showed how all the essential elements of sand, limestone and coal were readily available in the Stourbridge area. Indeed, glass manufacturing there is recorded in the early 17th century, the baptismal record of one John Tyzack in 1612 shows his father as a glassmaker, and must have been in place long before. Then, at the outset of the industrial revolution local entrepreneurial aristocrats such as the Earl of Bridgewater and especially John, 2nd Viscount Dudley & Ward together with the ubiquitous James Brindley and his colleagues, created the canal superhighway which included the Stourbridge canal.

The Stourbridge glass industry encompassed two main processes, hot and cold. The hot is common to all glass manufacture where the molten glass is blown, pressed or moulded to the desired shape. The cold is where the glass blank is crafted into the exquisite bowls, glasses, jugs and decanters generically known as 'cut glass or crystal' and for which Stourbridge is justly renowned.

For the hot end, the Stourbridge district also possessed good reserves of easily accessed fireclay for the pots used to melt the raw materials, and an illustration of pot setting at the Red House Cone in 1984 showed a cavalier attitude to 'Elf 'n Safety'. A cone-shaped chimney has been synonymous with glass manufacture since the late 17th century. Beneath the cone is a circular multi-pot furnace each pot of which was used by a single team or 'chair', often a family group. When shaping a blob of molten glass on the end of a blowpipe one of the craftsman's favourite tools is a wad of wet newspaper but there seems to be no preference between red-top and broadsheet for the best results. Pressed glass may be derided as 'cheap as chips' but underlying the process is considerable technology and precision die sinking.

Turning to the cold processes, there were principally two, grinding and acid etching. Grinding could use over or undershot wheels of stone or copper and was largely a masculine craft whilst women usually undertook the unhealthy task of etching using hydrofluoric acid, although female engravers were not uncommon. The illustrations of engravers, both early and current, showed vividly how little technology has changed over time. There are just very few practising engravers today.

The glass houses that arose in the Stourbridge area to exploit the local natural resources were initially located alongside the river Stour with the earliest recorded (Colemans) in 1612. Subsequent development closely followed the line of the Stourbridge canal when it opened in 1779. The arrival of the canal, with its significantly higher carrying capacity, shorter travelling times and minimal

breakage compared to the earlier pack-horse transport must have been of incalculable benefit to the fledgling industry. Furthermore, the canal slashed the price of raw materials, especially coal, which were needed in ever increasing quantities.

No review of the Stourbridge glass industry can ignore the story of the Portland Vase. This exquisite example of Roman cameo glasswork has a fascinating history. Probably, but not certainly, unearthed near Rome it was first seen in 1601 on its acquisition by the Barberini family on the death of Cardinal Del Monte. Sir William Hamilton reputedly paid £1,000 in 1778 when it was sold to pay gambling debts. In 1784 it was bought by the Duchess of Portland, hence its modern name. Its beauty and craftsmanship were much admired and copied, after much experimenting, by Josiah Wedgwood in his Jasperware. Deposited in the British Museum in 1810 it was smashed to pieces in 1845 but subsequently repaired and in 1945 was purchased by the Museum where it can still be admired.

Not only did the vase inspire Wedgwood, it also triggered a resurgence of interest in cameo glass that continues to this day. Benjamin Richardson, whose family owned the Wordsley Flint Glassworks, produced a transfer print version and is said to have offered £1,000 to anyone who could replicate the original, or possibly only said that that would be the value of the replica to its creator. In any event, some thirty years later suitable blanks were produced at the Red House Glassworks and John Northwood successfully carved a replica. He went on to create further masterpieces of cameo glass.

The visual history of the Stourbridge Glass Industry is rather sparse today but we were treated to a walk along the 'Cut' with the best of guides. Starting at the restored Bonded Warehouse in Stourbridge we passed the derelict site of Dovey's Glassworks, established in 1790, where one of the first steam engines was installed 'for the manufacture of cutting and grinding of glass'. Holloway End Glassworks is now a retirement home, and so on.

Bridges and the entries to barge tunnels have some interesting ironwork. Notably two bridges carrying the embossed name of James Bradley & Co, Stourbridge, AD 1838 and an earlier example by him cast at Coalbrookdale in 1873. Other abandoned and ruined works line the river and canal and present a depressing picture of how large swathes of our industrial heritage is disappearing under our eyes.

There is more to the district than glass, ironworks and canals. Foster & Rastrick were pioneers of steam locomotives and 'Agenoria', built in 1829 for the Round Oak Steel Works, can still be seen at the National Railway Museum in York.

Continuing along the canal we found reminders of other once great names; Webb, Corbett, Coalbournhill, Platts, together with a refreshing example of detailing by a modern architect who incorporated representations of glass cones into the brickwork of a modern supermarket built on the site of the Old Dial Glassworks.

There are now only four glass cones left intact in the UK, only one of which, the Red House Cone, is in Wordsley in the Stourbridge area. There is a truncated cone at the New Dial Glassworks which is still in regular use by Plowden & Thompson and Tudor Crystal, and is most likely the closest to a working example still extant in the UK.

The evening was a reminder, if any was needed, that our industrial heritage needs more Graham Fishers with his ability to articulate the need for appropriate preservation before all is lost, often on a whim. Another most interesting and thought provoking account of the practical issues facing Industrial Archaeologists.

April 2012: Sam Collenette, Archive Service Manager, Warwickshire County Record Office
From Bolton to Warwick.

Sam Collenette, Manager of Archives and Historic Environment at Warwickshire County Council added to a number of earlier presentations and gave us an illuminating overview of the issues facing those charged with safeguarding our heritage, which is not exclusively industrial.

Through the archives of two once substantial companies, Hick Hargreaves & Co in Bolton and Willans & Robinson in Rugby we were able to explore the rise and fall of several industries. More especially, there was a clear message that much of our remaining industrial heritage needs friends if it is to avoid the fate of many of its peers – records and artefacts unwanted and unloved tipped into a skip and thence to landfill.

We also learnt a lot about the work undertaken at the Records Centre, not least how much is done by Friends and Volunteers as several members can attest.

That archives can have a commercial value today was shown by the recent use made by Prudential of its association with the Titanic in a recent Asian advertising campaign that was very successful. It stemmed from an archivist stumbling upon a copy of an old newspaper carrying an earlier advertisement.

Another factor when dealing with industrial archives is technical expertise. Many professional archivists will have great competence in dealing with matters of commercial history but an understandable lack of technical expertise is clearly a handicap when examining engineering material. We already have members giving their time to help with the Willans & Robinson material and it may be that additional volunteers would be welcomed to help with other material.

Before dealing with her work in Bolton on the Hick Hargreaves material, Sam introduced us to the Bolton Museum, Library and Art Gallery site which also houses an Aquarium, the early work of Mass Observation in the person of Bill Naughton (author of Alfie and Spring and Port Wine) and memories of Fred Dibnah who was involved in the final days of Hick Hargreaves. Sam herself was responsible for removing the company's archive and many artefacts to the Bolton Museum in 2002.

B. Hick and Sons, later known as Hick, Hargreaves & Co, was based at the Soho Ironworks in Bolton. Benjamin Hick had originally been a partner in Rothwell, Hick and Rothwell and set up his company in partnership with his sons in 1832. After the death of the elder in 1842, the firm continued under the management of his son who in 1845 took into partnership William Hargreaves.

The Soho works were extensive and the site large. The first steam locomotive was built in 1833, followed by several more over the remainder of the decade, including an unconventional gear driven steam rail carriage. A number were built for export to America. Between 1837 and 1840 the company supplied engines to many of the new Railway companies as well as the Paris and Versailles Railway.

In 1841 the Birmingham and Gloucester Railway had found some American Norris locomotives very successful, especially on the notorious Lickey Incline, and Hick built three similar ones for the line. Locomotive building continued until 1855, and in all some ninety to a hundred locomotives were produced; but they were a sideline for the company, which concentrated on marine and stationary engines, of which they made a large number. Incidentally, as a result of the company's strong exports, especially to Egypt, Bolton Museum has the best collection of Egyptian cotton products outside of the British Museum.

At the end of the 19th century HH began to manufacture steam engines for electricity generating purposes, and from 1911 diesel engines. In World War I the firm did much war work, and began making high vacuum condensing plant, again used in power generation. This was greatly expanded in later years as centralised power generation was adopted in Great Britain.

In 1933 the records, drawings and patterns of three defunct steam engine manufacturers were acquired and a lucrative business developed in repairs and spare parts. Large stationary steam engines were still used by many textile manufacturers in the Bolton area until the collapse of that industry after World War II.

After World War II the firm expanded its work in electricity generation, and branched out into food processing, oil refining, petrochemicals and offshore oil equipment production.

The photographs from the HH archive gave a flavour of the business over the years and included the final removal of the factory gates in 2003, and Fred Dibnah's statue in front of the restored 1886 HH Corliss engine in Oxford Street, Bolton.

Turning to Warwickshire since her arrival in 2004, Sam expanded on the work of the Record Office and the January 2012 presentation to the Society by her colleague Christina Evans. In particular she expressed her thanks for the work done by friends and volunteers without which much needed research would remain untouched.

The Records Office provides a wide variety of services to the public including free access to various subscription websites. Interestingly, if any member is contemplating taking out a subscription to Ancestry UK with a view to a bit of family research it is financially advantageous to the Record Office if application is made via the link on the Warwickshire.gov website.

Future developments are dependent on the financial situation for which the outlook is gloomy in the short term. However, an application for Heritage Lottery funding for cataloguing projects is pending with a decision due in June.

Returning to the archive material, we revisited Willans & Robinson. Three of our members are currently working on this material and gave us a most detailed presentation in May 2010 (see Newsletter 38) and so a lot of the information was familiar and does not need to be repeated.

However, the concluding part of the evening covering the products of both companies allowed the use of much new material from the archives.

Early drawings of HH locomotives and pioneering railcar engines needed more time for study, as did the Corliss valve mechanism. The variety of industrial applications for W&R engines spoke for their exporting abilities and there were tantalising glimpses of ledgers and commercial documents written in immaculate copperplate.

A fragile blueprint relating to cattle pens on the SS Sorrento, an early Australian Refrigerated ship from the HH archive, indicated a connection with cold storage that might have links to the Nelson family's development of the frozen meat trade from Australia and New Zealand (see Newsletter 41). HH were even involved in the car industry in the 1920s, producing a range of small petrol engines. One was shown fitted to a now long-forgotten Vulcan car.

Sam Collenette made a powerful case for assistance, especially in dealing with technical or engineering subjects. Indeed, as she said 'I have chosen pictures for their aesthetic qualities. I do not understand the engineering'. There seems to be a gap that needs to be filled.

May 2012: Derek Hurst*Droitwich Salt Production: A Pickled Past.*

Whilst we all use salt on a daily basis, the techniques behind its production are less well known. Pictures of salt pans on coastlines, especially in warm climates, may be familiar from travel documentaries but Iron Age brine pits in Droitwich get few mentions.

Derek Hurst, Archaeological Projects Manager at Worcestershire County Council, knows more than most about them having been involved in much of the recent work around the Droitwich salt industry. Surprisingly, it has only been during the last thirty years that any serious archaeology has been undertaken in the area. As an archaeologist specialising in exploring the economic drivers behind his projects, one of which was the story of Cotswold sheep, Derek has found much of interest in Droitwich.

Inland salt production anywhere in the world stems from either mining solid deposits, as in Cheshire, or utilising brine from saline springs. Droitwich is rich in saline springs (unusually as a totally saturated solution with one gallon of brine yielding 3 ½ pounds of salt) and the town was long a producer of salt on a commercial scale.

The rights to making salt, given its importance and universal use as a preservative and as a condiment, were vested in persons of authority and power, often the Crown. However, in 1215 King John sold the rights to the citizens of Droitwich for an annual payment of £100 and until 1695 the industry was run as a monopoly of the townspeople. This period is well documented but needs a full investigation. When the borough monopoly was broken as the result of a court ruling, individual producers proliferated. With the simultaneous removal of price and output controls production soared and prices plummeted, ruining the speculators. One astute survivor, John Corbett, bought up the remains and in the 19th century his private monopoly brought great wealth to him and his descendants.

The early production process, known from at least the second century BC, was simple. Brine from the spring is first contained in large pits lined with wood and clay to form a watertight storage tank. Some evaporation may also take place at this point but settling out is considered the principal objective, with evaporation taking place in large shallow pans heated from below. Wet salt crystals deposited from the solution are removed and placed in another container which allows the salt to drain and form a solid block. Archaeology has found remains of both tanks and evaporating pans close by the saline springs in Droitwich.

The conical porous salt containers were made from 'briquetage' and some recent work has recreated examples based on fragments from excavation. Large quantities have been found in dense layers in the salt-making areas of Droitwich as well as in many Iron Age settlements in Hereford and Worcester and beyond. A network of salt trade and exchange across a large area can, therefore, be mapped in detail and shows the importance of Droitwich salt at this early period.

Roman times have left little evidence of salt production but the other nearby Roman remains of Doddenhill Fort and the luxurious Bays Meadow Villa (an example uncommon in the Midlands) dating from the 2nd century AD, together with the use of the name 'Salinae' for the town, indicate significant Roman interest in the area.

One piece of Roman archaeology is the major engineering works around the brine springs also dating from the 2nd century. A large plank-lined tank or channel, probably for brine collection was constructed from older timbers dendrochronologically dated to AD 61-5 and situated adjacent to two massive crossbeam braces, possibly part

of a later crane or winch mechanism. The villa was burned down in the late 3rd Century and the last dateable evidence of Roman occupation is coins dating to the 370s. There is evidence that the villa's aisled hall was reoccupied in the 4th century but extensive robbing has taken place and the site was ploughed up in medieval times.

Salt production continued in Anglo-Saxon times. Stone-lined hearths with lead pans have been found dating to the 5th to 7th centuries. There is also evidence of post holes that indicated an out-of-doors location protected by wind-breaks needed to ensure a steady temperature in the evaporating pans. Excavations have also found that during this period there was a great flood which inundated the site in mud and buried the evidence for salt making. The Saxons named the River Salwarpe after its propensity for 'throwing up brown stuff'.

Further evidence for the importance of Droitwich as a centre for salt production is that of the medieval 'salt-ways' that can be traced from Saxon and medieval place names radiating from Droitwich to the South and South East. Interestingly, there seems to be little evidence of such connections between Worcestershire and Warwickshire which begs the question; where did the latter's salt come from?

Perhaps the most interesting archaeological find from these times has been the 'Great Well' found in Upwich in the excavations of 1983/4. This large, ten metre deep brine pit has been dated to 1264/5. It is lined with oak beams and is located alongside the Roman crossbeam braces referred to above. Between the two lie the remains of a later medieval pump base. Other examples of medieval equipment found are the remains of barrels and wooden tools, rakes, paddles and shovels for handling the salt. Very similar equipment is illustrated in a 16th century German industrial treatise which suggests a strong European tradition of salt manufacture and the interchange of technology.

By around 1400, annual salt production had been raised to at least 1,500 tons using about 11.35 million litres (2.5 million gallons) of brine. The pump alongside the brine pit further increased production when it replaced the bucket method of brine extraction. Hollowed-out elm was used for piping. Interestingly, production of salt was limited to six months in a year equating to some 10 tons a day.

A visitor to the town in the 1530s reckoned that 6,000 cart loads of wood were being consumed each year by the brine boiling hearths. Terrible pollution resulted and a local cleric is recorded as petitioning the Bishop of Worcester for a transfer to a cleaner place!

By the end of the 17th century larger pans (some iron but many still lead lined) and brick built coal-fired hearths helped to increase production to nearly 3,000 tons a year. This led to the need for cheaper transportation and attempts were made to improve the navigability of the River Salwarpe between Droitwich and the River Severn.

In the 19th century, large factories were built alongside the Droitwich barge canal enabling boatloads of 60 to 70 tons of salt at the peak of production of 120,000 tons in 1872. After John Corbett amalgamated all the salt production he relocated much of it to Stoke Prior some 3 ½ miles to the North East, and Droitwich was developed as a spa. He also built Chateau Impney as his home.

Salt production finally ended in 1922 when ICI, by then owning all the salt resources in both Droitwich and Cheshire, moved production North. Apart from the archaeological remains, the main evidence remaining of Droitwich's great salt industry is the subsidence and leaning buildings, especially in the High Street. Had brine extraction continued the town might have disappeared!

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WARWICKSHIRE

Industrial Archaeology Society

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FROM THE CHAIRMAN

Maintaining momentum

During this year's AIA Conference in Chelmsford it was interesting to hear of the way in which many industrial history and industrial archaeology societies were struggling to maintain membership and attendance at meetings. The ageing demographic structure of membership, the diminished interest of current generations in past industrial eras, plus the proliferation of other societies that often touch on industrial subjects (e.g. local history and family history societies), were identified as possible factors, with the first of these seen as the main explanation.

The increasing membership of WIAS and the buoyant attendance at meetings seemed to buck the trend, and the committee is determined to maintain this momentum.

Principal amongst these is the goal of providing a range of monthly meetings that can prove attractive to a cross-section of our members and visitors - from the talks on the technologies of the past to interpretations of urban and social history; from the local to the national and even international context; from the lecture that occupies a whole evening to the shorter presentations, often given by members. These shorter 'add-ons' that usually occur in the latter part of the meeting have contributed greatly to the diversity of material that seems to interest the industrial archaeologist!

We hope that this year's programme fulfils this goal, and that no-one should feel reluctant about offering input to a meeting, either via comment, question or additional talk.

Planning the year's programme is probably the principal work of the committee, all of whom apart from

Richard Hartree - retiring after several years of loyal service - are willing to serve another year. Alain Foote will be joining the committee for 2012-2013. These and others (e.g. Jan Coulls and Barbara du Bois providing the refreshments at meetings; the website run by who also works with Richard Storey on the bookstall; the Newsletter largely written and edited by Mike Hurn) all combine to produce a highly effective team.

As you will notice, this Newsletter - in response to member requests - has an additional four pages containing photographs and text provided by members. We hope that this will become a regular feature and the editor Mike Hurn is very happy to receive contributions, either handed over at a meeting or sent via e-mail mikedhurn@btinternet.com.

This project obviously relies on the volume of contributions from members, so please send in material - particularly relating to Warwickshire - that you feel would be of interest to the industrial archaeologist.

The display boards purchased by the Society are also available at meetings should anyone wish to mount a display of material. Please contact the Chairman on wiaschairman@aol.com.

Other goals for the committee include making the AIA Journal more readily available to members; seeking the spread of the IA message into other parts of the county where we are not well represented (e.g. Rugby, Nuneaton); gathering knowledge and photographs of local firms with a view to mounting a presentation at one of our meetings, with the first of these concentrating

on the Ford Foundry of Leamington, co-ordinated by Peter Grenfell (rpgrenfell@ntlworld.com), with a presentation at our June 2013 meeting.

The Fenny Compton Kiln Preservation Trust

Many will be aware of WIAS's close involvement with the project to restore the Fenny Compton Brick Kiln. The Guild of Bricklayers and The River and Canal Trust (formerly British Waterways) are prime movers in this project, and members might know of the Fenny Compton Kiln Preservation Trust. The Trust was formed in 2010, and is committed to restoring the kiln and the surrounding area, thereby enabling the public to have a greater understanding of brick making, the canal network and local history. The trust is extremely keen to attract volunteers. For further information, please contact Steve Barlow, Secretary of the Trust stevebarlow@live.co.uk. Tel: 07932 310710. Membership is £5 per annum, with a joining fee of £5.

PROGRAMME

November 8th 2012

Ian Mackintosh (of the Stroudwater Textile Trust):

400 years of Stroudwater Textiles.

December 13th 2012

John Berkeley OBE:

From Pens to Particle Physics: the story of a Birmingham family business.

January 10th 2013

Alain Foote:

The English Electric Company 1918-1968.

February 14th 2013

Members' Evening

March 14th 2013

John Yates (Inspector of Historic Buildings, English Heritage)

The First Iron-framed Building in the World: Ditherington Flax Mill - History and Restoration.

NEWSLETTER

Meeting Reports

June 2012: Jeromy Hassell

Coventry Machinists and Coventry Victor

Jeromy Hassell has talked to the Society on two previous occasions; in March 2007 (Newsletter 27) on his ancestor Joseph Wright – a Coventry Watchmaker and in June 2006 (Newsletter 23) on engine makers White & Poppe. On this occasion he gave us his understated but penetrating observations on two other famous Coventry names: The Coventry Machinist's Company and Coventry Victor.

The history of these two companies was traced through a pageant of product illustrations and memorable pictures of factory conditions giving a vivid recreation of the bygone age of late Victorian and Edwardian England before WWI. This was the time of luxury toys for the well-to-do and horrendous working conditions under which the toys were produced.

Whilst some of the history of each company was familiar to many members, Jeromy's wry approach brought new insights into their activities and uncovered new material.

The story of the Coventry Machinist's Company starts with James Starley. His natural flair for invention led to an improved sewing machine, said to have been the first capable of stitching around the hems of cuffs and trouser legs.

Starley moved to Coventry in 1861 and started the Coventry Sewing Machine Company backed by a group of financiers wishing to provide employment for skilled workers laid-off through the decline in the watchmaking industry. The sewing machine went into production but with increasing American competition other products were needed.

Michaux in France had introduced pedal power with the Velocipede. Starley obtained an order to make 400 machines for sale in France, but the Franco-Prussian war resulted in their being sold in the UK. The Velocipede had a cast iron frame and weighed 160lb! It sold for about £12, at a time when the average wage was around £1 a week.

Starley started to make improvements, modifying the brake, fitting a mounting step and reducing weight. He introduced larger front and smaller rear wheels plus leg-rests over the front wheel. Starley's developments led to him becoming known as 'the father of the British bicycle'.

Jeromy explored the development of the 'penny-farthing', which was introduced to provide higher gearing and a better ride on uneven surfaces, through a series of illustrations highlighting brakes, chain drives, tricycle derivatives, free-wheels and rocking lever pedals. We even saw single and double coolie cycles for Colonial use and a tricycle which could be changed from single to double configuration, although perhaps not as smoothly as in the powerpoint transformation!

A Royal Warrant was granted in 1883 and bicycles began to take on a more modern appearance with the rider seated between two equal-sized wheels. Passenger carrying tricycle tandems allowed 'a lady to mount or dismount with perfect ease without soiling her dress'.

The review of Coventry Machinists concluded with nostalgic pictures of the Cheylesmore factory both inside and out and some of the eccentric machines it produced including four and five-seaters. Commercially the company languished. It was sold in 1896 and the name changed to The Swift Cycle Company. The purchaser was the flamboyant Ernest Terah Hooley whose practice was to buy well-run private companies and float them with a great fanfare. As with all his flotations, that of Swift was heavily oversubscribed. The future went well for the Company, but not so well for Hooley, who two years later when, after acquiring a series of companies for £9m, and then selling them for £14m, declared himself bankrupt on refusing to settle a small debt which he considered unjustified. During his career, over £100m passed through

his hands, and the companies he launched included Boots, Schwepes, Dunlop, Singer Sewing Machines and Raleigh Bicycles. Swift expanded its site at Cheylesmore and went on to manufacture motor vehicles but eventually folded in 1931.

Jeromy then turned his attention to the inventive William Weaver and his Company, Coventry Victor. Born in Peterborough in 1885, Weaver served an engineering apprenticeship in Manchester and moved to Coventry in 1904. He has been described as an individualist working on his own account, paying scant attention to anyone else and having the pioneer's obsession with his own ideas which he produced 'as a catherine wheel produces sparks'.

In Coventry, Weaver established Moreton & Weaver, in Hillfields to carry out experimental work and make machine tools and components for the motor and aircraft industries.

Weaver was attracted to the new field of aeronautics and built some pioneering ornithopters (aeroplanes with flapping wings) of which little is known save that the original machine was tested on the Hampton in Arden golf course and subsequently destroyed in a gale. However, Flight magazine in May 1910 did record the successful trial of an ornithoptone designed and built by a Mr Weaver of Coventry with a flight of a quarter of a mile.

In 1911 Weaver founded The Coventry Victor Motor Company Limited to manufacture engines and motorcycles under his own patents. The first engine was a horizontally opposed twin-cylinder, four-stroke which in due course established Weaver as Britain's major producer of such engines. At this time Weaver also produced parts for man-lifting kites and the Cody biplane. During WWI he made some of the first bombing devices for aircraft and by the end of the war Coventry Victor was producing motorcycles powered by their own engine.

A series of illustrations, culled from the Coventry City archives, of Coventry Victor promotional material showed many machines of originality and included a bullet shaped sidecar of polished aluminium with air cushion upholstery 'of superior quality'. Of even greater interest were photographs of the works, some of which included Weaver himself, that gave another glimpse into the manufacturing processes in early twentieth century Coventry.

The three-wheeled cyclecar, originated by Morgan in 1910, flourished in the post-war years being cheaper to buy, tax and run than cars and more comfortable than a motorcycle. Weaver launched the first Coventry Victor cyclecar at the 1925 Olympia Cycle Show. Unlike Morgan, Coventry Victor made both the chassis and the engine – a water-cooled version of the old twin.

A wide variety of models followed over the next decade but as tax concessions for small four-wheelers eroded the cyclecar's advantages and, despite good press comment and a loyal customer base, production ceased in 1937. Thereafter the company concentrated on manufacturing and supplying engines, always flat twins, both petrol and diesel, for vehicle, marine and stationary applications. There was even an air-cooled aircraft engine in 1955.

In 1965 production was moved to a new site in Willenhall Lane. William Weaver died in 1968 and in 1969 the company went into voluntary liquidation. Weaver's son then purchased the sole rights to manufacture Coventry Victor engines and trades today as A N Weaver (Coventry Victor) Ltd.

A most interesting meeting concluded with one of the Chairman's finds – a silent film from 1929 extolling the variety of activity to be found in the Port of London. A considerable contrast indeed to Coventry's manufacturing heritage.

Members' Contributions

Martin Green:

Two Modern Structures: Two new views of London's Industrial Heritage

One of the unexpected inclusions in the AIA Conference at Chelmsford was a talk on the structures of the Olympic Park, sites with which we had all become increasingly familiar via the extensive TV coverage of the Olympic and Paralympic Games. Love it or hate it, Anish Kapoor's and Cecil Balmond's ArcelorMittal Orbit certainly became one of the lasting images of those games, and will have a permanent place in the re-modelled Olympic Park in the future. It is Britain's tallest art sculpture at 115 metres high, and, as its appearance suggests, it presented a considerable challenge in terms of structural engineering, with Arup providing the necessary expertise. Sadly, the Orbit will remain closed to visitors for the time being and will not re-open until late 2013 or early 2014.

In addition, The Emirates Airline – the cable car across the Thames from the O2 arena on the Greenwich peninsula to the ExCel Centre at Royal Victoria Dock - had been built with impressive speed to be open in time for the Olympics. The cable car - capable of carrying 2,500 passengers an hour - stretches over three spiralling towers, designed by architects Wilkinson Eyre, and manufactured in Bolton. The towers are mounted by specialist cable car equipment supplied by Austrian-Swiss company Doppelmayr.

These two structures have generated an unexpected bonus for the industrial historian, by giving access to new views of some of the industrial sites of the area. During the Olympics it was possible to ride to the top of the Orbit and to enjoy the magnificent 360 degree views of the Olympic park and this part of east London. One building that was probably not on many people's radar was the (former) Bryant & May match factory in Bow. This has now been converted for residential use and is known as 'Bow Quarter', but remains one of East London's most important industrial sites.

Industries such as match-making were typical of the area, and the industrial activity on the north bank of the Thames continues this theme. 'Noxious trades' tended to be pushed eastwards of the City of London, partly because regulations on industrial use were far more lax east of the river Lea.

The sequence of wharves along this riverbank towards Silvertown illustrate the diversity of this past industrial activity. As we look downriver we see Clyde wharf (location of former sugar refinery), Pinchin's wharf (former Pinchin and Johnson paints and varnishes now Nuplex Resins), Peruvian wharf (location of former Anglo-Continental guano works with land now awaiting development), Plaistow wharf (Lyle's Golden Syrup still in active production), Knight's Royal Primrose soap works (now J.Knight : Animal by Products). – and many more beyond, including Tate and Lyle's sugar refinery. Each wharf has a story to tell, but seeing these either by land or riverboat was always difficult or inaccessible. The cable car has changed all that. A trip is strongly recommended, not only for the views of the Greenwich peninsula, Canary Wharf and the Royal Victoria Dock, but for a glimpse of the area's past and present industrial activity. Much of it is changing, with new residential developments built or in the planning process.

The only criticism is that the cable car travels too quickly, and the opportunity to really study the area quickly disappears. This makes a return trip almost imperative!



The Orbit close to completion, with just the viewing gallery still boarded up, and the Aquatics Centre in the background.



The former Bryant & May factory in Bow as viewed from the Orbit, with the tops of the Olympic Stadium floodlights in the foreground.



The view of the industrial riverside of the north bank of the Thames as viewed from the cable car across the river. The main wharf in the picture is the site of Pinchin and Johnson's paint works which passed through various owners before being sold recently by AkzoNobel to Nuplex Resins, a NZ-based multinational company. Beyond that lies the vacant ground of Peruvian wharf, and then Lyle's Golden Syrup works.

Members' Contributions

Roger Cragg:

Early Reinforced Concrete Bridges in the West Midlands Region

The technique of building bridges and other structures using reinforced concrete was developed by a French engineer – François Hennebique (1842-1921). He appreciated that the weakness in tension of plain concrete could be overcome by placing steel bars within the concrete in regions where tensile stresses occurred, most notable in the bottom face of concrete beams. In France this technique was known at that time as *Béton Armé* and in Britain as 'Ferro-Concrete', a term which has now gone out of use but may still be encountered in older publications.

The construction of reinforced concrete bridges using the Hennebique technique started in the UK with Chewton Glen Bridge in Hampshire in 1902, the British agents for the patented process being L.G. Mouchel and Partners.

The oldest reinforced concrete bridge in the West Midlands Region is the 96 ft. span arch bridge at Stanford upon Teme in Worcestershire, built in 1905.



Stanford Bridge

Another early bridge is Dogpole Lane bridge in Birmingham (SP061822) of 1908 with a skew span of 45 ft. This bridge has a very flat arch and is currently propped and awaiting replacement due to its inadequate strength.



Dogpole Lane Bridge

Early Mouchel-Hennebique bridges which also still survive in the Region are in Birmingham – Cranford Street Bridge (1906) SP035883 and Bond Street Bridge (SP052814) and Umberslade Road Bridge (SP053814) in Stirchley, both 1908. More locally there is Binley Road Bridge, Coventry (1911) at SP369786.



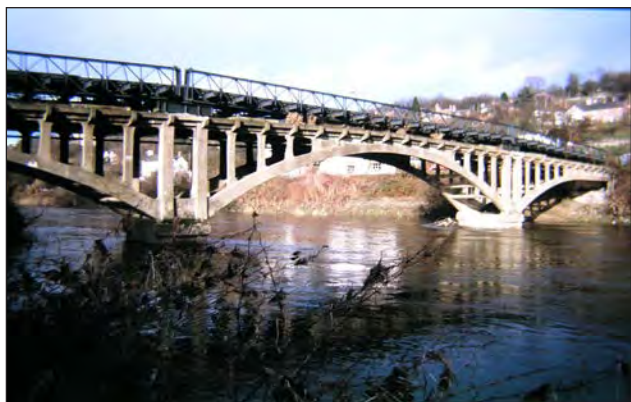
Bond Street Bridge

Princes Drive Bridge in Leamington Spa dates from 1923 but is of interest as it was built by the Trussed Concrete Steel Co.



Princes Drive Bridge

In 1909 a new reinforced concrete bridge was designed by Mouchel and Partners and built by the Liverpool Hennebique Company over the River Severn at Jackfield, downstream from the Iron Bridge (SJ681033). This bridge, named the Free Bridge as it was the only toll free crossing of the Severn in the area, had three open spandrel reinforced concrete arches of 66, 87 and 66 ft. span. Unfortunately, despite frequent repairs the concrete deteriorated and, due to its narrow width, the concrete parapets were subject to frequent damage by vehicles.



Old Free Bridge (1909)

In 1991, after lengthy discussion in which the author took part, it was decided to demolish the bridge and replace it with the present structure, a single span cable stayed bridge with a single tower on the south bank. The new bridge was opened in August 1994.

Also in Shropshire is Cressage Bridge (SJ594045), dating from 1913, with three spans of 40, 80 and 40 ft. It carries the B4380 road over the River Severn. A conventional reinforced concrete arch bridge, it is a good example of the transition from masonry to reinforced concrete, the external design, by Mouchel and Partners in conjunction with Shropshire County Council, being strongly based on masonry practice.



Cressage Bridge

Similarly dating from 1913 is Wergins Bridge over the River Lugg north-east of Hereford. (SO529447). It has a single span of 50 ft., was designed by the Considere Construction Company and built by Andrew Scott, Contractor, of Port Talbot. The bridge is rare in that it utilises the Kahn system of reinforcement. In this system the main horizontal steel reinforcing bars have 'wings' which are bent up at 45° to provide shear reinforcement.



New Free Bridge (1994)



Wergins Bridge

Another early reinforced concrete bridge over the River Severn is situated at Atcham, Shropshire (SJ541093). This large bridge has five arches of 60, 100, 120, 100 and 60 ft. span. Until recently it carried the A5 Holyhead Road. It was built in 1927, parallel to John Gwynne's 1779 masonry arch bridge a few yards away, the original bridge being preserved for pedestrian use. Another Mouchel & Partners design together with Shropshire County Council Engineer Mr. W.H. Butler, the bridge used coloured cement and a bush hammered finish to match the Grinshill stone of the old bridge.

There is a fine bowstring arch bridge of 110 ft. span over the River Avon at Evesham dating from 1928 (SP034431) but this bridge is under threat.

Although reinforced concrete bridges continued to be built until the 1950s the technique has now largely been superseded by the use of prestressed concrete.

Members' Contributions

Martin Green, Peter Coulls, Peter Chater and George Sayell

End-Piece: The Archaeology of the Inevitable

It was the submission of photographs by Peter Chater that prompted thoughts about a (potentially) untapped source of material for the industrial historian. The archaeology of death sounds a distinctly unattractive topic, but the cemeteries, churchyards and funerals that record the inevitable do contain much material of interest. This ranges from the content of inscriptions as a source of information, through the materials and techniques used for gravestones and memorials, to the manufacturing of all the components for funerals, burials and cremations. No doubt members will have knowledge of local churches, churchyards and cemeteries that contain material of an industrial connection, and we would be delighted to hear of them. An obvious and well-known source would be London Road Cemetery in Coventry - designed by Joseph Paxton in the middle of the nineteenth century - where several of Coventry's most eminent industrialists are laid to rest including James Starley.

This is a serious component of archaeological study and I am reminded of a conference I attended at Ironbridge where a lecture on this theme was given by Dr. Harold Mytum, of the University of Liverpool, and an old boy of Warwick School. He is author of a book *'Recording and Analysing Graveyards'*, a CBA Practical Handbook in Archaeology. This theme also fits in well with one of our monthly meetings where Elizabeth Perkins (Director, Birmingham Conservation Trust) will talk on Newman Brothers Coffin Works in Birmingham. This is a fascinating insight into the wide variety of materials (including 'soft goods') that were produced in Birmingham and elsewhere to supply the industry. This tradition lives on with John Wilde and Co Ltd of Devon Street, Birmingham, Europe's largest manufacturer of funeral furnishings with factories in both Birmingham and Glasgow, although competition from China - where else? - has become a serious challenge.

A few examples of local interest are included here. Peter Coulls, writing below, answers the questions over the identity of John Whitehead Greaves and the reason he is buried at St Mary Magdalene's Church, Lillington, Leamington Spa; George Sayell reveals a significant memorial in Old Milverton churchyard to Philip Kench of Emscote Mill fame; and Peter Chater asks whether anybody has more information on buildings which might be described as 'mortuary chapels'.

Who was John Whitehead Greaves (Born 21 June 1807; Died 12 February 1880) and why is he buried in this Churchyard? He was born in St Albans, Hertfordshire to John Greaves, a Quaker from Radford Semele and Mary (née Whitehead) in 1807 the third of four sons. His elder brothers were taken into the family banking business and he was advised to look elsewhere for employment such as Canada. In 1830 he travelled to Caernarfon, from whence transatlantic tickets were readily available. He appears to have been deterred from leaving after seeing the conditions which he would have to endure in order to reach the other side of the Atlantic.

Whilst in Wales he met Edwin Shelton and formed a partnership to take over a slate quarry in Llanberis. The partnership acquired new quarries in the Blaenau Ffestiniog area. The nearby Ffestiniog Railway, then in its infancy, enabled slate shipments to be taken to 'Port Madoc' which was being developed. In 1843 Greaves became Treasurer and ultimately the Chairman of the Railway Company that survives to this day as J.W.Greaves & Sons. At the age of 63 he announced his intention to retire to a house he had had built at Bericote (Bericote House) in 1870. He handed

over the business to his son J.E.Greaves.

J.W.Greaves died in Brighton in 1880 as the result of injuries sustained in a riding accident. His body was returned to Leamington Spa for burial in St. Mary Magdelene. The Company he founded survives today producing slates and slate products in conjunction with operating a very popular tourist attraction, Llechwedd Slate Caverns, in Blaenau Ffestiniog.

(acknowledgements to <http://warkcom.net/live/cme810.htm> and *Victorian Slate Mining* by Ivor Wynne Jones, Landmark Publishing)



The Memorial to John Whitehead Greaves in Lillington.



George Sayell with the memorial to Philip Kench of Emscote Mill which is to be found in the churchyard of St James in Old Milverton.



The 'Mortuary Chapel' found by Peter Chater adjacent to Farnborough Churchyard. It is thought that the original use was to hold a body overnight awaiting burial. This was before there was a road network and bodies were carried sometimes a distance over rough tracks by hand to the church the day before burial.

September 2012: Martin Green

The Industrial Heritage of Essex - A Personal selection

The annual conference of the Association for Industrial archaeology was held in Essex this year, and the Chairman chose the industrial heritage of that county as the theme of the opening lecture of the season. He began by explaining that he was no expert on Essex, but hoped that the (perhaps unanticipated) delights of the industrial sites in the county might stimulate interest, and might even tempt some to make the intrepid journey eastwards.

Industrial activity pays no heed to county boundaries, but an additional complication in Essex's case is that the current county was previously a much larger area. The major difference is that a large strip of land bordering the river Thames on the eastern edge of the county is now part of Greater London. This strip had become extremely industrialised (including sites such as the Tate and Lyle sugar refinery at Silvertown and the Ford motor plant at Dagenham), and there was a case for treating estuary-side Essex as a specific area. Such an area would include Tilbury docks, passenger terminal and power station, as well as the oil terminals at Thames Haven. The estuary location has dictated the nature of industrial activity at these locations.

For much of the rest of Essex, the nature of the land, its underlying geological make-up, and the pattern of rivers (Stour, Colne, Chelmer and Blackwater, Crouch, Roach, Thames) draining eastwards into the North Sea have been powerful determinants of the pattern of industry. The land is generally flat, with no coal or metal ores, nor significant quantities of building stone. Agriculture has dominated - and continues to dominate - the landscape. Timber and brick have been the favoured building materials. Some parts of Essex (particularly the extensive areas of marshland) have been unproductive and remain relatively isolated. Isolation is not necessarily a handicap to the growth of industry - isolated areas make good locations for the explosives industry, for nuclear power stations and offer the potential for opportunist entrepreneurs to take advantage of a low-cost location.

In simplest terms, the geology of Essex is a bowl of chalk (outcropping in the north and south of the county) overlain with clay. The chalk deposits have been exploited in the past, but no activity remains. The chalk quarries in the south have been converted into housing estates, nature reserves and the huge Lakeland shopping centre. Given the geology, it is no surprise that brickmaking has thrived in Essex with large numbers of small-scale producers. One such works still in operation is the Bulmer Brick and Tile Company. The AIA visit to these works, led by owner Peter Minter, gave a fascinating insight into the world of producing bricks for restoration projects, including Compton Wynyates, St. Pancras Station and Hampton Court.

The rivers of Essex have long been utilised as a source of power and a means of trade and transport. River ports (such as Maldon with its salt works, broad estuary and Thames barges) and riverside and river-dependent industries have always featured strongly in any of audit of industrial activity. The improved natural waterway has been a stronger ingredient than the man-made canal. Essex has a very long coastline (particularly at high tide!) and coastal trade has been vital in overcoming the limited resource base of the county, with imports of coal from the north-east instrumental in achieving this.

The coal trade was the driving force behind the construction of the Chelmer and Blackwater Navigation which sought to supply coal to Chelmsford via Heybridge, and its story reflects many of the characteristic features of canal construction in England - local canal mania,

commercial rivalries, eminent engineers (in this case, John Rennie senior), and construction controversy and crisis all had their part to play.

Riverside and canalside locations became prime sites for local industry, and Bentalls of Heybridge developed as one of the largest agricultural engineers in the country, let alone the county. A plaque on the wall of one of the few remaining buildings of the company in Heybridge gives some indication of this. It reads 'Bentall's Warehouse erected in 1883 by Edward Hammond Bentall, ironfounder and agricultural implement manufacturer, to hold up to 15,000 machines awaiting export.'

Power supply for these various activities reflected the development of technology throughout the land - wind, tide, water and steam power all made telling contributions, perhaps best exhibited at Beeleigh Mill and Langford Museum of Power. At Beeleigh, a long history of water mills and a later addition of steam power was curtailed by a disastrous fire of 1875 which left the water mill destroyed, but the (subsequently abandoned) boiler house, beam engine, and milling equipment of 1845 intact. The nearby Museum of Power houses one of the three Lilleshall Company vertical triple expansion rotative engines installed 1929-1931 that helped supply Southend with its water following the emergence of the town as a premier seaside location, much encouraged by the building of the London, Tilbury and Southend Railway. Both these fascinating sites are within easy walking distance of one another.

Processing the products of agriculture is inevitably one of the most prominent features of Essex's industrial landscape. The sugar beet industry of Felsted disappeared in the 1970s and many of the mill premises for other crops have followed a similar fate, or have been converted to other uses. East Mill in Colchester (now apartments after a brief spell as a hotel) and Moulsham Mill in Chelmsford (now a craft and business centre) are two such examples. The Marriage's Mill in Chelmsford remains as a working mill, although it now stands as part of a large modern milling complex comprising huge production buildings and flour silos, and modern steel-clad processing plants. It has long been a family firm, and still produces some stone-ground wholemeal flour as part of its product range.

Essex was described in one of the lectures as a collection of market towns, and Chelmsford possessed many of the criteria identified by Barrie Trinder in his analysis of the characteristics of the market town. For example, until the 1950s, every week Marriages's and other mill owners would visit Chelmsford Corn Exchange to buy wheat from local farmers and merchants, only for the Exchange to be demolished in 1969 as part of a 'redevelopment programme'.

Other food processing activities in Essex have prospered, and perhaps most notable of these is A.C. Wilkin and Co and their famous Tiptree brand of jams, preserves and chutneys. Originally arable farmers, the Wilkin family moved into fruit farming in 1865, taking stocks by horse and cart to the local railway station for sale in London's market, and then, in 1885 turning to fruit preserving. The firm has prospered in recent years, and within a modern farm complex, a small museum exists at the Tiptree site, including exhibits on the Kelevedon, Tiptree and Tollesbury Light Railway, and opportunities, of course, to take the obligatory cream tea.

It was at this point that our Chairman had to end his talk because of time pressure, although he clearly had more to tell us, and perhaps there will be an occasion to hear the second instalment.

October 2012: Dennis Crips

A Living Dinosaur: From crystal sets to quantum computing in one lifetime

Dennis Crips' account of his engineering career was a journey through the technologies of the twentieth century. It was also a powerful endorsement of the dictum that it is the engineers who change the world – without them there would be no progress, little evolution of society and certainly much less of domestic comfort or convenience.

As Dennis said, his time as an engineer was a boy's dream. Every day was Christmas Day with new components, new techniques and new products; all of a smaller size, improved performance and lower cost a daily occurrence. Yesterday's hopes became today's realities – and, inevitably, were obsolete by tomorrow. And the process is continuing to this day.

The presentation, in four parts, covered some of the technological advances made over the past 100 years. First, the key technologies involved in creating the world in which we live. Second, the effects these had on a digital electronics designer. Third, the changing face of project management and finally, a look at some of the social and engineering problems which have arisen and which will affect us as in an uncertain future.

Looking at the technologies in more detail, silicon technology has allowed us to progress from the germanium crystal and cat's whisker radio of the 1920s to today's microchip containing tens of thousands of individual transistors. These chips, already quality controlled, are mounted onto multi-layered printed circuit boards using automated processes that minimise cost and increase reliability.

Digitisation is a highly efficient way of capturing an analogue world and using the resultant information. It has its origins in cinematography but in the digital transmission of both sound and vision, samples of the analogue signal are taken, digitised, transmitted and then reconstituted at the receiver. A single fibre optic cable can transmit up to 160,000 separate voice channels. It is also possible to mix voice, data and tv signals on the same cable.

The development of fibre optics has virtually eliminated data corruption and increased speeds, thus revolutionising communications of all kinds. It is a somewhat reassuring link with our industrial archaeological roots to know that much of the UK's fibre network, 'Fibreway', has been laid along canal towpaths. Access for the installation is relatively easy and the canals connect all major towns and cities. What would James Brindley make of it?

With all this digitised material, data storage was the last major technology considered. It has been a growing requirement driven principally by the needs for faster access, smaller size and ever decreasing cost. Over the past half century we have moved from relays, valves and transistors through integrated circuits to memory sticks. From paper to magnetic tape to floppy discs to CDs and DVDs. Size and cost have reduced by unbelievable factors as has power consumption whilst physical robustness is beyond compare.

Turning to design techniques, Dennis used the example of a bedside tea making machine to explore different methods. All begin from the need for a clear specification and the need to consider testability in commissioning and maintenance, how the device will be used, what can go wrong and what would be the consequences. We looked at designs based on electromagnetic relays, the practical approach, and ones using mathematical equations which led to computer programming to achieve the design objectives.

Following techniques came project management. Advances in technology give rise to increasingly complex systems and many schemes have failed through poor management. About 100 years ago Henri Gantt developed his eponymous chart, basically a bar chart with a bar for each critical element of the project plotted against time. It is still widely used today and enables an entire project plan to be captured on a single A3 sheet and be understandable by all parties.

In the late 1950s the US Navy introduced Programme Evaluation and Review Technique or PERT to manage the Polaris submarine project following several costly programme failures. PERT is sometimes known as critical path analysis and has become an internationally adopted process with an associated industry ranging from software to a professional body, the Institute of Project Managers.

Gantt or PERT or CPA all break down the work into well-defined work packages which can each be analysed for content, start and finish dates, dependencies on other packages, criticality to the project as a whole and resource requirements. Hopefully the project manager will get appropriate, timely feedback from whatever system he employs and complete his project, on time, to budget and satisfy his client. Lord Coe must have had an excellent project manager for the Olympics.

Dennis concluded with some cautionary tales relating to design responsibility and safety, security, artificial intelligence and finally quantum computing.

Responsibility for design and safety highlights the difficulties at the interface between the design engineer and the computer or software developer. Often some aspects of design and safety responsibility have been transferred to people who, although highly qualified in their field, may have little or no engineering background. Few if any design engineers want to learn high level programming languages or to be responsible for debugging the inevitable problems. Equally, the software specialist may not have an instinctive feel for things mechanical. Again, a crystal clear, fully detailed functional specification at the outset of a project is vital if problems are to be avoided.

The bedside tea maker involves pumping a kilowatt of power into a device sitting a few feet away from the head of a sleeping person. What if the siphon is blocked? The kettle becomes a potential bomb! Like quality, safety has to be assessed and built in at every stage of the design process, not bolted on afterwards in a so-called 'safety audit'. It was suggested that only a competent engineer was qualified to undertake such an assessment.

Today, many real-time systems such as motorway signals use two computers validating each other but only one is in control at any one time. Aircraft flight control systems will use three computers and a two out of three voting system. Such automation has led to catastrophes such as an aircraft ground test when the computer released the brakes with engines on full throttle and no pilot at the controls and an airliner plunging into the Atlantic in a deep stall with the loss of all on board.

Data security is not just preventing identity theft from computer systems. With the development of highly portable flash drives, DVDs and laptops the theft of data from the workplace is a new problem for society.

The problem of 'artificial intelligence' is not so much mankind's subservience to some master computer complex but the myriad occasions when a transaction cannot be completed because 'the computer is down', the effects of social networking on real person to person interaction and the often dangerous times when searching for that elusive mobile.

Finally, quantum computing might give unbreakable ciphers or driverless cars but will it also bring with it the surrender of human control to a machine? And who or what would be responsible for any catastrophic system failure?

Dennis twice quoted the examples of the Mars rover vehicles to demonstrate the achievements of engineering and science. They will probably continue to rove for many years yet and garner unknown information for our benefit.

Many of us echo Dennis's wish to be 50 years younger and to share the engineering design challenges that lie in the exploration of the universe in which we live.

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FROM THE CHAIRMAN

Recessionary times

No-one needs to be reminded of the parlous state of the British economy and of government finances, but it is interesting to reflect on the impact that this might have on the recording and preservation of our industrial heritage.

In simplest terms, recession might have a number of impacts. The likelihood of closure of firms is heightened, and although this is most frequently brought to our attention via the retail sector, there must be a considerable effect on the manufacturing firms supplying these outlets, some of which may be housed in older premises. The desire to make most effective use of available funds has produced a boom in internet sales, once more adding to the potential loss of retail outlets. Slump conditions also mean existing vacant buildings remain empty for longer (with attendant problems of deterioration), and the prospects of the conversion and revitalisation of old industrial premises becomes less likely. These problems are often compounded by a potentially lethal combination of concentrations of large unoccupied industrial premises in areas of low incomes, high unemployment and social deprivation. The view of a former industrial building (with potential for renovation were it located elsewhere in the country) suffering the inexorable impact of neglect and vandalism is indeed a sorry sight.

Nor is this a problem that exists elsewhere in the country but not in Coventry and Warwickshire. There are several examples that come to mind of premises that deserve renovation but it is, indeed, difficult to see how funding might become available.

In terms of financing, there are many features that put pressure on funding. The quest to reduce (at least in real terms) the volume of government spending (both central

and local) could see budgets for industrial heritage as suitable candidates for pruning. Libraries, museums, record offices, archaeological services could find staffing levels reduced and funding re-allocated elsewhere.

At the individual level, subscriptions to societies may be one of the items scrapped from household budgets, and the cost of visits to museums carefully considered.

National leaders of the industrial heritage movement are well aware of these problems, and English Heritage's 'Industrial Heritage at Risk' programme highlighted many of these issues. One significant feature of Shane Gould's impassioned presentations on this issue has been the 'public attitudes survey' and the confirmation of the importance that the general public do indeed place on our industrial heritage. A good source of information is Issue 67 of English Heritage's Conservation Bulletin 'Saving the Age of Industry' (available online – or to borrow from WIAS).

As part of this process is the role of voluntary effort and support. There is a heightened need to monitor what is happening locally, and to lend support for national organisations such as the Association for Industrial Archaeology. We hope that our WIAS meetings can make a small contribution to this process, combined the efforts of individuals on particular projects.

One building that certainly is under our watchful eye (as well as being our society logo) is the Warwick gas works in the Saltisford, Warwick, which – after many years of being empty – is now planned for conversion. We shall monitor this carefully, particularly in terms of not losing the balanced, manageable scale of the streetscape fronting the Saltisford.

Willans Works Archive

In view of the pressures on funding outlined above, it is with enormous pleasure that I am able to pass

on the news that the application for funds to help the cataloguing of the Willans Works Archive has been successful. With professional input and the voluntary contributions of John Willock, Peter Coulls, Arthur Astrop and Alain Foote the future of the Archive looks safe.

Sad news

It is with much regret that I announce the death of two of our members – Tony Poole and Peter Mason. Our sincere condolences go out to their families and friends.

Next issue

The editor – Mike Hurn – is very willing to receive input for the next issue, due to be published in June. Text and/or photographs for the middle pages insert should reach him by 31st May. Please send to mikedhurn@btinternet.com, or hand to him at a WIAS meeting.

Change of meeting

In the programme shown below, there are two changes from the previously issued list. In May, the speaker will be Simon Buteux who has replaced Elizabeth Perkins as Director of the Birmingham Conservation Trust, and the June meeting will now be Anthony Coulls speaking on The Railways and National Railways Museum of Sierra Leone.

PROGRAMME

February 14th 2013

Members' Evening

March 14th 2013

John Yates (Inspector of Historic Buildings, English Heritage)
The First Iron-framed Building in the World: Ditherington Flax Mill - History and Restoration.

April 11th 2013

Richard Thomasson:

Ariel motorcycles from Selly Oak.

May 9th 2013

Simon Buteux (Director, Birmingham Conservation Trust):
Newman Coffin Works, Birmingham.

June 13th 2013

Anthony Coulls:

Railways and the National Railways Museum of Sierra Leone.

NEWSLETTER

Meeting Reports

November 2012: Ian Mackintosh

400 Years of Stroudwater Textiles

Ian Macintosh, resplendent in a 'Stroud Scarlet' waistcoat, gave us an illuminating tour of the Stroudwater valley – The Land of the Clothiers. As a trustee of the Stroudwater Textile Trust, he has an authoritative command over the subject which combines many aspects of industrial archaeology as well as English social history. In particular, he showed how the textile industry demonstrated adaptability and flexibility over several centuries and was always international in its outlook.

Woollen cloth manufacture has been important in the Stroud valleys since medieval times. The local streams are dotted with mill sites and their courses have been straightened and interrupted with weirs and millponds over the ages. Towns like Stroud and Nailsworth developed because of the industry while more ancient foundations like Cirencester, Dursley, Painswick, Tetbury and Wotton under Edge prospered.

Besides British markets the cloth was sold to Europe, the Native Americans and Asia in such large quantities that at one time there were over 170 mills working. The Royal families of Great Britain and Russia, the Queen's guards, The East India and Africa Companies as well as the Papal Court were all customers, and in the 1880s 21 ships a year are recorded leaving for Canton with the bulk of their cargo being West of England cloth from Stroud. A special double sided cloth, dark on one side and reflective light on the other woven simultaneously, was used for tents in the Crimean War and in India.

Evidence of the wealth of some merchants is that one Samuel Capel left on his death £3,000 worth of cloth in his London factor's house and a further £2,000 worth elsewhere.

The Stroudwater Textile Trust seeks to preserve this rich textile heritage, which extends to over 400 years, to promote awareness of the past importance of the woollen industry in the Stroud Valleys and to bring together past and contemporary textile art. The Trust was established in 1999, consolidating ten years of volunteer activity in the preservation and restoration of historic textile machinery, the provision of educational materials and the organisation of tours of the surviving mills.

The Trust's activities are centred on the Dunkirk Mill, with its impressive waterwheel and regular demonstrations of 'West of England' cloth being finished using historic textile machinery, and at Gigg Mill where there is a weaving workshop with demonstrations and classes. At two other historic mills, St Mary's has a large waterwheel and a Tangye steam engine, whilst at Stanley visitors can watch demonstrations of carding machinery and spinning mules in a Grade 1 listed building.

The historical part of Ian's presentation utilised many contemporary paintings that not only showed the beauty of the valleys but also contained many illustrations of the mills themselves together with the extensive outdoor activities involved in producing the cloth. These notably showed the variety of colours produced in the district: apart from the scarlet were green, beige, yellow and navy blue.

A number of well-known sayings come from the cloth industry. Dyed in the wool and dyed in the piece originally signified differences in quality whilst being on tenterhooks derives from the tenting frames on which the dyed cloth was hung out to dry stretched onto the tenterhooks.

Water has always been important, whether as a source of power to drive machinery or for the washing and dying

processes or for transportation of raw materials and finished goods. As early as the 1790s the Stroudwater canal provided a link to the River Thames. Mills were usually named after their owners and these place names sometimes survive even though the buildings are long gone. Four medieval mills within the course of a single mile of the river would seem to indicate plenty of demand for West of England cloth.

Turning to the technology, there was an early need for mechanical assistance to drive the fulling stocks where wet broadcloth, produced by a network of cottage hand-loom weavers, was pounded to consolidate the material. The fulling stock preserved by the Trust last worked in 1964 and takes six men to lift it. The process creates much heat and noise and a mill runs continuously, 24 hours a day for six days – Sundays off. In Nailsmith, 38 fulling mills ran full time and it was said that ladies of a nervous disposition should not live near to a fulling mill!

After fulling the cloth nap was raised using three grades of natural 'teazels' prior to 'shearing'. The shearmen were the elite tradesmen amongst the cloth makers and the description given by the Textile Trust is an evocation of times past. "The gentlemen shearmen considered themselves the 'dons' of all the branches of cloth making, cutting the nap to give the cloth an even and dressy appearance.

They worked in pairs in shirt-sleeves, generally held above the elbow by a strip of scarlet cloth - their badge - on a shear board about 18 inches wide and 8 feet long packed with coarse pillowing cloth made for the purpose. The shears weighed 40 to 50 pounds and a block of lead was placed on them to press them down steadily on the cloth which was strained out tight by hooks over the pillowing. One brought his shear to the list or selvedge; the other began in the middle so they finished at the same time. The shears and weight had to be carried off the cloth every time a 'board' was cut. Some allowed a 'colt', a strong lad, to pay them to learn the trade.

Dyeing became an important element as the Stroud industry became more vertically integrated and dye houses were added to spinning, weaving and finishing operations. Indigo was an important material providing blue for naval uniforms and black for Victorian gentlemen's formal attire. The famous Stroud scarlet had its origins in Montezuma's cloak. The Spaniards imported prickly pears on which to raise the cochineal beetles that were crushed to make the dye. Later the secret came to Stroud.

The industrial revolution came late to the Stroud district but it brought pollution, notably in the winter when smoke was trapped in the steep valleys where the mills were concentrated for lack of room to expand. A complainant was told to fit better windows! At the same time, increased demand for water from unreliable Cotswold streams caused friction amongst the mill owners that was only resolved with the increasing adoption of steam power which brought with it more pollution and accidents. The dye houses were particularly notorious for fumes that caused illnesses.

Nonetheless, technology from the cotton industry was gradually adopted. Water-powered carding and slubbing mills produced yarn material for the spinning jennies. The shearmen was replaced by a mechanised 'cross cutter' that boys could operate. Incidentally, this cross cutter gave birth to the cylinder grass mower.

Today, two mills are working producing cloth for billiards tables and tennis balls. A far cry perhaps from the Royal orders of past times but proof that the adaptability of the Stroud textile industry remains in place.

Members' Contributions

John Willock

The 3.7" Anti-Aircraft Battery at Goodrest Farm, Leek Wootton.

On Sunday, November 18, 2012, members of the public had a rare opportunity to view a surviving second world war anti-aircraft gun battery situated at Goodrest Farm, Rouncil Lane, near Leek Wootton. The site, comprising a command and control bunker, observation post and four emplaced 3.7" anti-aircraft-gun installations, has been surveyed and carefully conserved, over a number of years, by the Friends of the Anti-Aircraft Battery at Goodrest Farm.

Designated H25, Bannerhill Camp, this battery was brought into operation in 1941 as part of a ring of defences protecting Birmingham and Coventry. At its operational peak nearly 200 service personnel, many of them young women of the ATS, served at the camp to enable 24 hour operation of the guns. Members of the ATS operated the observation posts, the predictors (an electro-mechanical device that computed the time of flight of the shell) and assisted in the command room. All this information was fed to the guns, which were manned by men of the RA. Before each shell was fired the fuse had to be manually set, in accordance with the information supplied by the predictor. Much later in the war, with the advent of the British designed and American made proximity shell, the need to fuse set was obviated.

The site, which is on private land, has been restored to something of its former state and shows a typical installation of the early war period; the concrete command and control bunker being a particularly early example of its type - possibly a prototype. Surrounding each of the four gun emplacements are a number of small concrete receptacles for ammunition storage. Each shell weighed 28lb (12.7kg) and up to twenty could be fired per minute, depending on the actual variant of 3.7" gun being used, and could be fired to an effective height of 39,000 ft (12,000 m) with later marques of the gun. The battery worked in conjunction with a mobile searchlight unit that was situated a little distance away along Rouncil Lane.

Accommodation on the site was provided by a number of Nissen Huts and living conditions were particularly spartan for all the service personnel. In 1943 the guns were removed and transferred to the south coast. The camp then took on a new role as a small prisoner of war camp for about 80 Italian and German prisoners of war. It is thought that some of the prisoners from Bannerhill Camp may have been employed at the Cherry Orchard Brickworks at Kenilworth.

It is not known if the battery recorded any definite enemy aircraft "kills" during its operational life at Goodrest Farm. It is probably unlikely: during the early stages of the war, without the benefits of radar-assisted prediction and proximity shells, the chances of actually hitting a high flying enemy aircraft were extremely small. What battery H25 did, along with other similar AA units, was to give attacking aircraft a hard time, forcing them ever higher and thus making target acquisition more difficult. In addition, there was also the not inconsiderable propaganda effect derived from the sound of retaliatory gunfire!

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Command and Observation Bunkers.

The Command Bunker is of a particularly early type - possibly a prototype.



3.7" Emplacement. The receptacles surrounding the concrete plinth were for ammunition storage. At Goodrest Farm there were at least four emplacements, with just possibly a fifth.



Members' Contributions

John Copping and Arthur Astrop

Flotsam or Jetsam? Or perhaps a thingummybob.



Amongst a group of friends, John Copping is perceived to be knowledgeable about old tools etc. One has, over recent months, developed the habit of putting this to the test. He was politely surprised when the use of a small folding magnifying glass was identified as for counting the number of threads per inch in a piece of fabric. He was not to know John's grandfather was a haberdasher.

The next challenge he posed was to interpret the mechanism illustrated here. The owner was only able to say that it was found on a beach.

Its effect is to change the direction of a rotating drive through 90 degrees. There is no change of gearing, but an unavoidable reversal of the direction of rotation. It seems pretty certain to come from a ship, maybe only a boat. The possibility of its use in a lighthouse prompts consideration also of a light-ship. The bronze parts provide resistance to corrosion. However, a study of this photograph shows that each rotating sub-assembly needs to rotate on its fixed spigot, which is clearly steel. That obliges the use of bronze for the sleeve, even if not for the gear wheels. If the mechanism needed to transmit significant torque, the gears themselves would realistically have been hobbled onto iron castings. The logical conclusion is that the load to be transmitted is relatively light. Equally, the informal style of the whole, including the provision for transmission to shaft by some form of 'dog' to fit in the slots in the bronze lugs, strongly suggests intermittent rather than permanent operation.

It seems likely that the unit served as part of a control mechanism providing, for instance, the ability for a helmsman to operate a piece of kit further up the deck without need to leave the wheel. According to a member well placed to advise about such things, such an application could easily be envisaged on a canal boat.

Arthur Astrop adds: I agree with the conclusions drawn about the possible usage of the device. As for a possible application, one suggestion I can offer is as follows. Some years ago, while on holiday, I had the opportunity to use a boat with a small inboard engine and originally designed for steering by a tiller-operated rudder at the stern. The owner, however, had converted it to steering from the bow-seat by a small-diameter steering wheel which, through a set of bevels like those in the photo, turned a vertical shaft carrying an aluminium drum.

Around this drum was wound a length of Bowden cable which ran internally towards the stern, along both sides of the boat, close up beneath the gunwhales. The cable then wrapped around another aluminium drum, of identical diameter to the first, but attached to the rudder post. Small movements of the steering wheel to left or right thus turned the rudder by the same amount.

In short, the bevel drive was subject only to light-load usage, applied intermittently. Members may be interested in this 'holiday remembrance'!

Peter Chater

Memories of the Burton Dassett windmill.



These pictures were taken on consecutive days, 25th and 26th July 1946 by a person unknown. Peter and his two sisters are shown beside the picture of the fallen mill. It was obviously a Post Mill and is thought to have been built around 1664 and ceased working about 1912.



Martin Green:

Salt of the earth; salt of the sea.

The AIA's visit to Maldon, Derek Hurst's talk on the Droitwich salt industry, and the sheer volume of salt required to treat the roads in the current (January 2013) snow-covered landscape reminds one of the essential role that salt has played - and continues to play - in our society. Freezing temperatures also turns one's mind to sunnier climes and the production of salt in entirely different conditions to those pertaining in the UK.

In the northwestern corner of Sicily, along the coastline between Trapani and Marsala, lies a large area of salt pans that have an extremely long history and remain in production to this day. They also retain features that attract the attention of the industrial archaeologist.

With evidence of salt extraction in this region traced back to the Phoenicians, the current landscape has a timeless quality, particular with parts of the area given protection via the creation of a nature reserve. Salt production along this coast probably reached its peak in the mid-nineteenth century (after the Unification of Italy in 1860), when 31 salt pans produced over 100,000 tonnes per year, much of which was exported throughout Europe, including Norway and Russia.

The combination of high summer temperatures, the dry North African winds and the high salt content of the Mediterranean (3.5^o to 4.5^o Baumé) provide the ideal combination of conditions for the successful extraction of salt via evaporation. Apart from the mosaic of salt pans and the piles of evaporated salt lying under the protection of terracotta tiles, the dominant feature of the landscape is the collection of windmills that remain a testimony to the techniques used to extract and treat the salt. The windmills were used both to drive the Archimedean screws that lifted water from one level to another, and also to grind the salt once it had been extracted.

The typical windmill has a conical tower, capped with a conical roof, and six trapezoidal vanes made up of cloth sails attached to wooden frames. The roof (and, hence, the sails) can be turned to exploit the wind to best advantage. The sails can rotate at a speed of 20km per hour and generate a power equivalent to 120 horsepower.

There is also a single example of a much later so-called American Mill ('Mulino Americano') with metal blades. This mill was used solely for the transfer of water from one pan to another.

The water moves from those ponds closest to the seawater ('fridda') through a number of ponds each with increasing salinity, until the final evaporation ponds are reached ('cassedri') and the salt is ready for harvesting. My visit was in April well before the harvesting of the salt. This occurs in July and August when extreme summer temperatures would frazzle most Warwickshire industrial archaeologists, whatever their level of interest! Even so, I was fortunate enough to see the modern removal and transportation of the salt from the protected piles - not photographs that would gain an entry in the travel brochures, but perhaps deserving of a place in the WIAS Newsletter. Three thousand tons are produced each year, with the 100% natural salt occupying a niche market, possessing a higher concentration of potassium and magnesium than common salt.

There is a small museum - the 'museo delle saline' - housed in 300 year-old buildings - telling the story of the salt pans over time, with relics of the industry on display. Further information about the windmills and saltworks is probably best secured online, although those fluent in Italian could consult 'Saline e Silinai' (Salt and Saltworks) by Maria Manguerra!



Windmills near Trapani



The American Mill

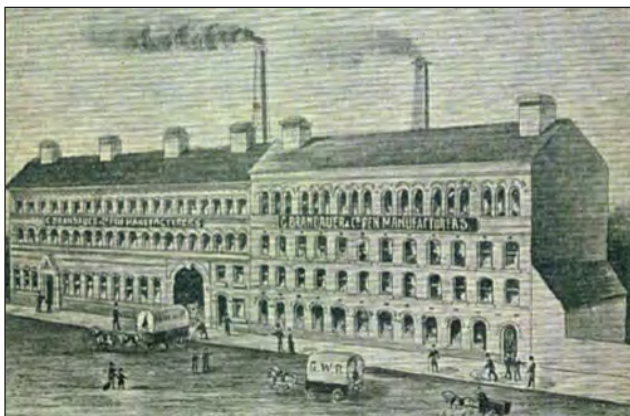


The Saltworks Museum - with obliging flamingos!



Moving the salt from the protected piles

From Pens to Particle Physics: the story of a Birmingham family business



Left: The Brandauer factory in the 1890s.

Right: Steel pen production was highly labour intensive. This is a Slitting Room where the all-important slit was added to the pen by ladies using fly presses.



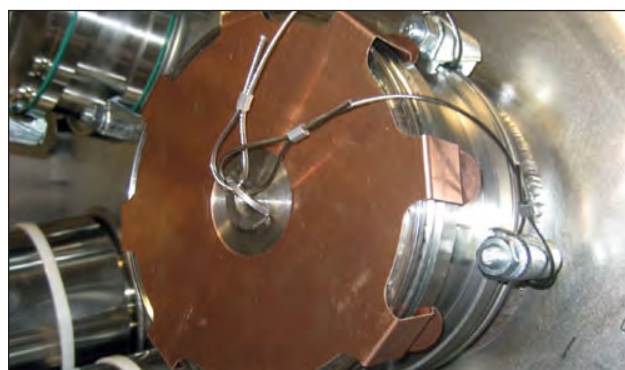
Mrs Fanny Phillips 1877 - 1972. The Company's longest serving employee with 71 years service!



A point-of-sale advertisement for one of Brandauer's most popular pens



Left: Charles Dickens featured in this typical example of early Brandauer advertising. Centre: BSR Record Changer. Right: Parts for use in Push-fit Plumbing fittings, typical of today's mass production. Below Left: Airspeed Oxford leaving Canley. Below Right: Large Hadron Collider pressure relief spring.



December 2012: John Berkeley OBE

From Pens to Particle Physics: the story of a Birmingham family business

Report by Arthur Astrop

By the mid-19th century, Birmingham was firmly established as the world's centre for the manufacture of steel pens. In fact the City was at one time home to more companies involved in that trade than in the whole of the rest of the world put together. Most of the companies were small to medium-sized, and the majority were to be found in the City's Jewellery Quarter, but 1862 saw the arrival of a newcomer. The frontage of its premises, a substantial 3-storey building at 403/407 New John Street West formerly owned by Thomas Derrington, a rifle and pistol maker, bore the name C Brandauer – Steel Pen Manufacturer. The new company was destined to become a significant force in the pen trade, and later to hold a similar position in the high-precision small-parts presswork industry, an activity in which it prospers to this day. The year 2012, therefore, saw it celebrating its 150th Anniversary.

It would be difficult to find anyone better qualified to trace the history of the Brandauer Company than WIAS member John Berkeley who, as that Company's Chairman, led the celebration of its 150th anniversary. John has lately retired as chairman but remains a director, and under the title *From Pens to Particle Physics* he delivered a memorable presentation to the Society's final meeting of 2012.

The demand for steel pens (nibs) and pen holders throughout the world, pouring in from schools to offices, from draughtsmen to map makers, from calligraphers to artists was, until approximately the mid-20th century, apparently limitless. Hence the number of companies offering and producing them in huge quantities and in an enormous range of different styles, colours, qualities and shapes.

At first sight, the steel pen is a deceptively simple item, but in practice its manufacture required a large number of successive operations, from preparing the raw strip steel in strictly-controlled gauges, through to the finished product. In between, each pen was subjected to a series of blanking, stamping, forming and slitting operations, often performed by tools in manually-operated fly presses, with annealing processes in between, and culminating in de-burring, heat-treating and chemical colouring. The 'colouring' of pens was generally regarded as a trade secret and in a Brandauer Board minute as late as May 1946 it was recorded that three of the Directors 'had been initiated into the processes of the No 4 Department', the area of the factory dedicated to the arcane art of pen colouring.

Traditionally, the industry employed large numbers of female operatives, not least because of their innate manual dexterity, and it was customary for each to perform one operation only. Thus, long rows of benches with fly-presses arranged side-by-side were a common sight, and each operator, once trained and having become skilful, would handle very large numbers of pens per shift.

For some operations, drop presses were also required, driven by overhead pulleys and shafting. Each press was tripped by a foot pedal, so that the operator could use both hands to position a pen accurately in its die. When a battery of such machines was in 'full song' striking simultaneously (but not necessarily in synchronism!), the noise must have been deafening. No ear-defenders in those days, nor safety guards and there are records of boys as young as 9 ½ in the raw material departments.

Finished pens were packed in small highly-decorated cardboard boxes, many of which bore outstanding examples of artistic design and colour printing, and to this day are regarded as highly collectible. Each box would contain a gross (144) of nibs, the quantity determined by weighing rather than by counting.

By today's standards, working hours were long (often as much as 57 or more hours a week), and conditions were rigorous. Workshops were heated by coal fires, but employees were required to provide their own fuel, and were also required to clean the windows of workshops regularly. Failure to meet these conditions, also to maintain quality standards of manufacture, was dealt with by a complex system of fines. It was those rules that undoubtedly contributed to the formation of a Penworkers Union in 1897.

In November 1901, the Company became C Brandauer & Co Ltd, the name under which it trades to this day, and in its first full financial year it recorded a payout to directors and shareholders of £13,200, equivalent to over £1m today. Business was booming, but all too soon WW1 came and the factory turned to producing war material such as pressed steel rifle cartridge clips.

The end of WW1 saw a return to established product ranges which, in the mid-1930s, also included a variety of nibs for the fountain pens that were becoming increasingly popular. Soon, however, minutes of Board meetings show that the Company was investigating the possibilities of diversifying into other types of light press work. WW2 saw Brandauer once again involved with war work, receiving contracts from, among others, Lockheed in Leamington, for components including 'undercarriage parts' for Airspeed Oxford aircraft, then being made by Standard in Coventry. The pre-war decision to widen its range beyond pens and into 'steel pressings in general' had proved to be a wise policy.

In the 1950s, Birmingham Sound Reproducers (BSR) introduced a range of manual and automatic record players, and by the 1970s was turning out no fewer than 250,000 per week. Brandauer was a major contributor of the many small pressed-metal components incorporated in those fantastically popular units.

But by then, time was fast running out for the manufacture of steel pens. The ball-point pen was increasingly dominant and in 1961, with the manufacture of steel pens down to only two days per week, it was decided to bring their production to a close.

And Birmingham itself was now changing rapidly. Old parts of the City were being redeveloped and one-time landmarks demolished. Brandauer had already adapted itself in the new needs of industry for light pressings, in many exotic materials besides steel, and demand equalled, indeed sometimes even exceeded, that for its steel pens. Components were now being made for Singer sewing machines, for the Harrier jump-jet aircraft, and not least for the Anglo-French Concorde.

Described by John Berkeley as 'probably its proudest and most significant achievement' is Brandauer's contribution to the Large Hadron Collider in CERN, Switzerland. Along both sides of the 27-kilometre long twin high-vacuum beam tubes of the LHC are pumping slot strips produced by Brandauer, their function being to maintain the operating temperature in the tubes at a constant -217 deg C.

In January 2001, Brandauer moved from its historic factory to more modern premises, albeit only a mere 200 metres away in Bridge Street West. Brandauer's original factory, now a Grade 2 listed building, stood empty for some years and time inevitably began to take its toll.

Fortunately, before its decline became irreversible, plans to redevelop it as a multi-occupation business centre have been drawn up and the intention is for the building to continue to bear the Brandauer name on its frontage.

January 2013: Alain Foote*The English Electric Company 1918 - 1968*

Member Alain Foote opened the New Year with our second highest attendance of 78 people who enjoyed a comprehensive review of the English Electric Company's 50 year history. This covered its formation, growth and demise and reviewed the products and plants involved.

EE was formed as a public company in 1918, merging a number of participants in the electrical industry, primarily, Dick, Kerr & Co and The Coventry Ordnance Works, to meet the expected demand for electrical machinery following the end of WW1. The founding directors all had backgrounds in shipbuilding and railway equipment.

Dick, Kerr dated from 1863 and incorporated a number of diverse engineering companies including Britannia Engineering in Kilmarnock, English Electric Manufacturing in Preston and notably, Willans & Robinson in Rugby. AEG Electric was acquired from the Controller of Enemy Property followed by The United Electric Car Company in Preston and The Phoenix Dynamo Manufacturing Company in Bradford. The Coventry Ordnance Works was a joint venture by shipbuilders John Brown, Cammell Laird and Fairfield to manufacture heavy guns in competition to Vickers and Armstrong Whitworth.

Post war growth continued in 1920 with the purchase of the Siemens Dynamo works at Stafford which had been compulsorily acquired by the government during the war. Another Siemens company jointly owned was Siemens & Electric Lamps Co.

At the British Empire Exhibition at Wembley in 1924 an engine plaque showed English Electric headquartered at Queen's House, Kingsway in London with five principal subsidiaries: Ordnance Coventry, Dick-Kerr Preston, Siemens Stafford, Willans Rugby and Phoenix Bradford.

However, this sprawling conglomerate did not find commercial success in the 1920s and in 1927 sold its half share in Siemens & Electric Lamps to raise cash. The next year the Coventry Ordnance Works, practically dormant since 1922, was closed and later sold in 1930. In 1929 a loss of £47,000 was declared and Lazards stepped in with new capital. In 1930, Westinghouse of the USA and other American backers took control appointing George Nelson from Metropolitan-Vickers as managing director.

Nelson set about a badly needed reorganisation and the company slowly recovered, much helped by the rearmament programmes of the late 1930s. EE made a great contribution to the war effort and in 1942 took control of Napier, the aero engine maker. The company expanded greatly to employ some 30,000 and double its assets to £16.5 million by the end of the war. From inheriting a near bankrupt business in 1930, Nelson now headed one of the largest engineering companies in the UK.

Post-war EE developed its interests in aviation, electronics, computers (in collaboration with NPL) and heavy engineering. In 1960 EE sought a merger with GEC but its approach was rejected. In the same year, under government pressure, EE Aviation was merged with Vickers-Armstrong, Bristol Aeroplane and Hunting Aircraft to form the British Aircraft Corporation. The loss-making Napier business was sold to Rolls Royce and diesel engine manufacturer W H Dorman was acquired in 1961.

In 1963 the computer interests expanded with a joint venture with LEO Computers (Lyons Electronic Office) as English Electric LEO, to which EE's Marconi computer operations were later added. The guided weapons division went to BAC. Ruston & Hornsby and Elliott Automation were the last major acquisitions by EE and in 1968 the Wilson government created International Computers (ICL) by merging EE's interests with those of International

Computers & Tabulators (ICT). In the autumn of the same year Plessey made an unwanted £260 million bid for EE but a white knight in the person of Arnold Weinstock's GEC gained government approval and the General Electric and English Electric Company came into being. Within a couple of years English Electric was quietly dropped and so ended 50 years of mixed fortunes in engineering.

A review of EE's products in the 1960s shows that it had spread itself too thinly for its resources and sowed the seeds of its own demise as a result. The main products included: generating plant for steam, water, gas, oil or atomic power; electric traction and transport; marine equipment; aircraft, equipment and guided missiles; transmission systems, switchgear and controls; meters, instruments and relays; substations and converting plant; electrical equipment; computers and domestic appliances.

All these activities were liberally illustrated with some evocative slides. Steam turbines and generators impressed by their scale as did water turbines. Gas turbines reminded us of the adaption to peak lopping generators of aircraft engines, notably the RR Avon. The diesel engine interests ranged from stand-by generators to rail traction, including the interesting but troubled 1750 hp Napier Deltic engine also used in minesweepers and fast attack craft. Trams, trolleybuses and locomotives included an early (1934) diesel-electric unit and later mainline locomotives, even a gas turbine version.

EE was more successful with its aircraft. A number of the founding companies had been involved in aircraft manufacture during WW1. The first EE aircraft, the Wren, flew in 1923 but after building a few flying boats the aircraft department was closed in 1926. However, under the rearmament programme begun in 1936 EE was chosen to build the Handley Page Hampden medium bomber. By the end of the war EE had built 2,500 Halifax and 770 Hampden bombers. In 1944 contracts were awarded to build de Havilland Vampire jet fighters of which over 500 were produced.

Two outstanding aircraft from EE were the Canberra and the Lightning. The Canberra, inherited from Westland, was the first jet-propelled bomber produced in Britain. It first flew in 1948 and was the most advanced aircraft of its kind in the world at that time. 1,400 examples were built over a service life approaching half a century. Production of the Lightning was held back by the belief in the late 1950s that manned fighters would become obsolete, but eventually 337 examples of the Mach 2 capable machine were built over some 30 years.

A specification for a Canberra replacement was drawn up in 1957. The design was extremely ambitious and the government decided that it would be built by Vickers-Armstrong and EE. This aircraft became the BAC TSR-2, and we all know what happened to that project!

EE's contribution to guided weapons, Thunderbird and Bluewater was limited in extent but its domestic appliances included cookers, refrigerators and televisions. Of greater importance was its contribution to the early development of computers in the UK. The Luton Analogue Computing Engine (LACE) resulted from war-time work on thermionic valve technology, whilst the Digital Electronic Universal Computing Engine (DEUCE) came from collaboration with NPL to develop the ACE (Automatic Computing Engine) inspired by Alan Turing and built by NPL in 1946.

The well-illustrated review of EE's many sites served again to demonstrate how widely the company's assets had been spread and the potential for rationalisation and cost saving that existed. All in all, a salutary reminder of an interesting period in Britain's industrial history.

WARWICKSHIRE

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FROM THE CHAIRMAN

These notes were prompted by a decision to try and re-visit some of the industrial museums and collections that exist locally and further afield in order to see how they had changed over the period since I first became interested in the subject of industrial archaeology. This was an excellent decision and reminded me principally of the wealth of industrial heritage that exists in this country and the sterling efforts of amateur and professional enthusiasts in seeking to record and preserve this heritage and to make it accessible to a wide audience.

It also reminded me that making the enjoyment of industrial heritage a viable financial proposition was no easy task, and attracting visitors on a regular basis demanded enthusiasm, initiative and dedication, often acting in the face of difficult economic circumstances.

Museums can gain income from a variety of sources and visitor income is only one amongst many. Public authority funding (both national and local), charity funding, sponsorship and private philanthropy all combine with earned income to provide funds for the museum. Earned income includes not only visitor income, but also the use of the museum's facilities by other groups e.g. for courses and conferences.

Some shifts are inevitable – making the museum somewhere that will attract families, perhaps with additional entertainment and a more diverse selection of items on sale in the museum shop. This 'secondary spend' income with visitors adding to revenue via refreshment and shop sales has become a very important ingredient in many cases. The leisure market is extremely crowded and competition intense, and this, combined with the increasing costs of travel, exerts great pressure on visitor income. Repeat visits also need to be encouraged, in part by flexible ticketing arrangements, with a changing programme of events and exhibitions, itself often an expensive process.

This has produced changes that might not always rest happily with the more specialist interests of the industrial archaeologist. As one member commented to me recently after a visit to the shop at an industrial museum 'you are more likely to get a packet of vanilla fudge than a technical guide to the exhibits!'

However, the reality is that these changes represent the only way forward, and we have two prime examples in the midlands with the Blists Hill Victorian town at Ironbridge and the Black Country Living Museum. These museums obviously offer a great deal more than these 'visitor experiences' but such experiences have become the main attraction for many families.

The Black Country Living Museum has recently lost its regular funding from Dudley Council as part of the cuts programme initiated by many local authorities, and the pressure to be self-financing has intensified. One initiative has been the 'Heritage Skills Courses and Talks', now in its second year. These seek to introduce a new audience to the heritage and traditional skills of the Black Country, with courses, for example, on canal crafts, ceramics and glass engraving, as well as some with an industrial archaeology theme. I attended a day course recently on iron making in the Black Country led by Paul Belford, which surveyed the various processes involved, related these to the exhibits on site, and spent some time on a case study of the archaeological excavations at Wednesbury Forge.

During our tour of the site, it was good to see the museum busy, and gratifying to witness visitors enjoying the nail and chain-making demonstrations as well as the fun fair and fish and chip shop!

Index to WIAS Proceedings

It is a truth (universally acknowledged!), that there is no such thing as a perfect index. It follows, therefore, that the index

recently published on our website for the proceedings of this Society must inevitably have its own share of errors and omissions. These are best spotted by its users and it is hoped that all such discoveries will be swiftly passed on either by e-mail to: artastrop@ntlworld.com or by 'phone to (01926) 857898. Or at one of our monthly meetings, of course.

Complementary to the index, it has also been suggested that our website could include a list of the titles of all the papers, booklets etc. which have been published by members since the Society's inception. Some were published under the *aegis* of WIAS, some privately and some just made available on request.

Such publications of course received coverage in the Society when they first appeared, but usually none thereafter. It follows therefore that there exist collections of valuable IA research of which some members (especially those newly-joined), will be completely unaware. If our website were to list the titles with brief abstracts of their contents, plus the authors' names and contact information, anyone interested in acquiring a copy of a particular paper can then approach the author direct.

Initially, therefore, all members are invited to contact Arthur Astrop (at the above e-mail address or 'phone number), to offer their published papers for inclusion in the list. Depending on the response to that invitation further details of the scheme will be worked out.

PROGRAMME

May 9th 2013

Simon Buteux (Director, Birmingham Conservation Trust):
Newman Coffin Works, Birmingham.

June 13th 2013

Anthony Coulls:
Railways and the National Railways Museum of Sierra Leone.

The programme for 2013-2014 will be published at the June meeting, with inclusion on the website, and as part of the annual mailing over the summer.

NEWSLETTER

Meeting Reports

February 2013: Members' Evening

Another excellent turnout of members and visitors were entertained by a varied programme which ranged from the saga of 'The Stone Pipe Company' through a 16th century mining text book, the vicissitudes of aircraft collecting and a few days in Liverpool to a clamp brick kiln in South Africa. Who ever said Industrial Archaeology was dull.

The Stone Pipe Company

The interest of Peter Chater, Peter Coulls and John Willock had been sparked during a presentation on John Rennie by a picture of a stone pipe embedded in a Cotswold wall near Guiting Powers. It was a good excuse for a Spring day out and once the right wall had been found (at the entrance to the village on the Cheltenham road) resulted in the unearthing of a fascinating example of industrial archaeology.

The existence of the Stone Pipe Company was no secret. The Gloucestershire Society for Industrial Archaeology had excavated one of the sites in 1984/5 without uncovering much of interest and it had been the subject of a public lecture at Durham University in 2009. However, much remained to be revealed. Searches of contemporary newspapers produced advertisements for 'stone masons, labourers and scablers' and the need to improve local roads to accommodate the transportation of some 30 tons a day of stone pipes by horse and cart. The bill to create a tram-road or railway was refused despite the damage being caused to the turnpike.

John Willock's reconstructions of the production machinery and manufacturing processes were exemplary and demonstrated the extraordinary activity taking place in the remote and rural Cotswolds at the time of the Napoleonic wars. Furthermore, the project was fundamentally flawed by the choice of grossly unsuitable raw material for its intended purpose, which led to complete commercial failure if not fraud on a grand scale. Over 60 miles of stone pipe (some 53,000 individual pipes) was laid in Manchester only to leak due to porosity and faulty joints as soon as the system was pressurised. The involvement of men like Rennie and Murdoch as well as the firm of Boulton & Watt raises the question of how did it all go wrong? Why was there, apparently, no testing to establish fitness for purpose?

The full story of The Stone Pipe Company of Guiting Power is told in an Occasional Paper published by the Society to coincide with the presentation.

Blame it on Demons

Professor Chris Voss, first a metallurgist and latterly an academic, 'blamed it on demons' and showed that there is nothing new today with a look at the pre-history of operations and engineering management. *De Re Metallica* by Georgius Agricola was published in 1556 and is seen as the first major textbook on the subject focussing on the mining and metallurgy industries.

Agricola says that "There are many arts and sciences of which a miner should not be ignorant". These include: Philosophy - to discern the origin, cause and nature and obtain more abundant results from his mining. Medicine - that he may be able to look after his diggers and other workmen. Astronomy - that he may judge the direction of

the veins. The science of surveying - that he may estimate and determine the limits and boundaries in these workings. Arithmetical Science - that he may calculate the cost to be incurred in the machinery and the working of the mine. Architecture - that he may himself construct the various machines and be able to explain the method of construction to others. Drawing - that he can draw plans of machinery. Law - that he may claim his own rights and that he may fulfil his obligations to others under the law. A pretty comprehensive curriculum even by today's standards.

Illustrations from the publication gave many examples of medieval production processes that had clear successors today; flow production, automation and green technology to name but three. Descriptions of organisation and management were equally modern, with a clear chain of command from owners through managers and foremen to tradesmen and included quality control or assaying to minimise losses. Also covered are the criteria for site location: the situation, the conditions, the water, the roads, the climate, the right ownership and the neighbours, financing, costs and technology.

The scope of engineering and operations management in medieval times seems very familiar and has not changed much in 450 years. The paramount considerations remain: people, process, technology, quality and cost. Technology has obviously advanced but other factors show little change in modern textbooks. Agricola even deals with environmental (mining was recognised as a serious source of pollution) and ethical (links to armaments and finance) issues.

And when it all goes wrong: 'In some of our mines, however are other pernicious pests. These are Demons of a ferocious aspect. Demons of this kind are expelled and put to flight by prayer and fasting'. Sentiments that may well be familiar to today's engineers and managers!

The Midland Air Museum

If collecting stamps is your passion then all you need are a few albums, and a small shelf on which to put them. But what if your obsession is collecting and preserving historic aircraft? Then you have a problem, because even the whole of your spare bedroom won't be much use for that!

The solution of that problem for the Midland Aircraft Museum on the periphery of Coventry airport was outlined by John Berkeley in his account of the difficulties involved in first acquiring iconic aircraft and then providing the substantial amount of open and covered space in which to house and to maintain them.

MAM was founded in 1967 by a small band of volunteers who, in its early days, began to attend 'air shows' and fêtes with just a few small exhibits, and a tent in case it rained! Bit by bit, sometimes with odd slices of luck, but always with countless hours of voluntary effort, the members built up their collection to the point where today MAM is recognised as one of the country's leading self-funded independent aviation museums.

An important breakthrough came in 1975 when the lease on a small piece of land on the north side of Coventry airport was obtained, which meant that the organisation had its first permanent home. Three years later, the museum opened to the public, proudly displaying five aircraft and attracting its first public visitors.

The 1980s was an important decade since it saw the acquisition of two very large aircraft, namely a Vulcan V-bomber and an Argosy freighter; together with the establishment of the Sir Frank Whittle Jet Heritage Centre; and a move to its larger present site. In due course, a Second World War Robin hangar was erected and the Museum at last had a substantial covered area where selected aircraft and associated items could be displayed, and proper facilities for maintenance and restoration could be provided.

Among its collection the Museum is proud to include a MIG-21 fighter, a Sea Hawk and Sea Harrier jump-jet, a Saab J29 and a CMC Leopard, an all-composite construction aircraft.

Liverpool Explored

Roger Cragg took us on a whirlwind tour of Liverpool as experienced during a three day visit by the Historic Engineering Works Panel. The appropriately named Hope Street is book-ended by two great Cathedrals. The Anglican, designed by a young (and Roman Catholic) Giles Gilbert Scott, was begun in 1910 but not completed until 1978. It is the largest in the UK and the fourth largest in the world. The Roman Catholic is unashamedly modern. The fourth design but the first completed on the site, it was designed by the Protestant Frederick Gibberd. The previous designs had been by Pugin, Lutyens and Adrian Gilbert Scott. Begun in 1962 and completed in 1967 the conical building is topped with a striking cylindrical lantern tower crowned with pinnacles.

We then went underground into the curious 'Williamson Tunnels'. The purpose of this warren is unknown but could have been a philanthropic make-work scheme by Joseph Williamson who had come to Liverpool in 1780, married the boss's daughter (Tate Tobacco) and sought to develop housing on the site of the tunnels. Building ceased on his death in 1840 and the tunnels remained derelict, filled with rubble and refuse, until archaeological investigations were carried out in 1995. Since then some excavation has taken place and part of the labyrinth of tunnels has been opened to the public as a heritage centre.

Much has been written about the World Heritage Site that is Liverpool's Albert Dock. Built in 1842/9 its buildings have been converted to other interesting uses and include a restored pumping station. Adjacent to the pier head and waterfront is a new canal linking the Leeds Liverpool Canal to the Albert Docks. The striking Cunard and Liver Buildings are tributes to reinforced concrete construction, the latter being the largest such structure when built.

The ventilation building for the Queensway Tunnel and its control room showed how complex are the needs of a two mile long tunnel carrying a high volume of cars and commercial vehicles. 2.5 million cubic feet of air need to be changed every minute by a two fan system, one inlet, one exhaust and duplicated for instant replacement in the case of failure.

In the newly restored St George's Hall, which houses a concert hall and civil courts, a wooden floor now protects the original and highly decorative Minton tiles of the concert hall. Finally, two stations. Edgehill the terminus for the Liverpool and Manchester Railway is the oldest station in continuous use and Lime Street, whose iron roof built in 1849 was the largest in this material in the world at the time.

South African Bricks

Martin Green's bicycle odyssey in South Africa was in striking contrast but started closer to home as his title 'Coventry to the Cape' indicated. A quick review of some now derelict Warwickshire brick works awaiting redevelopment led to consideration of other local sites and especially the concept of the clamp kiln, a temporary structure taking its name from the age-old method of preserving root vegetables by piling them under an earth mound. The process is no longer in use in the UK, needing both space and plenty of cheap labour.

Participation in a charity cycle ride took Martin to the beautiful scenery of South Africa's Cape Coast and the diversions of huge sand dunes and whale watching. The 'Whale Crier' of Hermanus seemed to enjoy plenty of job satisfaction. Some miles further on the riders were surprised to find a road sign warning of 'Smog – No Visibility' on a crystal clear day.

The reason became evident around a corner with a large open brick works using clamp kilns. This necessitated a pause from pedalling to investigate. The management and workforce were happy to receive visitors and Martin's ever ready camera.

Green, hand-moulded bricks were stacked to dry and covered if rain was coming – a useful local weather forecast for the neighbours. The huge kilns were seen in various states of construction, firing and dismantling. Typically a kiln would need three weeks to build, ten days firing and four days cooling.

Considerable skill was evident in the construction of the basic kiln with its labyrinth of passages to conduct the heat throughout the structure. Sealing or 'scoring' the outer surface with mud and without any signs of 'elf 'n safety' seemed slightly hazardous and emphasised the size of the finished kiln.

The works produces six to seven million bricks a year but the process is very wasteful of energy and only viable thanks to a plentiful supply of cheap, but on the evidence of the camera, very cheerful labour. The return to clamp kiln brickworks in Warwickshire seems most unlikely!

Endpiece: The flotsam or jetsam puzzle

The 'what's it for?' puzzle set on p 4 of our Newsletter No 47 caught the eye of Brian Wells of Middleton Cheney, near Banbury. Brian writes:

'I have seen an identical mechanism on one of the church clocks I look after. The yoke (associated with each bevel gear) is part of a crude universal joint. The shafts enter on the same alignment as the shafts in the photo, a small round bar is fixed at right-angles to the said shaft, and this allows for a degree of misalignment.

The whole mechanism rotates once every hour, and therefore drives only the clock's minute hand. Adjacent to the clock face there is a 12-to-1 reduction gear which drives the clock's hour hand, the latter being attached to a tube which is concentric to the minute-hand shaft.

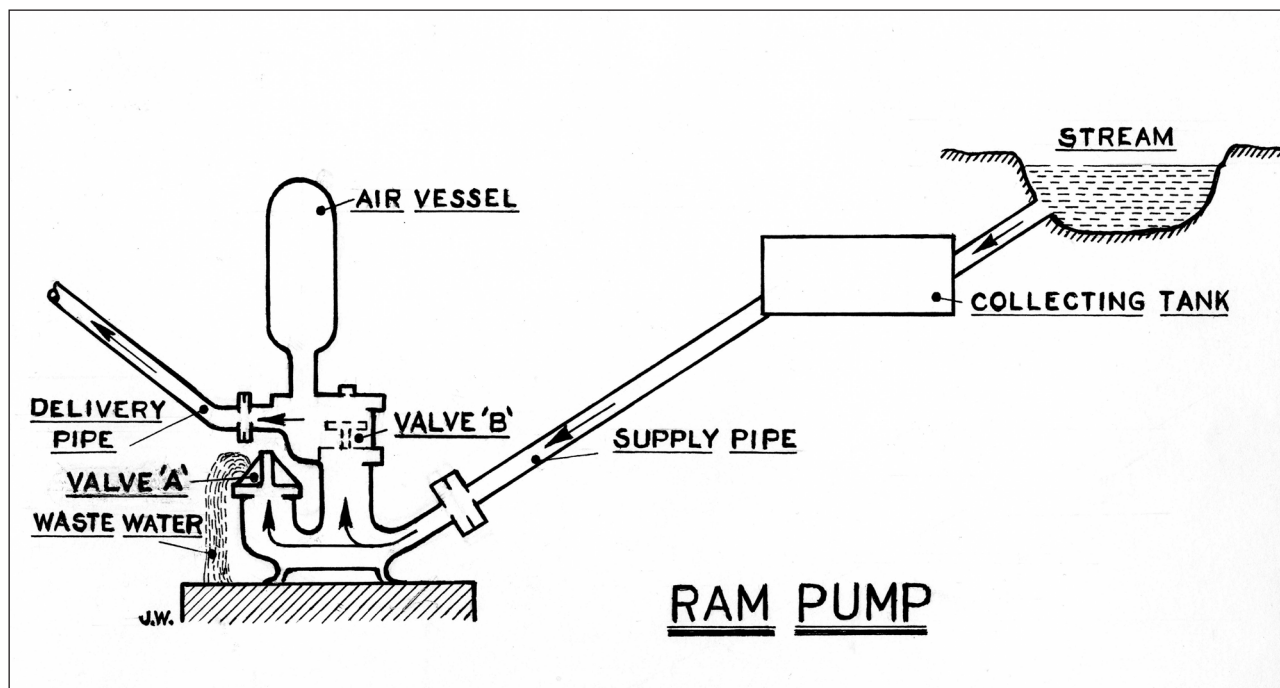
This type of bevel-gear system is used where, for structural reasons, the clock is remote from the clock face., and one such can be seen in the church tower at Middleton Cheney'.

Well spotted, Brian! Now we only have to discover how the mechanism in our photo came to be washed-up on a beach!

Members' Contributions

Peter Chater:

A Ram Pump



Almost hidden away in an unnamed stream which feeds into the River Alne, close by the Heart of England Way at Wootton Wawen, is a small ram pump (BLAKES HYDRAM 5X).

This pump is similar to the one shown opposite.

Those with good hearing when walking the Heart of England Way may hear it pulsating away, day or night, pumping water to farm buildings several hundred yards away.

It pumps about 10,000 gallons per week at very low cost as it relies on the water in the stream to provide power.

Ram pumps were fairly common until the advent of the electric pump and this is the only one in use that I am aware of locally.

The name Ram Pump with its knocking sound is said to have reminded the inventor of two rams (sheep) butting their heads together.

This simple pump operates with only two clack type valves. See diagram above.

Water leaves the stream and feeds into a collecting tank. The water then enters into the descending supply pipe to the pump. Water initially passes valve A until the flow has sufficiently built up to force this valve to suddenly close. This sudden closure trapping the water creates pressure, pushes valve B open and a small amount of water enters the delivery pipe. When water pressure in the pump equalizes, valve B closes retaining the water above it and valve A falls open to start the whole process again.

The Air Vessel holds a cushion of air which compresses at each action/stroke to give a more equal flow in the delivery pipe.

It is said that these pumps can perform this pumping action between 40 and 200 times per minute. This would depend on the head of water.



Diagram drawn by John Willock.
Some information given by Farmer David Steele.

John Brace:*A Sheepwash and Stone Culvert at Sutton-Under-Brailes*

The Sheepwash is located about 300m SE of the Manor House, Sutton – under – Brailes, and immediately upstream of the bridge over Sutton Brook (or Washbrook) at:

GR SP30213722. (Landranger Sheet 151).

It dates, probably, from the 19th Century but has had at least two major reconstructions.

Access is easy from the Sutton – Traitorsford Road.

Traditionally sheep were washed to clean the fleece before shearing. Often this was done in purpose-built permanent sheepwashes. As sheepwashing declined, after the great war of 1914-1918, the old washes were abandoned. Many are now lost whilst others are in ruins. A few have been restored.

This site has two features that may or may not be associated. The principal one is a typical 19th century Cotswold sheepwash. The second is a stone culvert.

The ditch is an extension of the roadside drain and reaches the brook a little upstream of the sheepwash. The stone culvert, which may or may not be contemporary with the sheepwash, runs for about 5m about halfway between the brook and the Sutton – Traitorsford Road. It must have been the crossing point for a roadway or track – perhaps an earlier alignment of the present road.

In about 2000 it was decided to restore the Sutton-under-Brailes sheepwash. The work, greatly assisted by a grant from the Heritage Lottery Fund, was substantially complete by September 2006.



Restoring the exit ramp



The sheepwash in the 1920s



An early photograph

Colin J Brookes:*The Last Picture Show*

During the 1960's cinema-going in the Birmingham and Midland area was in decline, as indeed was the general trend throughout the country. In the Birmingham area over 40 cinemas advertised, just ten years later there only remained a handful. Therefore, my career as a projectionist lasted less than three years and involved two Cinemas - the News Theatre in High Street Birmingham, and the Sheldon Cinema on Coventry Road, Birmingham. Both buildings have since been demolished and new buildings erected on their sites.

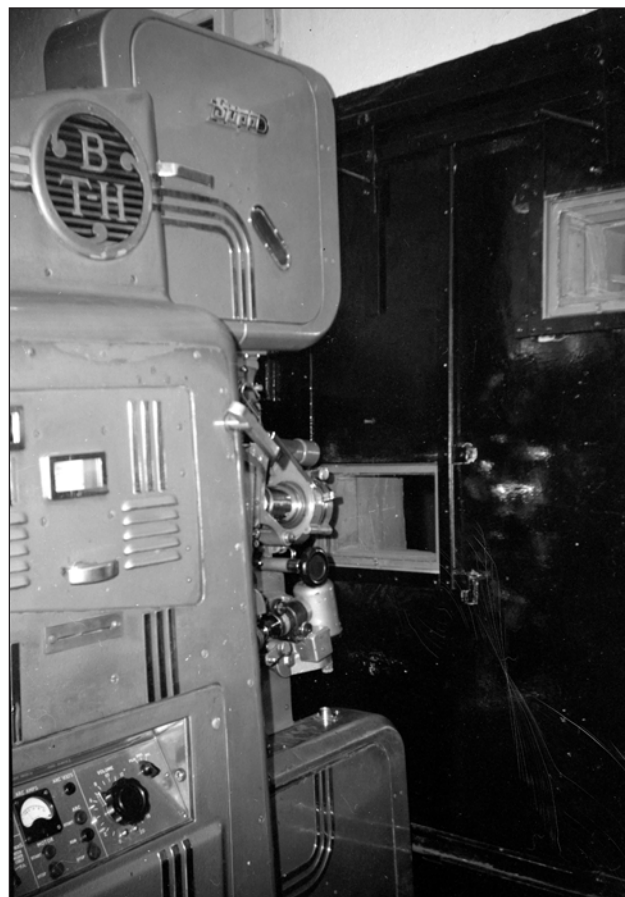
I joined the News Theatre in 1957 as a trainee, and a very green one at that. The hierarchy of the cinema world was headed by the Head Projectionist, universally referred as Chief, seniority of the "Box" was Second, Third and rarely Fourth, and Trainee, often as in my box, the fourth and Trainee were the same. Things were slightly different at the Sheldon; the main reason being that the operation of a feature house was different from the News Theatre as in the latter the programme lasted an hour and ran Monday to Saturday from 10.15 to 22.15- that is twelve showings a day, with Sunday from 14.00 to 21.15.

However my day started at 09.00 and my first job was to check the gas lighting mantels on the secondary (safety) lighting, as well as all the other bulbs in the theatre, of which there were many. Those gas lights were converted to battery electric and the entire cinema refurbished in 1959, just a year before it was closed. The whole stage was included in the refurbishment including a new screen and curtains (tabs) and masking for Cinemascope, all just for a few months use.

All cinemas had a room referred as a box to house the projection equipment. The News had two modern projectors, six foot tall BTH SUPAs. Sheldon had two ancient projectors with Kalee arcs plus a slide lantern, again with arc lighting. Arc lighting went out with the Ark and I know not of any cinema that uses this source of light in modern times. All cinemas had at least two projectors and some even had three. Essential for showing feature films which were on 35mm film with optical sound at 24 fps.

Film was spooled on to separate reels, typically 6 or 7 for a feature. The News Theatre spliced cartoons and features (not forgetting the adverts!) over four reels, and a reel would last about twenty minutes. In a feature house, projector one would begin the film, and projector two would be prepared and "laced up" with the second reel. The second projector would be fired up a few minutes before the end of reel one and the operator levelled the gate with the leader number (a known equation worked out in each box depending on the uptake of the projector and other factors). On the screen were two "signals" in the top right hand corner, the first the operator started the projector and opened the "dowser", and upon the second signal, the relay or whatever was activated usually by the cry "over!" and the film would continue, hopefully with the audience being completely unaware.

However all boxes had a device for opening one side and closing the other. The News was sophisticated, as you would expect from BTH, with a relay which was pressed at exactly the right moment, whilst the Sheldon had a somewhat primitive cable arrangement. The sound was transferred by a simple pole switch whereas the News was entirely automatic. Mind you, the changeover was used



One of the two BTH SUPA projectors at the News Theatre



*The last Chief Projectionist at the News Theatre, Charles Golder, watching the aperture above the gate for his cue to show *The Queen* for the very last time at 22.25 on 16th April 1960.*

rarely at the News Theatre, and the photograph above not only illustrates the changeover in practice, but is a unique shot of the very last ever running of *The Queen* at the end of the closing night of the News Theatre in 1960.

Today, for those that are left the scene is very different, one projector suffices, no arc's, and the film is supplied on what are called Todd-AO (albeit the latter is really 70mm film with optical and magnetic sound) but those 35mm reels have the whole film in one go, and the merry go round system enables it to self rewind- believe me they have got it easy today!

March 2013: John Yates (Inspector of Historic Buildings, English Heritage)

The First Iron-framed Building in the World: Ditherington Flax Mill. Its History and Restoration.

John Yates presented the most cogent argument we have yet had for the appropriate preservation of important industrial buildings. Arguably, few are more important than the world's first multi-storey, cast iron framed building built in Shrewsbury in 1797 not far from the iconic Iron Bridge in Coalbrookdale

As Inspector of Historic Buildings for English Heritage, John was able to give us the insider's line on the multitude of issues facing those charged with the preservation and/or conservation of the fabric of our industrial heritage. It is a task bedevilled by conflicting interests, often underfunded and dependent upon public donations in some form or another.

Happily, the future for the Ditherington buildings (the site includes several other important iron-framed structures contemporaneous with the Flax Mill) is looking tolerably secure. English Heritage acquired the derelict buildings in 2005, and has since been working with a steering group made up of Shropshire Council, the Homes and Communities Agency, the Friends of the Flax Mill Maltings and architects of the scheme Feilden Clegg Bradley Studios, to find a new use for the site.

The goal is to create a long-term future for the historic buildings and for the community of which they have so long been a part. The buildings have supported 90 years of flax production and 90 years of barley malting. Today the whole site is in need of a new sense of purpose and identity to ensure its survival and productive use for the next 100 years and beyond.

The site is large and complex and in need of serious repair and reinvention. The mill buildings have been a huge feature on the local landscape for over 200 years but, more recently, have been empty, abandoned and decaying.

Four buildings have been selected for the first phase of the development and a substantial Heritage Lottery Fund application has recently been submitted to secure part of the funding needed to bring them into a third century of productive use.

This first phase will carefully conserve and reuse some of the key historic buildings which include the Main Mill from 1797, the Kiln from the maltings phase in 1898, the Dye and Stove House and the Office and Stables along with works to ensure visual and physical access. This restoration will provide an 'exemplar' in how modern technology and innovation can be applied to ensure a sustainable future for these important historic buildings.

Once the Main Mill and associated buildings are repaired and brought back into use the remainder of the historic buildings on site will be more attractive to potential users and investors. The complete restoration of the historic site will then stimulate the final phase of development of the full site which will include commercial and residential buildings. This in turn will significantly boost the local and regional economies and will make a real difference to the lives of local people, particularly on the northern side of Shrewsbury.

But what is it that is to be preserved? Beneath the creation of these innovative structures in a somewhat unlikely market town in Shropshire lie the roots of the Industrial Revolution. 1797 was a significant year for Shrewsbury. For 500 years the town had been on the trade route for wool from Wales to Europe, this trade was in

severe decline because of European conflicts. Secondly, two canals reached the town, one from the East and one from the South. Thirdly, the Midlands Enlightenment was flowering across the region.

The processing of flax was one possible diversification from the wool trade and a suitable mill was needed. One recognised danger was that of fire and this would be minimised by a structure combining cast iron columns and beams, a system which later developed into the modern steel frame which made skyscrapers possible. The Flax Mill's architect was Charles Bage, it was built for John Marshall of Leeds and the brothers Thomas and Benjamin Benyon. Bage, was also a partner in the venture which was dissolved in 1804, the mill being retained by John Marshall. Another Mill was built by the other partners nearby. These two flax mills provided the 'chief manufacture' of Shrewsbury (according to an 1851 directory).

Illustrations of the ironwork showed how slender were the cruciform tapered columns and beams. Calculations indicate a safety factor of only 2 when today 5 would be the norm. Brick vaulted ceilings fill the 10 foot span between the beams. The centre row of columns on some floors are shorter with an open capital or frame to the beam to allow shafting to run the length of the building. This shafting and other equipment was powered by a Boulton & Watt beam engine at one end of the building and a Leeds manufactured engine at the other.

Overall the Mill measures 200 feet x 40 feet and rises to 5 storeys. An excellent piece of computer-generated action made the skeleton of the structure come to life and allowed us to enjoy the quality of its design and execution. Further illustrations of the investigations into the details of the structure confirmed the original thinking of its designers.

Amongst the other listed buildings on the site are The Cross Mill (an iron framed building replaced a wooden one burnt down in 1812), The Apprentice House also from 1812, The Warehouse (1805) and the Stable and Offices of 1804. The Dye and Stovehouse was added in 1850 and the Malt Kiln in 1898.

The 1882 OS map shows a 'Thread Manufactory' on the site which is alongside the Shrewsbury branch of the Shropshire Union Canal and with a siding off the Crewe & Shrewsbury Branch of the L & N W R. Well located indeed, and Shrewsbury thread was regarded as a premium product. So much so that the incumbent member of the Marshall family sold the Mill in 1887 – entrepreneur to country gentry in three generations.

The Mill remained empty for a decade until it was bought by William Jones, an established maltster in the town and it entered its second existence in a new industry. On the 1927 OS map it is shown as 'Shropshire Maltings' alongside the canal. One continuity from the early days also shown are the groups of 'cluster' dwellings – groups of four back-to-backs across the canal from the Mill.

Sadly, to date no illustrations of the Mill or its ancillary buildings in its days as a flax mill have been found. Perhaps something will turn up. In the meantime it is to be hoped that the proposed development will gain funding and progress smoothly so as to preserve a truly important example of our industrial heritage. An iron-framed, gas- lit, steam-powered Mill in an oil-lit, timber-framed county town.

April 2013: Richard Thomasson*Ariel Motorcycles from Selly Oak*

Given its relatively short life as an independent company and the low volume production of a somewhat limited product range, Ariel Motorcycles enjoyed, and still enjoys an enthusiastic following amongst its devotees.

Richard Thomasson is one of them and his review of the machines from Selly Oak drew a large audience, which included a number of visiting motorcyclists, to hear the history of the House of the Horse.

The story was liberally illustrated with archive photographs, contemporary restorations and a range of advertising material that latterly seemed more appropriate to sports cars than powerful motorcycles. Scarcely a hard hat in sight, but plenty of glamour.

The original company was established in 1870 by James Starley and William Hillman to make bicycles. After a few false starts Ariel Motorcycles began to build machines in the early 1890s at Bournbrook, Selly Oak, as part of the Dunlop Group. Perhaps Dunlop wanted to concentrate on its other businesses and in 1897 Ariel was sold to Cycle Components. At the 1898 National Cycle Show the company exhibited a tricycle powered by a 1 ¾ hp de Dion engine and made under license from the British Motor Co Ltd, according to a contemporary advertisement.

A remarkable number of early examples of Ariel machines survive, including one from 1901 powered by a Minerva engine and a restored 1914 TT Replica. This interesting machine has a rear hub containing a clutch and three gears made by Sturmeys Archer. The hub was stripped down by the restorer who, after taking a month to reassemble the 30 individual plates and other parts, vowed not to repeat the feat!

Once WW1 was over Ariel machines began to look more like a motorcycle with a proper gearbox, a twin cylinder engine but still with a belt drive to help damp out the engine pulses. By 1926 a substantial works had been built alongside the canal, simplifying amongst other things, coal deliveries.

Perhaps the most significant event in the company's history was the arrival in 1925 of Val Page from engine maker JAP (J A Prestwich). Page immediately stamped his mark on the company and started to bring the Ariel machines up to date, beginning with decent 7" brakes.

Various weird and wonderful exploits took place during the 1920s, one especially whacky one mounted a motorcycle onto two pontoons and proceeded to motor across the Channel. Having arrived in France, the two riders turned round and crossed back to England!

The Wall Street crash in 1929 had a dramatic effect on business and the Cycle Components Group of Companies was put into receivership. Jack Sangster was able to buy the tooling from the receiver and Ariel JS came into being. Sangster strengthened the engineering team by recruiting Edward Turner. One of Turner's first bikes was the Ariel Square Four in 1930.

This machine became the most famous of the Ariel range. Originally a 500cc, overhead camshaft engine it was successively developed to 600cc and finally 1,000cc. It was quite complicated for its modest power output (around 40 bhp), but it did produce lots of torque. Square Fours were famously capable of 10 to 100 mph in top gear and some 15,000 of all variants were built.

Ariel produced a number of innovations, prominent amongst which was a centrifugal filter built into a crankshaft

web. This was so efficient that clearing the debris during an overhaul required it to be drilled out, so compacted did it become.

The 1930s were busy times and one photograph of the crowded works showed the variety of machines produced, and how close the assembly area was to the finished stock. The 500cc OHV single was a popular model and even featured in a dirt track pre-event entertainment chariot race.

The model range expanded during the last years of peace as was shown in a series of contemporary advertisements. A number of models featured high level exhausts which looked certain to cause burnt knees and singed luggage. To say nothing of the discomfort to any pillion passenger! A number of engines utilised side valve configurations in the interests of reliability and reduced damage in the event of valve failure, which was not uncommon until materials technology improved.

During WW2 production was largely turned over to military machines. A 350cc OHV machine with high ground clearance and good brakes was initially ordered by the French Government but due to unfortunate circumstances they were unable to take delivery and the machines were diverted to the British forces. In total, Ariel produced 47,599 bikes for the War Department.

In 1944 Sangster sold the business to BSA but the Ariel brand continued to have its own identity and this was presented in a series of advertisements that cast some doubt on the suitability of the clothing being worn for meeting the rigours of motorcycling. Flat caps and plus fours are one thing but short sleeved summer dresses and lounge suits are quite another.

Nonetheless, Ariel steadily developed a loyal band of owners and in 1951 The Ariel Owners Motor Cycle Club was formed at the famous (or infamous) Ace Café on London's North Circular Road. The contemporary advertising strap line 'Leaders of Design' was equally at home at the Festival of Britain and the Ace.

Technical innovation continued with rear suspension and telescopic front forks, better saddles and a welcome spring absorber on the end of the crankshaft to damp down engine pulses. Ariel machines with their excellent torque characteristics had always been popular with sidecar enthusiasts but the advent of the BMC Mini at about the same price as a combination outfit spelt the end for the sidecar.

Ariel sought to break new ground with the Leader in 1958. Combining the weather protection of a scooter with the performance of a proper motor cycle it was popular with the Police and boasted trailing-arm front suspension, luggage capacity and, a world first, indicators.

Despite variants on the Leader theme such as the Arrow and the Pixie, Ariel eventually could not compete against Japanese imports and the company closed in 1966.

Richard closed with a review of Ariel activities and some interesting 'might-have-beens'. Never an out and out racer, there were no TT victories but the marque always performed well in trials and scrambles.

The Owners Club is very active with branches throughout the world offering events, advice and spares. The bikes are reliable, but they do wear out! There is even talk of the name being revived; in the meantime machines and parts are available for any enthusiast prepared to take on a restoration project. It can be most rewarding.

WARWICKSHIRE

Industrial Archaeology Society

NUMBER 49 October 2013

PUBLISHED QUARTERLY

FROM THE CHAIRMAN

The 25th. season of WIAS meetings began in September 2013, with a revised constitution, a healthy financial position and a thriving membership, all discussed fully at the Society's Annual General Meeting. Much has happened in those 25 years, and yet in some senses it 'seems only yesterday' that a group of 'younger men' gathered at St John's Museum, Warwick to launch the Society, with Toby Cave as Chairman and myself as Secretary, and an inaugural lecture from Barrie Trinder.

I thought it would be of interest to write down some of the industrial sites in Warwickshire and Coventry that had been lost in that time, and it will probably come as no surprise that the list was worryingly long. A presentation on these sites might be an appropriate inclusion on a Members' Evening. Fortunately, in some cases recording had taken place; in others the loss has been more serious. Many of us have photographs of these sites, and the increasing use of social media (e.g. blogs, facebook) has prompted the proliferation of oral memories of many of these buildings and their workings, but it did re-emphasise the continued need for recording by whatever means available.

Attendance at the AIA Conference in Dundee (recorded elsewhere in this Newsletter) added power to the argument. The gazetteers for these Conferences focus on what actually remains at the time of publication, and whilst those sites now built over by housing or retail developments are of interest to the industrial historian, the physical remains have been lost.

At the Conference, one delegate made the thought-provoking suggestion that industrial archaeology is about what happened inside industrial buildings, and the buildings themselves were of less importance. The retort to this is, of course, that we would dearly like the working parts of the site to

remain for us to study, but it is often only the framework of the building that remains, and the ability of the industrial archaeologist to interpret the physical remains of these buildings is a fundamental component of his/her role.

This recording of industrial activity can be achieved using a variety of techniques, but the advent of digital photography and HD video on phones and cameras (at an acceptable cost) means that accurate recording has become accessible to the amateur enthusiast. Postings on Flickr and clips on YouTube (and elsewhere) have given new life to the recording of industrial activity.

We are all photographers now, but the skill of the professional photographer still adds much to the recording of industrial processes and their associated atmospheres. For our county, Ian Beesley's wonderfully evocative record of the Atherstone works of Vero & Everitt 'Warwickshire Hatters' is an outstanding example.

Water colours are, of course, another medium, and there are many examples of very fine water colour depictions of industrial scenes. Many of these – perhaps by the very nature of the medium used – tend to concentrate on industrial landscapes rather than the detail of buildings and technology. One modern exception is the wonderful work of Falcon D. Hildred, with a range of drawings from urban and industrial settings, including Coventry, recently on exhibition at Ironbridge. Equally impressive in their intimacy and detail in recording the processes of industrial activity, often prior to their disappearance, has been the work of Arthur Lockwood. The fact that his work has been in Birmingham and the Black Country has been, of course, an added bonus for us. What is perhaps unusual about his work is the way in which he seeks to record the processes of

industrial activity, working inside factories and foundries and having the patience and skill to record these processes so effectively, from Acme Whistles to Webster and Horsfall's wire works. One example of his work – readily available on the internet – is the recording of the last days of the Crown Nail Company, Wolverhampton.

<http://www.historywebsite.co.uk/museum/engineering/crownrailco>.

He has also produced a wonderful new book, reviewed elsewhere in this Newsletter.

PROGRAMME

October 10 2013

Roger Cragg:
Managing the Civil Engineering Heritage.

November 14 2013

Barrie Trinder:
Pontcysyllte: its place in history.

December 12 2013

Alain Foote:
The History of British Thomson-Houston, Rugby.

January 9 2014

David Fry:
Industrial Coventry in old postcards.

February 13 2014

John Brace:
The Channel Tunnel Fires.

March 13 2014

John Frearson:
Jonathan Dumbleton Pinfold and the Brickmakers of Rugby.

April 10 2014

Malcolm Nixon:
A New Light on an Old Industry: the Industrial Archaeology of the Worcestershire Potter.

May 8 2014

Peter Perkins:
The rise and fall of the Northamptonshire boot and shoe industry.

June 12 2014

Members' Evening:
25 Years of WIAS. 1989 - 2014.

NEWSLETTER

Meeting Reports

May 2013: Simon Buteux (Director: Birmingham Conservation Trust)
Newman Coffin Works, Birmingham.

Simon Buteux is the Director of The Birmingham Conservation Trust and a Research Fellow of Birmingham University but is also very much a hands-on field archaeologist who was involved with the excavations before the Bull Ring redevelopment and the restoration of the Reader's House in Ludlow. More recently, he spent a year with a charity school project in Borneo before returning to take up his present position with the Conservation Trust.

The Newman Brothers' Coffin Works in the Jewellery Quarter is but one of his responsibilities although, perhaps, one of the more interesting. Located in Fleet Street on the edge of the Quarter it is not only the last factory left on the street, it is a time capsule unchanged from when the doors closed for the last time in 1999 after 105 years of business leaving most of the machinery, furniture, stock, records and everything else in suspended animation. A Mercantile '*Marie Celeste*' gathering dust in its Grade II* listed mausoleum.

Victorian funerals were lavish affairs of conspicuous expenditure. Coffin fittings were an important element to a stylish and opulent departure and Newman Brothers operated at the top end of the trade. Some notable 'clients' reputedly included Joseph Chamberlain, Winston Churchill, Cardinal Basil Hume, Princess Diana and HM The Queen Mother.

Until the end of the 19th century the coffin trade was centred on London but then moved to Birmingham where the small metal parts that formed the bulk of the coffin furniture were readily available. Newman Bros never manufactured coffins but supplied all the fittings, furnishings and textile elements needed by the local coffin maker.

In 1892 Roger Harley produced plans for 'A New Manufactory' in Fleet Street for Newman Brothers, Brassfounders, of 102 Irving Street. The Newmans had seen a business opportunity. The Fleet Street site was formerly a set of back-to-backs which were demolished. The façade of the building onto Fleet Street today is unchanged from the original drawings although photographs of the inner courtyard show the shoddy 1960s rebuilding of the casting shop wing.

Simon's presentation cleverly combined the original elevation drawings with schematics to show the locations of the various sections of the manufactory in its final days. To these he added pictures of the interior 'as left' when the doors were closed for the last time.

Amongst these illustrations were some evocative drawings by a Dr Allen, the son of a former sales director, recording his memories of the factory when he was a teenager in the 1930s. Dr Allen had fond memories of the polishing shop where large diameter linen mops were driven by individual electric motors. Apparently one majestic lady, known as Diamond Lil, was wont to support the part to be polished in her cleavage! The imagination boggles.

At one end of the courtyard, underneath the toilets, was located a gas engine which drove the line shafting for the barrelling shop and other machinery. The cramped working conditions in the workshops were clearly evident from the illustrations. If the conditions for stamping and pressing were bad enough those in the electro-plating shop would terrify today's officialdom.

Conditions were somewhat better for the seamstresses on the top floor. The shroud room was a 'jolly place to work' producing the clothes you would be seen dead in. This section contained huge amounts of stock, robes and fancy trimmings, including shrouds in Birmingham City and Aston Villa colours. An attempt at diversification that

failed, leaving plenty of surplus stock for any fans in need.

A hoist runs the full height of the building from the shroud room down through the warehouse to the post room on the ground floor. The warehouse remains stuffed with stock and is a treasure trove of Newman's products. The range was breath-taking and a 'one stop shop' that included embalming fluid.

Another most interesting archive is formed by the ledgers and catalogues found in the offices which, as with the factory, remain, as left, even to tins of soup and bottles of Gordon's orange gin and champagne in a cupboard.

Unsurprisingly, there were two entrances on Fleet Street to the manufactory, one double door for the workers which also gave access for transport into the courtyard, and one panelled door for office staff and clients. At its peak the business employed about 100 people.

Turning to the personalities in the company, one Alfred Newman, a brass founder, was the father of two sons, Horace (1885-1952) and George (1889-1944) the Newman Brothers. They were succeeded by John Kellett who rebuilt the product range and eventually sold the business to Joyce Green in 1976. Miss Green then ran the company until closing the doors in 1999.

What of the future? At present a team of volunteer guides, often in costume, entertain school parties and conduct 'twilight tours'; when candle-lit the Coffin Works can be very atmospheric. The works also provides a setting for art events such as the Tin Box Theatre Company's production of 'Stop the Clocks'.

The Coffin Works Restoration Project has a lengthy history. In 1998-9 an English Heritage survey of the Jewellery Quarter identified the importance of Newman Brothers' factory and in 2000 the Factory was listed Grade II*. In 2001 the Birmingham Conservation Trust (BCT) undertook a feasibility study commissioned by Birmingham City Council and The National Trust, and in 2003 Advantage West Midlands (AWM) bought the factory from Miss Green. Between 2006 and 2008 with funding from AWM and others BCT developed an ambitious scheme for the factory.

Then in 2008 recession struck. AWM withdrew funding when regional development agencies were wound up and BCT developed a revised, more modest scheme and applied for Heritage Lottery funding. In 2010, BCT bought the Coffin Works from AWM with funding from Birmingham City Council and English Heritage approved a grant for repairs. In 2011 the application for Heritage Lottery Funding of just under £1million was successful and the development of a scheme was put in hand together with grant applications for match funding. This was achieved in 2013 and Heritage Lottery Funding gave permission to start.

The BCT plans for the Coffin Works are comprehensive with multiple uses envisaged for the buildings. The front area and stamp room will become a heritage attraction. The South (1960s) rear ground floor is to be used for a collections store, a conservation workshop and meeting room. Top floor units will be available for commercial letting. The North (1894) rear buildings will house commercial units and BCT will move its office to the Coffin Works. Rent from the commercial units and ticket receipts from the heritage attraction will enable the Coffin Works to become financially self-sustaining in the long term. The approximate cost of the scheme (including activities) will be some £2 million. Construction work will last until April 2014 and the Heritage Attraction should open in July 2014 leading to a self-sustaining operation by 2017.

All in all an ambitious project that we wish well.

Members' Contributions

Peter Chater:

The Burton Dassett Quarries and Aerial Ropeway



The original owner of the Burton Dassett Quarries was Lord Willoughby de Broke of Compton Verney.

From 1895 the quarries were known as the Burton Dassett Iron Stone Company and from 1918-1921 as T&I Bradley and Sons Ltd.

The Quarries were opened intermittently from probably 1868. It is thought that the stone was conveyed at first by cart to Fenny Compton station.

The East and West Junction Railway was opened from Fenny Compton to Kineton in 1871, and to Stratford on Avon in 1873.

A ropeway was constructed in 1871 from the quarries to the Burton Dassett Sidings on the East & West Junction Railway. In 1895, under new ownership, the ropeway was rebuilt and much strengthened. Each bucket was capable of carrying a little over 3 cwt. The ropeway, powered by a steam engine, was a little over one mile long.

The railways in the quarries were of two foot gauge and the wagons were of the V-shaped tipping variety. Ponies were used to draw these wagons.

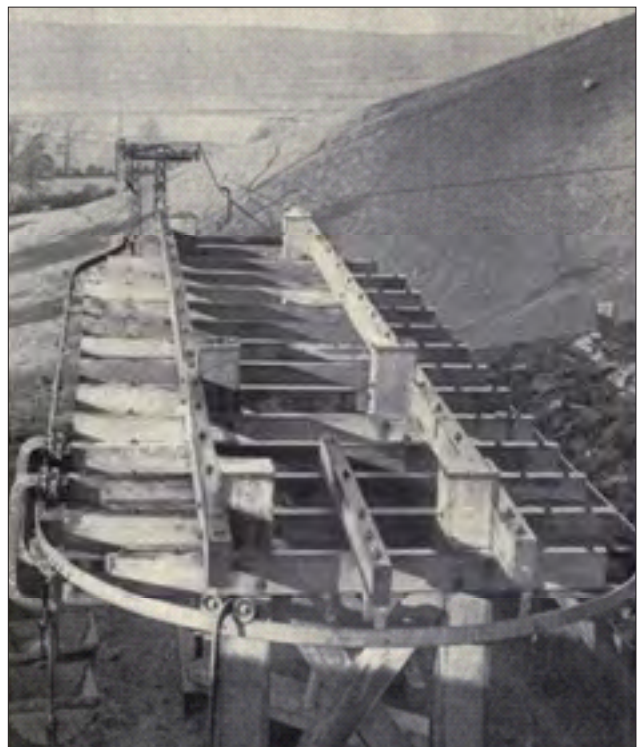
The head of the ropeway was at the western side of the quarries; the V-shaped wagons were brought to this point and their contents tipped onto a platform and then through a chute into the buckets.

The quarries were finally closed in 1921 and, when it became apparent that they would not be reopened, in 1929 the ropeway was dismantled as was the bridge which crossed the road between Little Dassett and Northend.

Much of the above information has been taken from Eric S. Tonks' *The Ironstone Railways and Tramways of the Midlands*.

The illustrations are from:

http://www.copsewood.org/aropeway/uk/rw_ukgaz.htm.



Top: Ropeway on the hillside west of the 'Beacon'.

Right upper: Bridge crossing the road between Little Dassett and Northend.

Right lower: The head of the Ropeway.

Members' Contributions

Richard Green:

Arthur Lockwood: Urban and Industrial Watercolours of Birmingham and the Black Country.

After his 'Change in the Midlands' publication in 2007, Arthur Lockwood has now produced a second, larger volume entitled 'Urban and Industrial Watercolours of Birmingham and the Black Country', and our Chairman asked his brother Richard Green (Honorary Secretary of the Birmingham Watercolour Society) to present a review of the book, published by Sansom & Co. £25.00, and to offer a broader perspective on Arthur Lockwood's work.

Arthur Lockwood's book "Urban and Industrial Watercolours of Birmingham and the Black Country" is a celebration of the talent and work of three generations of the Lockwood family, with paintings and sketches by Arthur's father Frank T, providing a context for Arthur's watercolours, and a few works by son Paul showing that the family traditions continue. We therefore can enjoy Frank's work in the 1920s and 30s, Arthur's early work at his father's side and in the 1940s and 1950s at College and as a graphic designer. Fortuitously, Arthur's timely return to the Midlands in the 1980s enabled him to produce a unique series of watercolours that now serve as a precious record of the decline and loss of the manufacturing activity that had been the lifeblood of Birmingham and the Black Country for more than a century, in a manner that gives real shape to our memory of those distant days. In complete contrast to Arthur's super-detailed and accurate representations of all he sees before him, Paul's work is fired by his creative imagination, and is more abstract than observed.

This is a beautifully produced, accessible book with the layout and print quality at the sort of high standard one would expect from an artist who studied graphic design and worked for much of his life as a designer, bringing to bear all his understanding of book layout and typographical structure. However, it is the technical skill shown in his use of pen and brush and the breadth of subject matter that make the book notable, working on many levels and enjoyable at every level. It is an attractive book to all, whether expert or novice, because it is simply so good to look at. It is a special historical record of industrial transformation and change that will help researchers understand the pace and process of change, and contains accomplished works of art which demand close study.

The book charts change, sometimes capturing an industrial scene that will soon disappear, or a set of buildings awaiting the hammer or in the middle of demolition. Many have a haunting quality, the structures being an echo of what was once there, an old friend about to be lost forever and suspended in time forever as an abandoned relic by the artist. Birmingham has seen many buildings disappear, some attractive, some an eyesore, but it is impossible to live in Birmingham or its Black Country neighbours and not witness the predicament of decision-makers as the old was swept away and the new was brought in. For good or ill,

it has been an irrevocable transition as, for example, some of Birmingham's well-loved bedrock industries collapsed overnight, never to reappear, and the road-building so beloved in the 1960s dominated the change agenda. We therefore hold a debt of gratitude to Arthur and his father for appreciating what should be recorded and why.

Arthur is not judgemental, nor is he a romanticist, at least not in his paintings as he seems more captivated by illustrating the real contribution played by a skilled workforce (e.g. *Smith Edge Tools of Oldbury: plates 302-304*), but equally does not ignore the grit and grime of the factory floor. He tells us how it is – or was. Nothing that Arthur portrays will ever return but there is no melancholy about his work. He simply – and with ease – captures the atmosphere of factories full of understated but industrious people hard at work, or buildings left exactly as they were when they were padlocked, or often just the empty shells that were left behind.

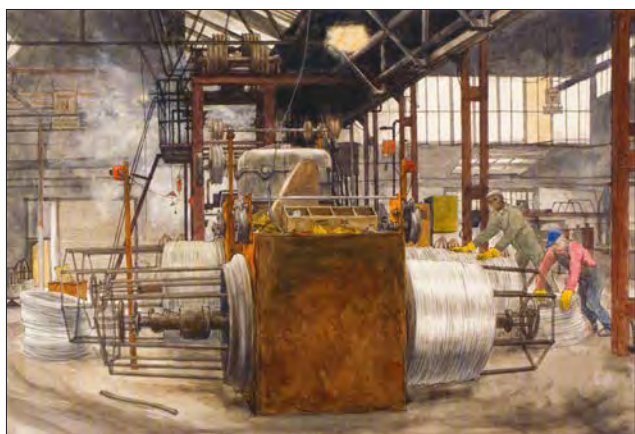
Arthur's paintings show a draughtsman's eye for perspective and he achieves compositions that draw the viewer right into the picture. Whether he is painting right up against the subject matter (e.g. *Canalside factories, Small Heath, Birmingham: plate 286*), or working inside buildings (e.g. *In the Henley Foundry, Smethwick: plates 243-246*), or capturing street scenes (e.g. *New Bond Street, Digbeth, Birmingham: plate 107*), he seems completely at one with the subject. Watercolour is an ideal medium for a 'light touch' and Arthur shows this skill when painting scenes that have a transitory nature or will soon be all that remains – as if they are just echoes of the past (e.g. *the Inn Place, Midland Street, Birmingham: plate 206*). By contrast many of his 'live' subjects – working foundries and forges etc – display the dark, muscular grittiness that working with metal and steel demands. What stands out in all his work – and his father's – is the attention to detail: the patina on the side of a drop forge, the discolouration on a skip. Not that Arthur slavishly paints every brick or corrugated iron sheet – he merely paints what is important to create an attractive picture and an appropriate record.

Little seems to have escaped Arthur's keen and reflective eye, whether it is comprehensive housing clearance, removal of modern structures or demolition in advance of the building of new industrial or commercial activity. He records some of the biggest schemes, such as that huge hole at the Bull Ring during redevelopment, but has rather greater empathy with more modest street scenes when seemingly overnight, buildings that had turned the corner of a street are no longer there.

For Arthur is a story-teller, a visual diarist of an ever-changing picture of urban change. Few of us can confidently predict where the next change will occur. But it surely will happen and hopefully others will follow Arthur's consummate skills of being there when it matters and being willing and able to record it.



The Inn Place, Midland Street, Birmingham: closed and boarded up, it was set on fire and demolished in 2001.



Webster & Horsfall Ltd., Hay Mills, Birmingham: hot dip galvanising for the application of a zinc coat to wire to prevent rust.



Acme Whistles, Birmingham: assembling the whistles prior to soldering the parts together.



Coventry Colliery, Keresley: Number 1 head frame derelict and ready for demolition, June 1997.



*Right:
Sidney Smith Castings, Stourbridge: the electric furnace, where molten metal is poured into the ladle or pot.*

September 2013: Martin Green

Association for Industrial Archaeology Conference 2013: Tayside (Dundee, Angus, The Mearns and North Fife)

For its fortieth Conference, the AIA ventured north of the border to Tayside, based at the University of Dundee. Four members of WIAS attended for most of the week-long Conference and our Chairman Martin Green produced this report for the September meeting.

The AIA Conference has become a focal point for AIA activities over the past four decades. It performs a range of functions, some associated with the AIA itself and its activities over the past year, whilst the majority of the time is spent learning about (via a series of lectures and shorter presentations) and exploring the industrial heritage of the surrounding area. The AGM, the Conference Dinner, the AIA Awards for various IA projects, and the Rolt Memorial Lecture – ‘*The Public Benefit of Industrial Heritage: Taking a Positive View*’ by Miles Oglethorpe – were the main formal elements, but there were also opportunities to share time with fellow enthusiasts and to establish and renew friendships.

The Friday prior to the main conference is reserved for a seminar, and the theme for this year’s presentations was ‘Iron Structures’. The seminar was chaired by Professor John Hulme, a pivotal figure in the recording of Scotland’s industrial archaeology, with an unrivalled collection of photographs taken in the 1960s and 1970s. A range of speakers (including Dr. David Mitchell, Director of Conservation, Historic Scotland) explored the history of particular structures in Scotland and beyond. This was followed by a fascinating presentation on the Tay Bridge Disaster from Professor Ian MacLeod, together with a description of the current restoration project for the bridge by Duncan Sooman of Network Rail. It was singularly appropriate that the afternoon trip was a walk beneath the current Tay Bridge, with the remnants of the piers of the doomed earlier bridge visible in the turbulent Forth of Tay beneath.

The conference gathered in the evening for a Tayside barbecue at Discovery Point, a visitor centre housing the Scott and Antarctica exhibition, with Scott’s ship RRS Discovery (1901) moored at an adjacent quay. Scott had decided to have the Discovery built in Dundee because of the experience of the city with Arctic whaling and the qualities of the ships required for such expeditions. This emphasised to me the importance of landmark exhibits in attracting visitors to the industrial heritage of an area. Two other craft moored in Victoria Dock – HMS Unicorn (venue for the Conference dinner) and Lightship North Carr – were further attractions to bring people into the ‘re-generated’ port of Dundee.

Another landmark attraction in the city is the Verdant Works which houses the jute museum of a city once dominated by production of goods derived from this brittle, imported fibre. Elsewhere the sheer scale of the mills devoted to production left a lasting impression, with the Camperdown Mills of the Cox Brothers in Lochee and the Tay Mills of Gilroy and Sons in the heart of Dundee representing two outstanding examples. Production was, of course, not confined to Dundee and the enormous Broadford works in Aberdeen represent a mammoth task

for regeneration as an ‘urban village’. Given the dominance of the jute industry, it is no surprise that many ancillary trades developed in the region, for example Pullars of Perth dyeworks; and Urquhart, Lindsay & Co., Blackness Foundry, Dundee, manufacturers of a huge range of specialist textile machinery.

Spending the week exploring the buildings of the jute industry, both in Dundee and beyond, reminded one that industrial archaeology is only one piece – albeit a very important piece – of the jigsaw of industrial history and heritage. The story of jute fascinated me, with so many aspects deserving further study, including the severity and social impact of the decline in the industry as a result of the (often Dundee-sponsored) rise of the Indian jute industry. Indeed, some of the most telling images at the Conference were pictures taken earlier this year by one of the AIA delegates Chris Emery of a jute mill in Kolkata (Calcutta). The atmosphere and conditions of the crowded factory – noise, heat, dust – were effectively conveyed through the visual image. Even more telling, perhaps, was the fact they were working with machines manufactured in Dundee.

Given the location on the north eastern coast of Scotland, maritime heritage would inevitably be an important element in Conference tours. Most dramatic of these was the visit to Aberdeen and the transformation of a once vibrant fishing port into one dedicated to serving the needs of the North Sea oil and gas industry. This was brought vividly home to us as we toured the harbour in our (Dinky toy) ferry beneath the bulk and sophistication of the vessels moored above. Other maritime elements were on a much smaller scale – for example the tide mill at Fife Ness and the saltpans at St. Morans. These two were excellent demonstrations of the benefits that dedicated, careful research (of both documentary evidence and physical remains) could produce in our knowledge, understanding and interpretation of an industrial site.

Jute, of course, was not the only textile produced in this part of Scotland, and there were many references to other textile sites. The Arkwright-influenced Stanley Mill – a range of water-powered cotton mills restored by Historic Scotland and the Prince’s Regeneration Trust – reminded one of the image of the isolated textile mill, with mill village attached, reminiscent of New Lanark. Deanston Mill was another example, now converted to a whiskey distillery.

It would have been, of course, a crime to have departed Dundee without tasting malt whiskey, haggis and Dundee cake and marmalade. The first two were very evident – the latter less easy to find. Fundamental to the success of the Conference is always the energy and efficiency of the organisers, and it was a goal of this year’s ebullient organiser Mark Watson that all should visit at least one distillery. Some delegates, I believe, managed three!

There are many reasons to return – the east coast rail route over the Tyne, Tweed, Forth and Tay bridges might be justification enough – particularly as Dundee seeks to raise its profile with the £45m project to build a V and A Museum adjacent to Discovery Point, and to bid for UK City of Culture 2017.



The second (1887) rail bridge over the river Tay seen from a vantage point above the city of Dundee.



Part of the Baxter Brothers jute mills in the Dens area of Dundee, now converted to housing.



The challenge of restoration to the enormous Broadford works in Aberdeen.



Cox's stack and the High Mill (1858-1868) of the Camperdown jute works of the Cox Brothers, Lochee.

*Right:
The stills at Deanston Whiskey Distillery, a converted textile mill.*



June 2013: Anthony Coulls:*Railways and the National Railways Museum of Sierra Leone*

Anthony Coulls has given us several interesting talks in recent years but the history of the railway and the story of how a National Railway Museum was created and is being developed in one of the most deprived of sub-Saharan countries was both stimulating and heartening. However, whilst there was much to admire about the museum project the contrast that emerged between the early British colonial development of the railway system with its echoes of English gentility and the present ruthless exploitation of the country's mineral resources by the new colonial power, China, was revelatory and worrying.

Sierra Leone is rich in possibilities. Its capital, Freetown, lies on the largest deep water harbour in Africa, and there are rich deposits of iron ore, rutile (titanium), gold and especially diamonds. Despite this, two-thirds of the country's 4 million inhabitants survive as subsistence farmers and many of the 1 ½ million in Freetown are unemployed shanty dwellers. The country is still recovering from a vicious civil war that lasted from 1991 to 2002.

A soldier with a passionate interest in railways and museums is a little unusual. Colonel Steve Davies MBE is such a man. In 2004 he was Deputy Commander of the International Military Advisory Training Team (IMATT) in Sierra Leone. In his spare time, and with the help of a small band of unemployed but enthusiastic volunteers, he transformed a warehouse of decaying railway artefacts, including locomotives and carriages abandoned since the abolition of the State railway in 1974, into a new museum. He even paid wages from his own pocket. The Museum was officially opened in 2005 by the President of Sierra Leone.

Anthony's talk included many anecdotes relating to the trials and tribulations surrounding life in Sierra Leone generally and especially the acquisition of material for the museum. Getting around by road, by air or afloat required patience, initiative and hope for a successful outcome. Davies' military experience stood him in good stead on more than one occasion!

But to return to the history of the railway in Sierra Leone. In 1896 a 2' 6" gauge line was begun running from Freetown 270 miles up country to Pendemu. At Bauya Junction some 50 miles from Freetown, a branch line went to Makeni. A separate 3' 6" gauge line to serve the development of minerals, especially coal and iron ore extraction, went from Freetown to Marampa.

A contrasting series of pictures showed the original railway infrastructure and the few remnants that survive today. Notable were the spidery iron viaducts and their later concrete pillars, the English style buildings and a sense of order with later ruin. Today, only those parts fashioned from stone and concrete remain. Station signs being good examples. Anything of use for building has been liberated and reused.

The rail system began to contract in the 1960s, shortly after diesel locomotives had succeeded steam. First the section from Pendemu back to Bo (twinning with Leamington Spa) was closed and a decade later the line retreated to Bauya Junction and in 1974 back to Freetown. Much of the permanent way has now disappeared via the scrap merchants.

Short lengths of track have survived in and around the old railway workshops in the Cline Town area of Freetown where the museum is presently located. The workshops had remained open until the civil war when, it is said, at one time 30,000 people were living in and around them.

When Steve Davies first saw the workshops and surrounding area he was surprised to see what had survived. Not only a number of locomotives, both steam and diesel but important rolling stock including the original Governor's coach and one specially built for the visit of The Queen in 1961. Sadly, it seems that she did not in fact travel in it but it is being restored to its original condition. Also there were a number of passenger carriages remaining from the 30 sent out from England in 1961 to improve the railway. One problem with many of these items is the 'heritage insulation' they contain.

In February 2009 Anthony left a snowy England for his first visit to Sierra Leone, in fact his first flight and overseas journey, to review the material with Steve Davies and to begin the creation of the Sierra Leone National Railway Museum. It was indeed a leap into the deep end!

Fortunately, Steve had excellent contacts at the highest levels and Anthony found that he and the Anglophile President were both alumni of Aberystwyth University. Another plus was the work ethic of the Sierra Leoneans at the nascent museum; often unpaid but still prepared to come in and help.

Fortunately, funding has been found to allow the creation of an archive (there is much important and endangered material), a curator's office and other facilities. Repairs, especially to the decrepit tin roof, and the buildings is a priority issue.

A potentially useful source of future income is from the increasing number of cruise ships visiting Freetown who are being encouraged to show generosity.

The pictures of the restorations carried out so far demonstrated that the museum has plenty of potential attractions. This will be further enhanced if some track can be restored outside the museum buildings to allow proper steaming. There are also a number of diesel locos that can probably be restored to running condition.

Outside of the museum there is now little remaining of track or bridges. The ever present scrap dealer has taken advantage of booming metal prices and thus the chances of restoring the railway have been greatly reduced. Given the dreadful state of the road system this is unfortunate since a working railway could be of great benefit.

The museum is well received by a growing number of visitors and has featured on the local TV network. Its displays will be augmented with material no longer needed by the NRM at York and an oral history project has been started with so far half a dozen old employees recording their memories. It is hoped that there will be a growing number of international links to other railway museums.

Outside of the museum, the description of a trip up country to examine the refurbished 75 mile long section of line to the iron ore fields was notable. This work has been sponsored by China with Chinese labour, locos and rolling stock and is another example of a new colonial power seeking raw materials. The quality of the new track seemed marginal for its 3,000 ton ore trains and there is a clear need for education of the local population about the dangers of open crossings.

The presentation closed with a few examples of other industrial archaeology including a flat pack house sent from Harrods in 1912, the government wharf used by slavers and filmed in 'The Heart of the Matter', an ex-Isle of White hovercraft ferry from the 1970s and a bus emblazoned with 'Banbury United F.C. on its rear.

WARWICKSHIRE

Industrial Archaeology Society

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FROM THE CHAIRMAN

WIAS DATABASE: STAGE 1

The Warwickshire Industrial Archaeology Society has always maintained a broad perspective by exploring both the industrial archaeology and the wider industrial, economic and social history of the county. In fact industrial archaeology (IA) looks specifically at the physical remains of past industrial activity, and this has been the focus of our attempt to establish a database of IA sites for Warwickshire, Coventry and Solihull (henceforward abbreviated to 'Warwickshire').

Our approach has been (deliberately) practical and our goal (initially) modest. We have sought to establish what a visitor to Warwickshire - or to the WIAS website - might want to know about the IA sites of the county. A small team was charged with the task of identifying the principles and process of establishing such a database for Warwickshire. This comprised Roger Cragg, Dennis Crips and myself. I would like to place on record my particular thanks to Roger Cragg for taking on the responsibility for entering each site on the database, and to webmaster for masterminding the inclusion of the database on the WIAS website.

The focus throughout has been on what actually remains. This, of course, in no way diminishes our interest in other sites in the county that have disappeared, but we needed a specific framework within which to work. This is the approach adopted by the Association for Industrial Archaeology (AIA) and the publication of its regional

guides (often as part of the Annual Conference). The team identified the essential ingredients to be: Site Name; Site Location (including OS Grid Reference); (brief) Site Details; Photograph; Industry concerned; Availability of Access to the site.

Once these details had been gathered, the site would be entered on the database, and any visitor to that database would discover both a listing of sites by location and a listing of sites by industry, together with a collection of photographs linked to the sites.

We began by entering some 'tried and tested' sites, based on the work of Roger Cragg for the Civil Engineering Heritage of Warwickshire. Many of these sites (e.g. bridges, aqueducts) are readily identifiable, are still in (original) use, and have up-to-date information and photographs attached to them. Thus they provided an ideal launchpad for the project.

Other sites may be less easy to record e.g. a building that has undergone much physical alteration and changes of use over time; the landscape of an industry such as sand and gravel.

So there remains a great deal of work to be done, and one of the guiding principles of the project has been to encourage the involvement of members of WIAS wherever possible. We have now reached the stage where we need to expand our list of entries, for there remain considerable gaps in the geographical and industrial coverage of the database. We hope that members will feel encouraged to participate. The first stage is to ask individual members for a

statement of intent - that you would be willing to assist - and this can be done by completing a form available at WIAS meetings or by contacting me on wiaschairman@aol.com. You may know a specific industry well, or a particular location, or you may simply wish to be directed to sites that need to be recorded. The method of recording will be via the WIAS Database Information Sheet, which will be available both in hard copy and on the WIAS website.

When we know the likely level of involvement of members, hopefully we will be able to make considerable progress with the project. The goal is to reach a situation in June 2014 when we will be able to go 'live' on the internet. This is a real opportunity to contribute to recording the industrial archaeology of Warwickshire and we very much look forward to sharing the experience of creating the database with members of WIAS.

PROGRAMME

February 13 2014

John Brace:
The Channel Tunnel Fires.

March 13 2014

John Frearson:
Jonathan Dumbleton Pinfold and the Brickmakers of Rugby.

April 10 2014

Malcolm Nixon:
A New Light on an Old Industry: the Industrial Archaeology of the Worcestershire Potter.

May 8 2014

Peter Perkins:
The rise and fall of the Northamptonshire boot and shoe industry.

June 12 2014

Members' Evening:
25 Years of WIAS. 1989 - 2014.

NEWSLETTER

Meeting Reports

October 2013: Roger Cragg

Managing the Civil Engineering Heritage.

Members with good memories may recall Roger's presentation at the 2005 AGM when he introduced a *Scheme for Industrial Monument Assessment and Grading*. At that time it was envisioned that, whilst the system had been devised for use on a national scale, it could, with little if any modification, equally be applied on a local scale. In particular, it could be of assistance in selecting those IA sites suitable for inclusion in the Society's Gazetteer.

We have had several recent speakers talking about our engineering heritage; from Ditherington Flax Mill to the Railways of Sierra Leone. In this talk Roger spoke with the authority of a practitioner and as a long-standing member of the Institute of Civil Engineers' Panel for Historical Engineering Works (PHEW).

Many would agree with the proposition that our engineering heritage requires managing; all aspects of conservation and preservation involve managerial decisions in addition to the purely technical. Assessments need to be made of quality and historical significance and balanced with financial and other criteria, all reflect management processes.

Three fundamental questions are raised when considering any potential subject under the scheme:

Does the structure have sufficient historical value?

Is it feasible to take any action to preserve or conserve?

What method of preservation or conservation treatment is appropriate?

In a presentation replete with illustrations predominantly of Warwickshire examples Roger explored these issues.

The assessment of historical value, its quality or its merit is contentious and gives rise to much debate. Description, let alone quantification is problematic, value judgments are needed and all too often the 'I know one when I see one' prevails over a more structured approach.

After many years of discussion, and attempts at devising a rational system for assessing historical value, the PHEW set up a Working Party under Roger's chairmanship which devised the method used today. The basis of the system is that a number of separate categories are each independently assessed. The results are then combined to give an overall assessment in four categories. The assessment categories are:

Landmark, does it represent a significant stage in the development of structural form or does it utilise new materials or construction techniques. A typical 'landmark' might be Bage's Mill at Shrewsbury.

Rarity, (not to be confused with Landmark), is it the sole surviving example or one of only a small number remaining. A typical structure might be Meldon Viaduct, although not the oldest wrought iron lattice viaduct ever built it is one of only two surviving similar structures.

Age, must be assessed, not as the absolute age of the structure but in relation to the age of the oldest known structure of the type under consideration. Stanford Bridge may only have a chronological age of 107 but it is one of the earliest surviving concrete bridges.

Size, all other things being equal a large structure would be more highly regarded than a smaller one.

Engineer/Contractor, there is a tendency to favour works by those eminent in the profession to have a better claim to fame than those designed and built by 'unknowns'.

Aesthetics, some types of structure might be appropriate for an

assessment to be made of the aesthetic quality of the design.

Condition, assesses the present physical condition of the structure, the degree to which the original design has been altered by later work and takes into account the current state of the structure. It is not possible to devise a single, unique, assessment formula that would be applicable to all types of civil engineering structure. Consequently for each type of structure, cast iron bridge, seaside pier, windmill or whatever, a set of factors is extracted from the above list which is felt to properly represent that particular type with the proviso that at least five factors must be chosen

Once the list has been decided then each one is graded from A (best) to D (least). Lastly, a final overall Grade is determined on a scale from 1 (best) to 4 (least). The method by which this combining is done is flexible but the recommended method is to take the best three factors. From these the final grade is determined as:

AAA or AAB	Grade 1	Nationally important
ABB or AAC	Grade 2	Regionally important
AAD or ABC or BBB	Grade 3	Locally important
All other combinations	Grade 4	Probably worth recording

Following assessment comes feasibility, and here it became necessary to modify the Panel's organisation from regional to national by type of structure. Each panel has to compile a data base of structures and then has to devise a suitable assessment procedure which will consider, *inter alia*:

Is it feasible to preserve or conserve?

Does a valid use exist for the structure?

Is any finance available?

Are there issues of maintenance or other long-term expense?

In cases where the structure has retained its original use, or has acquired a new use, then a useful source of revenue may be income from future users of the system. An obvious case would be the preservation of a railway line where fares would contribute towards the upkeep of the line once the running costs have been met. However, it is salutary to note that even with the very high levels of "free" labour which such projects usually attract, financial difficulties may arise. Charges for admission to sites may also be a factor but in some cases, especially where a structure is preserved in situ this may not be a feasible proposition since the costs of collecting and administering such charges may not be economic. Preservation on an established "museum" site may be one way round this problem.

Finally, there are the methods of conservation. The best solution is for the structure to remain in full use for its original purpose and this will sometimes be possible, especially where the original owner is co-operative or where the structure can be taken over and run as a going concern, such as with many of the preserved railway lines of which the Welshpool and Llanfair Light Railway is a shining example.

Given the scale of many structures, preservation on the existing site is optimal but there are clearly safety issues with derelict structures that need to be covered for public safety. If demolition becomes necessary, full prior recording must be undertaken.

Clearly, preserving our Civil Engineering Heritage is a complex business involving a wide range of management decisions. It is fortunate that it is being managed in such a professional way.

November 2013: Barrie Trinder

Pontcysyllte: its place in history.

Whilst our founder members may have felt a glow of nostalgia twenty five years on, other later comers may only have heard Barrie Trinder speak once or maybe twice on his more recent visits to the Society. All, however, must have found his presentation on Pontcysyllte: its place in history a great pleasure. A *tour d'horizon*, centred on Telford and Jessop's soaring aqueduct, and the extraordinary developments in British industrial development at the height of the Napoleonic Wars, was all too short.

Those who acquire a copy of Barrie's latest book; *Britain's Industrial Revolution* (Lancaster, Carnegie, 2013. www.carnegiepublishing.com) will be able to enjoy the full story at their leisure.

The Pontcysyllte aqueduct is today the centre of a UNESCO World Heritage Site. A part of the Ellesmere Canal it is a landmark in the development of the constructional use of iron and a symbol of Britain's Industrial Revolution.

The aqueduct was a child of its time; its promoters gained their Act of Parliament in 1793 and completed the structure in 1805, just after Nelson's victory at Trafalgar. The immediate canal system had its hub at Ellesmere where a substantial headquarters overlooked the canal near to the town wharf and the depot for the Shropshire Union Railways & Canal Company, some of which buildings still survive.

The structure came after the successes of the Iron Bridges at Coalbrookdale and Sunderland and the disastrous failures of others at Staines and Yarm. The latter did constrain the optimism about iron structures which had been expressed in 1801 with the claim that the Coalbrookdale works could produce 'iron bridges of any span or height'. Pontcysyllte embodied such optimism, carrying the Ellesmere Canal 126 feet above the River Dee in a cast-iron trough supported by 19 cast-iron arches erected between slender, hollow masonry piers.

It is useful to see Pontcysyllte in its context; the canal mania that had followed the Bridgewater Canal's opening and the national network of 'navigations' that was beginning to be created. The Ellesmere Canal, authorised in 1793, was intended to link the river Dee at Chester with the Severn at Shrewsbury through the North Wales coalfield. The company engineer was William Jessop and Telford was appointed its 'general agent'. Both men had experience of iron structures and in 1795 it was decided to follow Jessop's recommendation to carry the canal on high aqueducts at Pontcysyllte and Chirk.

The original route, due South from Chester via Wrexham to near Pontcysyllte, was abandoned in favour of a longer but easier Eastern loop using some existing canals via Whitchurch and Ellesmere to Welsh Frankton, where it joined the branch originating at Horseshoe Falls beyond Llangollen and passing over the two aqueducts.

Barrie traced the route of the canal with some early illustrations that evoked a more leisured era, not that canal work was ever easy but the countryside seemed more tranquil. The 'Mosses', the junctions, the locks, the bridges and the wharves all contributed to the overall effect. However, many of the buildings are now in a sad state of disrepair. A situation that did not help the campaign for World Heritage Site status!

One place of considerable importance was Plas Kynaston, a notable centre of iron-founding and the source of parts for other iron bridges including Telford's over the Scottish

Dee at Craigellachie with its commemorative plaque from 1814, over the Caledonian Canal at Moy and the Waterloo Bridge at Bettws-y-Coed.

The commercial justification for the Pontcysyllte and Chirk aqueducts was to facilitate industrial development to the North by delivering the high quality iron and limestone from Llangollen to the Shropshire coalfield and the Black Country. Important industries from dyestuffs to explosives were also developed as a result together with general cargo traffic.

As the commercial relevance of the canals declined in the latter half of the 19th C, pleasure boating gained in importance but by the 1920s this had reduced considerably and deterioration set in. So much so that in 1939 Tom Rolt was unable to complete his proposed journey from Banbury. By the mid-1930s closure was threatened but fortunately in 1954 British Waterways agreed to keep the canal open – it was important for the distribution of water!

Pontcysyllte was a landmark in the development of the constructional use of iron. Barrie entertainingly traced the early history of the material from Coalbrookdale in 1709 with its revolutionary use of coke for smelting via the Iron Bridge to structures at Sunderland, Buildwas, the Longdon Aqueduct on the Shrewsbury Canal, Pont-y-Cafnau (the Bridge of Troughs) and Stalybridge, before ending back at Pontcysyllte rising 126 feet above the Dee and its cast iron trough. Truly, a magnificent and amazing vision and a feat of engineering skill.

However, as noted above, confidence in large iron structures was shaken by several major failures and no significant iron structures were built in the early 1800s apart from some canal aqueducts, including those on the Stratford on Avon Canal at Bearley and Edston.

As a symbol of Britain's Industrial Revolution, the Pontcysyllte Aqueduct enjoyed a splendid opening ceremony on 26 November 1805 orchestrated by Thomas Telford. Rowland Hunt of Boreatton gave an oration which included such phrases as 'Antiquity has produced no structure, as an Aqueduct, which can compare with Pontcysyllte or with many other of the works we are now assembled to celebrate.' And 'the complete sense of security in which we floated 126 feet above the River Dee, and a just acknowledgement to Mr Telford, to whom it was deservedly a proud day, and who had most happily arranged the whole of our accommodation as well as constructing the wonderful edifice that supported us'. And 'A beautiful picture of the harmony with which all ranks may unite in promoting the prosperity of the British Empire and in diffusing general happiness'.

Praise was also heaped upon other pioneers including: the 3rd Duke of Bridgewater, our first National Patron of Inland Navigation; Mr Darby, who erected the first Iron Bridge; Mr Wilkinson, a late member of this company and an improver and leader of the iron trade in this kingdom; Rowland Burdon, builder of the Sunderland bridge; and the manufactory of Messrs Benyon & Bage in Shrewsbury.

But the final words of a fascinating evening that had reflected social as much as engineering history are from the *Chester Chronicle's* report of the events: 'The Canal Works between the north bank of the River Dee and the south bank of the Ceiriog, consisting of two large Aqueducts, two tunnels and a great extent of deep cutting, will gratify those who enjoy the effects of works of art, when executed on a large scale.'

December 2013: Alain Foote

The History of British Thomson-Houston, Rugby

A near record attendance of 62 members plus 10 visitors heard Alain Foote further develop the history of Rugby's engineering with a review of British Thomson-Houston or BT-H as the company is often known.

This talk well complemented Alain's presentation in January 2013 on BT-H rival English Electric (Newsletter 47), the other great electrical engineering company in Rugby.

Whereas English Electric was an assembly of companies with a common theme of electrical engineering, BT-H arose from the efforts of two American Professors. Elihu Thomson was born in Manchester but when he was 5 the family moved to Philadelphia and at the age of 23, he became Professor of Chemistry and Physics in the Central High School. Edwin J Houston was born in Virginia and after teaching at Girard College, he was elected Professor of Civil Engineering at the Central High School where he later became a Professor of Natural Philosophy.

The subject of electricity attracted both Thomson and Houston and they worked together on developing a dynamo, arc lamps and transformers. An American, named Churchill invited the Professors to join him in forming the American Electric Company in 1880.

The venture failed, but in 1883, a group of shoe manufacturers acquired the company and changed the name to the Thomson-Houston Company which merged with the Edison General Electric Company to become the General Electric Company. The Edison General Electric Company still exists today as GE.

The Compagnie Française Thomson-Houston (CFTH) was set up in 1893, in Paris, as a European sister company to General Electric. Much later, in 1928, CFTH joined with Societe Alsacienne de Construction Mecanique (S.A.C.M.) to form a common subsidiary, which took its name ALS. THOM from the two companies.

Meanwhile, in 1886, the firm of Laing, Wharton & Down was formed in London to sell apparatus made by the Thomson-Houston Company. These included the Thomson-Houston system of arc lighting and high tension AC incandescent lighting. The first contract was for electric lighting in the Eastern district of the City of London.

The new company no longer acted merely as agent, as it had purchased the existing patents of the American company with the exclusive rights to manufacture and sell in Great Britain and Ireland. The British Thomson-Houston Company Ltd. was formed from the old company in May 1896. During the first year or so it had no manufacturing facilities, only a small works and store at Bankside in London. One of the orders, received in 1896, was for some alternators, coupled to Willans engines, for the City of London Electric Light Co. They were built for BT-H by Armstrongs, Mitchell & Co. of Newcastle.

After an interesting speculation surrounding the similar 'logos' of BT-H and GE (which included a tale of a twisted paper clip), Alain moved to the construction of the Rugby works of BT-H. The need for manufacturing facilities had become evident by 1899 and after careful consideration, a site in Rugby was chosen on account of it being central and having good railway connections. About 25 acres of land were purchased for £10,000. Levelling began on 11 January 1900 and manufacturing commenced on March 14 1902. The works were planned for 800 staff and consisted of 14 substantial steel and brick buildings with a total floor space of about 206,000 sq. ft. A number of archive photographs showed the scale of some shops, notably the turbine factory, foundry and machine shop.

The majority of staff moved to Rugby in October 1901. The chief difficulty with the move was the lack of housing for the workers and their families. In 1901, the town was

still lit by gas, the only electrical plant being a small one at Rugby School. At the end of 1902, BT-H supplied electricity for lighting and power in the town with two Willans engines driving BT-H generators.

The works grew substantially during WW1 (with an interesting early example of precast concrete framing) when turbines and generators for naval vessels were made and the manufacture of thermionic valves commenced. Illustrations showed the extent of the works in 1914 and 1924.

The importance BT-H attached to civic responsibility was shown in the War Memorial, designed by Lutyens and now Grade II listed, erected within the grounds to commemorate the 243 employees killed. Later the 175 who died in WW2 were added.

In 1928, some of the country's leading electrical manufacturing companies pooled their resources to create Associated Electrical Industries Ltd. Initially the American company International General Electric (IGE) had a significant shareholding through its holdings in BT-H and Metropolitan Vickers. IGE steadily reduced their holdings and by 1953, AEI was a fully British-owned company. Despite the formation of AEI, BT-H continued to operate independently, although there was some rationalisation of manufacture between the various AEI locations.

Other important developments of the inter-war years were the establishment of the Research Laboratory which grouped a number of the existing electrical development and metallurgical facilities, a new office block and a new lamp works.

At the start of WW2 a factory was built to manufacture complex electro-mechanical predictors for aiming anti-aircraft guns, but production ceased with the introduction of proximity fuses. BT-H magnetos were fitted to all the UK-built Rolls-Royce Merlin engines that powered so many fighters and bombers. By the end of WW2 BT-H was manufacturing a wide product range in Rugby: Steam and Gas Turbines, Turbo-generators and Compressors, Motor-Generators, Converters and Transformers, Electrical Control Gear, Filament and Discharge Lamps, Thyatron and Magnetron Valves and Tungsten and Molybdenum Wires. Other plants around the country added to this imposing catalogue. By 1960 AEI employed some 110,000 people in the UK, but perhaps a portent of the future was the opening of the largest turbine works in Europe at Larn, NI in 1957. Funded by the government (£8 million) it was another industrial white elephant.

The later history of AEI is well known. During the early 1960s the CEGB ordered the construction of new power stations to meet the anticipated need for electrical power. In the event, the forecasts were wildly optimistic, the plans were cut back drastically, leaving power station equipment suppliers with excess capacity. In 1967 came the amalgamation of AEI, EE and GEC. Later, GEC formed a joint venture with Alstom of France to form GEC Alstom which then joined with ABB in 1999. In 2005 Alstom sold most of the business to a management team.

Plentifully illustrated with many nostalgic photographs Alain closed with a review of BT-H products over the years. Many have been mentioned above but others of particular note include: radio and radar sets, torpedoes, the Whittle jet engine, marine propulsion gas turbines, domestic appliances, cinema projection equipment and not least a hand in developing transistors and holography.

Sadly, today many of the old buildings have gone and an aerial view of the site showed much open space planned for redevelopment. But to close on a positive note, there remains in Rugby the world's leading developer of marine electric propulsion equipment.