WARWICKSHIRE WIAS
Industrial Archaeology Society
NEWSLETTER

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FROM THE CHAIRMAN

There was a moment during questions following the Zoom presentation by David Skillen on Gretna Girls and the Devil's Porridge when George Illingworth pointed out that the statue in Gretna depicting a girl filling of shells was an incorrect illustration of what actually went on at Gretna. They manufactured Cordite which was then transferred to various National Filling Factories spread around the country, including, of course the White and Poppe factory in Coventry, originally labelled Filling Factory 10; later re-named as Filling factory 21 after a break in production in 1916.

This was an illustration of the awareness and expertise that exists within our membership, and the dangers of making a false move! In fact, over the years, many speakers have remarked on the quality of questions that WIAS members raise on these occasions.

This set me thinking about giving greater opportunity to our members to relate their own – or their family's involvement – in industrial heritage. My own family's background includes the development of the machine tool industry in Birmingham, the subject of repeated lectures by my grandfather at every available opportunity! Perhaps personal recollections and family connections might be an ingredient for a Members Evening as part of the WIAS programme.

This is part of a wider issue and one that concerns me as one views the future of the Society. Participation is vital to its long-term survival not only in terms of taking on responsibilities but simply in seeing WIAS as something more than a monthly meeting where topics of interest are presented and discussed. I am very aware that Warwickshire's industrial heritage may not be a member's primary passion and may stem from interest and involvement in related activities, but the website provides the ideal opportunity for material to be posted for the wider audience. Already we have had a large range of contributions, from the small snippet to the extended essay, with John Willock setting the pace with 29 entries in the Contributions section. I really would encourage all to take the time to explore what is available on our website, so expertly maintained by Peter Riley.

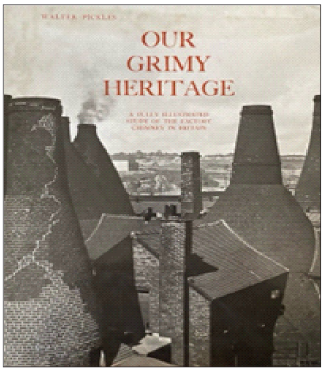
The Society also fosters larger projects and Brian Joseph and myself have received the benefit of a generous WIAS grant to help the publication of a book looking at an aspect of Stratford-upon-Avon's twentieth century industrial history 'N.C.Joseph Ltd., The Aluminium Works & Stratford Produce Canners'. As a result of that grant and support from The Stratford Town Trust, we are able to offer the book at a discounted rate to WIAS members (and supporters) as well as to former Joseph employees, details of which will soon be announced.

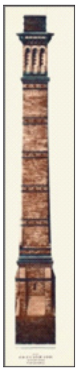
Spring approaches together with the prospect of joining Alain Foote on one of the visits that he is planning for the coming months. This is another example of the way in which members and supporters can be involved. March also marks the return to the Warwick Prep School Hall for WIAS hybrid meetings, and I was glancing through my book collection to see if there were any items that might be suitable for the bookstall, and came across 'Our Grimy Heritage: a fully illustrated study of the factory chimney in Britain' by Walter Pickles. This set me thinking about surviving industrial chimneys in Warwickshire and that it might be a good project to record these chimneys and place them as a category on the website. We have, of course, lost the majority of these chimneys with the process of de-industrialisation, but a few remain. They might be classified according to factors such as age, height, diameter, construction materials, industry, function, architectural detail and would offer both the chance for archive research and site visits.

The development of steam power was the obvious catalyst for the need for industrial chimneys, and they also can be an indicator of a shift from water power to steam. Two examples from Leamington Spa are Rock Mill and Blackdown Mill, with the latter chimney adorned with its mid-C19th origins 'JJ 1854'.

One of the lost Warwickshire chimneys was, of course, the chimney at Cash's works in Coventry, which demonstrated that a very functional facility can carry architectural merit as well. In a brave defence of conservation of industrial buildings, the demolition of the Cash's chimney was a move that Falcon Hildred compared to the demolition of the Euston Arch, asking "Are we are a cultured nation of art lovers or a nation of iconoclasts?"

The industrial chimney does, of course, present quite a dilemma once its useful life is over – what uses can these chimneys provide other than as a symbol of former industrial glory?





'Our Grimy Heritage'; Cash's chimney, Coventry, by Falcon Hildred; Rock Mill.

Blackdown Mill

PROGRAMME

10 April (live/zoom): Tim Bridges (of the Victorian Society)
Victorian and Edwardian Industrial and Commercial buildings in the West Midlands.

8 May (live/zoom): Dr Jonathan Aylen
RAF Planes that won the Battle of Britain were built on German Machinery.

5 June (live/zoom):Colin Millett
The Wonder of Worcester Porcelain: a City Heritage Success Story.

Meeting Reports

December 2024 (zoom): Martin Green

Candles at Christmas - A History of Price's Candleworks.

With a sub title of 'Candles for Christmas' our Chairman Martin Green shed light on the history of Price's Candleworks. He introduced it as embodying:

- Entrepreneurial initiative
- Success in both national and international markets
- Innovation, diversification and utilization of by-products
- Industrial Communities
- Lasting markets
- Surviving industrial archaeology

Three brothers, John, William and Robert Wilson in Wilsontown, South Lanarkshire set up an ironworks in 1780. An artist's impression showed a substantial works with a long row of workers' cottages -- now only the cottages survive as the firm went bankrupt in 1812. William made a huge decision to move to London where he began business as a merchant in the Russia trade. In 1830, in partnership with Benjamin Lancaster, William set up Edward Price & Co to make tallow candles. Tallow is made from animal fats and was cheap but it "smoked, smelt and guttered". The wealthy and the Church used beeswax but this was expensive; spermaceti from whales was even more expensive.

From modest beginnings the company made rapid growth by using power and mechanization and particularly a range of raw materials. In the 1820s Michel Chevreul discovered that by adding a strong alkali to animal or vegetable oil the oil separated and stearine, a hard pure fat was produced along with oleine and glycerine. Price's invested in 1000 acres of coconut plantation in Ceylon [Sri Lanka] to obtain suitable oil. They separated the stearine from this oil and blending that with refined tallow, were able to produce a modestly priced candle which, with their other important development, a plaited wick, burned cleanly and did not smell. The plaited wick curved over so that its tip was consumed in the side of the flame and it did not smoke or need snuffing.

It was a time of much public support for the ending of slavery and Price's made much of the fact that their plantations were not worked by slaves. For many years they used an image of a slave being pulled by a rope with an abolitionist severing the rope with a candle (no doubt one of Price's) and below it the words, 'setting the slave free'.

Price's had failed to patent their ideas and, after competing companies began to use them, they adopted the policy of patenting everything. Between 1840 and 1858 they took out 114 new patents.

From 1830 Price's built an extensive works close to Vauxhall Bridge on the side of the Thames which allowed them to bring their materials in by barge. For the roofs, they made much use of the recently developed corrugated iron sheets curved to a wide arch form and this gave distinctive appearance to all their works. As the business expanded, they needed more space but at Vauxhall they were hemmed in, so they developed a new factory at Battersea, either side of Battersea Creek. These were known as the Belmont Works and they had the same arched corrugated roofs. Martin had researched the factory sites on old OS plans and had unearthed some drawings of the works in action and some early aerial photographs.

By the 1850s the Belmont Works had filled all the available space and demand for Price's candles had risen so much that they needed to develop new premises. They decided to look for space in Liverpool, where land was less expensive and in addition was where the palm oil was imported. They found a site on the Birkenhead side at Bromborough Pool, where they built a new factory which opened in 1858, easily recognized in an aerial photo by the distinctive curved roofs.

By then the company employed over 2000, about half of these were boys. The boys were appreciated for their nimble fingers and by the standard of the time they were very well treated. In line with the Wilson family religious principles, they were encouraged to attend prayers every morning and each had a locker for his own bible and prayer book.

Very important for the prosperity of the company was the development of uses for the by-products. In addition to the stearine for candles, the refinement of the palm oil produced oleine and glycerine. The oleine was the basis for oils and lubricants particularly for cotton machinery. By 1870 glycerine was being used as a treatment for burns and skin diseases and food preservation, among many other things. Price's had started to manufacture soap, using the glycerine, at their Battersea works in 1856.

Preceding the better known neighbouring Port Sunlight by thirty years, Price's built a model village for their key workers at Broomborough Pool. This consisted of 147 houses with a village hall, a chapel and a school. There were also allotments and a cricket ground. A quotation described the Mutual Improvement Society as "one of the most genuine efforts to broaden the horizons of a working community and cannot be attributed to motives of expediency or self-interest." In 1869 they introduced profit sharing and, in1893, a contributory employees' pension scheme.

There was now a degree of mechanization - a slide showed a machine which would mould a large quantity of candles at a time and extruded the candles upwards.

In 1854 the discovery of oil in Burma led to paraffin wax as a new material for candles. By-products were benzene as a cleaning agent, kerosene for lamps and stoves and a heavy oil which was developed for all kinds of lubricants for sewing machines, bicycles, steam and gas engine. Later it became the basis of oil for petrol and diesel engines.

By 1900 Price's were offering 130 different named specified sizes of candles, potentially made in 60 permutations of material, colour and hardness. The company was buying up many of the smaller manufacturers.

However, before the end of the century gas lighting was competing with candles although the market for other Price's products, particularly lubricants, was still strong. In 1919 the company was taken over by the neighbouring Lever Brothers Ltd. Just three years later Lever Brothers partnered with Shell, BP and Burmah Oil to form Candles Ltd. Lever Brothers pulled out in 1936, taking the Bromborough works and the soap making rights with them. Shell became the sole owner in 1982 but in 1991 they sold Candles Ltd to a private owner who reinstated the name 'Price's Patent Candle Company'. Their candles are now made in Italy.

To conclude a very interesting talk, Martin showed us slides from a visit to the only remaining candle makers in Britain, Charles Farris and Co who produce candles in Wiltshire, mainly for church use.

January 2025 (zoom): Alan Hill
The History of Colliery Ventilation.

Alan began this comprehensive account of mine ventilation with a brief history of coal mining in Britain.

There is evidence that the Romans used coal, but this was probably only dug from outcrops and it was not until the thirteenth century that proper mining took place. Alan showed a pair of maps which demonstrated how the industrial areas of the country correspond with the coal fields. The exception was London, which received its coal by sea and used a tax on it to finance the city's development and reconstruction after the great fire of 1666.

By the late 15th century timber was running short and demand for coal grew. During the 1600s its use spread although it wasn't until the 1700s, with the industrial revolution, that deep mining developed dramatically. In 1700 output was some 2 1/2 million tons, by 1800 we were mining about 225 million tons.

Shallow mining with bell pits did not need ventilation but deep mining certainly did. Men and animals need oxygen. If this falls to 18% from its normal 21% fatigue increases, but even more important is the need to clear poisonous gases. The presence of methane increases with depth; at 7% it will burn at 12 1/2% it is explosive. One percent of carbon monoxide will cause instant death. In some pits, at the beginning of a shift, 'firemen' or 'penitents' would crawl along the floor and burn off the methane that had collected in hollows in the roof above them.

Ventilation was also needed for cooling; for every 50 feet of depth the temperature rises one degree Fahrenheit. Blasting caused huge quantities of dust. Overall, 18 tons of air were needed for every ton of coal extracted.

The basic principle of mine ventilation was to have a path of air down one shaft, around the mine and up a second shaft. Early mines had a single shaft divided into two by a wooden partition or brattice but this was outlawed after a dreadful accident in 1857 at Hartley Colliery in Northumberland when part of the iron beam of the pumping engine fell down the shaft sealing it and the 204 men and boys underground. Thereafter there had to be two means of exit, usually two shafts.

From about 1680, a form of forced ventilation was achieved by lowering a 'fire basket' down one shaft which drew the air through the mine and vented it up the shaft. This was developed by having a furnace near the bottom of the upcast shaft with a flue into that shaft which drew the air out of the mine; effectively a chimney the full depth of the mine. This arrangement was first used at Wallsend in 1707 and it was used at most collieries until about 1850. However, it was the source of many accidents, 86% of collieries that suffered explosions had furnace ventilation. Nevertheless, Walsall Wood Colliery continued to use furnace ventilation from 1879 until it closed in 1954, it was calculated to move 100,000 cu ft per minute. A safer method was to have a furnace at ground level taking its combustion air from the upcast shaft and venting up a 30 foot or taller chimney and drawing air from the mine with it.

Steam jet ventilation was tried but not widely used. In this steam was injected into the upcast shaft which heated the air and caused it to rise with more vigour thus providing a draft through the mine.

From the middle of the nineteenth century all these methods were gradually superseded by mechanical systems. De re Metallica published in 1556 illustrated a water wheel powered centrifugal fan to ventilate a mine, but the earliest known use in Britain was at Elsecar, where James Nasmyth pioneered a centrifugal fan which operated between 1830 and 1850. Another early design worked like a gasholder with an engine moving an hollow piston up and down, its rim being in a water bath. Nixon's piston made in 1861 had a rectangular piston 30 ft by 20ft, weighing 7 tons with a stroke of 7 feet. It worked until 1891.

The real breakthrough came with Guibal's centrifugal fan in 1869. This drew the air in from the side into an enclosed space with rotating blades that 'swept' the air through an adjustable shutter. Some of these were huge, up to 50 feet diameter and 12 feet wide. By 1876, 200 were at work. Alan showed a number of pictures of the remnants of their housings. Early versions were subject to fatigue and were very noisy. Improvements were made to increase the efficiency with the Vasey exit which tapered the exhaust pipe so that the compressed air from the shutter could expand. In 1894 a patented change was to reshape the outlet shutter to a vee which made the equipment much less noisy.

In a diversion from mining, Alan turned to the London Underground, which in its early days was operated by steam locomotives. Guibal fans were used to ventilate the tunnels which otherwise would have been full of smoke. The exhaust steam was condensed in water tanks on the sides of the locomotives. Two rounds of the Circle Line were enough to boil nine tons of water! When it opened in December 1933 the Mersey Tunnel used Walker's Indestructible fans for ventilation, these were the final developments of the Guibal.

A competitor of the Guibal was the Waddle. This had two rotating discs with vanes between them; they could be as much as 40 feet in diameter. They were made between 1863 and 1962 and during that time the shape of the vanes and the discs was developed with consequent improvement to their efficiency.

The alternative to the centrifugal fan was the axial. Charles Parsons designed a version of his turbine and, with the advent of high speed engines, initially steam but later electric, these proved to be much more reliable and cheaper with speeds up to 3000rpm compared to the 500rpm of the Waddle.

The succession of mining disasters and the enquiries that ensued have led to changes of the legal requirements for mining ventilation. An underground fire at Clara Vale colliery in Durham led to the rule that ventilation systems should be reversible.

Alan concluded his talk with a summary of the changes from:

The furnace system up to the mid nineteenth century,

1870 The Guigal Fan weighing 70 tons at 50rpm moving 140k cu ft per min,

The Walker Indestructible,

The Waddle,

1910 The Turbine weighing 2 1/4 tons at 2500 rpm moving 125k cu ft per min.

Februsry 2025 (zoom): David Skillen
Gretna Girls and The Devil's Porridge.

David began his talk by distinguishing between Gretna Green and Gretna. Gretna Green's reputation is familiar to most but Gretna much less so despite having been the site of a factory nine miles long and three wide employing 15 to 20 thousand in 1917.

This factory produced cordite of which a huge quantity was needed by the army in World War One. Cordite was basically cotton waste soaked in nitro-glycerine and used as the propellant in artillery and rifle cartridges. The name 'The Devils Porridge' was coined by Conan Doyle when he visited the works as a war correspondent.

Whereas in the Boer War a field gun might manage 3 shots per minute by 1915 in the same timea quick firing gun could fire 13 shots. The army needed an immense quantity of ammunition. This situation came to a head after the battle of Aubers Ridge when the British forces suffered dismally through the inadequate artillery cover. Charles Repingham, the Times correspondent, with the encouragement of the British commander, General Sir John French, reported this which led to a public outcry and 'The Shells Scandal'.

The PM Hubert Asquith appointed David Lloyd George to solve the problem. In turn Lloyd George appointed Lord Moulton as Chairman of the High Explosives Committee. They recruited Kenneth Bingham Quinan from South Africa and it was he who set up the immense factory at Gretna. His success was such that after the war was over Lloyd George said, 'It would be hard to point to anyone who did more to win the war than Kenneth Bingham Quinan.'

Quinan sat down with an atlas to select a site. It needed 5 million gallons of clean water a day, to be well away from any large population in case of accidents, have good rail communication and be out of range of Zeppelins. He settled on the Solway Firth and the River Eske.

In the 11 months between August 1915 and July 1916, ten thousand Irish Navvies built the immense works. The work force was mainly young women who were recruited from all over the country and later from the British Empire to 'do their bit'. David showed us several pictures of the actual processes with the girls handling the fearsome products with little or no sign of protective clothing. Many lost fingernails because of the acid. They lived in wooden huts; one picture showed scores of these stretching into the distance.

Nitro-glycerine cannot be pumped; it is too dangerous and has to flow by gravity. While it is brewing the temperature must be kept down and one picture showed a man on a one legged stool watching it – should he go to sleep he would fall off !

The cotton waste came in bales from the Lancashire mills and there were nine vast nitrating halls where the cotton absorbed the explosive. It then had to be carefully dried in ovens. The finished guncotton, which looked like bundles of spaghetti or thick string, was then taken to shell fillings factories in other parts of the country. At its height Gretna produced 800 tons of guncotton per week. The material was moved around the works on 125 miles of railway, using special 'fireless' steam locomotives. These took on superheated water under pressure at a central depot.

Once the factory was built the Irish Navvies turned to housing. There was concern whether the Irish would be influenced by the Easter 1916 rising in Dublin but the navvies stayed loyal to the crown. To provide better accommodation than the very basic wooden huts, Sir Raymond Unwin, who had been responsible for much of Letchworth Garden City, was employed to design decent housing together with a social centre, shops, churches and a post office. Some of the more senior workers brought their families and so schools were needed. There was a laundry, a bakery, canteens and a restaurant. The housing remains and is now the only physical evidence of the vast factory.

The First World War changed life for women; they were doing work that would have been unthinkable before. One picture showed women working in a machine shop threading pipes. An important attraction for the women was better pay; In the cotton mills 15 shillings was a week's pay, at Gretna they could earn 22 to 25 shillings. Their work was very demanding. Lloyd George was converted to votes for women by their record.

David gave details of some of the women. Maud Bruce was a chargehand in the drying section and was responsible for putting out two fires there, for this she was awarded the OBE. Not surprisingly there were liaisons between the girls and the relatively few men on the site. A sad account was that of Bessie Storey and William Hall. They were married one day in 1918 but on the next day William had to return to his ship. He died of the 'Spanish' flu before Bessie could see him again. The girls could wear a triangular brass badge inscribed 'On War Work'.

Besides a hospital, largely staffed by women, Gretna had the largest female police force in the country as well as a fire brigade. However, despite the hugely dangerous work there were no major explosions at Gretna. David mentioned the horrific explosion at the Chilwell shell filling factory in Nottinghamshire which resulted in considerable loss of life.

In their time off many of the girls resorted to the pubs in Carlisle and the authorities were anxious to control excess drinking as they feared this would affect production. They took the bold step of nationalising all the pubs in the district. The managers were very strict and besides adulterating the beer they would not allow 'rounds of drinks' to prevent an individual buying several drinks for themselves. The architect Harry Redfern was employed to design a new style of pubs with bigger, open spaces which were easier to control. This style became popular throughout the country. Carlisle's pubs remained nationalised until 1972.

In the factory area the Welfare Department ran the Gretna Institute with a brass band and regular dances in the Border Hall. Ladies football thrived with a team called the Mossband Swifts in a local league that attracted many thousands of spectators.

When fighting ended in November 1917 the factory was promptly closed. By Christmas the workforce dropped from 17 thousand to 17 hundred. The buildings were demolished and the equipment sold in a series of auctions.

Now there is a much praised museum there called The Devil's Porridge Museum which David strongly recommended.

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