

INDUSTRIAL ARCHAEOLOGY NEWS

186
AUTUMN
2018

THE BULLETIN OF THE ASSOCIATION FOR INDUSTRIAL ARCHAEOLOGY

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INDUSTRIAL ARCHAEOLOGY NEWS 186 Autumn 2018

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Testing the Waters in Barcelona

The TICCIH Conference in Barcelona April 2018 was held in the Agbar Museu de les Aigües. The full title of this event was 'The international heritage of the water industry – historic values of supply and treatment networks.'

Stephen Sanders

The material remains of industry: industrial sites, buildings, plant, machinery and equipment as well as housing, industrial settlements, industrial landscapes, products and processes, and documentation of the industrial society, all fall within its remit. Members of TICCIH come from all over the world and include historians, conservators, museum curators, architects, archaeologists, students, teachers, heritage professionals and anyone with an interest in the development of industry and industrial society. Although TICCIH members are both individuals and institutions, it is organized through national associations, here in the UK, being the Association for Industrial Archaeology.

The Barcelona Conference in April 2018 concentrated on the water industry and aimed to put the industry's infrastructure into its historic technological and social context, to examine the origins of the technical solutions that have been developed and to compare how they were applied in different cities around the world. The conference room itself had been a large, brick, above ground reservoir and, now redundant, converted into a large meeting room and concert hall. This was the first of several redeployed redundant industrial buildings connected with the city's water supply to impress me.

Delegates were welcomed to the conference by the museum director Sònia Hernández and James Douet from TICCIH. He introduced the inaugural address, given by Professor Martin Melosi, Director of the Centre for Public History, University of Houston, USA. Professor Melosi described the social pressures that led to the need for better water supplies, mostly health driven. He cited the findings of people like Edwin Chadwick and Dr John Snow and explained how the development of a greater understanding of what diseases were – from the idea of miasmatic influences, to bacteriological theory, to the ecology considerations of the present day – have created the mosaic nature of the systems we depend on. He explained that the watercarriers and wells had been adequate until the rapid growth of population in the nineteenth century created an unmanageable need for clean water. Private enterprise could not cope with the investment required and municipal investment was often key to providing fresh water, often from remote sources. As the appreciation of the issues involved in providing clean water improved, so too did the handling of 'hazardous substances' of sewage and waste.

James Douet's own presentation to the delegates was entitled, *What is Significant about the Water Heritage?* This was an explanation of the TICCIH comparative study of the water

industry which will inform the UNESCO report on water supply, the universal importance of water, the history of the water industry and identifying what aspects of the industrial processing architectural heritage is historically significant. He went on to show how the mortality rate fell as water quality improved, how the introduction of the steam engine helped, how water could be brought from further afield and how the size of water processing facilities grew to keep pace with the increasing demand.

Rolf Höhmann of the Büro für Industrie-archäologie in Germany delivered a paper on *Pre-industrial technology for water supply*. Using the German city of Augsburg to explain both the way water supply was managed and had evolved, he illustrated the difficulties of working with limited historic material and the absence of industrial archaeological remains. He explained why Augsburg had been selected for the study and raised the significance of water used by those in authority, be they princes or states, to show how powerful they were – princes building fountains and states building water towers.

Professor Susan Ross talked about the management of the water supply to the city of Montreal. She told the conference how reservoirs had developed at various places on the adjacent mountain over time and how they had been maintained, some as parts of the landscape, some as enclosed treatment plants. There were many contentious issues surrounding aesthetics, ecology and security of the city's water supply. Professor Ross implied that commercial considerations too often held sway. She finished by emphasising the importance of 'water rights' and the importance of public dialogue.

Barcelona developed its industrial revolution without coal, water or minerals. Dr Manel Martin told how the City developed through the nineteenth century with references to many of the spectacular buildings that were built to quench the thirst of a rapidly growing conurbation. He explained how not all were as successful as the entrepreneurs had hoped. A magnificent water tower had been built too near the coast. It produced water too salty for public consumption and so was used to serve nearby industry and fire brigades. High in the hills behind Barcelona there is a water tower with an exceptional lift to carry staff and visitors to the top, from where spectacular views of the city can be enjoyed. Its elevated position meant that it could keep even the tallest buildings adequately supplied. As Barcelona became a modern European city, it lost its medieval heart and its ancient walls but gained refurbished old and impressive new fountains.

Dr Jorge Tartarini from the Museo del Agua in Buenos Aires described how a town whose principal industry had been contraband, grew into today's Buenos Aires. Founded at the time of the conquistadores, as its population increased a water industry had to develop. Outbreaks of water borne diseases, particularly cholera, proved

COVER PICTURE

Knappenrode, Saxony. The business end of a brown coal bucket wheel excavator. The wheel is 10m in diameter and the adjacent figure gives an idea of scale. See page 4.



too much for the water carriers who provided water for most of the citizens and even for the rainwater wells favoured by the better off. This was in spite of the precaution, taken by the wealthy, of keeping a small tortoise in their wells to purify them! The first clean water was brought into the city by the railway company and shared between the engines and the station's neighbours! The city commissioned the Irish born engineer John Coghlan to build the first water treatment works anywhere in the Americas. This was superseded by more efficient plant in an enlarged system by John Bateman, the British engineer. The project was so grandiose that Doulton decorative tiles were imported from the UK to grace the building.

The final presentation was a detailed account of the spectacular Bubene waste water treatment works. Dr Sárka Jiroušková is the administrator of the Bubene in Prague. It was in use from 1907 until 1967 and currently its building serves as a museum of Prague's sewage system. It was designed by William Heerlein Lindley to cope with the sewage from Prague.

The following day was devoted to site visits and again, very rewarding. The city has several historically interesting water pumping stations and storage and distribution buildings. Delegates were taken to the Torreó del Tibidabo water tower, the Casa de les Aigües steam engine and pumping station in Montcada and the Torre de les Aigües del Besòs in Poble Nou. All fine buildings, but for me the last place we visited was the most spectacular redeployment of a structure. An enormous brick-built reservoir, originally constructed to supply water to fountains in a nearby park and designed to resemble an impregnable fortress is now converted into the library complex of one of the University Campuses.

The conference was very well organised, interesting and informative, and we would like to acknowledge and thank the Peter Neaverson Travel Bursary and the Council of the AIA for their support in attending this event

Casa de les Aigües the pumping station in Montcada, on the outskirts of the city, has two vertical engines by Alexander Brothers of Barcelona photo Mark Watson

Ode to Joy

IA News 185 included a plea to mark the month of May as Chimney Month by serenading your local industrial chimney with a rendition of Beethoven's Ode to Joy. This action was in line with the call launched by Plácido Domingo and Europa Nostra, the 'Ode2Joy Challenge' – to perform the piece in front of or in a historical monument or site. EFAITH translated this call into a campaign to call attention to factory chimneys, and asked everyone to perform this famous piece of music near a chimney on 9 May.

Unfortunately *IA News* was distributed too late to have an effect in Britain but there were performances elsewhere in Europe.

To see what did take place – search – EFAITH chimney serenade – and you will be able to watch and listen to all the 14 entries. The Santorini Tomato Factory won the vote with 51% of the

total. It would seem that the local town was fully behind the performance and was united in placing their vote.

The United Kingdom had only one entry but in the opinion of the editor and everyone he has consulted, their performance was the best, although they only took a measly one per cent of the vote (bit too shy we are for this sort of thing – pity). Our entry came from Yorkshire where the Langcliffe Singers had chosen Langcliffe's own Hoffman Lime Kiln to sing the piece.

Singing in the original German they made two recordings inside and one outside, aided by a passing train and some particularly lovely birdsong! Well worth a moment — search — Langcliffe Singers Hoffman kiln.

The kiln was built in 1873 and ceased production in 1939. The chimney survived until 1951 when, the day before the intended demolition, it collapsed with nobody to witness it.

A different way to celebrate chimneys was in a small village in the province of Limburg, Belgium where – thanks to the mayor – a piece of art symbolising a flame was fitted to the top of a chimney of a former brickworks. Almost the whole village, including the brass band and local politicians were present and there was an impressive light and sound show after dark.

Industrial chimneys are the subject of Robert Carr's piece on page 12.



Adorning the chimney at Limberg

AIA Spring Tour 2018 to Saxony

The 2018 AIA Spring Tour set out to investigate the very significant industrial area of Saxony and the Erzgebirge (Ore-mountains) in the former East Germany which form the natural border with Bohemia to the south and which had important mining interest from the Bronze Age to the Atomic Age.

John Copping

Professor Helmuth Albrecht of the Technical University of Freiberg provided much of the information and a provisional itinerary for the tour. On the first evening he talked about the industrial archaeology of the region and especially about the efforts to get the area listed as a World Heritage Site – see box.

The first visit was to the Sächsisches Industriemuseum in Chemnitz, the first of several ERIH anchor points. The survival of industrial heritage can be a precarious matter, no better exemplified than by the numerous holes drilled below the dado line of the engine house ready to accept the dynamite charges which were so nearly used to destroy the site. An eclectic range of displays included a range of old cars presented in a multi-storey bookcase, a Trabant sleeper-car, the tent over the roof apparently erectable within three minutes, and a minuscule electric car dating from 1921. There was discussion about the artistic form of presses from the 1880s against that of the robot endlessly repeating the same weld on a VW car body. A range of textile machines was operated with enthusiasm by a staff member, demonstrating how a razor blade cuts the slot between the bindings of a button hole. Typewriters and telephones were made locally until the major de-industrialisation of the early 1990s.

The Ernemann Tower 'nearly a sky-scraper' was on the day just a cloud-scraper, but offered oversight of Coventry's twin city. An advertisement for Zeiss Ikon on the wall explains its earlier links with cameras and film, but closure came in 1990. Visitors young and old(ish) are given the opportunity 'to experiment with and explore natural phenomena, scientific foundations and the most recent achievements'. Apparently a 'smart' material has a state that can be changed repeatedly, requires a trigger necessary for that effect and an application that can usefully use these changes. Population and its growth rate is monitored by continent; apparently the world had gained 26,003 people between opening time and the time of our visit, a sobering thought. We have all blown bubbles, but one member was bold enough to stand on an island in a lake of soapy water and have a tubular film the shape of a cooling tower drawn up to head height around him. Another floor offered reminders of Bletchley Park and Babbage.

In cold climates freezing of water lying in the working parts of a gasholder can pose problems so they need enclosing; two of 1878 were in elegant 'windowed' buildings reminiscent of the

Albert (of Saxe-Coburg-Gotha) Hall, followed in 1907/08 by one within a huge concrete frame, now pending adaptation as an open air theatre. Alongside, the remaining 1878 model offers an ingenious heritage adaptation. On entering, one passes a curved perspective of Dresden in mediaeval times. Further round, well-presented bays reflect the ruling families, development of the Lutheran church and early exclusion of Jews from owning property – until one Jewish family helped the ruler out of financial troubles. After passing a C18 bell recovered from the Frauenkirche following an aerial visit in 1945, a right turn enters the huge central space encapsulated by the enormous cylindrical mural known as the Panometer. It depicts life in the city around 1750 and offers a fifteen-minute son-et-lumière from pre-dawn to post-dusk. One notices the wood-framed farmhouse burning on a distant hillside, which may suggest why few thatched houses were seen on the tour.

The evening was spent pleasurably ploughing steadily up the Elbe and back on the second oldest of Dresden's eight paddle streamers, the Diesbar. One did not have to be a crank to admire the elegant machinery rotating and reciprocating in the engine room below its glazed roof. Admiration was expressed for the extremely smooth turns made by the craft at each end of its route: also of the Meccano-set bridge known as the Blue Wonder.

At Grossroehrsdorf, opportunity had been taken to present and use for interpretation a range of machinery most of which was in productive use barely twenty years ago. The earliest was Mr Hans' simple loom of 1680. Alongside was a simple multi-loom, the shuttle mechanism operated manually. Capable of working only twenty minutes at a stretch, the men of the town must have had broad shoulders. Mechanisation put at threat the home-worker with his necessarily simpler loom. Attempts were made to introduce legislation to effectively ban the more productive machines but it was difficult to draft definitions that were not open to challenge. A particularly interesting loom used the Jacquard principle but involving a board with pegs rather than the expected punched cardboard. Franz Dietzmann, from Professor Albrecht's department, is to be thanked for his very proficient translation.

Brown coal or lignite has been a major energy source in Germany up to the present. The Energiemuseum at Knappenrode was built during the first war to convert raw lignite, with its 60% water content, into dry briquettes. The chance discovery of a demonstration adit permitted a few of us to handle the raw material, much like shredded tree trunk, lacking only the huge pressure from above that would have turned it into black coal. A process built into two passes from top to bottom of the factory through seven stages ended in forming briquettes at the rate of one a second from mighty reciprocating presses – literally mass production. Conveyors carried the

output direct to road or rail trucks, a proportion no doubt recycling as fuel for powering the processes. Despite attempts to continue and export, the plant closed in 1993, being converted to an industrial museum and another ERIH anchor point.

A visit to Drei Bruder Schacht near Freiberg broke up the return drive and gave us the opportunity to understand how important underground water management still is, long after mining activity has ceased. This, combined with the description of the disused underground hydro-electric plant based on the water flow led to the intriguing suggestion that it could be brought back to life as a source of green energy.

There are limits to where you can safely go at a site involved in mining uranium, first called pitchblende around 1789, so much of the story was explained in the WISMUT HQ building. During the period 1946-91 it became the fourth largest producer in the world. The possibility emerged that the USSR had identified it as a strategically important target to be consolidated within the division of Germany in 1945. Again it was becoming unprofitable around 1990. The comprehensive plan for remediation apparently incorporates a golf course – a site visit that invited some thought.

After twisting down wooded valleys the coach turned a corner and there it was above us, Goltzsch Valley Bridge. Started in 1846 to permit rail access across the valley it was the prototype curved stone arch bridge and today the largest brick built bridge in the world, reminiscent of the rather earlier Pont du Gard. A rail car blessed us with a crossing, although a couple conjectured that the Red Arrows should have appeared through the arches. The civil engineers enjoyed it, some rude mechanicals possibly favouring the operational Trabant parked nearby – the first seen outside a museum.

The West Saxon Textile Museum at Crimmitschau, the town of a hundred chimneys, is another site that stopped production in the early 1990s. The problems of the closed economy of the DDR in its later years obliged inclusion of used fabric in the threads of both natural and synthetic fibres, presumably much as the processing of used fabric deposited at the local tip today. The weaving processes were interpreted in physical terms by a previous employee.

The final historic weaving mill at Braunsdorf, undamaged during the war, reflects the large-scale production for which heavy machinery was installed in 1910. A few machines had already been removed just after reunification before the scope for presenting the heritage was fully recognised, so further examples have been installed to complete a comprehensive collection. The leat serving its original water-wheel now serves the active mill next door.

The fourth morning presented three different industries but each of them ancient. The lime works at Langefeld offers an imposing architectural façade, fronted by four Rumford



Knappenrode. Briquette presses, each one turning out one briquette per second



Kalkwerk Langefeld. Three of the limekilns.



Braunsdorf. Warp threads entering the loom.



Goltzsch Valley Bridge with the assembled party

All photos by Bill Barksfield

A World Heritage Site?

The Erzgebirge possesses an outstanding variety of raw materials in a small geographic area, starting with silver, via lead, tin, copper, iron, cobalt, arsenic and zinc through to uranium as well as other raw materials such as clay, kaolin, lime marble and coal. Mining has been in progress for over 800 years and has created not only surface underground mining installations but also development of many towns and settlements. There is a campaign to have the 'Mining Cultural Landscape of the Ore Mountains' inscribed by UNESCO as a transboundary cultural heritage landscape of outstanding universal value i.e. a World Heritage Site. The original bid comprised 85 component parts, 79 in Saxony and six in the Czech Republic. This has now been reduced to a serial nomination of 22 component parts, 17 in Saxony and five in the Czech Republic. It has been a major exercise to bring together all the parties from these settlements. The AIA wishes Professor Albrecht and his associates every success with the nomination.

Marilyn Palmer

kilns erected from 1818 to 1853, backing onto the original open-cast workings, pocked with adits for the later underground mining. The raw limestone, lifted from below, entered at height in wheeled tubs to be fed to either the kiln for 'binding' lime for building, or to the one to be used for agricultural purposes. A companion (un-named) mentioned the load of balls displayed in one chamber, apparently for crushing the ash, which could be retained in the mix used on the land, an impressively pragmatic option. A change of production to terrazzo chippings occurred in 1975. One kiln was converted to a museum in 1986, well before the changes of 1989/90 and since. The demonstration of the slaking process posed minor issues of H&S but permitted one member to get 'hot finger', a syndrome perhaps more common among AIA members than others. It was an atmospheric site articulating the longest-standing industrial process of all.

Mining for silver and other ores started at Lauta in 1833. From 1838-77 there was in operation the original horse gin by which men and materials were moved down or up the shaft. A faithful replica was built in the 1990s, comprising a substantial shed over the head-gear and the elegant roof over the capstan and horse-riding, both beautifully crafted. The option to enclose it totally was apparently rejected. It was impressive how immediately the rather elegant horse, missing its previous companion, responded to the signals by bell from inside. In a room beyond a display workshop was a ten-metre long wood, cork and moss model in the local style of the numerous characters of the brothers Grimm, Rumpelstiltskin dancing a jig in perpetual circular motion.

Water is abundant in the Erzgebirge so it was no surprise to visit water-mills, but the hammer-forge at Frohnauer was special for many. The cavernous workshop, rebuilt in 1692 is served by two water-wheels, one operating the bellows for the two forges by an interesting overhead mechanism of wooden spars. The three tilt-hammers of increasing weight operated each more slowly but the precise rate of striking was controlled by an iron stylus falling from above which engaged in a plank perforated like a huge cribbage board. A new oak shaft, twelve metres long, around a metre in diameter and weighing twelve tonnes, had recently been fitted. Fortunately, that need is expected only every thirty years.

Carl Thorsager, on an AIA trip for the first time but established authority within Norway, kindly offered to pitch the journey on the Fichtelbergbahn from Cranzahl to Oberwiesenthal in the strategic context of continental narrow gauge steam railways. He regards the track and infrastructure as good with nothing particularly exceptional. The gauge of 750mm is pretty standard across Europe, except in Austria where 760mm is the norm. He suggests we should be relieved that so many railways survived in the old DDR, as many in the BRD have been closing down. The maintenance of engines is key and Germany, respecting sound workmanship, has at Meiningen the most



Hammer Mill at Frohnauer

esteemed workshop on the continent. There are some of equivalent quality in the UK, so some engines are brought across the Channel for overhaul. Meiningen services all the engines of the DDR and some 30% of those of the former West Germany. The two engines seen on the day were judged in excellent condition. However, with the recent closure of the depot at Gera, the continuing success and sustainability of Meiningen is increasingly critical. The narrow gauge railways in Saxony now form three privately-owned companies.

It is hard to envisage the scale of open-cast mining in Braunkohl. The historical map shows a fan of successive excavations configured rather in the style of the local slated roof, but each 'cut' maybe a hundred meters wide and a few kilometres long. The bucket wheel excavator of 1968, 62 meters long and weighing 1342 tons is dwarfed by the later overburden spreader, interestingly as late as 1985, which stretches to 202 meters and weighs in at 2424 tons. Each can move at 5-6 metres per minute, needing their exceptionally large tracks to progress over soft ground. These monsters were operated by just two men, or maybe women, with a third on the ground as an independent pair of eyes. Our voluble guide knew his subject, having researched the manning, management and conditions of the workforce through the years of the Third Reich and the Communist era. He drew attention to the landscape stretching almost to the horizon in each direction to indicate the standards to which the original topography could now be reinstated.

The short visit to Leipzig will be remembered more for the numerous darkly clad people supporting Faust – the Rock Opera than for the city's railway station. As the coach drew slowly

away, a score of old hearses, including a Wartburg or two as well as a few Trabbis, passed in the other direction occupied by Faustian characters. One industrial archaeologist at least found it difficult to identify Mephistopheles.

The final visit was to the site of a coal mine, this time for black coal, but closed as early as 1971 when it became substantially mined out. As access underground is not feasible, it presents well the rail-system, trucks and cages for moving men and materials both up and down the shaft and around the over-ground facilities. The mine mock-up at lower ground floor level was regarded as less successful by some, but offered an impression of most phases of an extensive system in a small area, although one was conscious that passage heights had been adapted for visitors. Even then, several appreciated the provision of hard hats. But the magnificent steam winding engine, now turned electrically, which was in use from the 1920s to the closure of the pit, put a smile back on some people's faces. Also several will have been attracted by the mighty railway engine parked outside. That was the end of the shift.

It was sad to learn that so much of the reputable traditional industry of Saxony that had survived through the post-war period to the changes of 1989/90 had found need to close by the mid-1990s. The passive effects of a closed economy becoming open to external pressures are recognisable. It remained unclear whether that situation was exacerbated by active influences emanating from outside the old DDR.

Thanks are once again due to Bill Barksfield for his overall organisation; also to Professor Albrecht and Franz Dietzmann for helping to illuminate several of the site visits. The hotel and gradually the weather served us well too.

The Henry Ford Museum at Dearborn, Michigan and a shopping expedition to dream of

In 1928, on a visit to England, Henry Ford met Henry Frederick Morton, an engineer at Ford's plant in Trafford Park, Manchester. Morton had knowledge of early engines and was a member of the recently formed Newcomen Society. His interests were known to his managers, who had him sent to look at old engines at the request of the 'Chief Engineer' in Dearborn. Ford outlined to Morton his plans for his Institute to celebrate the genius of Edison, and said that it was to include a representative sample of early steam engines. Morton told Ford 'that just enough specimens are still in existence to enable the project to be carried out but the cost of obtaining them, and their dismantling, shipping and re-erection might be enormous'. Ford considered this for a few seconds and then said "Well I'll tell you – I'll spend Ten Million Dollars".

Prof David Perrett

Originally published in the *TICCIH Bulletin* Nos 78 and 79 and reproduced here with kind permission.

In the 1920s, Henry Ford was the third richest American with a personal wealth of \$200 billion in today's terms. While reducing his role in the company, he was extending his diverse historical interests. Ford's early life was on the family farm in Dearborn, a small community west of Detroit. 1879 saw him apprenticed to a ship-builder in Detroit and on returning home he helped maintain some steam powered farming machinery, so starting his lifelong fascination with steam. In 1891 he joined the Edison Illuminating Co. in Detroit as an engineer working on steam-driven generators, rapidly becoming Chief Engineer. He met Thomas Edison in 1896 with hopes that Edison would encourage him to develop a 'horseless carriage', but that was not the case, so he left and in 1899 started his automobile company.

Nevertheless, the pair later became great friends. In the mid-1920s Ford developed plans to build a museum like London's Science Museum. The Edison Institute along with Greenfield Village was to be built in Dearborn alongside a new motor factory. A major gallery was to show a fully comprehensive history of both stationary steam power and steam locomotion.

On 31 March 1928, Ford and his wife Clara, travelling *incognito* as Mr & Mrs Robinson, along with his private secretary Frank Campsall, sailed from New York for England. They soon blew their cover, so by their arrival in Southampton on 6 April the press and politicians were aware of their visit. Speculation centred on Ford seeking site(s) for major new car plants. With the exception of a visit the day after arriving in London to land purchased at Dagenham, Essex, site of a future Ford factory, business was not the prime aim of the visit. It was much more about filling his new Institute.

Neither Henry nor Clara kept records of this meeting or of their travels with Morton around Britain looking for suitable engines to buy.



Fairbottom Bobs in the 1880s. This 22 x 16in sepia photo donated by Roger Francis to the Ironbridge archives shows the engine 40 years before Henry Ford saw it.

However, Morton wrote a memoir titled *Strange Commissions for Henry Ford*. When privately published in 1946 the printer advised that he only print 100 copies, given the specialist subject, so it is very rare. On retiring in the 1960s Morton wrote a fuller account called *Spend me Ten Million* which was never published. Some of Morton's records are in Chetham's Library in Manchester U.K. and the Benson Ford Research Center at The Henry Ford in Dearborn, USA.

The following morning Ford insisted that they visit the Science Museum even though Morton said it did not open until 10 am. A surprised doorman was persuaded to tell the Director that a Mr Ford had come to visit. They were shown round with Ford offering to buy Stephenson's Rocket and the 1788 Boulton & Watt Lap engine. His offer was rejected; they were national treasures but Morton would be allowed to make measured drawings. Robert Stephenson & Co of



Fairbottom Bobs under reconstruction at Dearborn with five fewer courses of masonry to allow it to fit in the building

Darlington searched their archives for drawings but with little success. At the end of April Morton visited Stephenson, who agreed to build an 'exact' working replica using Morton's drawings and in July, £2451.7s.2d was sent for the work. All transactions for Ford by Morton were informal and the cashiers were told not to question any of the money requested. The replica was completed in May 1929 and after a short U.K. tour was shipped to Dearborn. Morton approached Hick Hargreaves & Co of Bolton to build the replica Sun and Planet engine. Amusingly, they told him that it was a very old design and they could build him a much more modern one! The replica, completed by 1930, is still in the Henry Ford Museum.

Leaving London, they went to Warwick where its horse-hauled steam fire-pump attracted Ford. The Birmingham Navigation Co. showed them the 1777 Watt engine that worked until 1898 at Ocker Hill Pumping Station. Ford was astonished to see something so large and so old. They then went to Lawley St. Pumping Station where the 1812 Watt engine was still working. Ford's party now met the Warwick & Birmingham Navigation Co's manager, who took them to Bowyer St. Pumping Station with its giant 1796 B&W engine which, having stopped in 1854, was in a sorry state. Ford instructed Morton to try and obtain all three engines and their engine houses. Eventually Morton secured the Lawley St and Bowyer engines. The Smethwick (Ocker Hill) engine survives in Birmingham's Think Tank Museum.

Their next task was to find and secure a Newcomen Engine. Morton was able to show Ford the 1795 Newcomen Engine at Elsecar in South Yorkshire, which because of a failure in the colliery's electric pumps, was back in steam. Earl Fitzwilliam stated categorically that it was not for sale. Morton knew of a Newcomen Engine on a former colliery east of Manchester. This engine,

popularly known as Fairbottom Bobs, dated from c1760 but, having stood in the open since stopping in 1827, was totally derelict. Ford was so impressed that he jumped on Morton's shoulders to see into the cylinder but they collapsed to the ground laughing. Even in its dire state Ford instructed Morton to acquire it. Henry and Clara returned to London where, seeing Bennett's clockworks in the City being demolished, he told Morton to buy it, too. Passing a steam wagon in the street he wanted one also.

After their month's stay in Britain, on 2 May Henry and Clara Ford sailed back to New York. Herbert Morton was left with the task of acquiring the engines and buildings Ford had visited, dismantling them and shipping them to Dearborn for re-assembly there. This in itself was a major task but Ford's wish list for his museum extended to many more engine types than he had seen on his UK holiday and Morton was charged with finding and obtain the desired examples.

So he started working full time on the direct instructions of Henry communicated via Campsall from Dearborn. Telegrams with short messages such as 'buy Warwick Fire Engine' survive in Chetham's Library, Manchester. It was not only steam engines that Ford wanted. He was also after a Welsh woollen mill, a Cotswold cottage and a village smithy. Morton had to arrange for, not just the construction of a replica Stephenson's Rocket, but also for the Boulton & Watt Lap engine, which the Science Museum had told Ford he could not buy. A request to buy Cugnot's Steam carriage exhibited at the Musée des Arts et Métiers in Paris was also rapidly turned down. There were trips to Germany in search of early diesel engines. The Fords also wanted large numbers of other antiques to be sourced, bought, carefully packed and shipped to the USA.

The task of identifying the true owners of engines such as Fairbottom Bobs was a challenge

in itself. Eventually it was gifted by the Earl of Stamford's Trustees in return for re-building a bridge over the nearby river that had been washed away. For others, the cost was the purchase of new electric motors to replace the steam engines, as in the case of a beam engine acquired from Coalbrookdale.

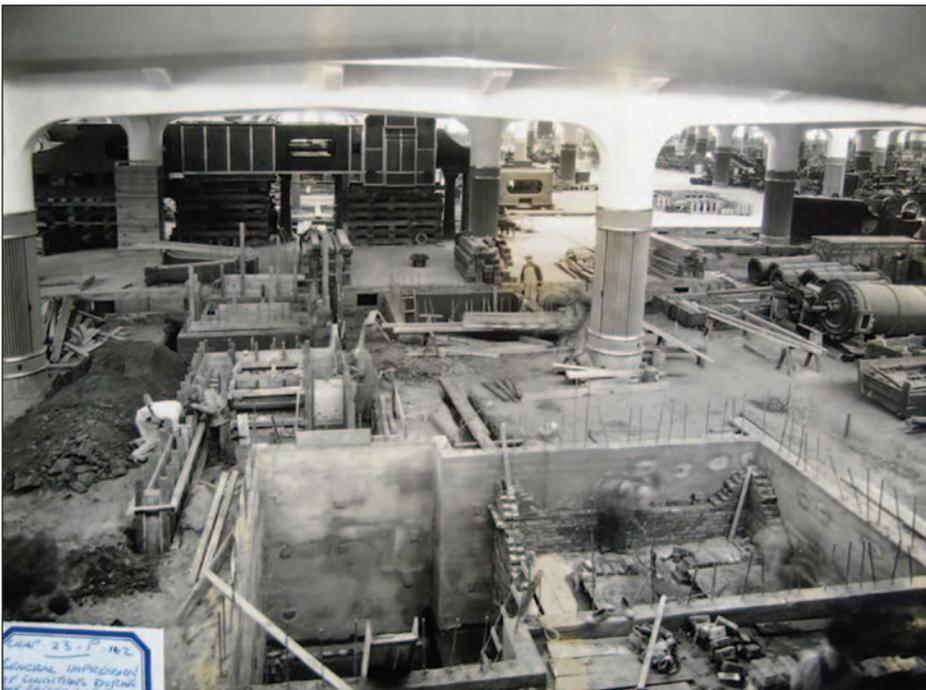
At Fairbottom, Morton and a small team of workers crudely excavated around the remains of the engine and other surviving structures. Some 25 years earlier the rotten beam had finally snapped with part falling down the mine shaft. Grappling tools failed to recover much, so Morton had himself lowered down the mine shaft to seek any missing parts. All the components of the engine including the masonry beam support were carefully numbered, crated up and shipped to Dearborn.

Removing the B&W beam engines from Birmingham did not require excavations, but the careful removal of the entire pumping stations without the citizens knowing their heritage was on the move was the essential. A local engineering contractor did the work, not knowing where the engines were going or who had acquired them. The challenge with the 1811 engine at Lawley St was the sheer weight of the components including the cast iron beam.

By late 1929, Morton had collected a total of three Newcomen engines, 19 stationary engines including two enormous Boulton and Watt pumping engines from canal pumping stations in Birmingham plus the replica lap engine, two steam generator sets, four marine engines, four early boilers, seven mobile engines and traction engines, two steam fire engines, three steam turbines, four hot air engines, eight oil engines and the Rocket replica, as well as a great number of minor artefacts.

At Christmas, Percival Perry, Head of Ford UK, informed Morton that he was to go to Dearborn to reconstruct the engines in the Edison Institute which was next to Ford's newly completed River Rouge complex. Parts of the plant had been designed in an innovative style by the foremost industrial architect of the day, Albert Kahn. It was the world's largest integrated factory covering 16 million ft² (1.5 km²) on a 1,212-acre (490 ha) site. Ford commissioned local architect Robert Derrick to design his museum but the main exhibition hall extending 400 ft. (120 m) is essentially Kahn's structure as is the factory. The facade is a replica of Independence Hall, Philadelphia. Edison himself had partially opened the Institute in October 1929 just three days before Wall St crashed. Next to the main museum and extending to 240 acres (970,000 m²) is the outdoor museum, Greenfield Village, where Ford re-assembled many historic buildings including much of Thomas Edison's Menlo Park research complex, the Wright Brothers workshops, Bennett's watch shop from London, etc. In addition, he built his personal railroad and a lake on which a rebuild of Edison's paddle steamer sailed. Initially a private museum, it opened to the public in 1933.

Morton, working with a team of local engineers and builders, started to re-assemble the engines, making any missing parts. Kahn was annoyed that Morton required major changes to



Henry Ford's museum under construction



The Ford Museum today

the foundations of his exhibition hall to accommodate some of the engines, whilst Morton was annoyed that the ceiling of the finished hall was too low for some of the engines. The support pillar for Fairbottom Bobs' beam had to be reduced in height by five masonry courses and the local team had to make a new beam of American oak. In one of their few disagreements, Morton had the beam adzed to look more authentic but Ford insisted it be planed 'fine and straight'. While Ford was away Morton had it covered with a crude coat of coal tar, giving an appearance that Ford said looked fine. The waggon boiler taken from Ashton Vale does not appear to have survived the journey so the haystack boiler sourced from J & J Charlesworth's Rothwell Haigh Colliery south of Leeds was installed. This boiler may have been used with Old Sarah, a Newcomen engine that worked at the same colliery until 1917 and was dismantled the following year.

The other Newcomen engines, one from Moira in Leicestershire and the other from Windmill End, Netherton in the Black Country, were rotative engines and required the excavation of the museum's floor to accommodate them. In the case of the older engines shipped to Dearborn, Ford required that the engine houses were also re-constructed as near as possible, but it is impossible to say how well this was done since only photographic records survive plus a few crude drawings by Morton himself. The dozen other engines acquired from all over England are generally smaller and would have been somewhat easier to remove from their engine houses and ship to America. However, fitting them all into the space available in the exhibition hall must have presented a challenge.

Following the first prolonged trip to Dearborn, Morton had further working stays in 1931 and 1932. By early 1933 he was under

pressure from his bosses in England demanding to know what he was up to. On 1 April, Campsall wrote to him saying that he was to cease all 'research', to which Morton replied that he had devoted too much of his life to the task and since his job at Trafford no longer existed he regretted the situation. On 9 May he resigned from Fords, becoming Bandmaster to a local Regiment. He always regretted that Ford had not personally supported him. In 1937 he joined the De Havilland Aircraft company and was appointed Chief Engineer, retiring in 1952. He died in 1966.

Although some items Morton had gathered and shipped were sold off by the Museum in the 1980s, most are still in the exhibition hall where Morton placed them. Without Morton's knowledge and Ford's enthusiasm, our knowledge of the Industrial Revolution in Britain would be significantly less.

Painting the bridge

The Iron Bridge in Shropshire will be returned to its original colour, English Heritage announced in May. This follows the discovery of samples of the bridge's earliest paintwork during the charity's £3.6m conservation .

The charity took advantage of the enormous scaffolding currently covering the bridge to undertake detailed research, looking for samples of the earliest historic paintwork. Detailed analysis of those samples revealed that the world's first iron bridge was originally painted in a very dark red-brown lead-based oil paint – the same colour as depicted in William Williams' 1780 painting, *Cast Iron Bridge near Coalbrookdale*, one of the earliest depictions of Abraham Darby III's pioneering structure. English Heritage's Senior Property Curator, Dr Heather



Sebire, said, "Uncovering the original colour of the Iron Bridge has been a fascinating mix of both archive research work and detailed forensic investigation. We had already found some clues in the archives but the decider was the results of our analysis of the historic paint

In recent years, extensive surveys and investigations by English Heritage revealed that

the historic structure was under threat from cracking due to stresses in the ironwork dating from the original construction, ground movement over the centuries, and an earthquake in the nineteenth century.

Following cleaning, the historic ironwork has already been protected with a layer of primer to prevent further corrosion.

Six painters will have used 2,400 litres of paint, to protect the historic ironwork in a similar way to the paint system used on the Forth Bridge.

At £3.6m, Project Iron Bridge is English Heritage's single largest conservation project since it became a charity in 2015. Last year, the charity announced a €1m donation from German funder the Hermann Reemtsma Foundation and launched its first ever crowd funding campaign to coincide with the start of works, with members of the public giving £47,545 to support the project.

Caithness impressions

On 22 June a group of regular AIA conference goers and others set off by coach from Inverness to travel north to Wick for a conference under the banner of the Scottish Vernacular Buildings Working Group and the Scottish Industrial Heritage Society after the AIA had withdrawn in favour of its own conference taking place in Nottingham from 31 August. The Wick week was to prove a great success with support from numerous local sponsors.

Chris Barney

Three principal eras of industry characterise Caithness. First came the herrings which began to be exploited after 1803 when the British Fisheries Society, which had been founded in 1786, adopted Telford's plan to improve the harbour. This was extremely successful and by the 1860s Wick could be described as the 'Herring Capital of Europe' with over a thousand boats working there in the season and ten thousand workers employed afloat and ashore. The greatest catch was said to be 25 million herrings in a single day. The society also built houses for the workers and for the shareholders, creating Pulteneytown to the south of the harbour, named after Sir William Pulteney, Thomas Telford's patron, and to Telford's plan. Most of this survives and we had a conducted tour led by Jenny Bruce. She is a leading light of the Wick Society, which has done a huge amount for the history of Wick and its surroundings, and had helped to develop much of the programme for the conference. Later in the week we visited the Wick Heritage Museum which has an amazing collection depicting the life and industry of the area and has been created in three of the original fisherman's cottages. The one remaining traditional herring drifter, the 44 foot *Isabella Fortuna* was in harbour about to sail to Portsoy Boat Festival. Built in 1888 with an auxiliary Kelvin engine fitted in 1919, replaced in 1929 with a 66hp K3, she has been superbly restored by the Wick Society and we were able to go aboard and examine every detail.



Breakwater at Castleton harbour built of Caithness flags. Placing them vertically was shown to make them less vulnerable to wave action

Herrings were followed (or overlapped) by flagstones. Most of Caithness is made of a Devonian sandstone and in many places this can be quarried and split into large thin slabs like slate. It is very hard, strong and impermeable which makes it ideal for paving, while the thinner sheets



Thomas Telford bridge on the Wick to Thurso road – now bypassed

All photos: Chris Barney

can be used for roofing. At one time it was being exported all around the world for street paving including Australia (Sydney and Melbourne) and New Zealand (Christchurch). All the Caithness towns have used it and many of the buildings, even outbuildings, have flagstone floors. Compared to precast concrete the stone is obviously expensive but it is having a moderate resurgence for conservation work; when first exposed it is black but weathers to a golden colour from the iron which it contains. We were able to visit Castletown, east of Thurso, where there had been quarries and from whose harbour much of it was exported. There was a small but interesting museum there showing the work. We also visited to a quarry and works, Caithness Stone Industries Ltd, where they are working it, not only for paving but also for tombstones, worktops and for small items such as clocks and coasters.

The third significant industry was and is energy. Dounreay, a few miles west of Thurso, was chosen, partly for its remoteness, as the site for a series of experimental atomic reactors. The first, commissioned in 1958, known as the DMTR, was for testing the effect of radiation on various materials; it shut down in 1969. Meanwhile the iconic Dounreay dome (which is really a sphere) 41.5m in diameter, had been constructed and this, the Fast Reactor (DFR), operated from 1959. The object was to determine the feasibility of the 'fast breeder' process. It ran, producing about 14MW of power until 1977. The process was considered a success and the third reactor, known as the Prototype Fast Reactor (PFR) was built and ran from 1974 producing 250 MW. A political decision was made in 1988 that this was not the road to pursue, partly as the world's stock of uranium was then realised to be much larger than originally thought. Now the extensive site is being dismantled, an expensive process that will take many years. The site security is very tight so it took a long time to gain access, following all

the procedures. Once inside the group was driven around and, although not able to see much, we obtained a very good impression of the scale and complexity of the whole site. The dome itself was not accessible but we had lunch and discussion in the original DFR control room, now stripped of its equipment; this is now in the Science Museum store awaiting re-erection. Although we did not see much detail, it was a privilege granted to very few to get as close as we did.

The original decision to develop Dounreay was also mindful of the need to develop employment in the area which it has done but, in addition, a great many workers, particularly specialists, moved to the area and the town of Thurso expanded threefold. The newcomers were known as the



Control room from the 1972 DMFR at Dounreay now reconstructed at 'Caithness Horizons' in Thurso

'atomics' but integration was a success and the town continues to thrive at least for the present. The 1960s housing areas provide an interesting contrast to the planned town developed by Sir John Sinclair, the agricultural reformer, from 1812. In Thurso there is another excellent museum, Caithness Horizons, which covers the history of the area back to the Picts but is primarily about Dounreay and has on display the control room of the second, 1972 DMFR reactor. A temporary exhibition on industrial heritage curated by Jenny Bruce coincided with the conference and ensured

local engagement, via schools' responses to heritage packs supported by several business sponsors of the conference. Others of her panels, packed with information, also turned up in Berriedale Church and our lecture venue in Wick. As everywhere, we were made very welcome.

The archives of the whole UK nuclear industry are being transferred to a new and very impressive building at Wick which we were able to visit and see some very interesting documents which had been put out especially for us. When it is all assembled we were told that it will be second only to the National Archive at Kew and as some of the material relating to waste storage may need to be available in thousands of years there is a suggestion it should be transferred to parchment!

Traditional energy was evident in the great number of water mills which still survive – in all conditions from dire to well restored and producing flour. Two aspects were new to many of us; the climate conditions mean that the corn cannot be dried in the field so that the farms have 'kiln barns' attached to them – small, often round kilns at one end of their barns and unique to Caithness, Moray, Orkney and Shetland. After threshing the grain still needs further drying before milling so that most of the mills in Scotland are equipped with furnaces to do this, their upper floors perforated in the same way as a malt kiln. Husks from the first stage of milling are used for fuel. Caithness is too far north to grow wheat and the other novelty was the use of a primitive form of barley known as bere which can be milled to flour and will make an acceptable bread. We had an excellent tour of Barony Mill, where they carry out this process. It is owned and interpreted by Birsay Heritage Trust

While on Orkney we called in at the Kirkwall power station which is equipped with a row of massive V12 Mirrlees Blackstone diesels each with an output of 4500 kW, by courtesy of SSE. These are now only needed at peak times and when the wind does not blow, which in Orkney is not often.

Nowadays the energy industry continues as 'hi-tech' focussing on wind, both on-shore and off-shore, but also tidal. It is hoped that this will provide skilled employment in the future.



4500kW Mirrlees Blackstone engine at Kirkwall Power Station

While on Orkney we had a good look at the 'Churchill Barriers' which had been the subject of an interesting talk at the conference. These were constructed to close off the eastern openings to the fleet anchorage in Scapa Flow after a U-boat penetrated the defences in 1939 and sank the *Royal Oak* with the loss of 834 lives. The four

sections of the barrier total about one and a half miles and were a major engineering feat, as the water is up to 60 feet deep, but most of all because the tidal currents can exceed ten knots and are capable of shifting a five ton block. Over a thousand Italian prisoners worked on the project and were allowed to build their own chapel using two Nissan huts. This is the famous Italian Chapel which is beautifully decorated inside with trompe l'oeil tiles and religious paintings besides lamps wonderfully constructed from empty cans and railings reforged from scrap. It fully deserves the many thousand visitors it gets each year.

The 'flow country' which comprises much of inland Caithness is peat bog, 1500 square miles of it, the largest area in the UK and possibly a candidate for world heritage listing. Where the land is higher or has been drained it appears fertile and there are numerous remains of small farms and crofts. Many of these are roofless and abandoned but some survive and near Lybster one of the 'long houses' with its traditional thatch



Statue of St George by Domenico Chiochetti made of concrete on a barbed wire armature outside the Italian Chapel on Orkney

is open as Laidhay museum. The enormous quantity of artifacts collected was interesting but somewhat detracted from the impression of the building. Nevertheless, with the cow byre at one end opening off the kitchen and the stable at the other, we could imagine the confined way of living. However, on a bright sunny summer day we could hardly envisage what it would have been like in the long dark northern winters.

The traditional life of Wick and Caithness has been recorded in the extraordinary work of the Johnston family who were photographers from 1863 until 1975. Their collection of over 40,000 pictures now belongs to the Wick Society and is available on-line. Many examples were on show at several of the sites we visited; it is particularly strong on the fishing industry but covers all aspects of the work and lives of the people.

The most consistent historic presence from the time the coach left Inverness was that of Thomas Telford. The Commissioners for Building Highland Roads and Bridges appointed him to survey the roads in 1803 and his routes still dominate the modern map. He designed over a thousand bridges many of which survive, even if they have been bypassed. Many are small but they all have a consistent dignity and simplicity with handsome arches and neat battered wing walls. Most are a single arch although some have three and a few five; Telford had a strong dislike of 'unresolved duality', an aphorism that survived



Inside the 'doocot' at Dale House, Westerdale near Halkirk

in advice from the Institution of Civil Engineers until recently and maybe still does.

Between Wick and Thurso we stopped to examine one simple bridge and a piece of roadway, bypassed since 1931, and inspected the original road surface, by kind permission of the current owners, who even more kindly invited us to tea and cakes – delicious.

Telford's work was not limited to roads and bridges as besides these he also planned Wick Harbour and Pulteneytown, as mentioned, and was responsible for the series of 32 highland churches built for the Church of Scotland with a government grant. This was one of Telford's very last works and we visited an example at Berriedale. A simple, tee shaped plan in a lovely site now closed as a church but well maintained as a local amenity.

This report has hardly touched on the interesting talks we had at the conference and can only give a flavour of some of the sites we visited but space must be found to report the welcome (often with cakes) we experienced everywhere and the enthusiasm to impart local knowledge particularly by our drivers, George Dunnett father and son, (also George), who appeared to know everybody and everything wherever we went. Besides the Dunnett's it is fitting to mention others: James Gunn who conducted us around Dounreay, having spoken at the conference; Kathrin Haltiner, a Swiss architect who has taken on Dale House, a mill and particularly a doocot (dovecote) which she is restoring; Jamie Stone, MP for Caithness, Sutherland and Easter Ross who joined the coach for part of its journey from Inverness; Geoffrey Stell who spoke about Caithness in World War II and will be giving the Rolt Lecture in Nottingham. At the conference dinner Lord Thurso, Chair of VisitScotland and Lord Lieutenant of Caithness spoke eloquently about the prospects for the area, the need to develop tourism and the part that industrial heritage could play in that. Particularly thanks also go to Jenny Bruce, mentioned above, who was constantly available with her local knowledge and led some of the groups and with Mark Watson devised and organised the conference.

Inverurie wins award

The 2018 Creative Reuse Award will be going to the Inverurie Carriage Works and Loco Buildings, near Aberdeen, developed by Malcolm Allan Housebuilders, as a result of the entry submitted by the Garioch Heritage Centre. More information will appear in *IA News 187*.

Industrial Chimneys

This discursive essay examines the subject of brick chimneys built for industrial use from the later eighteenth century up to the early twentieth century. It is hoped to get some response from the readership.

Robert Carr

The recent EYCH2018 (European Year of Cultural Heritage 2018) industrial heritage initiative for the month of May focussed on the subject of chimneys. In preparing material for publication in *Industrial Archaeology News* I have realised that the subject of British chimneys has been rather neglected. Britain, quite early in the nineteenth century, had very tall chimneys – for that age surprisingly tall. This is before the reign of Queen Victoria, essentially before the railway age, when people still travelled by stage coach. At first it seemed incongruous that at this early period we had huge cotton mills with slender chimneys up to 300 feet high.

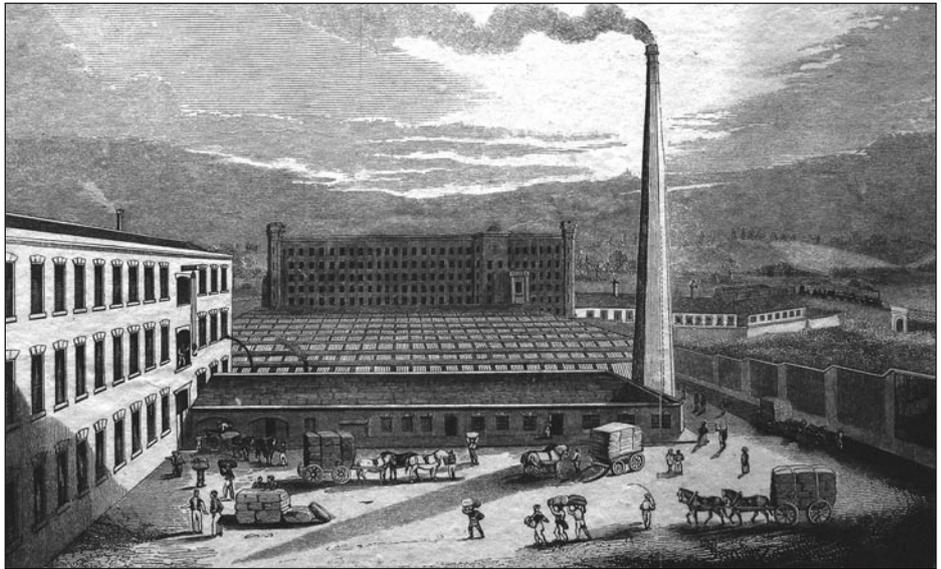
The Great Western Cotton factory, a large spinning and weaving mill, opened in Bristol in April 1838. The first section of the Great Western Railway from Paddington to Maidenhead was completed in May 1838. If you wanted to go to Bristol to see the new Cotton Factory, you went by stage coach.

Take the example of the massively built chimney at Woolwich Dockyard which is said to be based on previous industrial chimneys in other parts of Britain; this was not built in the last quarter of the nineteenth century as you might at first suppose but in the early 1840s! Originally 208 feet high, this chimney is now reduced to 180 feet, but is still rather impressive. A specialist chimney designer and a builder have been mentioned but information as to who these people were has become lost.

The skill and expertise required to construct such towering chimneys must have been prodigious and one asks where the knowledge and skills came from, and who it was that carried out their design and construction. A popular answer is that they were 'steeple jacks' – but in present-day experience a steeplejack is essentially an artisan, generally engaged in repair, maintenance and small-scale alterations. It does not seem likely that people of this kind designed and constructed daring engineering structures which considerably surpassed anything built previously.

At an earlier period things might conceivably have been different. After all, if 'steeple jacks' (or were they some kind of master builders) built the spires of Salisbury and Strasbourg Cathedrals with a height of 404 feet and 466 feet respectively, this might possibly have been so. But wouldn't the engineers responsible for these great works have been known as Master Builders or Architects at that time? Such people were probably within the body of the church with their engineering activities partly obscured by an ecclesiastical status.

The construction of a tall brick chimney is probably rather more difficult than building a



The Great Western cotton mill in Bristol, 1838

church spire. A spire tapers and can have an internal framework for support – it does not have to contend with thermal stresses in the way that a chimney exhausting furnace gases has to.

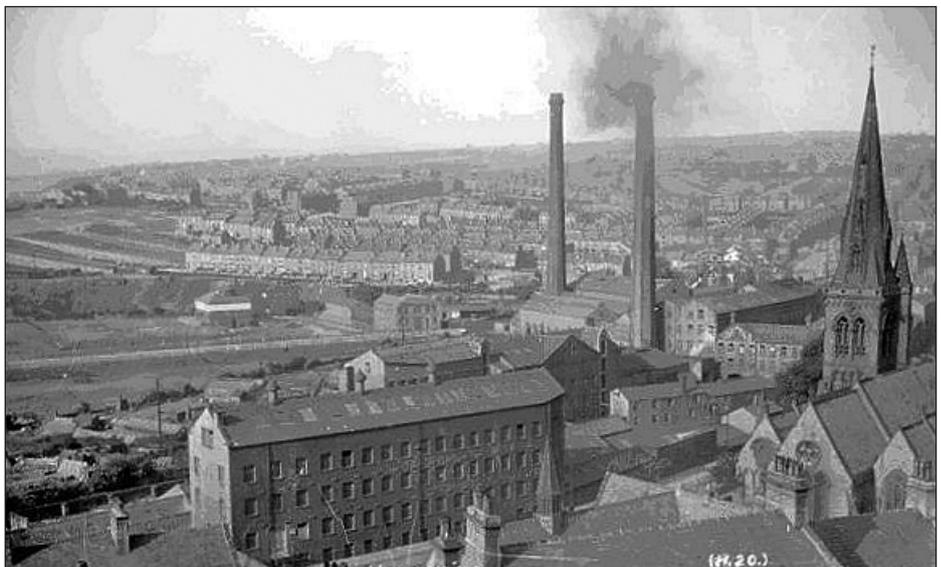
Now there may possibly be a parallel activity in the construction of mills for grinding corn and other purposes. As Professor Alec Skempton pointed out, millwrights who built water mills had a very considerable knowledge of hydraulics and yet we know nothing of this. There is no surviving written evidence – expertise was passed down from master to apprentice, and that was that. One could suppose that steeple jacks were rather similar, immensely competent and knowledgeable and yet all their expertise has now totally evaporated, or so it seems. Even the amazing work that they created is now becoming rather scarce.

The situation is similar to the sinking of wells and the construction of adits. An enormous amount of work of this kind took place to supply towns and cities with water. And then there are all the mining works with lengthy drainage adits, often built at quite an early date. Was this kind of

work carried out by people who were essentially craftsmen or were the people involved really engineers in the modern sense? There is clearly much we do not know.

There is a similar situation regarding mediaeval carpentry. Cecil Hewett, an unsung hero of architectural research, was not believed; many people considered his books unworthy, many academics dismissed his opinions as those of a crank. The official position was that for timber structures nothing survived that was much older than the sixteenth century.

Hewett had not bothered with historical research. He just studied the woodwork and noted the changing fashions in carpentry. It was only when carbon 14 dating became available that people began to appreciate just how early many timber-framed buildings actually were. The classic examples that Hewett worked on, and that finally began to convince people in general that he was right, were the two Great Barns at Cressing in Essex – built in the thirteenth century. Hewett was using pure archaeology, with no preconceptions acquired through reading.



Longroyd Bridge, Huddersfield

However, no more of this; the term steeplejack is self-explanatory. Jack is a workman and certainly not an architect, engineer or master builder. This is made clear by the popular figure of speech 'Jack of all trades, master of none'. A corresponding expression was in use in Elizabethan times, so even at quite an early date steeplejacks would not have been undertaking the design of prestigious steeples. A steeplejack was simply a skilled workman who was prepared to work at great heights.

This article essentially concentrates on textile mills; chemical works are a special case where chimneys must be especially high to distribute noxious fumes. The example of Tennant's chemical works in Glasgow was amazing but this was a **very** special case rather than the norm. The huge chimney there known as the St Rollox Stalk or Tennant's Stalk towered over everything. It was a well-known landmark around Glasgow. Built in 1842, it rose to a majestic 435.5 feet (132.7 m) and it was 40 feet (12.2 m) in diameter at ground level. In 1922 it was struck by lightning and had to be dynamited down, but until that time it was in daily use. A remarkable achievement.

Another notable example was the 312 ft chimney at Adams soap works in Smethwick, built in 1836, later reduced in height to 250 feet and now demolished. It is believed that the reduced height chimney survived quite well into the twentieth century. Does anyone have further information? Examples that survive include the chimney of India Mills in Darwen, 1867, originally 303 feet high. Now reduced to 289 feet, it is listed grade II*. The architecturally elaborate Cox's stack at the Camperdown works in Dundee, 1865,



Cox's stack, Camperdown, Dundee
Historic Environment Scotland

survives just as it was built and is 282 feet high. It is listed grade A.

Office blocks are uneconomic over a certain height. Those that are of great height are built for reasons of aggrandisement, essentially to advertise the corporation that built them. It seems that with some chimneys built before about 1845 the situation was rather similar – it was a case of 'my chimney is taller than yours'.

There is a second and more practical reason for making a chimney tall, which is the more important, will depend on the context. Making a chimney taller increases the flow through it owing to the 'stack effect'. This may be useful if you want to get rid of exhaust gases rapidly and it avoids the cost of having to pump such gases. With respect to textile mills, Roger Holden points out that the optimum height for a spinning mill chimney is 200-220 feet. However; it is also possible that at this earlier time the optimum height for a chimney was to some extent unknown – this may have been a period of trial and error.

The stack effect or chimney effect is the movement of air in or out of buildings, chimneys, flues and so on. It is caused by the different buoyancy of the air inside compared with outside, owing to a difference in temperature and moisture. The result can be either positive or negative; the greater the thermal difference and the height of the structure, the greater the buoyancy – and thus the stack effect. The stack effect helps drive natural ventilation, air infiltration, and fires such as the King's Cross underground station fire of November 1987, responsible for 31 deaths – and without doubt the Great Fire of London of 1666.

To appreciate why the tall timber buildings of the 1660s burnt so rapidly it is instructive to visit Bessie Surtees House on Sandhill, Newcastle. Five stories high, it has a central stairwell from the ground floor to the top of the building. This shaft is in effect a chimney, and if the building were to catch fire it would rapidly begin to function as a furnace.

This is interesting, but we are digressing – and now return to the subject of industrial chimneys.

Actually the term 'industrial chimney' is outmoded; they are now commonly referred to as 'flue gas stacks' – three syllables instead of two – see *IA News* 179 page 21. However, most readers of *IA News* will be more familiar with 'chimney', one word instead of three, so for this article chimney will continue to be used. Also dimensions are generally being given in feet rather than metres because the chimneys described here were built in feet.

If the exhaust from an industrial chimney is environmentally unpleasant, say from a chemical works, then injecting noxious gases into the atmosphere as high as possible will reduce the chance of turbulence carrying them back to ground level. It will probably also increase the dispersal rate as the wind speed is greater at higher altitudes.

Regarding steeplejacks, the notions proposed earlier that they performed tasks of planning and construction that we would now consider to be

civil engineering are almost certainly incorrect. By the later nineteenth century the building of large chimneys was not in the hands of steeple jacks, who at least by then were essentially artisan craftsmen. Then the work had become much more like civil engineering. For instance, the St. Rollox Stalk or Tennant's Stalk just outside Glasgow, mentioned above, involved no less a figure than Professor W J M Rankine. An excellent book *Tall chimney construction. A practical treatise on the construction of tall chimney shafts ... constructed in brick, stone, iron and concrete* by Robert M Bancroft and J Francis, published in 1885, gives a very full and satisfying account of the building of large chimneys over the previous fifty years. As well as covering Great Britain it includes examples from the USA and other foreign parts. It is available online.



Woolwich Dockyard chimney built c.1843, looking North East, May 2018
photo R Carr

There appears to be no corresponding publication dealing with the slender elegant chimneys of the latter part of the eighteenth century and the early nineteenth. Commendably, Bancroft and Francis describe chimneys back to the 1830s, although not before. For the earlier chimneys the information they provide is rather sketchy but there are examples where they quote the name of both an architect and a builder which implies that even before the 1830s such people were involved. The only place to look for corresponding information before 1830 would probably be encyclopaedias of the period and periodicals such as *Mechanics Magazine*, *Nicholson's magazine* – possibly the *Gentleman's Magazine*.

What of the more serious publications, papers prepared for learned periodicals such as *Industrial Archaeology Review* and the *Journal of the Construction History Society*? Three papers have appeared, one dealing with industrial

Continued on page 14

chimneys in Italy and another concerning chimneys in Spain and surprisingly there appears to be only one publication which deals with chimneys in Britain. This is the concise article by Ray Warburton that was published in *Industrial Archaeology Review* in November 2013. Might we have expected rather more British examples?

For an industrial brick chimney, say about 200 feet high, the top 20 feet or so was often only one brick thick. Then, proceeding downwards, there would be an increase in thickness of half a brick and so on, increasing as you descend. For a 200 ft chimney the brickwork would be about 4 feet thick at the base. It has been recent practice to remove precarious brickwork at the top of a chimney to reduce maintenance costs. The magnificent example of Dixon's chimney at Shaddon Mill, Carlisle, 305 feet high, had this treatment in 1950 reducing its height to 270 feet. In its day Shaddon Mill was the largest cotton mill in England and had the eighth tallest chimney in the world. Built in 1836, this chimney was first listed in November 1972 and it has been grade II* since April 1994 (see the photograph on page 24 of *IA News 185*).

To sum up, we have two types of chimney. In the earlier period, up to about 1850, chimneys tended to be generally plain and functional and of circular or octagonal cross-section. At the top, these chimneys were often only one brick thick. Chimneys of the later period could be more elaborate, say of square cross-section and often had architectural embellishment. Brickwork at the top of these chimneys was generally more substantial.

In the later 1850s there were great storms and a number of chimneys were blown down. Regulations for the construction of chimneys were then introduced. The regulations came into force at roughly the same time that chimneys of the second kind began to be built but this could be coincidental. Professor Rankine was widely regarded as the leading authority on chimney stability.

In the later period an architect and a civil engineer were definitely involved in the construction of taller chimneys. For chimneys of more modest height, sufficient guidelines had been laid down for an ordinary jobbing builder with experience beyond that of small-scale work to be able to do this. The problem of who designed and built tall chimneys of the earlier period remains slightly less certain. The change of style coincides with the change of architectural taste from Georgian or early Victorian to high Victorian. Victorians criticised their predecessors for their flimsy construction, even describing it as 'jerry-built'. Victorians tended to build rather massively with elaborate decoration. On the European Continent surviving factory chimneys are predominantly of the first type.

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Industrial Archaeology and Newton Abbot

In the last issue of *IA News* I reported on the Carriage and Wagon Shop, rear of Ford Close, Newton Abbot, Devon and the application to demolish the remaining red brick goods/engine shed buildings of the locomotive works. Some features were to be retained including the boundary wall (reduced in height), the facade of the limestone goods shed and the signal gantry. None of these were listed. The application was allowed.

However, another piece of Newton Abbot's industrial heritage will die this year with the closure of Tucker's Maltings on Teign Road. It is one of only four traditional floor maltings still in operation. With its closure there will be just three.

Tuckers was founded by Edwin Tucker in 1831 as a seed merchants and maltsters in Ashburton. According to trade directories, Tuckers had a presence in Newton Abbot by the 1880s with an address in Market Street. In 1899 Tuckers became a registered company, Edwin Tucker and Sons Limited. The previous year, 1898, John Parnell Tucker had acquired a stretch of land in Teign Road, Newton Abbot next to the main Great Western Railway line, for the construction of a new malthouse. The final decision for the malthouse was not taken until March 1899 when a building agreement was made. The maltings was designed by William Bradford the well-known maltings architect/engineer. William Bradford had his practice in London by the end of the nineteenth century but he had been born in Devon (in 1845). Although now apparently one building, the maltings was built in two phases. The first section, a 60 quarter malthouse was opened on 5 November 1901. Almost immediately the decision was taken to construct a further slightly smaller malthouse of 50 quarters and it was begun in December 1901 and opened in 1903. Building details show that Nalder & Nalder of Wantage provided the screens and barrows. There was also a Crossly gas engine to provide the power for the hoists etc. A barley drying drum by Robert Boby of Bury St Edmunds, Suffolk was installed in 1952. The steeples in the 1901 maltings were supplied by R Ramsden & Son Brewers Engineers, 177 Kingsland Road, London and those in the 1903 building were by Buxton and Thornley of Burton on Trent. The germination floors are of concrete screed. The kiln furnaces are now only operated in the 1901 building and are modern gas fired ones which means that the original coke/anthracite fired furnaces are no longer in use. (Anthracite arrived by rail from South Wales.) However, the doors do survive in the furnace



Tuckers Maltings, Newton Abbot

room and were manufactured by Buxton and Thornley of Burton on Trent.

The Association visited the maltings as part of the 1998 annual conference and it received the President's Award for that year.

Not only will it be a sad day for industrial archaeology when the maltings closes in the autumn but it will be the loss of jobs for the maltsters and the end of a family malting.

Amber Patrick

World Heritage UK starts first ever review of all UK sites

World Heritage UK, the body which represents all Britain's World Heritage Sites, has started a major review of all 31 of our World Heritage Sites. This is the first time that a comprehensive picture of how they are protected and managed has ever been undertaken.

The review is being led by Chris Blandford, WHUK's President and a leading international heritage expert. The review will focus on key management problems and issues at the sites, which range from Stonehenge and the Giant's Causeway, to Edinburgh New Town and Liverpool's city centre. It will investigate new options for sustainable management of sites, for public and private sector partnerships, and for improving benefits for local economies, stakeholders and investors.

It is anticipated that the final report will be completed in late autumn 2018, for sharing with the sites, government and other partners.

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Malting floor at Tuckers Maltings

Underfall Yard Trust – Conservation of Line Drive and Tangye Steam Engine Project

The line drive forms the major power source to Underfall Workshop. This is in a Grade II* listed building built to service Bristol Harbour and the original machines from the 1880s are scheduled ancient monuments. The line drive has been modified over time, but still provides the same function of driving four machines: a Whitworth planer, a Whitworth slotter, a long bed lathe and a small shaping machine. The Tangye engine is the original machine, installed in 1885; a twin cylinder E-type model, which won a gold medal at the 1878 Paris exhibition.

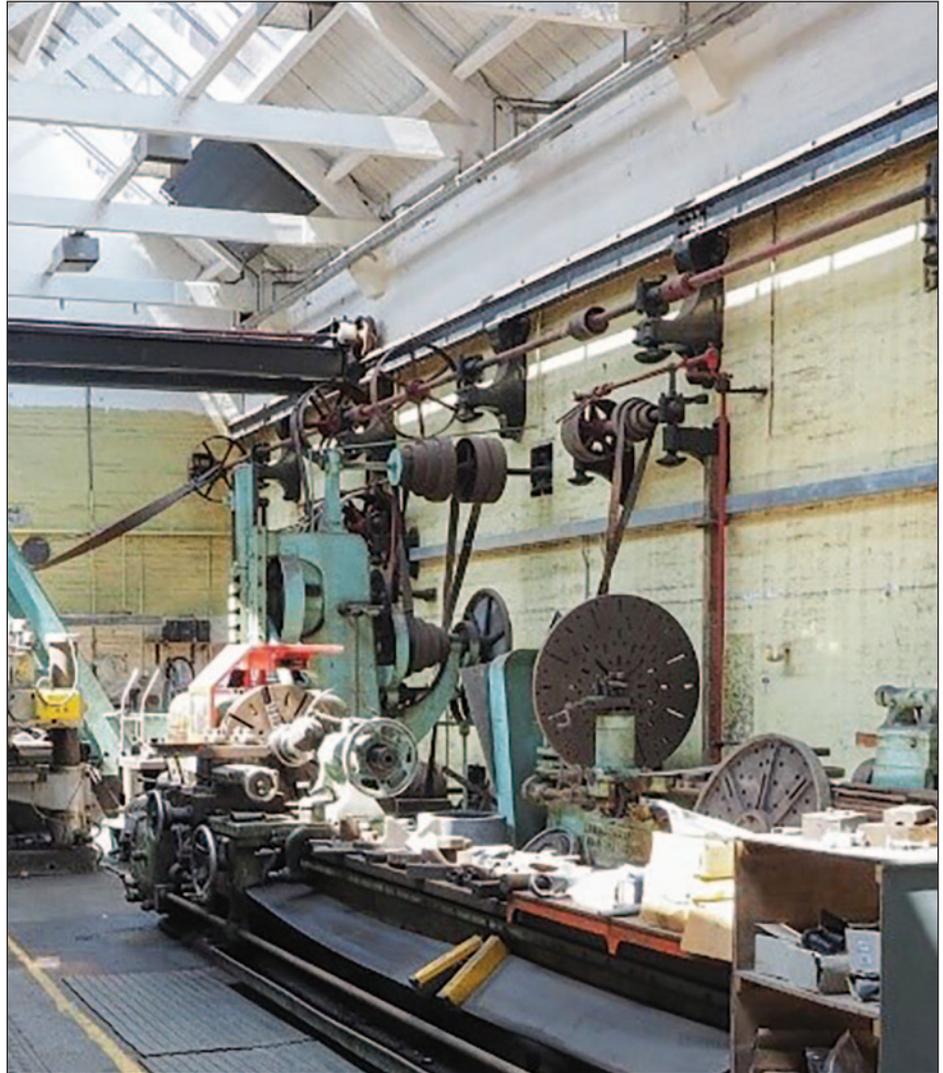
Within this project, partially funded by the AIA, the line drive has been serviced to working condition, fitted with a hydraulic motor, and the engine has been serviced to a moving condition in order to provide a test load for the system. Work has been started to clean the Whitworth planer and service moving parts to working condition. Successful test runs of the planer have been achieved.

The north wall line drive is located about 4m from the ground, with a large amount of fixed equipment installed close to the wall beneath. Accessing the bearings by ladder or cherry picker is impossible. A platform was designed, installed and commissioned. By hanging from the I-beams that form the gantry crane, the platform can be positioned anywhere along the line, and accessed by ladder away from the wall.

Bearings were cleaned on the outside and the oil-catchers cleared of loose debris. Grease pots were removed, cleared of old grease, delivery holes cleaned out and thin oil run through to flush the bearing. While old, the grease was not dried and it was felt that this was enough to allow new grease into the system. Of the eight bearings, three were missing grease pots. The grease in these empty delivery holes was solid, so these bearings were dismantled and the top half thoroughly cleaned on the inside surfaces. Three grease pots were removed from the south wall line drive, and adaptors made for the BSP thread to fit the Whitworth delivery hole. The rest of the shaft is now being cleaned.

The three bearings on the line shaft in the engine room are more severely worn than the ones in the main workshop. The end bearing has an insert, but the other two run directly on the housings. The end bearing insert was turned over, making the top half the new bottom section and vice versa. The 'new' top section had a grease hole and dispersal tracks machined in. The other two bearings were dismantled and cleaned. These were raised to the level of the end bearing by adjusting the wedge-fixings on the housing stem.

Four quotations were received from three companies for powering the line shaft drive. The proposed solutions were evaluated against a set of weighted scoring criteria including overall cost, safety and robustness of operation; risks to fabric of buildings and existing scheduled machinery and, finally, an assessment of the level of 'through-life' support likely to be available



Line drive now powered by hydraulic motor

(including the supplier's previous experience working with industrial heritage organisations).

The proposed technical solutions included:

- Drive via the steam engine driveshaft/belt with motor on frame behind engine with a sprocket fitted to engine driveshaft and a split chain as drive-connector. The control box would be in the engine room.
- Direct drive to line-shaft with electric motor & gearbox mounted to the wall above the boiler and a vee-belt as connector.
- Direct drive to the line-shaft with a hydraulic motor, gearing and coupling mounted to the wall above the boiler. A hydraulic pressure pack would be installed at floor level, behind the steam engine. Control box also in the engine room.

The chosen solution utilises a hydraulic motor. The motor is somewhat dwarfed by the rest of the line shaft drives; it is mounted on an adjustable back-plate and platform which permitted precise

alignment in three dimensions. The supplier informed us that this motor is 25% of the weight of the equivalent electric motor thus significantly reducing any loading on the wall of the workshops. The hydraulic motor solution also provides torsional drive only to the line shaft thus removing any side loading and wear on the bearings.

Mark Williams



Working from the new platform

A (very) Brief History of the Waterworks Museum – Hereford



Waterways Museum from the north east

Shortly after Stephen Southall had been appointed Chairman of the newly-formed Herefordshire Water Board in 1960 he visited the lower pumping station below Broomy Hill in Hereford with its triple expansion engine. It had been gathering dust since last used in 1953 and he is recorded as saying, "The first sight of the engine took my breath away."

Richard Curtis, Museum Chairman

Southall resolved there and then that Broomy Hill pumping station should become a museum, but this was not an immediate priority because at that time 78,000 people in Herefordshire were without piped water, and, whilst Hereford had a piped supply, it was unreliable in quality and quantity. His ambition was eventually realised in 1974, when he established, and became Chairman of, the Herefordshire Waterworks Museum Charitable Trust. This had only been possible through his action over the preceding ten years ensuring the pumping station and its magnificent steam engines were suitably preserved.

Today, the Waterworks Museum – Hereford has one of the UK's widest collection of working engines and pumps associated with public water supply and is a leading visitor attraction. When open in-steam, visitors can see over thirty engines and pumps in operation at the Museum. But it has not always been plain sailing for this independent museum that is managed and run wholly by volunteers.

The first working party took place at Broomy Hill in December 1974, its first opening to the public in April 1975, and it opened for the first time with an engine powered under steam in September of that year. In 2005, John Townsend, the first curator, wrote, "In retrospect, what now seems quite remarkable was how much was achieved in such a short period to get the

museum open. The records show that what memory says was accomplished over a number of years was in fact carried out over just a few months". This is even more remarkable because, as John went on to recall, "For each of the volunteers the nature of the work they carried out had generally been for the first time" – something that is still true for most new volunteers today.

The early focus of the Museum was restoring to full working order the engines and pumps at Broomy Hill and, through a limited programme of open-days, attracting sufficient paying visitors to finance this undertaking. This was especially successful after volunteers acquired a Lister diesel locomotive and installed a two-foot gauge track down to the River Wye. Train rides were a significant attraction.

The late 1980s saw the Museum at a very low ebb with just three volunteers desperately maintaining the pumping engines and opening the site a few days each year, and it was only after a senior British Rail engineer retired to Hereford and became a volunteer that things looked up. He perceived the difficulties very quickly and immediately instituted a regular work day and, through his contacts, recruited more volunteer engineers. The Museum had turned the corner and quite quickly new water-pumping engines were installed from other locations in Herefordshire and across the region served by D r Cymru Welsh Water. A regular pattern of open-days evolved, which led eventually in 1999 to the Museum opening its doors every Tuesday, and over the next decade the Museum flourished.

In 2000, however, the Trustees received unexpected and, at the time, unwelcome news, when English Heritage placed the main building (then a Scheduled Ancient Monument and Grade II Listed Building) on the Register of Buildings at Risk. This was a daunting responsibility for volunteer trustees but, with the support of the

Heritage Lottery Fund, English Heritage and the Museum's benefactors – the Southall Trust and D r Cymru Welsh Water, this was the spur to doing all the things that hitherto had been aspirations and to create the Waterworks Museum as it can be seen today.

The Museum was a construction site and closed to the public for almost two years between 2003 and 2005, during which time a new building emerged providing a Visitor Centre (which included a flexible education area), a new display gallery and an engineers' workshop, at a cost of some £850k. It is quite hard to realise now but, with the professional support that an exercise of this scale and complexity demanded, the Museum's volunteers project-managed and undertook all the building infrastructure. It was a very proud day when the new facilities were opened in 2006.

Over the past twelve years, the Waterworks Museum has improved its visitor offering and engagement and has lived up to a policy aspiration, which becomes more challenging over time, that annually-returning visitors should always be able to see something different: a new display, temporary exhibition, or a recently-restored engine or pump. In 2007, only a year after the new visitor centre opened, the Museum took its first step towards broadening its visitor appeal. The Trustees were offered the chance to save a fine Blackstone EPV5 5-cylinder diesel engine and other artefacts that had been used for firefighting purposes during WW2 at the Royal Ordnance Factory in Hereford. These were moved to the Museum and, with the support of the Heritage Lottery Fund and the Southall Trust, restored to working order and housed in a new building in the style of a WW2 bunker. It also houses the only permanent exhibition of Hereford's role in World War Two.

In 2015, the opening of the Heritage Water



The water wheel amid forsythia

Park took a huge step forward in addressing an inherent challenge for all industrial heritage museums: attracting families with young children. It took a team of twenty volunteers five years to convert a leased area of overgrown scrubland into an outdoor learning space where children can interact with life-size artefacts that their ancestors would have used to pump, lift and carry water. Volunteer engineers used around thirty skill sets to design and build the park and to create artefacts by re-purposing original items in back store. The number of children visiting the Museum has increased markedly and the Trustees were delighted when this huge effort was recognised with the team winning the inaugural West Midlands Museums Development Project Award in 2016.

Trustees were also again delighted when, earlier in 2018, the Worth Mackenzie triple expansion steam engine (the reason for the Museum being created in 1974) was the recipient of an Engineering Heritage Award from the Institution of Mechanical Engineers, which we consider the 'gold standard' award for an industrial heritage museum.

Today, the Waterworks Museum enjoys its status as one of Herefordshire's leading visitor attractions, being the only working museum in the county. Open to the public every Tuesday and on some twenty in-steam days between Easter and October, last year the Museum attracted nearly 5,000 visitors.

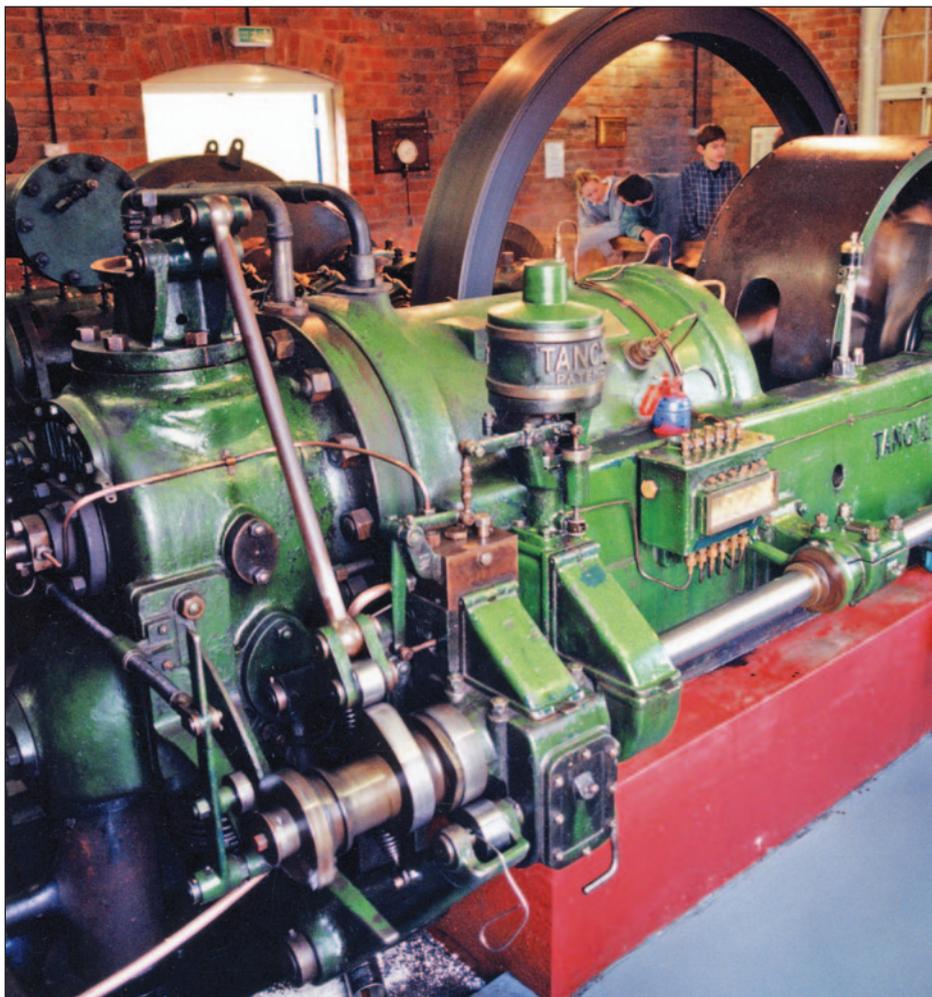
The Museum has a thriving community of volunteers, including engineers and others who support all aspects of the operation of the Museum. However, like all small museums, succession is a challenge. To learn more about the Waterworks Museum and the facilities and services it can offer, search — waterworks museum Hereford.

The Epping to Ongar Railway

The Epping to Ongar branch line has had a chequered history since London Underground ceased passenger services in 1994. But once the current owners, Epping-Ongar Railway Holdings Limited, took over in 2007 the 6½-mile heritage line has undergone a real transformation, reopening in 2012. It is well worth a visit.

The original signal box at Ongar was demolished in the early 1980s after being redundant since 1969. However, a replacement GER signal box, originally the top half of Spellbrook (Hertfordshire), was found in storage at Mangapps Railway Museum and moved to the railway in 2010. The original lever frame from 1888 came to light and was installed in the replacement box.

There have been reports in GLIAS newsletters of 5ft gauge Finnish steam locomotives appearing at various sites in London – for example, Ongar, Creekmouth and Southbury. It seems these locomotives were part of Finland's Cold War strategic reserve. When deemed surplus to requirement 12 locomotives were bought for use



Tangye diesel



The 5ft gauge locomotive from Finland

at the 'Spirit of the West' American theme park in Cornwall and were shipped to Felixstowe just as the park ran into financial difficulties. Four of these locos found a home at Ongar under the ownership of Pilot Developments, who won the original bid for the branch in 1998. Pilot Developments planned to convert the line to 5ft gauge but this never happened and they sold the

line to the present owners.

One loco still remains on the Epping Ongar Railway just outside Ongar station in very poor condition. There are plans to give it a cosmetic restoration as a static display in a proposed picnic area.

Robert Mason

Belgium and a bicentenary that slipped by



John Cockerill, Place Luxembourg, Brussels

In 2017, CMI (Cockerill Maintenance & Ingénierie) celebrated its 200th anniversary in Seraing, near Liège. Today Belgium is seen as a small country renowned for its linguistic battles so it is hard to imagine that only 150 years ago, it was the first industrial nation on the Continent and second in the world. The country started by industrialising the textile industry in Ghent (cotton) and in Verviers (wool). Under the French administration from 1795-1814, coal was mined in the Borinage (southwest of Mons, in the province of Hainaut) to feed Paris via the river network.

Robert Carr, with material from Hughes Belin, The Brussels Times

Belgian heavy industry developed dramatically during the Dutch rule of the country from 1815-1830. William I, King of the Netherlands, wanted the south of his realm to feed the north with industrial products. He supported industry tycoons such as John Cockerill, an Englishman who had come to Verviers with his father to build textile machinery. In 1817, the Dutch king sold him the former castle of the Prince-Bishops of Liège at Seraing with the task of developing steel manufacturing in the region. As recognition for his services to the country, a statue of John Cockerill can be found right in the middle of Place Luxembourg in Brussels' European quarter.

The first industrial revolution saw clusters of industrial activities located near the needed energy and raw materials. Liège already had some proto-industry with forges and gun manufacturing, while Charleroi had its nail factories, so they were ready to embrace coal mining, steel and other metal construction industries. People came from the countryside to work in the industrial areas. There was no social security at the time and workers organised

themselves. They created the *mutualités* (social security organisations), which were eventually incorporated by the state, and still exist today.

Factories were built next to transportation lines, be it rail or rivers. The Brussels-Charleroi canal was inaugurated in 1832: it linked the mines in the south of the country to the North Sea, via Brussels. The industrialisation of Brussels started when the canal opened.

The continent's first coke furnaces were put into service in Wallonia in 1827. After a bit of post-independence turmoil in 1830, due to the loss of the Dutch market, Belgium outperformed all its neighbouring countries with a massive growth spurt from 1840-1872. It grew almost as fast as the US. The average productivity per furnace was the highest in the world. Charleroi led global glass production. And in 1850, Belgium had the highest density of railways per square kilometre.

English competition proved too strong for the Belgian textile business, which collapsed in 1840 and made way for heavy industry. Flanders was hit hard and abandoned by the liberal Francophone elite, which ran the country and its national banks. The influence of the *boerenbond* (farmers' trade union) grew in rural Flanders, which was mostly Catholic. A fundamental division in Belgian society emerged: on the one hand, the French-speaking liberal *bourgeoisie* in the south supported by the high clergy and focused on the industrial bonanza in Wallonia, and on the other, the dense, rural, Catholic population of Flanders, supported by the low clergy and local banks – the perfect foundation for the future Christian Democrats of the Flemish socio-Christian party.

In 1892, 44 of the 50 biggest companies in Belgium (excluding banks) were heavy industries and mainly based in Wallonia. But a general economic decline had already started and would last until 1896. It was time to look abroad and lots of industrial groups reliant on the Société Générale de Belgique went to build railways overseas, including in Congo. Belgium also became the first foreign investor in the coal basin of Donbass (now eastern Ukraine), ahead of France. The nationalisation of industry by the

Bolsheviks in 1917 however, caused huge losses.

Meanwhile, the centre of Belgium (the Brussels-Antwerp axis) was gaining momentum with new industries. Gevaerts (photography) was founded in Antwerp in 1894. After the First World War, Ford and General Motors came to Antwerp, and Renault to Brussels (Vilvoorde). The year 1917 also brought change; coal was found in Limburg (eastern Belgium). Electricity generation, glass, petrochemicals, non-ferrous metals and artificial fibres followed in Flanders. But the crisis of the 1930s hit Wallonia hard and the Flemish movement, linked to Flemish employers, had its revenge: it demanded a Flemish institutionalisation of the northern part of the country and a linguistic re-balancing in state entities, which until then had been heavily dominated by French speakers.

After the Second World War, Wallonia's heavy industry moguls gave the illusion that their production assets were competitive. But this would only last until other European countries had rebuilt – and hence modernised – their own industrial base. The weaknesses of Wallonia's industry became more and more apparent.

At the end of the 1950s, politics changed, the government pumped up salaries to boost private consumption and launched huge infrastructure programmes (motorways, railways), it opened industrial zones and welcomed foreign capital. The latter went to Flanders, which had become the gateway to the German motorways and booming Ruhr area thanks to the King Baudouin motorway. Refineries developed in the northeast of Flanders. Small industries flourished in the west, precisely where the textile crisis had hit the hardest in the nineteenth century. Local banks and the powerful *boerenbond* helped intensive agriculture to thrive.

In Wallonia, the coal crisis of 1955-58 destroyed the last illusions. It was not only an industrial but also a social crisis. Wallonia was not diversified enough. Socialism, anti-capitalism and strong workers' movements were strongly rooted and did not help attract foreign investors. Moreover, local politicians were risk-averse and turned to past industries and business models rather than boosting entrepreneurship. The



Brussels Charleroi canal 1966



Hasard Cheratte, an abandoned coal mine near Liège

consequences were clear: modernisation stayed away along with foreign investors, who would only come if large amounts of public money was offered to them, making the region even more vulnerable to decisions taken elsewhere.

The situation did not change until the oil shock of 1974 because there was economic growth in Europe. Hence reforms were postponed. Investments were defensive, aimed at maintaining the workforce in the traditional sectors (steel, glass and cement). The state played a complicit role by generously financing unemployment and early retirement.

Meanwhile, stimulated by hosting European Communities institutions, the tertiary sector grew significantly in Brussels, as did the public sector, which boosted the non-merchant part of the economy. In 1960, Flanders' industry had caught up to Wallonia's in terms of contribution to GDP. And this trend intensified with, in the north, Flanders attracting the companies of tomorrow in the Golden Sixties while in the south, Wallonia fell back on itself, taking advantage of the state's budget to pay its social bill and, in the process, reducing its industrial base.

The 1974 crisis emphasised the new service orientation of the Belgian economy, with international holdings pulling out of industry and investing in finance. The steel crisis hit Belgium and unemployment exploded, in Wallonia more than anywhere else. Flanders, with more up-to-date means of production, resisted better. Wallonia's decline (and to a lesser extent Flanders') would continue with globalisation and the delocalisation of production facilities to countries with cheaper labour and fewer social and environmental constraints.

Nevertheless, two events have deeply contributed to the division of the country as we know it today. One was the *Question Royale* in 1950-51, when the citizens of Belgium voted in a referendum on whether King Leopold III should return to Belgium, given his acquiescence towards Germany during the Second World War. Flanders voted for his return, whereas Wallonia voted against. In the end, the king abdicated in

favour of his son, Baudouin. The second event however, was directly linked to Belgium's industrial history: the general strike of December 1960 to January 1961.

The strike was triggered by a proposed austerity plan from the government, which led to a quasi-insurrection in the country. Three-quarters of the strikers were from Wallonia. Today, some see it as an upswell of Walloon identity. The strike's leader, André Renard, was an ex-Cockerill worker turned trade unionist. The strikers wanted more economic autonomy and freedom for Wallonia, something that would finally become reality in 1993 with the creation of the three regions within a federal state.

Today, Flanders is still a strong economic player with its competitive industries and Wallonia is trying to rid itself of a mindset turned towards the past. From industrial giant to the sometimes absurd little country we know today, Belgium is still looking for an identity. If it is still what Karl Marx called, "the snug, well-hedged, little paradise of the landlord, the capitalist and the priest", it is now also a small paradise for civil servants, be they from one of its seven institutional entities, its *communes* or the European institutions. Belgium's industrial history has shaped its institutional organisation. That process is not yet over.

In 1843 the first train to cross a national border, steamed from Lille (France) to Kortrijk (Belgium). This was the first border-crossing railway line in the world. When Lille was connected to Paris, in 1846, for the first time in the world two capitals were connected by train.

As part of the European Year of Cultural Heritage 2018, on 5 May 2018, cultural associations from Kortrijk celebrated the 175th anniversary of the line – taking a train and a brass band to Lille.

Alan Crocker

With regret that we must record that Alan Crocker died on June 22 after a long illness.

An obituary will follow in the next edition.

A Note on Gasholders

Various groups have been campaigning to preserve their local gasholders and this has often involved organising a petition to be signed by local residents. For the Kennington gasholders by the Oval cricket ground, a petition may have helped to get one of them listed – see *Industrial Archaeology News* 182 page 23. For the gasholders in Tower Hamlets, petitions have not been as successful. In December 2016 it was reported that a petition to save holders at the Bethnal Green holder station received 1494 signatures while for the Poplar holder station there were 400 signatures. Unfortunately, owing to Council regulations and deadlines, it was not possible for these petitions to be considered for the emerging local plan and so a new petition was started. South of the river in Greenwich there has been a petition to save the large East Greenwich No.1 gasholder. At the time of writing this petition had received more than 1400 signatures. Verbal reports that some petitions had received thousands of signatures are probably grossly exaggerated.

In Chelmsford, gasholder 114 dating from about 1919 is to be incorporated into a major new housing development. Presently there are two holders at the Wharf Road site formerly occupied by the Chelmsford Gas Company. Both gasholders were decommissioned in 2009; the more modern spiral gasholder dating from about 1950 is to be demolished. The older gasholder to the northeast, 114, will be carefully dismantled and used in the eventual redevelopment of the area for housing. It has a guideframe which consists of 12 lattice standards supporting two tiers of horizontal members formed of lattice girders with diagonal bracing. It was considered that this guideframe provides a striking, positive contribution to the character and appearance of the conservation area and reflects its industrial heritage. Both Chelmsford gasholders have aboveground tanks. About three quarters of the upper two tiers of the guideframe of gasholder 114 will be retained with a view to its reuse. One idea is to incorporate some of the lattice girders in a new bridge across the River Chelmer which will provide access to the Baddow Road car park.

Robert Carr

GDPR

You have doubtless been swamped with messages asking for your permission to stay in touch with any number of organisations and companies. As far as the AIA is concerned, we hold contact information on our members so we can send *IA News*, *IA Review* and AGM papers. You do not need to do anything to allow this to continue. In compliance with the new GDPR legislation our Privacy Policy can be found on the web site, which allows you the right to access the data we hold about you. Be assured we do not make the information available to any other organisation.

David de Haan

Report of Council Meeting 2 June, 2018

There were several positive outcomes from the second Council meeting of 2018 which was held in London on the 2 June.

However, sadly, we had to start with noting the deaths of five significant AIA members: David Crossley, John Selby, Henry Gunston, Mark Sissons and John Powell. Their lives have been marked by obituaries in *IA News*.

Patrick Nott, who died in 2016, left a legacy of £15,000 to the Association. The meeting agreed that the legacy would be used in part to subsidize the attendance of students at the annual conference and the preceding seminar. Full details are available on our web-site.

The Chairman reported that the post of Industrial Heritage Support Officer has been filled by Joanna Turska. Joanna will be co-opted onto Council.

The Chairman believed that the Association should be proud of what has been achieved by the All Party Parliamentary Group on Industrial Heritage. The Group's *Report on the Challenges Facing the Industrial Heritage Sector* was published on the 1 May. (See page 21)

It was noted that the CBA continues to have a funding shortage. The Association's annual donation of £300 for five years will end in 2019, after which it will be reviewed.

Lancashire Mills Museums: Helmshore has now re-opened on Fridays, Saturdays and Sundays until the end of October and Queen Street Mill will follow from 7 July.

The idea of Research Grants, first put forward for consideration in 2015, has been agreed. There will be a total of £4500 available over three years, with up to £1500 a year available. Publicity giving details plus an application form will appear in due course.

The Secretary reported on vacancies on Council. Three existing co-opted members will be nominated at the AGM to fill vacancies; Keith Falconer, Becky Haslam and Ian West. David Perrett has also agreed to stand for election at the Nottingham AGM.

Conference Report – All members will receive a copy of the gazetteer produced for the Caithness Conference. This is in recognition of the £1000 grant made by the Association to the organisers.

Bookings for the AIA Annual conference at Nottingham (31 August to 4 September 2018) total 80 to date, tours A, D and G are already full.

Creative Re-use Seminar, Salford, 12 October. See page 23 for details.

Work is proceeding on the 2019 AIA Annual Conference (9 to 14 August 2019) to be held at Bridgwater & Taunton College. One of the local organisers, Peter Daniel, will be attending Nottingham AGM to make a presentation on the event.

Liverpool University has been chosen as the venue for the 2020 Annual Conference from 20 to 27 August 2020.

The Affiliated Societies Practical Weekend held at Matlock in April was attended by 20 delegates, only half of whom were members. The non-members were approached to join the Association, and two have since done so.

AIA Annual Awards: the full list of winners will be published on the web-site and in *IA News* as soon as they have been informed.

The web-site will also detail the eight winners of Restoration Grants, totalling £128500, when they have been informed.

Planning Casework Report: A list of cases from 2015 to date is now shown on our web-site. This report shows the date, local authority, building type, application number, stance and results & notes.

Future Field visits: Contacts are being sought for tours to Milan, Turin and Bologna.

Bruce Hedge

AIA Action Plan

As reported in *IA News* 184, AIA's Council spent some time last October considering the challenges which the Association will face in the coming years, as new generations of people engage with industrial archaeology and heritage in a wide variety of different ways, without necessarily wishing to become members of an organisation such as the AIA. Following on from this, a small group of Council members has been formed to produce a new Action Plan for the next five years. The results of these deliberations will be discussed at the AIA Council meeting in October and a summary of the key points will be included in a subsequent issue of *IA News*.

Ian West

Roles of Council members during 2017, including Co-opted members

Bill Barksfield	Overseas Trips, Peter Neaverson Travel Bursary judge and Peter Neaverson Digital Initiative judge.
Chris Barney	Editor <i>IA News</i> , Local Society Publication Award judge and Best Creative Re-use of an Industrial Building Award Building judge.
Dr Robert Carr	British Archaeological Awards liaison, TICCIH-UK Representative and Restoration Grant panel member.
Tony Crosby	Restoration Grant liaison with donor, APPT representative and HLF IM&T representative.
David de Haan	Honorary Secretary, Liaison Officer, Restoration Grant panel member and HLF IM&T representative.
Stephen Dewhurst	Dorothea Award coordinator.
Kate Dickson	E-FAITH Liaison and Best Creative Re-use of an Industrial Building Award Building judge.
Keith Falconer	Chairman (until 27th August 2017), APPT representative, HLF IM&T representative, Best Creative Re-use of an Industrial Building Award Building judge and Restoration Grant panel member.
Roger Ford	Sales Officer.
Rebecca Haslam	Assistant Editor, <i>IA Review</i> .
Bruce Hedge	Membership development.
John Jones	Honorary Treasurer.
Shane Kelleher	Industrial Heritage Support Officer, Archaeological Awards coordinator Peter Neaverson Digital Initiative coordinator.
John McGuinness	Conference Secretary.
Michael Messenger	Professional Publication judge, Peter Neaverson Digital Initiative judge and Restoration Grant panel member.
Stephen Miles	Conference Booking Secretary and Restoration Grant panel member.
Ian Miller	Archaeological Awards judge; Co-editor <i>IA Review</i> .
Roy Murphy	Publicity.
Dr Michael Nevell	Vice Chairman (Chairman from 27th August 2017), Peter Neaverson Outstanding Scholarship Award judge and Dissertation Awards judge.
Prof Marilyn Palmer	Hon President, Dissertation Awards coordinator, Publication Awards coordinator and Peter Neaverson Outstanding Scholarship Award judge.
Amber Patrick	Planning Casework Officer, Peter Neaverson Travel Bursary judge, Archaeological Report judge and Best Creative Re-use of an Industrial Building Award coordinator.
John Powell	Librarian and Archivist.
Dr Tegwen Roberts	Social media and Dissertation Awards judge.
Mark Sissons	Restoration Grants coordinator and Best Creative Re-use of an Industrial Building Award Building judge (until 1st November 2017).
Lynne Walker	Affiliated Societies Officer.
Mark Watson	Best Creative Re-use of an Industrial Building Award Building judge Chair of TICCIH-UK.
Dr Ian West	Co-editor <i>IA Review</i> , Health & Safety Officer, Peter Neaverson Outstanding Scholarship coordinator and Peter Neaverson Travel Bursary coordinator.

All Party Parliamentary Group on Industrial Heritage

Since the previous report in *IA News*, and following on from the two Evidence Sessions which were held in early October 2017, the Chairman of the Group, Nick Thomas-Symonds MP, and his staff spent the winter months drafting a report based on the transcribed oral submissions from the sessions and the written submissions which were also made. This *Report on the Challenges Facing the Industrial Heritage Sector* was published and launched on 1 May 2018 at an event in Portcullis House, Westminster. It was well attended by representatives of various sector organisations including the Association for Industrial Archaeology (AIA), Historic England, Historic Environment Scotland, and the Heritage Lottery Fund. A small number of hard copies of the report were available at the launch, but it is available to all on-line – see the AIA website.

The report's key findings are that industrial heritage is vital in the formation of local and national identities, and is highly valuable in the UK's contemporary society as a source of economic potential. By providing an examination of the value of industrial heritage to the UK and the major social, economic and cultural issues impacting this sector, the APPG has compiled a series of conclusions and recommendations on how to face the challenges of the future. While the report identified fiscal challenges – the industrial heritage sector is no different from many others in the UK – the report found examples of innovative ways to raise capital and generate revenue, including community ownership, and designing projects with commercial income opportunities. The recommendations and key findings are below.

Future meetings of the Group will be looking at how to implement the recommendations of the report within Government and the industrial heritage sector.

Tony Crosby

Recommendations of the All-Party Parliamentary Group:

Recommendation 1: Develop skills training in key aspects of industrial heritage. Examples could include dedicated post-graduate training in industrial heritage conservation, care and maintenance.

Recommendation 2: To improve the inclusivity of industrial heritage as a sector by improving community and industry outreach.

Recommendation 3: To develop relationships with other trusts and groups within the sector in order to promote industry collaboration. Key statutory agencies and professional bodies could establish a standing forum dedicated to the following objectives:

- a) To establish a national strategy for conserving the UK's industrial heritage in collaboration with the Government.
- b) To promote and drive through that national strategy.

- c) To regularly review and report on the progress of that strategy.

Key Findings:

This report provides an examination into the value of industrial heritage to the contemporary United Kingdom and the social, economic and cultural issues industrial heritage, as a sector, faces today. With contributions from a diverse range of experts and volunteers throughout the sector forming the evidence base of this report, a series of recommendations have been formulated by the All-Party Parliamentary Group on Industrial Heritage and its contributors. These recommendations can be utilised by anyone within the industrial heritage sector, with the exception of the Government-specific recommendations. We aim to outline methods to overcome social and economic challenges either cost-free or at low costs, as is necessary in times of austerity.

The inclusion of case studies in this report seeks to demonstrate sites, who by using creative methods, have successfully overcome some of the challenges outlined in this report.

The need for cost-efficient plans to promote and sustainably support the industrial heritage sector is urgent; this paper offers some ways forward.

The conclusions reached throughout this inquiry were:

- 1) Industrial heritage is highly valuable in the UK's contemporary society as a source of economic potential and proved integral in the formation of local and national identities.
- 2) While many of the challenges faced in industrial heritage are fiscal, other challenges to be conquered include improving the inclusivity of industrial heritage to different age, ethnic and gendered demographics; offering more training programmes in order to increase the number of skilled workers in this sector; how best to preserve the historical site and adaptively redevelop.
- 3) There are sites across the UK which have creatively overcome issues of inclusivity and training through industry-sponsored apprenticeship schemes and projects; reduced costs through commercial approaches to redevelopment; improved community engagement through heritage adoption schemes.
- 4) The evidence found in surveys and by experts in the sector indicate strong support and interest in industrial heritage from the public. Many of those who strongly engage within the sector are not having their voices heard.

John Powell 1948–2018



John Powell 1948 – 2018

We were all shocked and deeply saddened to hear of the untimely death on 16 April of former AIA Librarian John Powell.

In 1980 he joined the Ironbridge Gorge Museum where he spent the next 32 years as Librarian and Information Officer, not only building up the Library and Archives, but also giving so many people from all over the world the benefit of his vast knowledge on so many subjects. The late Stuart Smith had already started the collecting of journals and reports relating to Industrial Archaeology, and on John's arrival he passed on the baton and what became the AIA Library, which he continued to manage beyond his retirement in 2013. Non-members of the AIA would ask for photocopies of articles, which John would supply at cost. Many of the book review copies are passed to the Library, as well as back issues of journals missing from the collection, so it continues to grow. The AIA material also includes some archives, mostly Council papers, and we are happy to continue this work via the Hon Secretary.

John was a life-long train spotter, which formed the basis of just one of his interests, and more locally his view from the Library window allowed him to keep an eye on the coal trains travelling to and from the Ironbridge Power Station. Living just two miles away in Broseley made it possible for him to pop down to see the occasional 'special' that used the otherwise goods-only line.

His humour was legendary, his knowledge amazing, and his willingness to assist people inspiring. To many who knew him he was also a true friend and he will be greatly missed by so many people. Our heartfelt condolences to Rita and their children Gareth and Jessica.

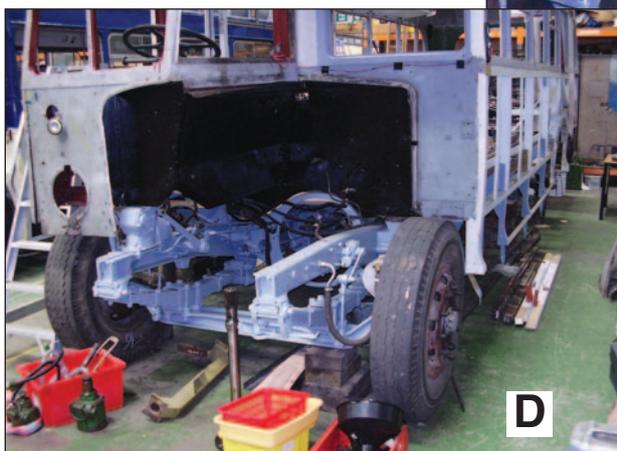
*Joanne Smith
(Ironbridge Gorge Museum Registrar)
and David de Haan*

2018 Restoration Grants

This year's applications produced another crop of worthy projects, most of the 27 applications (valued at a total of over £400,000) arriving in the Secretary's inbox just hours before the deadline of midnight of 31 March. Keith Falconer has taken over the task of coordinating the Grant Panel deliberations, which had been undertaken by Mark Sissons since the inception of the awards, and the Panel has been joined this year by Geoff Wallis. Among the projects were seven relating to buildings, five for repairs to locomotives and four more specifically for boiler repairs, four for road vehicles, three for railway wagons or coaches, two for water wheels, as well as one boat, a horse-drawn tram, a railway viaduct, a steam winch, the launder of a cotton mill, a lime kiln and a portable steam engine.

Thanks to the generosity of the two anonymous donors we were able to fund eight projects totalling £126,500, the highest number so far. These were for the restoration of a 1951 Morrisons' electric coal lorry [A] (£7,000) at the Ipswich Transport Museum; the wrought iron roof of 1874 gasworks retort house (£15,500) for Sudbury Hall in Derbyshire owned by the National Trust; [B] the No 1 brine pump, gantry and shaft of the c1890 Murgatroyd's Salt & Chemical Works in Cheshire (£17,000) for the Middlewich Heritage Trust; a Bradford wooden horse tram cabman's shelter of 1877 (£20,000) at the National Tramway Museum in Crich, Derbyshire [C]; a group of three small industrial buildings at Coldharbour Mill in Uffculme, Devon [E] (£20,000) for the Coldharbour Mill Trust; repairs to the roof, walls and waterwheel of the pumphouse that supplied water to Croft Castle near Leominster, Herefordshire [G] (£18,000), another National Trust property; a 1947 Leyland bus (£10,000) at the South Yorkshire Transport Museum in Rotherham [D]; and lastly the restoration of a c1910 Clark Chapman steam winch for the Hollycombe Working Steam Museum's sawmill (£19,000) at Liphook in Hampshire [F].

David de Haan



Help needed with insurance — Backbarrow Ironworks

The surviving structures of Backbarrow Ironworks in South Lakeland have been described by Historic England as 'the best illustration nationally of iron-smelting technology development from the early C18 to the C20'. The site has featured on the Heritage at Risk register for many years, and there have been a number of previous attempts to 'save' it without success. Until now that is.

Under the supervision of Historic England work is nearly complete to conserve the remains of the scheduled ancient monument – which include the furnace stack, hot air stoves and blowing engine – alongside work to develop the rest of the site for housing. The Backbarrow Ironworks Heritage Trust has been established to take over responsibility for it.

The decision was made as part of the planning process that the ironworks would be accessible at all times by the public from the footpath that will run (when building works on the site are completed) between it and the housing development to connect one part of the village with the other. Potentially dangerous



Backbarrow ironworks – stack under scaffolding. The photo was taken from the public road, there is no access to the ironworks until the housing development is complete.

sections have been fenced so, for example, no-one can wander inside the furnace stack.

Is anyone reading this involved with a site in a similar situation? Not 'owned' by a large organisation; not gated off but open at all times; in the middle of a village; drawing visitors from far and wide?

What advice would you give the Trust regarding public liability insurance, and can you point us in the direction of an appropriate insurer?

Roger Baker

*Backbarrow Ironworks Heritage Trust
and AIA member*

mbarb@freenetname.co.uk 01229 586573

AIA October Seminar Creative reuse

The Creative Re-use seminar will be on Friday 12 October at Islington Mill in Salford, 10am to 4pm. The programme will showcase some of our creative reuse award winners as well as discussing the impact of regenerating industrial heritage with an opportunity to tour the mill. A full programme and booking will be available at the end of July.

The AIA understands that many industrial buildings will only survive in any form if they can be converted and reused but that this conversion should recognise the original use if it is to contribute towards preserving our industrial heritage. This was the primary reason for introducing the Award for Creative Reuse of an Industrial Building in 2015. Awards have been made to buildings as varied as a redundant gravediggers hut in Painswick converted to a local information centre, to the Fairfield Shipbuilders drawing office converted by Govan Workspace to modern offices.

Islington Mill had been out of use for 30 years before it was converted into a successful exhibition and art space with the first event in 2000. The current development programme will regenerate and remodel a further 6,000 sq ft – two floors – of the building.

New AIA Industrial Archaeology Research Grant Fund

From 2019 the AIA will be offering research grants for industrial archaeology and heritage projects. Details of the scheme and the application form will be launched at our annual research seminar at Nottingham conference this August with a closing date in March 2019. The intention is to promote research into sites, processes, and landscapes from the industrial period through survey work, excavation, and documentary study. Grants up to £1500 will be available for proposals from the voluntary, academic or professional sectors. The successful applicants will be expected to provide a summary of their proposed research for IA News and a final written report that may be published in IAR. This is a partner scheme to our conservation awards and expands AIA's commitment to understanding and promoting industrial archaeology landscapes and the process of industrialisation in Britain and beyond.'

**VISIT THE AIA
WEBSITE**

www.industrial-archaeology.org

A very warm welcome to our new members:

Andrea Brownsdon, Newent

Robert Fletcher, Chester

Anthony Lee, Blackburn

Paul Dottridge, Berkhamsted

Daniel Graber, Oensingen, Switzerland

Brain Kane, Bedford

Angela and Richard Knisely-Marpole,
Burbage, Derbyshire

Rebecca Trow, Sale.

Miller's time off

In earlier, more conservative times, the miller was punished for working on Sunday, but he didn't always care. When a protest against Sunday work was made to Mr. Wade of Wicklewood towermill, Norfolk, he retorted: "If the Lord is good enough to send me wind on a Sunday, I'm going to use it". On the other hand, when there was no wind, millers did other work, like maintaining their machinery, or took time off. Noah Edwards, the last miller of Arkley tower mill, Hertfordshire, would "sit on the fan stage of a fine evening and play his fiddle".

Rex Wailes, The English windmill.

South Wales and West of England Regional IA Conference 2018

The 49th annual SWWERIAC was held in West Coker, near Yeovil, on Saturday 14 April and was attended by 100 participants from all over the region. This year's conference had been arranged by the Somerset Industrial Archaeological Society (SIAS) in conjunction with the Coker Rope and Sail Trust.

Geoff Rowton

Richard Sims began the day by providing an overview of the twine, rope and cloth industries that dominated the area surrounding West Coker, and which would be the focus of the morning's proceedings. The limestone geology between Bridport, Crewkerne and the Coker villages produced soils that were ideal for growing flax and hemp. The demand for twine, rope and cloth produced from these crops led to flourishing industries from medieval times. Richard described in detail the harvesting, preparation and spinning of the fibres to form yarn, the raw material for twine, rope and cloth. Huge quantities of rope and sailcloth were required to equip sailing ships of the eighteenth and nineteenth centuries. The superiority of Coker Sailcloth was widely recognised, and was the cloth of choice for the Navy. Such was the demand that the flax and hemp based industries predominated in South Somerset and West Dorset, and have left a rich legacy of mill buildings, housing and associated structures in the area.

Ross Aitken, Chair of the Coker Rope and Sail Trust, continued the story of this local industry by recounting the remarkable survival of Dawe's Twine Works and the challenges that were met during its restoration. The site, within West Coker and only a short walk from the conference venue, has a long history of twine and rope making. The present buildings date from the end of the 1800s, and were in use until 1968 when the works were closed and were left to decay. In the 1990s research by the local community, assisted by SIAS, revealed the uniqueness of this site, and that almost the whole history of this nationally important industry within this local area had been lost. The Coker Rope and Sail Trust was set up, and in 2005 South Somerset District Council compulsorily purchased the site. Appearance in the BBC series 'Restoration' in 2006 brought welcome publicity, and although the project did not win nationally, significant funding from other bodies enabled restoration to begin. Following a successful application to the HLF for funds to finish the project, work is now almost complete. This year it is intended to build a visitor centre, and soon twine-making will once again be seen in South Somerset, in the last surviving Victorian twine works in England with its original machinery.

Conference then split into groups to visit the twine works. The imposing 100 yard-long covered 'walk', working machinery and preserved artifacts all demonstrated a high level of restoration and commitment by all involved, whilst retaining the atmosphere of a small workaday Victorian factory.



Dawe's Twine Works

Dawe's Twineworks in West Coker, Somerset, is said to be the only surviving rural twine works which still has its twine-making machinery in place. In June 2015, as part of the restoration, the AIA awarded the Coker Rope and Sail Trust a grant of £3,700 for 'the restoration of a range of machinery and other artefacts used in the twine-making process.' This included work on the line shaft, restoration of the 54in pulley and acquisition of a 'new' water pump which will be used to irrigate the new flax plot from the underground cisterns.

After lunch SIAS member Peter Daniel, a Chartered Civil Engineer and retired waste manager, was well placed to describe the history and archaeology of solid wastes management

with a talk entitled, 'What a Load of Rubbish'.

The beginnings of the industrial age, and the rapid urbanisation that followed, presented a waste problem on a scale never previously seen. In urban areas waste of all kinds was piled in huge heaps, from which anything saleable was removed. By the late nineteenth century 'scavenging' had become an organised industry. The Public Health Act of 1875 marked the end of uncontrolled tipping; refuse destructors were operating as early as c1876, and by the 1890s electricity was being generated. The systematic separation of wastes was accelerated by wartime salvage drives. With the decline of coal as a fuel the proportion of ash dropped sharply, but that of organic waste consequently grew, forcing the



industry to address the problems of pollution, leachate and landfill gas.

Dr Peter Stanier led a visit to Ham Hill, near West Coker following the conference, so his talk entitled 'England's Most Seductive Stone' provided an understanding of the significance of this golden Somerset building stone. Hamstone is a sedimentary rock, and being a freestone, it can be carved and has a distinctive texture. Ham Hill has been quarried since Roman times and whole villages west of Yeovil were built of Hamstone.

Joseph Lewis, Heritage Coordinator at South Somerset District Council's Community Heritage Access Centre outlined the history of Yeovil's gloving industry. He spoke about the workers and also the tools which were unique to glove making. Gloving here dates back to the fourteenth century and by the eighteenth it was the town's main industry. In the 1890s three quarters of the town's workforce was engaged in leather, gloving and associated industries, in both factories and homes. By the 1950s Yeovil was producing half of Britain's gloves, but this boom was halted, again by the lifting of import bans, and also by the aircraft and engineering industries which could offer better wages.

The Somerset Industrial Archaeological Society will be hosting the 2019 AIA Conference, at Cannington near Bridgwater between 9 and 14 August, the first time it has been held in Somerset in its 40 year history. It is planned to include a visit to Dawe's Twine Works as part of the programme.

Lea Valley Heritage Alliance aspires to World Heritage status

Lea Valley Heritage Alliance (LVHA) is an organisation based in Chingford that upholds the industrial heritage of the area, promotes local sites such as museums and living history projects, and champions business investment in the Lea Valley. The Lea Valley already contains several sites of special scientific interest and an area of outstanding natural beauty but is also home to over 100 world-first industrial achievements, the highest concentration in a single location anywhere in the world. For this reason, LVHA's long-term objective is to have the area added to the UNESCO World Heritage List on the basis that its breadth of industrial inventions and innovations have made an outstanding universal contribution to humanity. This contribution includes the first British airplane, the first electric light bulbs used in houses & public buildings, the diode valve (which paved the way for just about everything electronic), the first beer that could be transported and the first sale of petrol.

The World Heritage list contains 1,073 locations across 167 United Nations' member states. Nominations for inclusion on the List are made by the UK Government, from a tentative list that it compiles during the period between UNESCO reviews. The next review is due no earlier than 2019 and LVHA is keen to be considered on the Government's tentative list.

Brunel thwarts road widening in Devon

A feature of Starcross, Devon is the Italianate pumping engine house, the best surviving building from Brunel's 'Atmospheric Railway'. But there is more to it than just the building as work has been suspended on a road widening scheme with the discovery of a 'nationally significant' underground reservoir.

It was part of system which used suction generated in pumping stations to move trains by extracting air from pipes laid between the rails. The pumping stations used water from the underground reservoir to create steam but the system proved more expensive than using conventional steam-power and operated for less than a year.

The discovery was made by the Environment Agency, which has been carrying out tidal defence work in the area.

Devon county councillor Alan Connett said: "There have been some significant developments that are likely to prevent any improvement scheme in Starcross. As the chamber lies beneath the area where the road widening was to take place, the council will no longer pursue the scheme."

The Environment Agency confirmed work had been suspended due to the 'historically important' discovery, with archaeological surveys identifying two chambers, 32m (105ft) in length joined by 10 underground arches.

Thanks to Neil Preston for forwarding this

National Historic Ships UK

National Historic Ships-UK (NHS-UK) is a Government funded, independent organisation which gives objective advice to UK Governments and local authorities, funding bodies, and the historic ships sector on all matters relating to historic vessels in the UK. NHS-UK has a wide remit, looking not only at the immediate issues concerning historic vessels in the UK, but also addressing questions relating to the support infrastructure for historic ships, their potential for contributing to the wider economic, social and community context, and maintaining a watch list of vessels abroad with potential UK significance.

NHS-UK promotes the availability and standards of ship and boat conservation skills and training, and shares experience and expertise across the sector, particularly by establishing a number of maritime heritage hubs through its Shipshape Network initiative. A current project is Shipshape Heritage Training Partnership (SHTP2), a revised version of the first phase of this scheme which is funded by HLF under Skills for the Future and will see 16 trainees undergo 12 month-long placements in conserving, maintaining and operating historic vessels.

The organisation also runs a number of award schemes, including the Flagship of the Year and Marsh Volunteer Awards, together with an annual Photo Competition.

Energy in Store

The Science Museum Group (SMG) stores its larger objects in old aircraft hangars at Wroughton, near Swindon, but the vast majority of its collection – around 320,000 items in total – is kept at Blythe House in West London. This Grade II listed building, originally the headquarters of the Post Office Savings Bank, also provides storage for the British Museum and the Victoria and Albert Museum.

The Government, which owns Blythe House, has decided to sell it for commercial or residential use, and some of the sale proceeds are being allocated to provide new storage facilities for the current tenants. SMG recently obtained planning consent for a 20,000m² building at Wroughton to house objects from Blythe House, as well some material currently stored in unsatisfactory conditions in the existing buildings at Wroughton. The new building should enable SMG to offer much better access to their collections for researchers and the general public. The process of moving the objects, which begins in 2020, will also provide an opportunity to enhance the cataloguing of the collection, with photographs of every object, and to make more of this available on line.

In preparation for this massive move, SMG has been working with King's College, London on a project, funded by the Arts and Humanities Research Council, which explores how users engage with museum objects in store. This project uses the energy sector (steam, gas, electricity, nuclear etc.) as a pilot for the SMG's collections as a whole, and is working with a range of professional and non-professional researchers to help shape the systems, facilities and processes needed at the new store to improve access to the collections.

For more information search – science museum energy in store or – science museum collections management Wroughton

Ian West



Paddle Steamer Monarch is for Sale

Monarch has a 42ft steel hull, fitted with a wooden saloon and wheel house.

She is powered by an inclined condensing compound engine supplied with steam from an oil fired scotch dry-back boiler. Licensed for 12 passengers she has been successfully operating river trips on the Frome and into Poole Harbour in Dorset.

Offers over £75,000 – Enquiries to Wareham Steam Navigation Co. Ltd

EMIAC 95

INDUSTRIAL HERITAGE DAY – Keeping One in Suspenders!

Saturday October 6 2018

Roman Way Community Centre, Market Harborough, LE16 7PQ

Our EMIAC day will look at the industries which flourished in Market Harborough, the restoration of The Old Grammar School, and the canal system which linked the town to the rest of Britain before the coming of the railways.

Speakers include:

Rosalind Willatts – Market Harborough: the industries of a market town

Mike Stroud – The Symington Brothers 'From Soups to Suspenders.'

Bryan Martin – Rebuilding of The Old Grammar School.

Mike Beech – Foxton Locks and the Harborough Arm

Followed by afternoon tours.

To download EMIAC 95 Booking form – search EMIAC 95

Please complete this form and post it to the address below by September 29 2018 together with a cheque made payable to LIHS.

EMIAC 95, 3, The Orchard, Groby, Leicester LE6 0BA

The cost of the event is £15 per person including lunch. Any queries please e-mail emiacbox@gmail.com

History of Industry

Bilbao City Safari 19th – 23rd September 2018

Our Safari will explore the remains of the city's industry from milling to iron mining. We will also look at the transport including a narrow gauge railway (Feve), a transporter bridge and a funicular. Architecture will not be forgotten with some interesting groups of workers' housing, a walk round the new town and a visit to the Guggenheim Museum. Our visit to Bilbao will be a day longer than normal beginning on the Wednesday evening and finishing at lunch time on the Sunday. Booking is still open for the few remaining places so if you fancy a late summer trip go to the their website for more details and booking arrangements.

Dates for your 2019 Diary

Planning is already underway for 2019 and I am pleased to announce that the dates for next year's tours (although not yet all the details) are now on the website: Safaris, Country House tours and the AIA Spring Tour. Check out all the upcoming tours on the Heritage of Industry website.

Martin Randall Travel

are running guided tours with an
IA interest including –

16 to 22 September – 'Early Railways: The North – History, technology, architecture, landscapes'

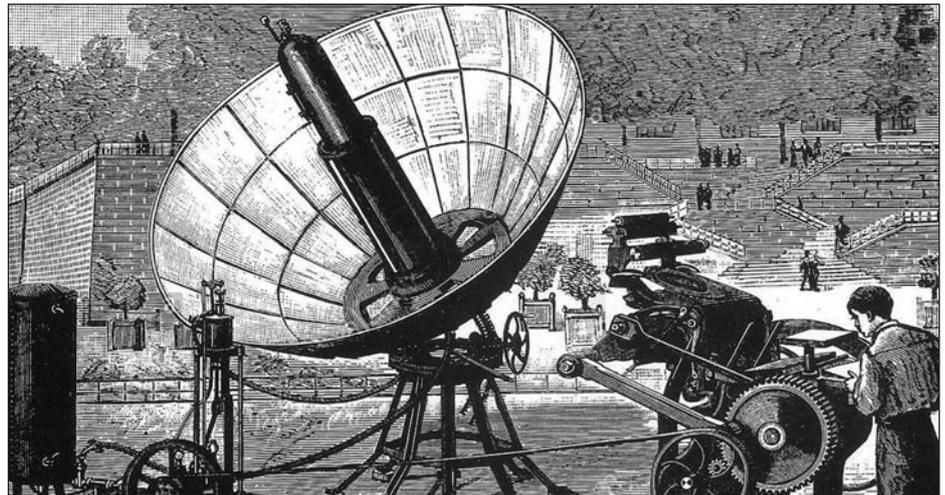
13 to 20 August, – 'The Victorian Achievement – Architecture, Industry & Art in Lancashire & Yorkshire'.

Also London Days Out on –

26 October – 'Great Railway Termini – Paddington, King's Cross & St Pancras Stations'

13 September 'London's Underground Railway – A History & Appreciation of the Tube'

Full details on their website



Augustin Mouchot (1825 – 1912) was an early advocate of 'renewable energy', believing that the coal would eventually run out. By August 1866, Mouchot had developed the first parabolic trough solar collector, which was presented to the emperor Napoleon III in Paris. It did not survive the 1870 siege of Paris.

He presented a paper on his experimental solar generator to the Academy of Sciences in 1875, and in the same year he presented to the

Academy a device he claimed would, in optimal sunshine, provide a steam flow of 140 liters per minute. The following year he sought permission from the ministry to take leave from his teaching position in order to develop an engine for the Universal Exhibition of 1878, where he won a Gold Medal for his work, most notably the production of ice using concentrated solar heat. This is his solar powered printing press, 1882.

Local Society and other periodicals received

Abstracts will appear in *Industrial Archaeology Review*.

Bristol Industrial Archaeological Society Journal, 50, 2017

Greater London Industrial Archaeology Society Newsletter, 296, June 2018

Hampshire Industrial Archaeology Society Journal, 26, 2018

Historic Gas Times, 95, June 2018

ICE Panel for Historical Engineering Works Newsletter, 157, March 2018

Leicestershire Industrial History Society Newsletter, 5/1, Spring 2018

London's Industrial Archaeology, 16, 2018

Manchester Region Industrial Archaeology Society Newsletter, 157, Summer 2018

North East Derbyshire Industrial Archaeology Society Newsletter, 70, May 2018

Piers: the Journal of the National Piers Society, 127, Spring 2018

South West Wales Industrial Archaeology Society Bulletin, 132, June 2018

WaterWords: News from the Waterworks Museum, Hereford, Spring 2018

Welsh Mines Society Newsletter, Spring 2018

Worcestershire Industrial Archaeology and History Society Newsletter, 52, March 2018

Yorkshire Archaeological Society Industrial History Section Newsletter, 103, Late Spring 2018

Bristol Area Gazetteer

An updated and greatly expanded version of Joan Day's 1987 gazetteer of industrial archaeology in the BIAS area is available from the Museum of Bath at Work, Julian Road, Bath BA1 2RH. Price £9.95, p and p £3.00. Cheques payable to BIAS please.

Ring bound, the gazetteer uses map references and postcodes along with easy to use maps to identify the sites; 123 printed pages. A thematic approach has been adopted to this revised version. Industry sectors, Banking; Food, Drink & Tobacco, Mining & Quarrying, Metals, Manufacturing, Transport, Utilities; it covers 308 sites of industrial archaeological importance within the four unitary authorities of Bristol; Bath & North East Somerset; North Somerset and South Gloucestershire.

Books

The ups and downs of Bristol's Clifton Rocks Railway and the Clifton Spa, by Maggie Shapland, Bristol Industrial Archaeological Society for the Clifton Rocks Railway Trust 2017, 317 pp, 430 illus, ISBN 978-1-908905-05-5. Hardback £15 to pick up from Clifton library, Princess Victoria Street Clifton Bristol BS84DD or order online from cliftonrocksrailway.org.uk. It can also be purchased from Clifton Suspension Bridge and Bristol Archives. All proceeds to Clifton Rocks Railway Trust.

This is a major definitive work by a BIAS member, 12 years research has produced a fascinating collection of oral histories from those who remember travelling on the railway, to those who experienced the Bristol Blitz, working in the Balloon squadron, and reminiscences of the remaining few BBC personnel. There are descriptions of the artefacts from each period, and work done by the volunteers since 2005 after years of dereliction.

Having gone bankrupt twice in its life (it ran from 1893 to 1934), it was then converted into wartime shelters, barrage balloon workshops, a transmitting station for the BBC Bristol complete with a small studio. All the transmitting between 1940 and 1945 was performed here and then from 1946 up to 1950 it was used for the Third Programme.

Early Railways 6

Edited by Anthony Coulls
National Railway Museum

The series of Early Railways Conferences held its sixth gathering in June 2016 in the cradle of railway history that is Newcastle, with visits and events across Tyneside away from the conference venue. A full programme of papers showed that there is still a rich seam of research being undertaken into early railways across the globe. In this volume, a selection of papers cover that international aspect whilst others break new ground in terms of location and subject, always part of the excitement of the conference, where conversations over coffee turn up new research potential almost every minute. Dr Michael Lewis examines the very basics of early pointwork and track, John R New's paper explores why the horse was displaced as motive power and Dr David Gwyn reflects on the first railways in Africa. Between the variety of other papers, the social, economic and technological history of early railways is covered. Following the amazing wooden wagonway discovery and excavations on Tyneside in the summer of 2014, the book begins with Discovering the Willington Waggonway which was the public lecture and sets the tone for the rest of the publication.

The papers

Discovering the Willington Waggonway: Archaeological excavations at Neptune Yard on North Tyneside in 2013, R Carlton, L Turnbull & A Williams

Early Railways in The Bristol Coalfield, Steve Grudgings

Why Killingworth?, Robert F Hartley

Pointwork to 1830, Dr M J T Lewis

Why Displace the Horse? John R New

Early Locomotives of the St. Etienne-Lyon Railway, Miles McNair

Blücher and After: A Re-assessment of George Stephenson's First Locomotives, Dr Michael R. Bailey

Interpreting Sources for the operation of the Durham & Sunderland Railway 1836-56, Colin Mountford

Early Locomotive Performance, Peter Davidson

Penydarren Re-Examined, Andy Guy, Dr Michael Bailey, Dr David Gwyn, Robert Protheroe Jones, Dr Michael Lewis, John Liffen, and Jim Rees

Two Early French Non-Railways, Dr M J T Lewis

Joseph Atkinson and the Early Images of the Tanfield Arch, Robin Adams

Plateways, Steel Road Rails, and Rutways in Australia, Dr Jim Longworth and Phil Rickard

The First Railways in Africa, Dr David Gwyn

When to Stop Digging: Assessing the Excavated Evidence, Helen Gomersall

Sierra Leone: Proposals for a Colonial Early Railway, Anthony Coulls

Publication

The book will be published by Six Martlets Publishing on behalf of the sponsors at the discounted price of £35 each plus p and p. To reserve a copy go to www.earlyrailways.org.uk or contact the publisher for an order form.

The postage and packing rates will be: UK, £3.50 per book. Europe, £9.00 per book. Other countries, £14.00 per book.

All subscribers will receive a copy of the book at the discounted price for advance payment and will have their subscription acknowledged in the preliminary pages. The subscription list will close on 15 October 2018 and book will be published shortly after.

This will be the only opportunity to obtain a copy at the discounted price Six Martlets Publishing, c/o Better Prepared Ltd, 15 Diamond Court, Opal Drive, Fox Milne, Milton Keynes MK15 0DU. sixmartlets@uwclub.net

Sponsored by The Newcomen Society, The Railways and Canal Historical Society, The Institution of Civil Engineers, The National Railway Museum

31 August – 5 September 2018

AIA CONFERENCE
Nottingham

9 – 16 September 2018

TICCIH CONGRESS
Santiago Chile
Industrial Heritage – Making a Sustainable future by understanding the past
ticcih.org/ticcih-chile-2018-congress

20 – 22 September 2018

ICOMOS
International Symposium on Cultural Heritage and Legal Issues
Bled Slovenia
Management of Cultural Heritage Sites

29 September 2018
NORTH WEST INDUSTRIAL ARCHAEOLOGY CONFERENCE

Cross Street Chapel, Manchester
The Archaeology of Peterloo

6 October 2018
EMIAc 95

Market Harborough
Industrial Heritage Day – ‘Keeping one in suspenders’
See page 26

12 October 2018
SEMINAR – CREATIVE REUSE
Salford University
See page 23

24 – 26 October, 2018
2nd INTERNATIONAL CONFERENCE ON INTERNATIONAL HERITAGE AND PUBLIC WORKS.

Alcalá de Guadaira, Seville, Spain
For information search – fupia.es/ii-congreso-internaciona

27 October 2018
DEVIZES CONFERENCE

Devizes Town Hall 9.30 – 4.30
Information – *IA News* 185 p24 and AIA Website

9 – 14 August 2019
AIA ANNUAL CONFERENCE, SOMERSET

Keep an eye on the AIA website for details of the seminar in Salford on Friday 12 October on the subject of Creative Reuse. This is concerned with the essential strategy which holds the key to the preservation of many of our most important industrial sites but it needs to be done well.

IMPORTANT NOTICE

IA News would like to publicise your event, particularly if it will appeal to members outside your area BUT if you don't tell the editor IT WILL NOT HAPPEN. The production schedule is long and it is no good leaving it to the last minute.

For events before the end of May, copy information needs to be with the editor by email before the end of December to make the edition distributed in February.

Likewise for events before the end of August information by the end of March (distribution in May) and events before the end of November then information by the end of June (distribution in August).

You are welcome to send details a year in advance if you wish and the date will be in the diary.

More Diary Dates can be found on the AIA website at www.industrial-archaeology.org



The Dounreay party in front of the iconic 'dome' – access to the interior is through the tube on the right at mid height.

Photo James Gunn

*Delegates to the Caithness conference at Wick Town Hall. Front Row: Jenny Bruce with three local councillors, Willie Mackay, Nicola Sinclair and Donnie MacKay
photo Miles Oglethorpe*



INDUSTRIAL ARCHAEOLOGY NEWS
(formerly AIA Bulletin ISSN 0309-0051)
ISSN 1354-1455

Editor: Chris Barney

Published by the Association for Industrial Archaeology. Contributions should be sent to the Editor, Chris Barney, The Barn, Back Lane, Birdingbury, Rugby CV23 8EN. News and press releases may be sent to the Editor or the appropriate AIA Regional Correspondents. The Editor may be telephoned on 01926 632094 or e-mail: aianewsletter@btinternet.com

Final copy dates are as follows:

- 1 January for February mailing
- 1 April for May mailing
- 1 July for August mailing
- 1 October for November mailing

The AIA was established in 1973 to promote the study of Industrial Archaeology and encourage improved standards of recording, research, conservation and publication. It aims to assist and support regional and specialist survey groups and bodies involved in the preservation of industrial monuments, to represent the interests of Industrial Archaeology at national level, to hold conferences and seminars and to publish the results of research. The AIA publishes an annual Review and quarterly News bulletin. Further details may be obtained from the Liaison Officer, AIA Liaison Office, The Ironbridge Institute, Ironbridge Gorge Museum, Coalbrookdale, Telford TF8 7DX. Tel: 01325 359846.

The views expressed in this bulletin are not necessarily those of the Association for Industrial Archaeology.

