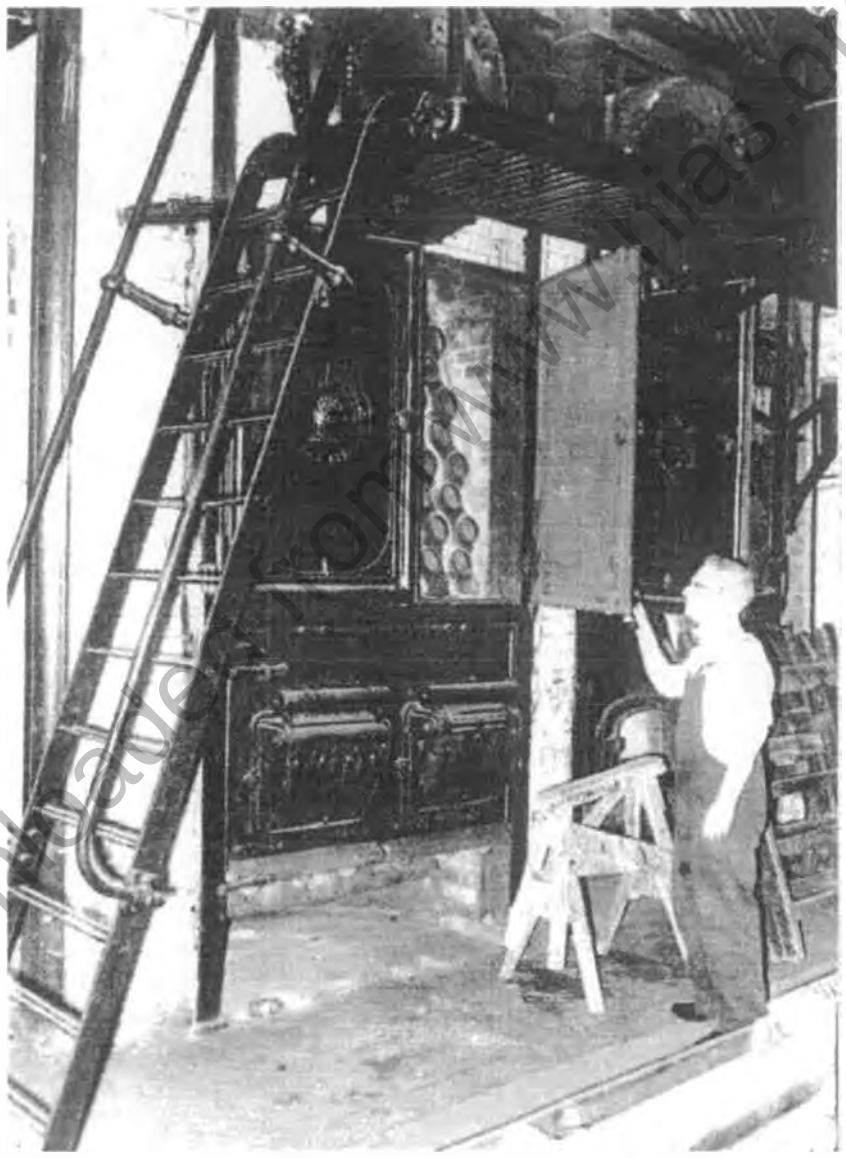
ISSN 0967-3474

Southampton University Industrial Archaeology Group

Journal



No. 8

1999

Downloaded from www.hias.org.uk

Downloaded from www.hias.org.uk

Cover photo: Babcock and Wilcox water tube boiler of 1916 at Twyford Waterworks

Contents

Contributors i
Editorial and Acknowledgements ii
Paddle Steamers built in Southampton and Cowes *by Bert Moody* 1
A Note on Stationary Boilers *by Dr Martin Gregory* 3
The Tram Shelter at the Junction, Southampton *by Tram 57 Project* 9
Industry in a Small Wiltshire Town *by Michael Tighe* 14
Along the Right Lines (Darkhill Ironworks) *by Keith Lloyd Webb* 19
Bricks at Twyford Waterworks *by Dr Rodney Hall* 23
SUIAG Surveys *by Dr Edwin Course* 26
SUIAG Publications 30

The Contributors

Dr Edwin Course

Edwin Course grew up in the old London Docks, alongside the London River. After war service in the Navy, he qualified as an emergency trained teacher. After a prolonged period of part time study at L S E, he was appointed to the University of Southampton in 1956. His teaching, research and writing have been mainly in transport history and industrial archaeology. The Southampton University Industrial Archaeology Group was a development from his courses in industrial archaeology.

Dr Martin Gregory

Martin Gregory's interest in the history of steam and the steam engine goes back over 40 years. It has led him to research and build models of many varieties of steam plant. He is also an authority on sewing machines and Stirling hot air engines. He is a founder member of SUIAG and has been both Secretary and Chairman.

Dr Rodney Hall

Rodney Hall has spent much of his life at Bletchley, within a mile of the railway junction and wartime 'Enigma' code cracking centre and now part of Milton Keynes. On leaving school, he undertook an apprenticeship in mechanical engineering in Northampton. In the mid 1970s a career move resulted in going to south Lancashire. Deciding a few years later to change direction, he gained degrees at Loughborough University and a Postgraduate Diploma in Industrial Archaeology at the Ironbridge Institute. He is now involved in research in metal fatigue at the University of Portsmouth.

Bert Moody

Bert Moody was born in 1921 in a suburb of Southampton and has been studying its shipping and railways almost ever since. His career in the railways, with an interruption for war service, lasted for 37 years. He is now President of the Southern Counties Railway Society, having been Chairman for 45 years, and Editor of their Newsletter for 40 years. For shipping, after holding positions in the World Ship Society, he helped establish the Solent Maritime Society in 1968, and since then has been its Secretary and Editor of its Newsletter. In his retirement he continues to lecture and write on railways and shipping with special reference to the Southampton area.

Michael Tighe

Michael Tighe is a retired banker and founder member of SUIAG. He edited the SUIAG *Gazetteer of Hampshire Breweries*. He continued his work on industrial archaeology after removal to south Lancashire and now, in his retirement, he is working on the history of a small town in Wiltshire.

Tram 57 Project

Tram 57 Project is a small group of local people which was formed in 1977 by members of SUIAG to assist Southampton City Heritage with the restoration of Southampton knifeboard tram 57 which had been discovered by SUIAG members and returned to the city in 1975. Subsequently two further tram bodies were located – open-top 'knifeboard' car 38 and 'domecar" 11, upon which work has concentrated. Apart from providing the practical work, Tram 57 Project also carries out fund-raising for the restoration.

Keith Lloyd Webb BEM JP

On his retirement, Mr Webb settled in the Royal Forest of Dean and immediately took an active interest in nearby Darkhill Ironworks. He has made a significant contribution to enhancing understanding of the Works – particularly through his collection of documents about the site – and of the Mushets, as well as its preservation and promotion in conjunction with Forest Enterprise. He is a past Chairman of the Forest of Dean Local History Society and has published *"Darkhill Iron Works Walk"* in the Forest of Dean Local History Walk Series. He is also an active contributor to Dean Forest Railway operations. Mr Webb was recently honoured with appointment as an Inclosure Commissioner for The Forest of Dean in a ceremony at the Verderers Court. He was our guide on the occasion of the SUIAG visit to the Darkhill Iron Works during our Annual residential Field Excursion in 1999.

Downloaded from www.hias.org.uk

Southampton University Industrial Archaeology Group Journal

Editorial and Acknowledgements

Welcome to the 1999 edition of the SUIAG *Journal*, the eighth to be published. As usual, all the contributions are from our members or are records of SUIAG activities. However, SUIAG is formally associated with other local groups in the field of industrial archaeology – namely the Hampshire Mills Group, the Twyford Waterworks Trust, the Tram 57 Project and the groups concerned with the steamers *Shieldhall* and *Calshot*. An article in this edition has been contributed by members of the Tram 57 Project. It deals with the recent removal for preservation of one of the last survivals of the Southampton street tramway system. Martin Gregory's piece, while concerned with stationary boilers in general, makes special mention of the Babcock and Wilcox boilers at Twyford Waterworks. Also related to Twyford is Rodney Hall's article on the discarded bricks which he has found on the Twyford site. They have been left over from building and other operations and some have come from faraway places. For instance, there are bricks from the local works at Bursledon but the Glenboig fire bricks were brought from Scotland. Bert Moody's contribution shows that a surprising small proportion of the local paddle steamers were built locally – most of them came from Scotland. The spread of the textile industry in the eighteenth and nineteenth centuries is not always appreciated and Michael Tighe's piece demonstrates its importance to a small Wiltshire town. Other articles are concerned with SUIAG activities. Keith Webb writes about one of the sites which we have visited and Edwin Course recalls the six surveys of Hampshire industries completed during the last 30 years.

We are grateful to those who have helped with the production of the articles, particularly to Laurie Wing and family. For the design and type setting, again we would thank Angela Smith. Acknowledgements and thanks for the provision of illustrations are made as follows:-
Edwin Course (Figs 34 – 40); Edwin Course Collection (Figs 1, 3, 4); Mick Edgeworth (Figs 24, 25);
Martin Gregory Collection (Figs 5 – 15); David Hughes (Fig 32); J.D. Knowles (Fig 20);
Gillian Moncur (inside back cover); Martin Petch Collection (Fig 19); Ordnance Survey (Figs 17, 18, 27, 31);
Angela Smith (Figs 22, 23, 26, 29, 33); Nigel Smith Collection (Figs 2, 16, 21);
Michael Tighe Collection (Fig 28); Twyford Waterworks Collection (Cover); Laurie Wing (Fig 30).

Edwin Course
February 2000

Published by Southampton University Industrial Archaeology Group

© Copyright 1999 individual authors and
Southampton University Industrial Archaeology Group
All rights reserved

Editor: Dr Edwin Course

ISSN 0967-3474

Produced by Angela J. Smith

Reproduced by The Print Room, 7 Bournemouth Road, Chandlers Ford, Hampshire, SO53 3DA

Downloaded from www.hias.org.uk

Paddle Steamers built in Southampton and Cowes

During the last hundred years there have been many paddle steamers operating in the Solent area, but somewhat surprisingly only a comparative few were constructed by local builders. Day, Summers & Company at Northam were involved in the 1860s with some of the original steamers operated by the Southampton, Isle of Wight Company – or, to give them their full title, Southampton, Isle of Wight and South of England Royal Mail Steam Packet Company (since 1935 known as Red Funnel) – but in later years Day Summers were responsible for four paddlers. John I. Thornycroft & Company built three for local operations, and their predecessors, the Southampton Naval Works, built one and Mordey, Carney Ltd also built one. J.S. White at Cowes were also involved with the early vessels built for the Southampton, Isle of Wight Company, and in later years they built one paddler for local operations.

Day, Summers & Company

Of the five built by Day, Summers & Company, two were for local railway services – the *"Lymington"* of 1893 and the *"Duchess of Kent"* of 1897. The *"Lymington"* was employed on the Lymington-Yarmouth service until 1929 when she was withdrawn, at first becoming a houseboat on the Hamble then later moved to the River Yare near Norwich where she was used as an accommodation ship for Sea Cadets. The *"Duchess of Kent"* operated mainly on the Portsmouth-Ryde service until 1933 when she was sold to the New Medway Steam Packet Company and became their *"Clacton Queen"*. This only lasted two years until she was sold to the Mersey & Blackpool Steam Packet Company and became their *"Jubilee Queen"*. She was scrapped two years later at Preston.



Figure 1: P.S. *"Duchess of Kent"* after collision in Portsmouth Harbour

The other paddlers built by Day Summers were for the Southampton, Isle of Wight Company. The *"Princess Mary"*, which came out in 1911, had a very short commercial life as she was taken up by the Admiralty during the First World War to become an auxiliary patrol vessel/minesweeper in the Mediterranean and, in August 1919, she had the misfortune to be wrecked in the Dardanelles and became a total loss. The other paddler became much better known – the *"Princess Elizabeth"*, completed in 1927 and remained in service locally until 1959 when she was acquired by Torbay Steamers, who later became Coastal Steamers & Marine Services Ltd. In 1960 and 1961 *"Princess Elizabeth"* operated out of Torquay but, in 1962 she was transferred to Bournemouth and between 1963 and 1965 was based at Weymouth. Sold in 1966, she was in Southampton in 1967 when her engines and some other fittings were removed. However, she survived, and was to have been



Figure 2:

P.S. *"Princess Elizabeth"*

Downloaded from www.hias.org.uk

used at Hayling Island, but this failed to materialise and in the 1970s she was fitted out as a floating restaurant on the Thames where she remained until the middle of the 1980s. In 1987 she was towed across the English Channel and eventually became a floating museum and gallery on the River Seine in Paris. In recent months the vessel has been moved from this berth and it has been reported that she is to be berthed in Dunkirk for use as a floating restaurant and also as a memorial to the British Army evacuation in 1940, at which *"Princess Elizabeth"* was present when she brought back to this country a total of 1673 troops in four trips.

Finally, during the early part of the 20th century, there was also a small paddler to be regularly seen in the Southampton area - the *"Hampton"* on the Hythe ferry service. She was built by Day, Summers & Company in 1894 and was sold in 1936 to be broken up in Holland.

John I. Thornycroft & Company

Two of the three paddlers built at Woolston by J. I. Thornycroft & Company were for the Southampton, Isle of Wight Company. The *"Princess Royal"*, completed in 1906, was not accepted by the Company and, after alterations, was sold to Cosens Ltd of Weymouth and renamed *"Emperor of India"*. She saw service in two world wars being used as a minesweeper and also as an anti-aircraft vessel during the Second World War. She was finally broken up at Bruges in 1957.



Figure 3: P.S. *"Shanklin"*

The second paddler built by Thornycrofts was the *"Gracie Fields"*, launched in 1936 by Gracie Fields herself. Unfortunately she had a very short life; in 1939 she was taken over and used as a minesweeper and was at Dunkirk, and while embarking troops on the 29th May 1940 was bombed and sank early next morning. The other paddler built by Thornycrofts for local service was the *"Shanklin"* for the Southern Railway. She entered service in 1924 on the Portsmouth-Ryde service. Her engines were built by D. & W. Henderson of Glasgow. In 1951 she was sold to Cosens Ltd and became their *"Monarch"*, being finally broken up by Haulbowline Industries at Cork in 1961.

Southampton Naval Works at Woolston completed the *"Prince of Wales"* in 1891 for the Southampton, Isle of Wight Company, and she lasted until 1938 when she was scrapped at Llanelli.

J.S. White

As mentioned earlier, J.S. White of Cowes were involved with some of the early vessels in the Southampton, Isle of Wight Company's fleet, but in later years the only paddler they built for local services was the *"Freshwater"*, completed in 1927 for the Southern Railway for operation out of Lymington. In 1959 she was sold and, in 1960, she was renamed *"Sussex Queen"*, but after an unsuccessful season on the Sussex coast, she was renamed *"Swanage Queen"* and operated out of Bournemouth. This was not successful and she was sold for scrap at Bruges in May 1962.

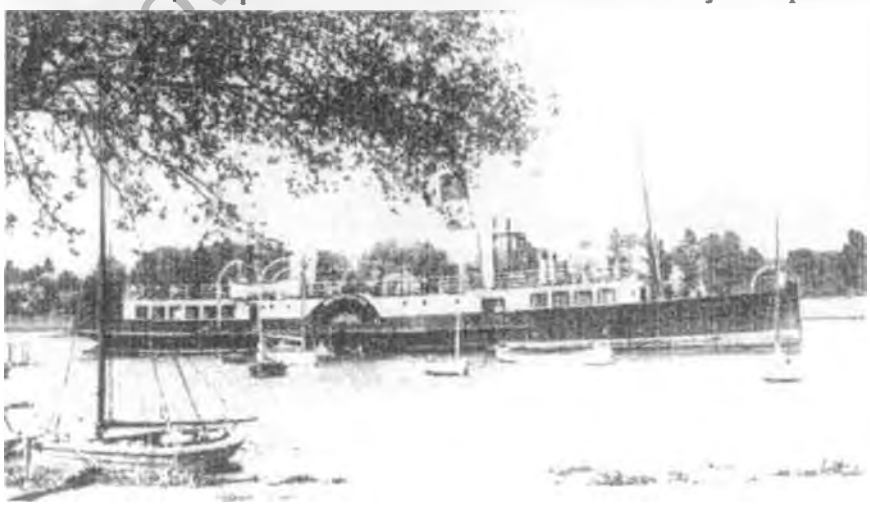


Figure 4: P.S. *"Freshwater"*

Downloaded from www.hlas.org.uk

Mordey, Carney Ltd

One other paddler built at Woolston was the *"Solent"* completed in 1902 by Mordey, Carney Ltd for the London & South Western Railway for operation out of Lymington. She was frequently used to take the Tow Boats across the Solent to and from Yarmouth. She was withdrawn from service in 1948 and was sold to H.G. Pounds at Portsmouth who re-sold her to become a café and dance hall beached at Portchester, operating for several years under the title of "Bert's Cafe".

Bert Moody

A Note on Stationary Boilers

The provision of boilers to provide steam is an integral part of any steam engine yet boilers elicit much less interest from steam freaks than engines. Most boilers have a short life because of corrosion from poor quality feed water and damp air, and of fatigue from thermal stresses set up by heating and cooling. One of the greatest hurdles in the restoration of many steam engines is the provision of replacement boilers.

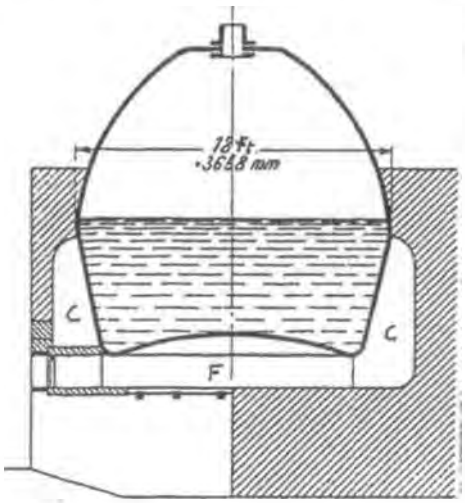


Figure 5: Haystack boiler for Newcomen atmospheric engine

The earliest boilers for Newcomen engines were known as 'haystack' boilers [Fig. 5] and were made of many small iron plates riveted together. The fire (F) was underneath and the flue (C) extended round the sides of the boiler to try and extract more of the energy from the fuel. The construction was inherently weak and would only supply steam at little above atmospheric pressure (10 kPa gauge or 2 p.s.i.g.). This did not matter for the atmospheric engine as the pressure difference arose from condensing the steam in the cylinder. You can see a surviving haystack boiler in the Blists Hill Museum. James Watt's engines were also low pressure condensing engines and his favoured design of 'wagon' boiler [Fig. 6] was equally weak with its almost flat sides and low heating surface. It also had the fire (F) below and the flue (C) encircling the boiler on its way to the chimney.

The advent of the high pressure steam engine at the start of the nineteenth century was dependent on the provision of better stronger boilers. In the new cornish engines of the 1830s pressures rose to 300 kPa gauge (45 p.s.i.g.) and the 'cornish' boiler was developed, a shell boiler with a single internal circular firebox and flue. The cornish boiler was mostly superseded by the 'Lancashire' boiler [Fig. 7] which had two circular fireboxes and flues side by side in a common shell. This arrangement gave greater heating surface and better water circulation. The gas path was through the boiler flues, back along the underside of the boiler and finally forward again along the sides of the boiler before going to the chimney. A typical Lancashire boiler was 2.5m (7 to 8 ft) in diameter and 10m (about 30 ft) long. As materials and riveting processes improved Lancashire boilers were made up to the end of the steam era using pressures of up to 1.3 MPa gauge (200 p.s.i.g.). Crofton engines are still supplied with steam from a Lancashire boiler as are the engines at Kew, though, in the latter case, modified to burn gas.

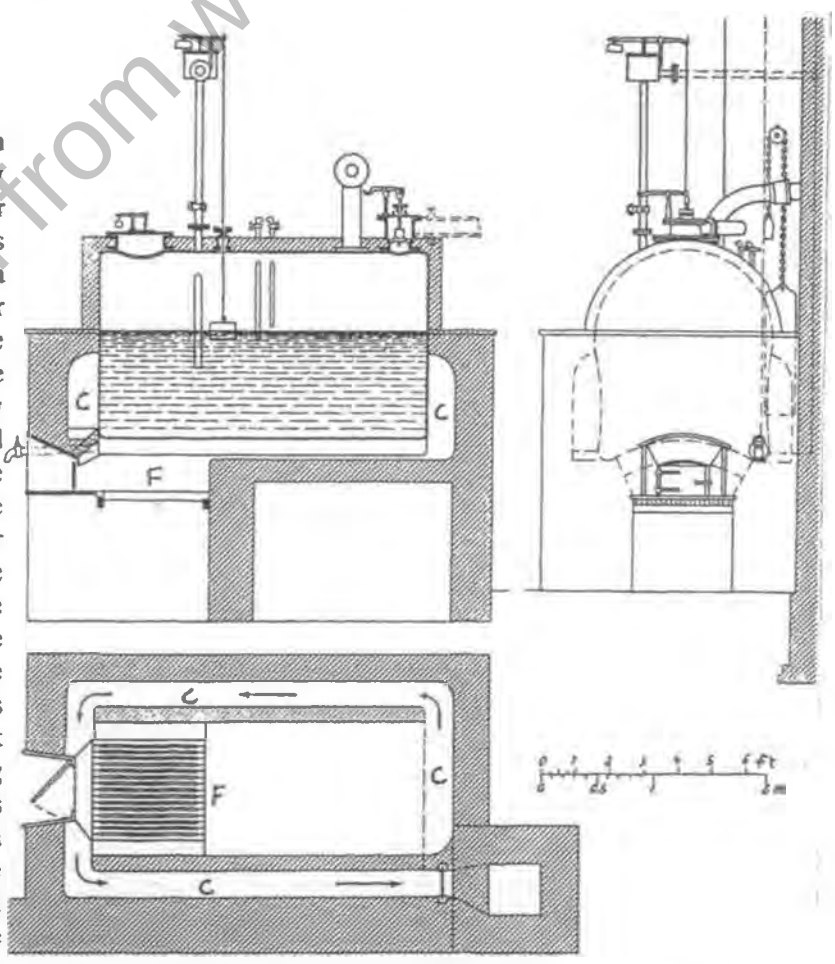


Figure 6: Wagon boiler for Watt low pressure engine

Downloaded from www.nias.org.uk

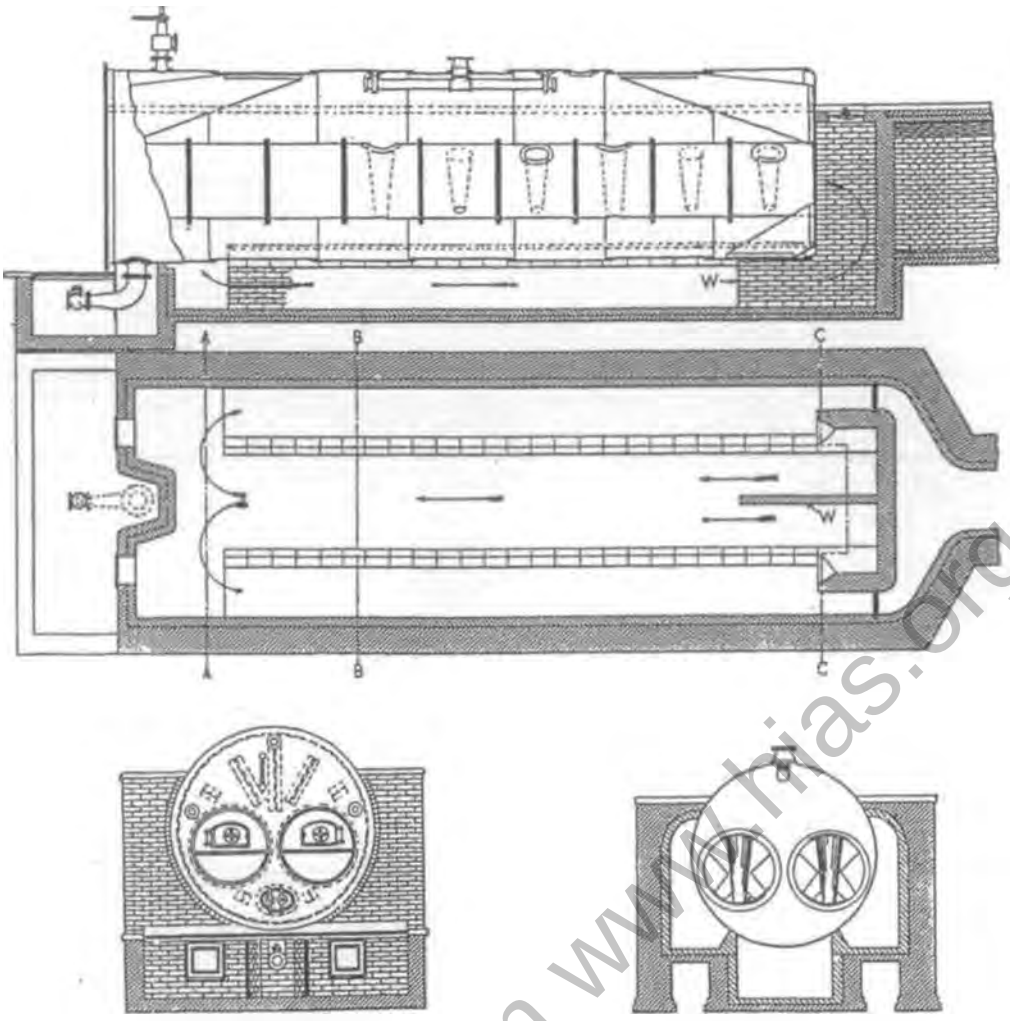


Figure 7: Lancashire boiler in brick setting

The Lancashire boiler held lots of water and so could respond well to sudden changes in steam demand without the water level changing much. However, the flat endplates were a weakness unless properly stayed and if the water level was allowed to fall, the furnace tubes could overheat and distort or collapse. Methods of stiffening the furnace tubes differed from manufacturer to manufacturer. They included corrugating the furnace tubes, stiffening the flue tubes with hoops of T-iron, and placing conical cross tubes in the flues to keep them in shape and also to increase the heating surface and improve circulation. The last method was Galloway's patent and such tubes are shown in the boilers in Figs. 7 and 8. When a Lancashire boiler did explode, usually due to

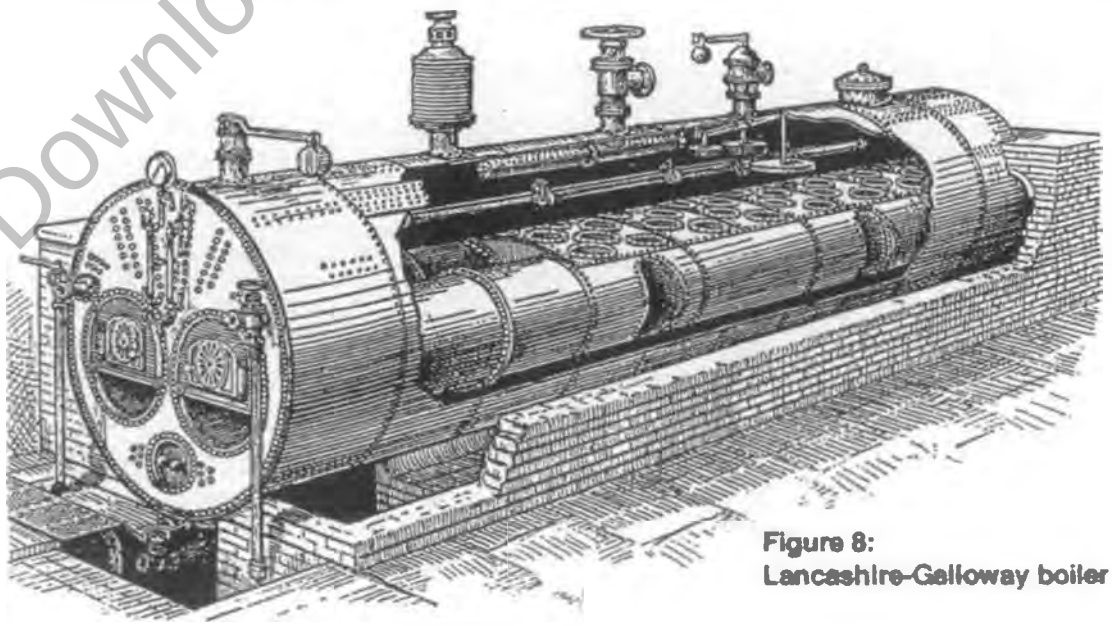


Figure 8:
Lancashire-Galloway boiler

Downloaded from www.hias.org.uk

bad maintenance or negligence on the part of the fireman, the results were serious. Figures for 1895 show that in the UK plus America there was an average of just over one boiler explosion per day of a shell boiler (a boiler with an internal firebox and fire tubes) with an average of 2.5 people killed or seriously injured in each event. The worst explosion that year was at Redcar where 12 were killed and 20 seriously injured. This is an horrific toll given that boiler insurance inspectors had given hydraulic tests to 8400 boilers in the year and condemned 800 boilers before they had a chance to explode. Thurston calculated that the energy stored in the steam and superheated water of a typical shell boiler working at 200 kPa (30 p.s.i.g.) was sufficient to project the boiler nearly 1000m (3000 ft) into the air if all the energy released were turned into kinetic energy of the boiler fragments!

The locomotive boiler [Fig. 9], familiar as the boiler of the steam railway locomotive, was used for small stationary engines. Many were small enough to be called semi-portable in that they could be moved from site to site and did not require the brickwork associated with the Lancashire type of boiler. The locomotive boiler's internal firebox required lots of stays and the large number of flue tubes meant that maintenance costs were much higher than for the Lancashire boiler.

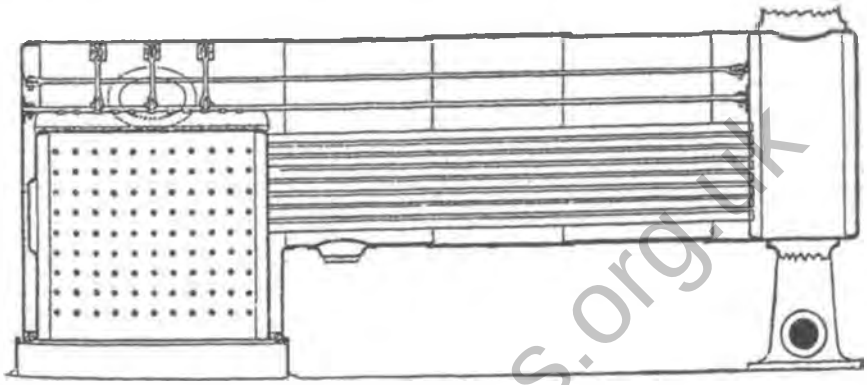


Figure 9: Locomotive boiler for stationary use

Cornish and Lancashire boilers took a long time to raise steam and were very heavy for a given steam output. From the beginning of the nineteenth century inventors and manufacturers sought to design lighter boilers which did not contain as much water and in which the water was circulated in a nest of small tubes suspended over the fire. Such boilers are called 'water tube' boilers. They were often called 'safety' boilers because failure of a small tube in the firebox usually put the fire out but did not result in the damaging explosions seen with shell boilers. Of the hundreds of patented boiler designs in the nineteenth century involving water filled tubes connecting steam and water drums, few achieved much commercial success in the stationary field. The most successful was that designed and built by Babcock and Wilcox.

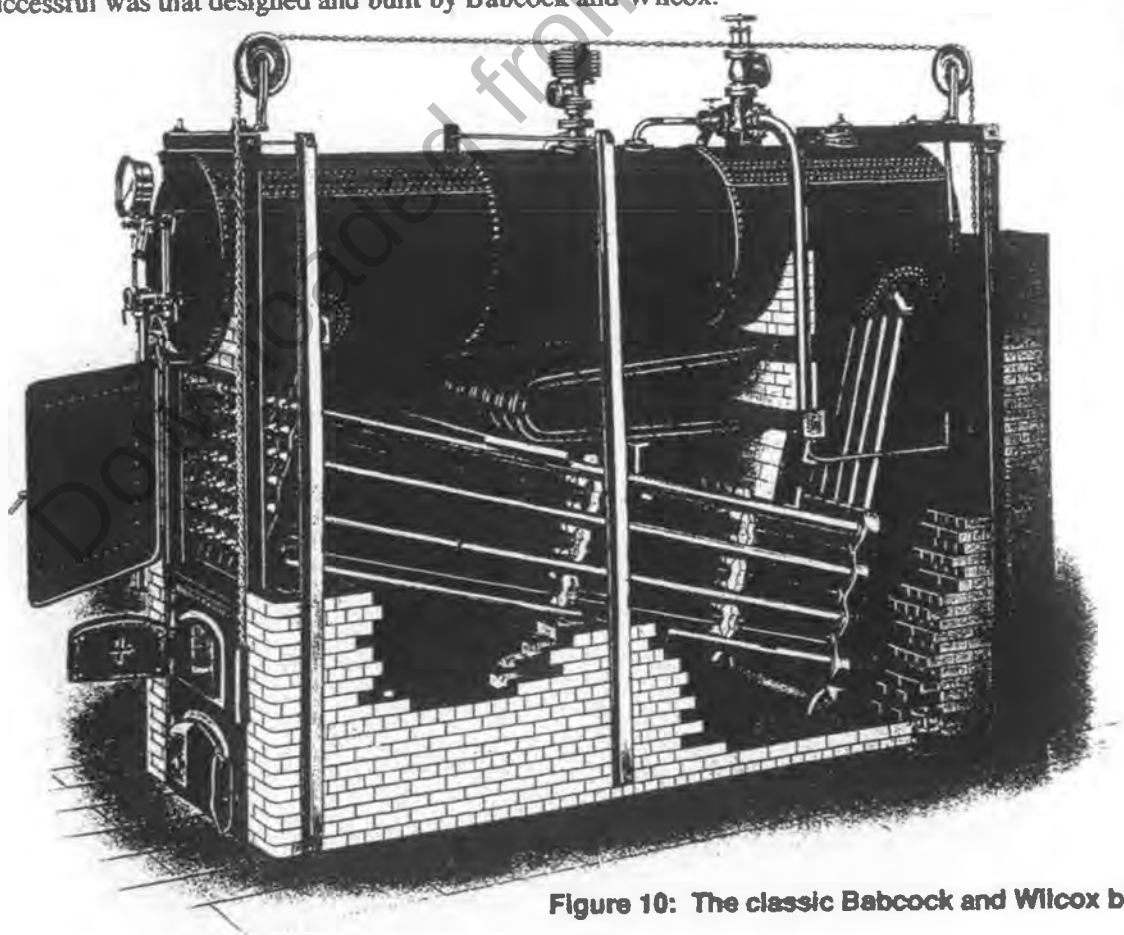


Figure 10: The classic Babcock and Wilcox boiler

Downloaded from www.hias.org.uk

The original Babcock and Wilcox boiler was patented in 1867. Its main claim was safety. It consisted of a nest of horizontal straight tubes acting as a steam and water reservoir, connected to a set of inclined heating tubes suspended over the fire. The tubes were cast iron and cracked when coated with scale and heated. The second version showed the characteristics of the classis Babcock and Wilcox boiler [Fig. 10]. The horizontal reservoir tubes were replaced by a horizontal drum with the water-steam interface on a diameter. This increased the water capacity and gave drier steam since there was a larger steam/water surface. The heating tubes were of wrought iron and a 'mud drum' was added at the lowest part of the boiler to collect sediment and scale. Water circulation was excellent with steam rising along the heating tubes to the front of the drum, and cooler water

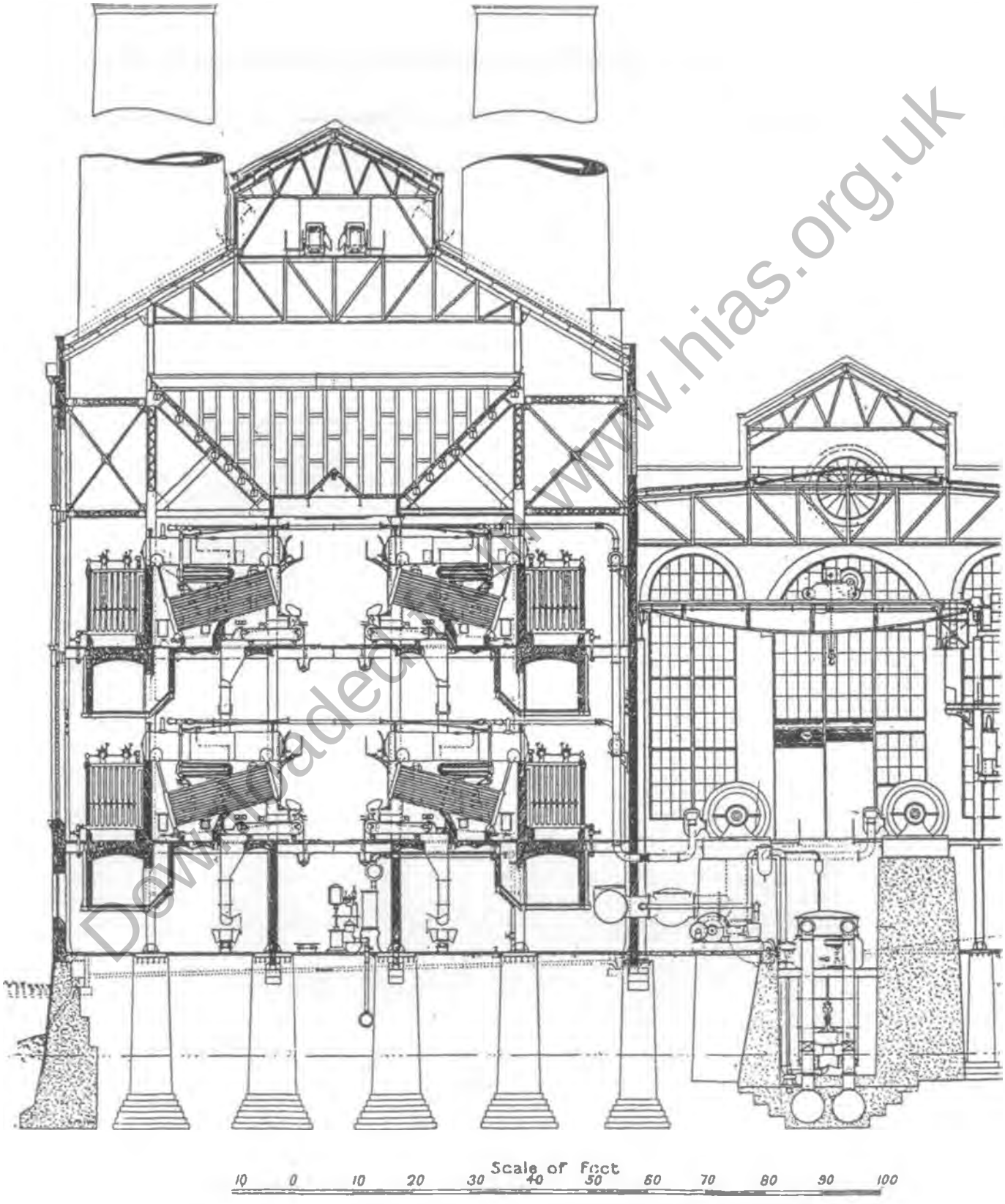


Figure 11: Cross-section of boiler house of Lot s Road power station

Downloaded from www.hias.org.uk

descending from the back of the drum to the bottom end of the heating tubes. To improve heat transfer to the tubes, the tubes were staggered in each section of header so that they were not vertically above each other. Over the next thirty years to 1900 the detail design evolved. Forged steel replaced iron for the top drum and fittings; drawn steel tubes replaced welded wrought iron tubes; cast steel replaced wrought iron for the sinuous headers connecting the tubes to the drum and for other fittings. Finally a hairpin superheater was added in the space between the drum and the inclined heater tubes. The resulting boiler was easy to clean and maintain internally as the top drum had a manhole and there were individual plugs in the headers enabling each tube to be cleaned or removed and replaced.

From their head office in New York, Babcock and Wilcox became a world wide multinational company with a large number of manufacturing subsidiaries in many countries. Their British plant was sited at Renfrew near Glasgow to be near their compatriot company, the Singer Manufacturing Co., whose sewing machine plant at Clydebank provided castings for the British Babcock and Wilcox factory in its early days. They marketed the boiler vigourously and claimed by 1905 to have in use nearly five million horse power (about 25 000 boilers). The production consisted of large numbers of a few standard sizes of boiler. A customer with a large steam demand would have a large set of boilers. Not all would be in use at any one time as it was sensible to have one or more spares to allow for washing out and repairs. Lot's Road *(sic)* power station, which still supplies the London Underground railways, had 64 of these standard units [Fig. 11]. Twyford water-works still has three of these standard Babcock and Wilcox boilers, installed in

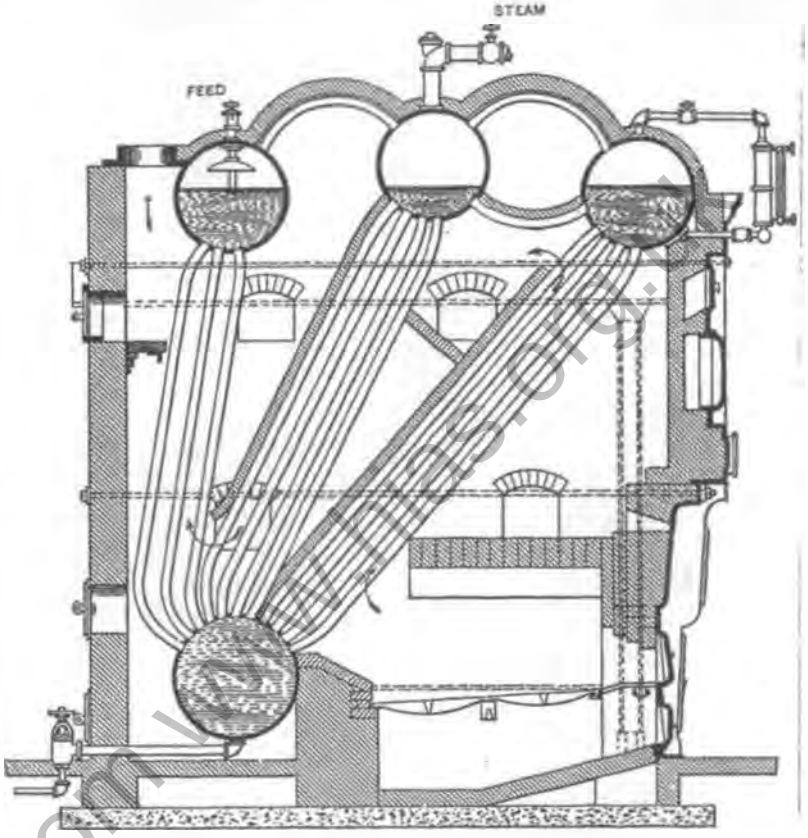


Figure 12: Stirling water tube boiler

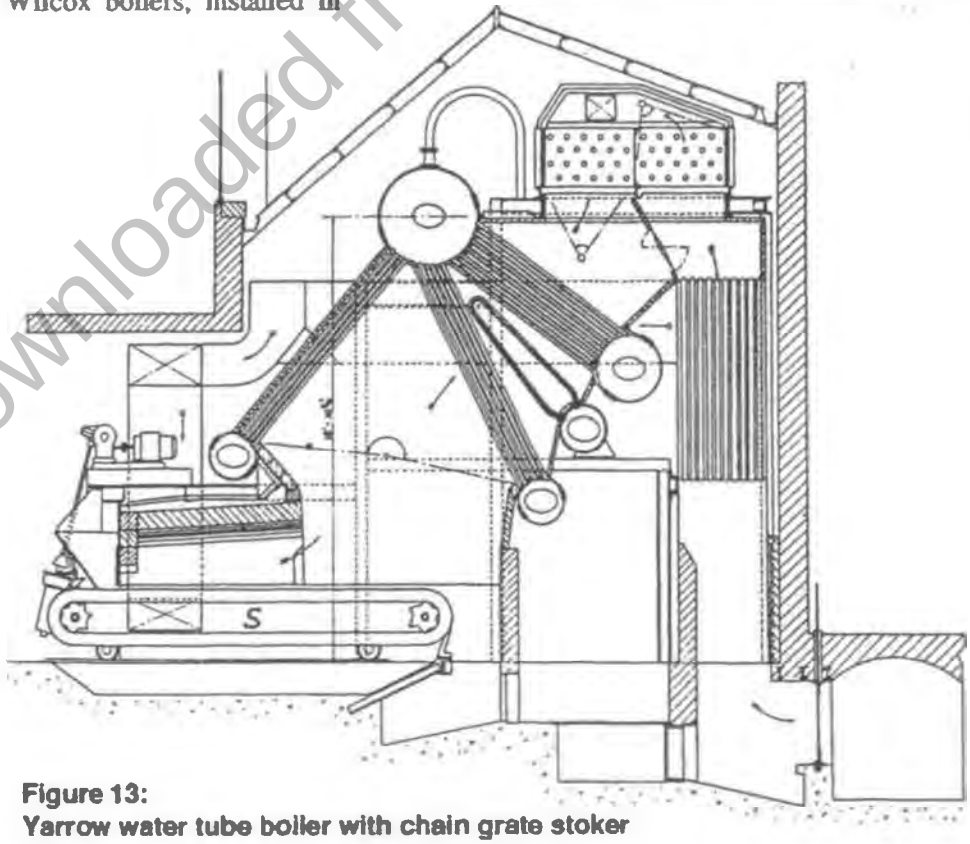


Figure 13:
Yarrow water tube boiler with chain grate stoker

Downloaded from www.HVAC.ir

1902, 1905 and 1916. Two would supply the normal load with one being on standby. The 1916 boiler is steamed today to supply the triple expansion engine at the plant. It is the oldest steamable Babcock and Wilcox boiler in preservation, followed by that at the Cheddars Lane sewage pumping station in Cambridge.

Babcock and Wilcox were not the only successful water tube boiler manufacturers. One of the competitors was the Stirling Boiler Co. of New York whose boiler is shown in Fig. 12. They claimed that their curved water tubes, whilst more difficult to clean internally, were more flexible when heated and thus less likely to leak. Water circulation was excellent. In 1905 they claimed that their manufactory at Barberton, Ohio, was the largest boiler factory in the world.

Water tube boilers were developed for marine engines and after 1900 quickly overtook drum boilers for naval ships. Some of the early marine water tube boilers were not very successful. However, Babcock and Wilcox produced their own very successful marine boiler to compete with the excellent water tube boilers of Yarrow, Thornycroft and other ship builders. Yarrow adapted their multi-drum marine boiler for land use as seen in Fig. 13.

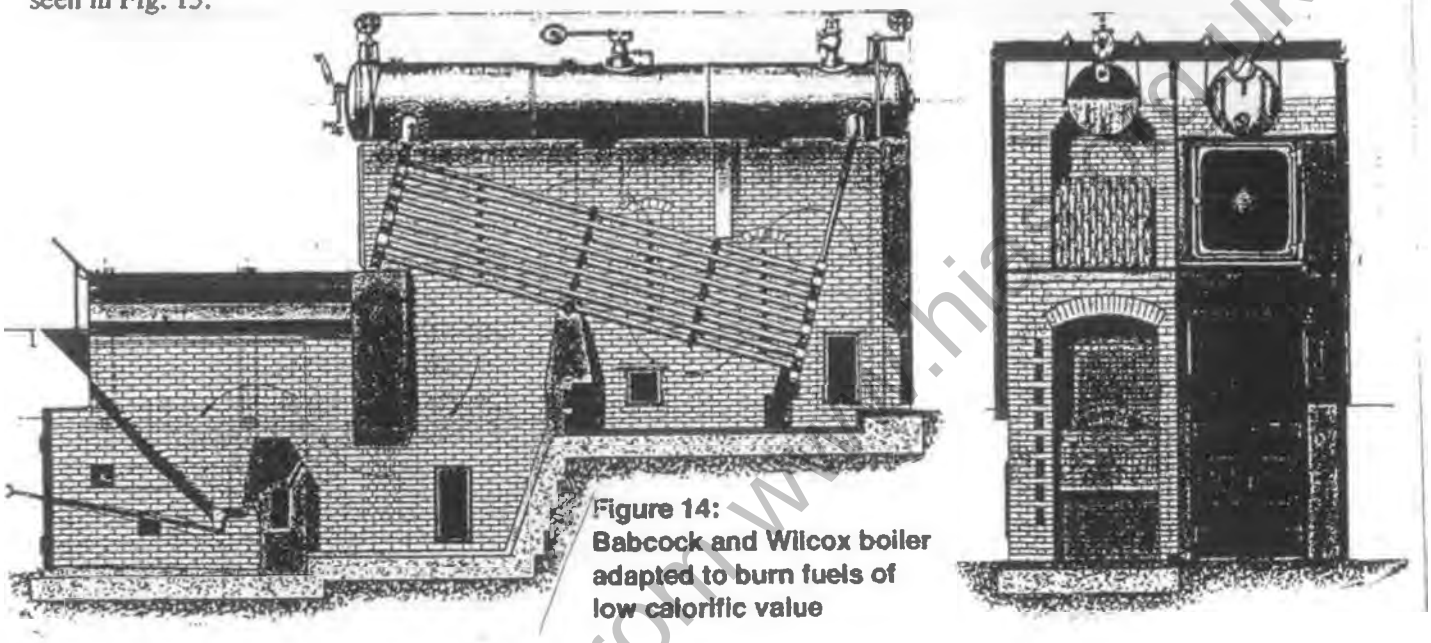


Figure 14:
Babcock and Wilcox boiler adapted to burn fuels of low calorific value

All these water tube boilers were suspended from a steel framework [Fig. 10] over a brick firebox with firebrick baffles to define the gas path to the chimney. They were thus easy to adapt to different methods of firing and for different fuels. Because the gas path past the water tubes has a much larger cross-sectional area than that in Lancashire or locomotive boilers they steam well with poor fuel and with poor draught. It is easy to change the firing arrangements: a chain grate mechanical stoker to cut out the labour of hand firing can be installed simply by removing the firedoor and firebars and rolling in the unit. The boiler in Fig. 13 has a chain grate stoker (S).

Changing the fuel is straightforward provided there is a large enough firebox volume. Both the Twyford and the Cheddars Lane boilers now burn wood as their primary fuel. The boilers can be suspended over or brought up to any suitable furnace. Fig. 14 shows a Babcock and Wilcox boiler arranged to burn bagasse (sugar cane waste) or rice husk or other low calorific value fuel such as straw. Special furnaces were designed to burn domestic refuse and raise steam off the heat

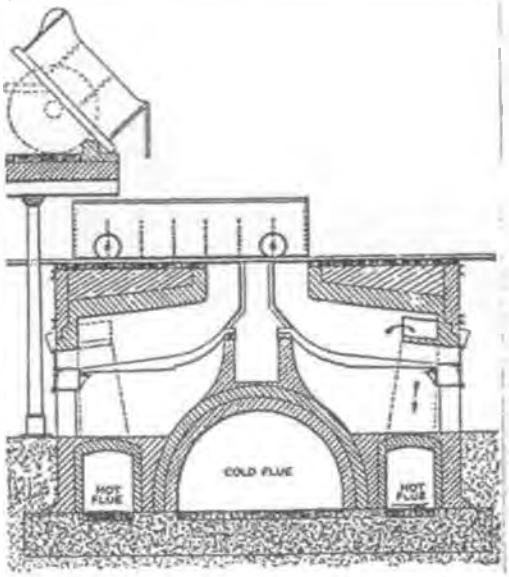
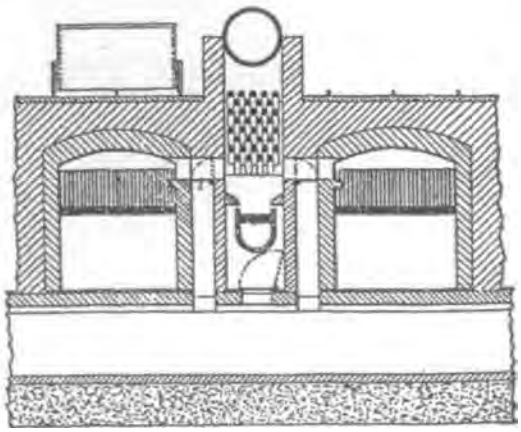


Figure 15:
Refuse destructor furnace for water tube boiler



Downloaded from www.hia.org.uk

generated. Fig.15 shows Wood and Brodie's layout of incinerator straddling a Babcock and Wilcox type of boiler. This is very similar to the arrangement at Cheddars Lane. Garnier Road pumping station in Winchester had a Heenan and Froude refuse destructor which burnt local refuse to generate steam in a Babcock and Wilcox boiler which powered the steam section of the sewage pumping plant. It was almost 'free' energy to pump the sewage up to the treatment works.

Babcock type boilers were harnessed to many other sorts of waste heat generators to supply process steam in factories. Examples include firing boilers with gas from blast furnaces and coke ovens, and recovering waste heat from puddling and reverberatory furnaces.

Twyford Waterworks Trust has three Babcock and Wilcox boilers in situ. In 2000 the 1916 boiler will be in steam on May 7th, June 4th, July 2nd, August 6th, September 3rd and October 1st.
Martin Gregory

References

Babcock and Wilcox, *Steam*, 5th British edition, 1905
Borthwick, A., *Yarrows, the first hundred years*, 1965
Hutton, W.S., *Steam-Boiler construction*, Crosby Lockwood and Son, 1903
Thurston, R.H., *A manual of steam-boilers*, John Wiley, 1896

Downloaded from www.hias.org.uk

The Tram Shelter at the Junction, Southampton

Most people in Southampton could still direct a stranger to *"The Junction"*. Fifty or more years ago they might have replied "Do you mean Tramway Junction?" before pointing you towards the corner of Above Bar and Commercial Road. Although it was far more modest than Bristol's Tramway Centre, for example, it was the connecting point of Southampton's two main tram routes throughout the horse and electric tram periods, which spanned the years 1879 to 1949.

Because it was an important transfer point, there was a passenger shelter at Tramway Junction for many years. The original shelter at the Junction (or "Prospect Place" as it was then more commonly known), in a corner of West (or Watts) Park, was of rather rustic appearance, identical to those at the corner of Palmerston Park by the Clock Tower in Above Bar, which survived until the early 1930s when New Road was realigned, and in the Avenue alongside Stag Gates. A smaller version remained in The Avenue near the junction with Burgess Road until 1973.



Figure 16: The Junction, Southampton c1930 showing the original "rustic" tram shelter and passenger island

Latterly a shelter was built as part of a typical piece of municipal architecture which incorporated two underground lavatories. Southampton has been fortunate to secure a multi-million pound Millennium grant to return its many parks "to their Victorian splendour". This includes clearing away buildings which have become an embarrassment through neglect including those lavatories and (because it was partially built on top of them) the former tram shelter at The Junction.

At a very late stage local tram restoration group, Tram 57 Project, was informed by the City Council that the tram shelter was not included in the plans. This corner of the park was due to eventually be the new entrance gate, until when the contractor would be using the cleared area, including removal of raised flower beds in the pavement, shrubbery and telephone boxes, as a base during the parks renovation work. The group realised that this small shelter was the last significant link with the town's trams. All three depots have been demolished and all but one of the few surviving traction poles have recently come down. There is also one rosette, for fixing overhead wires to buildings, which is closely watched! Everyone had rather lost sight of the shelter. Quite literally so, because its open front had been boxed-in to make a room. At different periods this had served as an information bureau, a café and as a meeting point for pensioners, before becoming derelict.

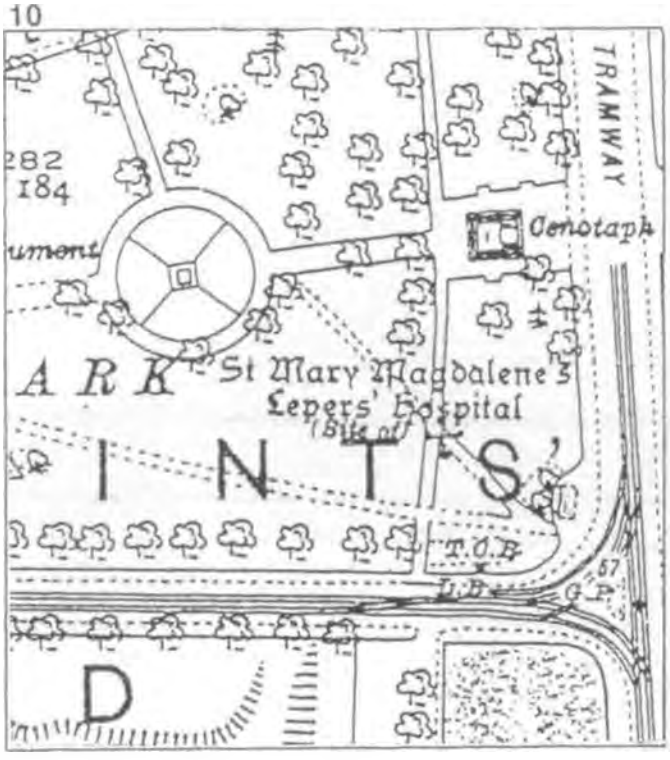


Figure 17:
Enlargment from the 1931 revision of the 1:2500 Ordnance Survey map of Hampshire, Sheet LXV.10

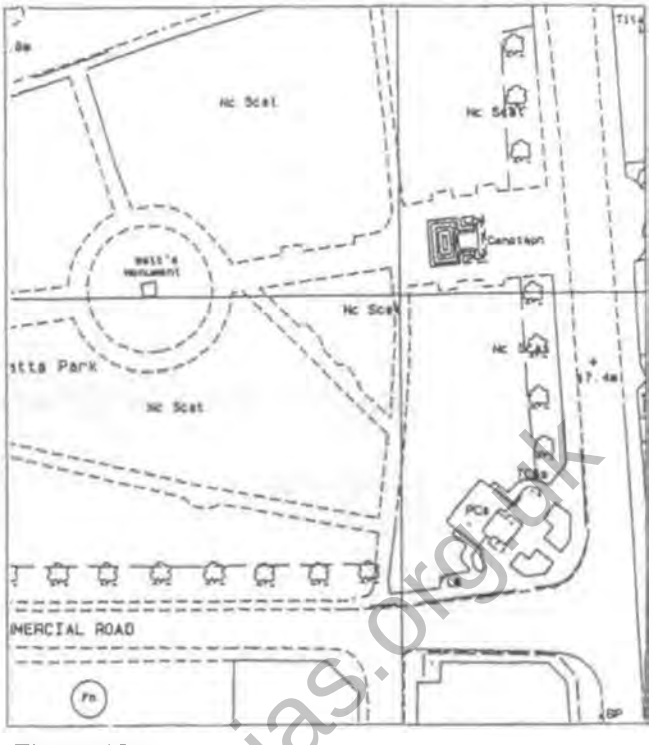


Figure 18:
Enlargement from the Ordnance Survey 1:2500 Superplan dated 1999 **© Crown Copyright**

At the back, out of sight, was a smaller room which was at a higher floor level. This had been an office used by Timekeepers or Inspectors in tramway days. A small stock of dry sand was available to fill the hoppers of any car which might need it. There was also a telephone so that defects could be reported in advance of cars reaching their depot so that a spare tram would be ready at a certain time for a change over. Beneath the wooden floor some odd lengths of heavy cable served as a reminder that this was a (rather non-fireproof) switch room. The trap door had brass fittings for ease of access but it was still an odd substitute for a street box.

The tram shelter was built in 1933, purely as an afterthought. The nearby Civic Centre was, and remains, a fine complex of buildings and in the early 1930s an effort was made to improve the appearance of the adjacent streets. A scheme to build underground public lavatories at Tramway Junction was batted between the various Committees of the Council from 1928 until, in 1932, the Ministry of Health refused loan sanction. The scheme went ahead after it was cheapened in several cheese-paring respects to satisfy the Ministry. The fact that the Borough Engineer had just sacked ten of his staff to save money may also have impressed the official from Whitehall who chaired the necessary local enquiry.



Figure 19: The Junction c1933, shortly after the new tram shelter was built

Downloaded from www.hias.org.uk

Having approved designs for their underground lavatories, the Works Committee had politely asked the Tramways Committee to "remove the present shelter at the Tramway Junction, and make other arrangements". The existing tram shelter was small, old and close to the kerb but the Tramways Committee (or perhaps their spirited manager, Mr Baker) had other ideas! They wanted a bigger and better shelter to be built partly on top of the Works Committee's underground lavatories, complete with a feeder switch room. There were problems with levels (the sewers were found to be rather shallow), hence the switch room and the Timekeeper's Office had to be somewhat elevated, but plans were quickly drawn and honour was satisfied when the Tramways agreed to contribute £500 to the £4,650 total cost. It was a typical triumph of the Committee system, steered by Officers who thrashed out the detail.

Of the nine bids received to construct the scheme, the cheapest was that from The Building & Public Works Construction Co Ltd of Swindon. A local bid was only £26 more, but failed. Ministry sanction was received in December 1932 and construction went ahead in the New Year.

The new shelter at the Junction had open front and sides, and an attractive hipped roof with rustic slates, possibly from Coniston in the Lake District, supported by 4 front columns, each consisting of two brown-painted wooden pillars dowelled to bases of metre-high Portland Stone. The rear of the shelter was also the front wall of the office with a column, identical to those at the front, on each corner as the office was not as wide as the shelter. The Ministry had called for concrete bases, fewer pillars and no hot water in the lavatories, but somehow these agreed economies do not seem to have materialised. A wooden seat for passengers was situated across the whole width of the back of the shelter and, a few years later, a large clock was suspended from the centre front of the shelter's roof, replacing the original "Bundy" clock on its pole in the pavement. The exterior office walls were of brown and white wood panelling and windows above fitted with frosted glass. The office ceiling was panelled with "beaver board", an early type of soft fibre board: it is interesting to note that the lower saloon ceilings of the earlier Southampton domecar trams were made from beaver board, but they were removed in 1929 to be replaced by plywood. No facilities were provided in the office, which contained only a desk, chairs and cupboards for the stock items. The typical early 1930s desk, complete with an imprint from a tramways ink stamp in one of the drawers, remained in the office until the building was dismantled. External staircases led down both sides of the office for ease of access to the tram stops in Commercial Road and Above Bar Street.



Figure 20: Top-covered Bargate tram 7 waiting in the loop line at the Junction on February 7 1945, still carrying its wartime headlamp covers

Former tramway employees Fred Bignell and Ernie Orchard have recalled their memories of the shelter. Ernie, who was a pre-war conductor, said that two inspectors manned the office on a rota basis – one he remembered was called "Snuffy" Best because he took snuff; other names were Sandy Hiscock and "Curly". Apart from fresh sand being stored, light bulbs were kept for quick changing when trams were in service, tickets and waybills could be issued to conductors, timetables were available and the times for transfers between the Portswood and Shirley routes were notified to the drivers. Another employee called a regulator – usually older staff – would walk to a tram at one of the stops to let them know if a tram was due on the other route, and to wait for transfer passengers.



Figure 21: The Information Bureau at the Junction from the 1960 Southampton Official Handbook [Photo E.G. Patience]

Ernie vividly remembers that a tram could be stopped at the traffic island in the centre of the junction and the driver or conductor removed for some misdemeanour which he may have committed anything up to two weeks previously. The miscreants were usually conductors who

Downloaded from www.tiac.org.uk

may have been reported for taking wrong fares, or for drinking alcohol whilst on duty. He had to remain in the office, while a standby conductor or driver took over the vehicle, until the Inspector was able to escort him to the nearby Above Bar main Tramways Office where his name was put in a book.

The shelter survived some concentrated German bombing, unlike the Tramways Office which was moved to Portswood Depot. Only the regulator then remained at the Junction office. It witnessed the ceremonial Last Tram on New Year's Eve 1949/50. Car 9 did the honours with flags and coloured lights, passing the Junction in the closing minutes of the old year. Over the next few weeks a number of 'ghost trams' sneaked past on their way from Shirley Depot to Portswood for dismantling or, if they were lucky, for transport to Leeds. Within the next decade the Transport Department gave up possession of the Timekeeper's Office and the shelter was enclosed for other uses.



Figure 22: The former tram shelter / Information Bureau on 23.7.99

Late in July 1999 the Tram 57 group was asked if it would like to take away the shelter since its demolition was due "tomorrow or the day after". A group member was on site within the hour, along with the City Archaeologist, but declined the gift since the group's 'tram shed' was very full already, mostly with trams. Unlike the City, they had no park in which to place the shelter. Priorities, which were kindly agreed to on site, were firstly, recording to a high standard, secondly, making sure that the roof space did not contain any documents or artefacts, and thirdly, that certain materials could be kept for re-use elsewhere.

Another group member then visited the site to photograph the exterior and discovered that the building was to be bulldozed by the contractor without any investigation as to whether any of the original tram shelter still existed underneath the later cladding. The office, however, had undergone little alteration, although a section of the front wall had been removed to enable a doorway to be inserted. This member spotted a small hole in the front cladding of the building, which revealed one of the original columns, still complete and in fine condition. But the city council representatives and contractors were adamant that work could not be held up to investigate further: the bulldozer was due on site first thing the following day to flatten the structure.

Some quick work by the group member and a supportive local BBC-TV report brought a willing change of heart from the Council. Demolition was postponed and a site meeting arranged at which it was decided to remove all the later parts of the building to see what remained of the shelter. When the cladding was removed and the original shelter revealed, it was clear that everyone's priorities had been unambitious: the Council and enthusiasts alike were surprised to discover what lay beneath the tatty modern exterior. Here was an

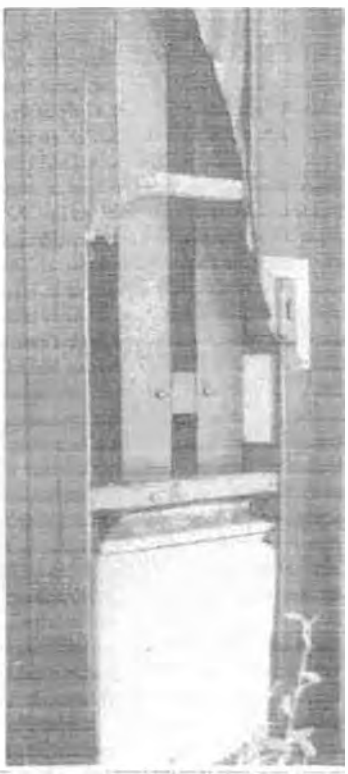


Figure 23: Portland stone base and wooden pillars of tram shelter on 26.7.99

Downloaded from www.tram57.org.uk



Figure 24 (above): Front view of the tram shelter on 29.7.99

Figure 25 (below): Rear view showing the office and demolished lavatories underneath, which have now been infilled for a future archaeologist to discover



Downloaded from www.trias.org.uk

elegant little tram shelter, among the best of its type, for the most part in good condition. The structure was recorded by surveying and photographs before being carefully dismantled by the contractors. Final dismantling involved very little damage despite taking place on Friday 13th of August 1999. Some of the softwood frames were in poor condition and will need replacement but the hardwood columns, frames, roof structure, slates and stone bases were well preserved, and stored safely by City Heritage along with their collection of traction pole bases.

So there is a nice kit of parts with detailed drawings for reassembly in the future when a suitable location can be found for it.

Tram 57 Project

Industry in a Small Wiltshire Town

Mere [pop 2,200] lies in the far S.W. corner of Wiltshire, below the scarp of Salisbury Plain, which effectively cuts it off from the rest of the county; as a result in many ways it looks more to Dorset than to its own county. A spring-line settlement since Anglo Saxon days, it never became a corporate town, remaining just a parish, with about half of its area forming the Manor of Mere, from the earliest days part of the Duchy of Cornwall. Basically it has always been predominantly an agricultural community, relatively isolated from the outside world with the nearest main road passing a couple of miles to the north over the Downs until the creation of the Wincanton Turnpike in 1756. However, over the centuries various textile industries were the major source of employment.

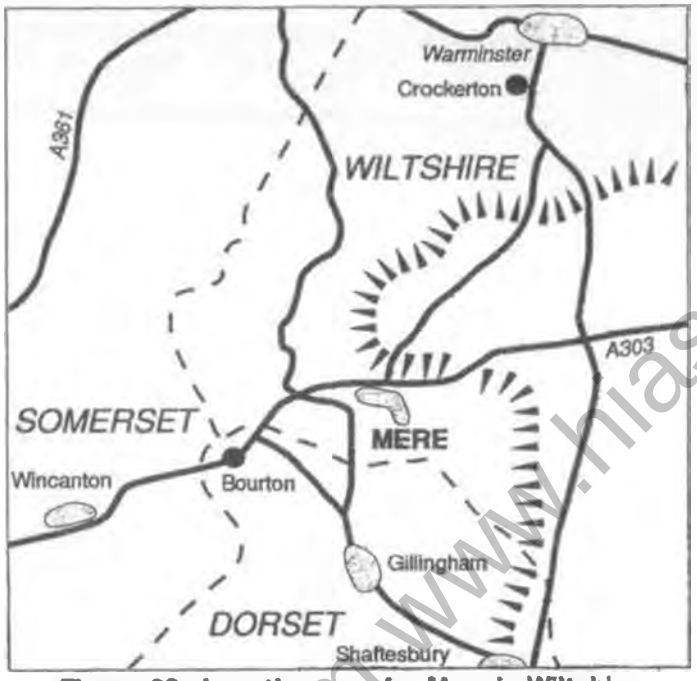


Figure 26: Location map for Mere in Wiltshire

Woollen Cloth

As in most of Wessex, the first recorded industry in the area was cloth weaving from the fleeces of the sheep which were a vital component of the farming economy. In an Account Roll of the Duchy of Cornwall for 1276 [1] appears for the first time the rent of *"uno molendino fullonico"*; the site of this fulling mill has been identified on the Shreen Water at ST813316 where traces of its waterways remain. The names of various fullers or tuckers appear in Probate Inventories and the like throughout the sixteenth and seventeenth Centuries, and the magnificent fourteenth century parish church witnesses to the wealth of the little town at the peak of the industry, but all the time the importance of woollen cloth weaving in the area was waning as it became concentrated into North Wiltshire and the West Country proper. The fulling mill site appears on Andrews & Drury's 1773 map [2] as a mill, but by the end of the century it seems to have become derelict. Up into the late eighteenth century James Harding and his successor, to whom later reference will be made, were still acting as cloth merchants with an export trade, but their orders were fulfilled with cloths bought in Bristol and Gloucester.

Linen

Geologically, Mere lies at the extreme eastern end of the wide belt of well drained soil running along the Dorset/Somerset border and down to the sea at Bridport, which proved highly suited for the growth of flax and hemp and led to the establishment of coarse fibre-based textile industries in virtually every community there. Strangely the importance of these industries has been sadly overlooked by industrial historians, and there is scope for a serious study of the whole area. Although the boundary of the flax growing area only just included Mere, processing of the product became an important feature at an early date, and by the sixteenth century linen weavers make their appearance in the Probate Inventories, completely outnumbering the cloth workers by the next century. From the start, the area concentrated on the coarser end of the trade, such as cheesecloth and dowlas weaving, and Mere became known as a major source of tick, the closely woven linen with a thin blue stripe intended to contain the down and feathers of bedding. In Mere it was usually woven on three headles; it was also made in Hampshire near Ringwood and Fordingbridge, but their product seems to have been a heavier version woven on four headles. Cloth width was measured in "nails" – a nail was 2¼ inches – one sixteenth of a yard, or a twentieth of an ell; the standard width was 13 nails, frequently specified as "nails".

Downloaded from www.hias.org.uk

This weaving industry was an entirely domestic, cottage, one. The largest numbers of looms found returned on an inventory was five, and the greater number of the families engaged had only two; many weavers had only the one loom, and from time to time there are references to the Overseers providing £1 for the purchase of a loom to put a man into work. Most of the weavers processed and spun the flax within the family and some carried considerable stocks of the various raw materials; in 1701 Valentine Harcourt, who had the 5 looms, held 3,000lb of yarn, with flax out at the spinners, four pieces of linen in stock and seven chains in progress [3]. By this time the industry had outgrown local supplies of raw flax and more and more reference is made to "*hambora*", or Hamburg, yarn and flax, imported from NW Europe. To some extent this reflects the restriction by landlords of flax growing, as the crop was regarded as one which rapidly exhausted the soil.

Obviously some capital nexus was needed in a trade so dominated by peasant production. James Harding (1655 - 1725), bearer of a name which appeared in the Duchy of Cornwall Account four centuries earlier, was a cloth and tick merchant, dealing with Hamburg and Portugal. His son, also James (1688 - 1775) built on this business; as well as tick, he bought and sold woollen cloth both from the West of England and from Essex and Yorkshire, trading also with the American colonies. He lived in the centre of the town, in a house with warehousing at the rear, later to become the "White Hart" inn. He employed a clerk, Henry Hindley, who is reputed to come from a family of blacksmiths in Wigan, Lancashire, which was then a centre of the fustian trade, while a brother is said to have been a London linen merchant. Hindley bought the house next door to his employer and, by 1751, whilst still Harding's manager, he entered into business on his own account on borrowed capital of £1,400, £800 of which was provided by Harding, who was beginning to withdraw from trade. We are fortunate that three of Hindley's letter books have survived, in the custody of Wiltshire & Swindon Record Office [4]; they were the subject of detailed study by Dr Julia de Mann in 1963, and transcripts were published [5]. These give a detailed insight into the workings of the local linen trade.

Gradually Hindley took over the whole business, at the same time caring for Harding, who was a bachelor, until the latter's death in 1775; the surviving letter books end a few months later. Although no longer in trade, Harding was of considerable substance (even if not to the £300,000 extent quoted by the local newspaper at the time) [6]. His will indicated lands around Mere and in Somerset and large cash holdings, with many specific legacies; however the bulk of the estate devolved on William Beach of Fittleton, 6 miles north of Amesbury, son of his sister, and from him to his daughter who was married to Michael Hicks, who then assumed the additional name of Beach. Ultimately the Hicks-Beach family, who retained connections with Mere for a time, became the Lords St. Aldwyn.

The pattern of both Harding's and Hindley's trading was the purchase of flax, or linen yarn, both locally and from Europe, its sale-on to local weavers, the purchase of the finished cloth from the latter and its final sale, either within England, or in Portugal or Hamburg. Agents were employed in both countries as well as in London; settlement was made on contra account or by bills of exchange. For exports to Lisbon, payment was sometimes made by shipment of olive oil – not for the table, but for sale to the North Wilts clothmen for tempering the wool in weaving. The letters contain much detail on the fascinating commercial practices involved; foreign exchange dealing on this scale in a little place as remote as Mere is most unexpected!

Shipment of flax from Rotterdam was made through various ports as shipping space became available – Southampton, Lymington, Poole, Weymouth and Bridport are all mentioned. However, large consignments often came through London, where they were unloaded in the Pool, transhipped to barges which went up the Thames and Kennet to Newbury, whence they went to Mere either by carrier or on farm carts commissioned locally by Hindley. Timing of shipments was important; there was little sale for flax or yarn in Mere after mid-May as virtually all the textile workers in the area – and even Hindley himself – were either also small holders on their own account or were employed on the land. Frequently there are references to shortages of finished cloth as all the hands were engaged in the fields. In years of a good apple crop this kind of hold-up continued well into the late autumn, as they were all engaged in cider production. We are used today to many excuses for late delivery, but not this one!

Hindley died in 1783 and his business was continued, but on a much reduced scale, by his son, Henry Plucknett Hindley, who seems to have sold it later to John Jupe, a member of a local farming family. John Jupe married into the Maggs family of Bourton, Dorset, 3 miles west of Mere, who were also in the linen trade, though they had diversified into mill-wrighting and machinery making; not entirely by coincidence, Henry Hindley's two grandsons also married into the Maggs family and became engineers, under the name of Maggs & Hindley, the founders of the well known engineering works there [7].

It was just at this time that the linen industry in the area fell away, as a result of competition from Scotland and Ireland, where the preparatory processes prior to weaving were being mechanised. By 1770 some 250 Scottish mills had a capacity between them of nearly 3,000 tons of flax p.a., but it was not until 1803 that a flax

Downloaded from www.hias.org.uk

"swingling" mill, the first in the west of England, was opened at Burton Bradstock, two miles east of Bridport – in the heart of the sailcloth area! [8]. Around 1800 John Jupe took over Lordsmead Mill in Mere (ST816318), replaced the water wheel with a new one rated at 8hp, and built a four bay factory building beside it. He took into partnership his son Henry, who had married Anna White, a granddaughter of Hindley, and eventually Henry became sole proprieter of the last linen firm in the parish. A billhead of 1848 announces him as "Flax Spinner, & Linen Tick & Cheesecloth Manufacturer". It is probable that only the spinning and similar processes were mechanised, as the Handloom Weavers Commission referred only to hand looms in the area – as indeed did the 1851 census. By 1860 Henry had retired, and the linen industry in the town had finally faded away after years of decline. This was to cause much poverty in the town, with the loss of wages of heads of households – though at rates of 11 shillings per week it is not surprising that the hands tried to supplement their income by working on the land. Also, agriculture was entering one of its periodic spells of depression, and emigration from the town began to take place. This situation was not helped very much by the nature of the textile business which was started by Charles Jupe, Henry's brother; this employed only a very tiny number of grown men, the labour force consisting nearly 90% of girls and young boys.

Silk Throwing

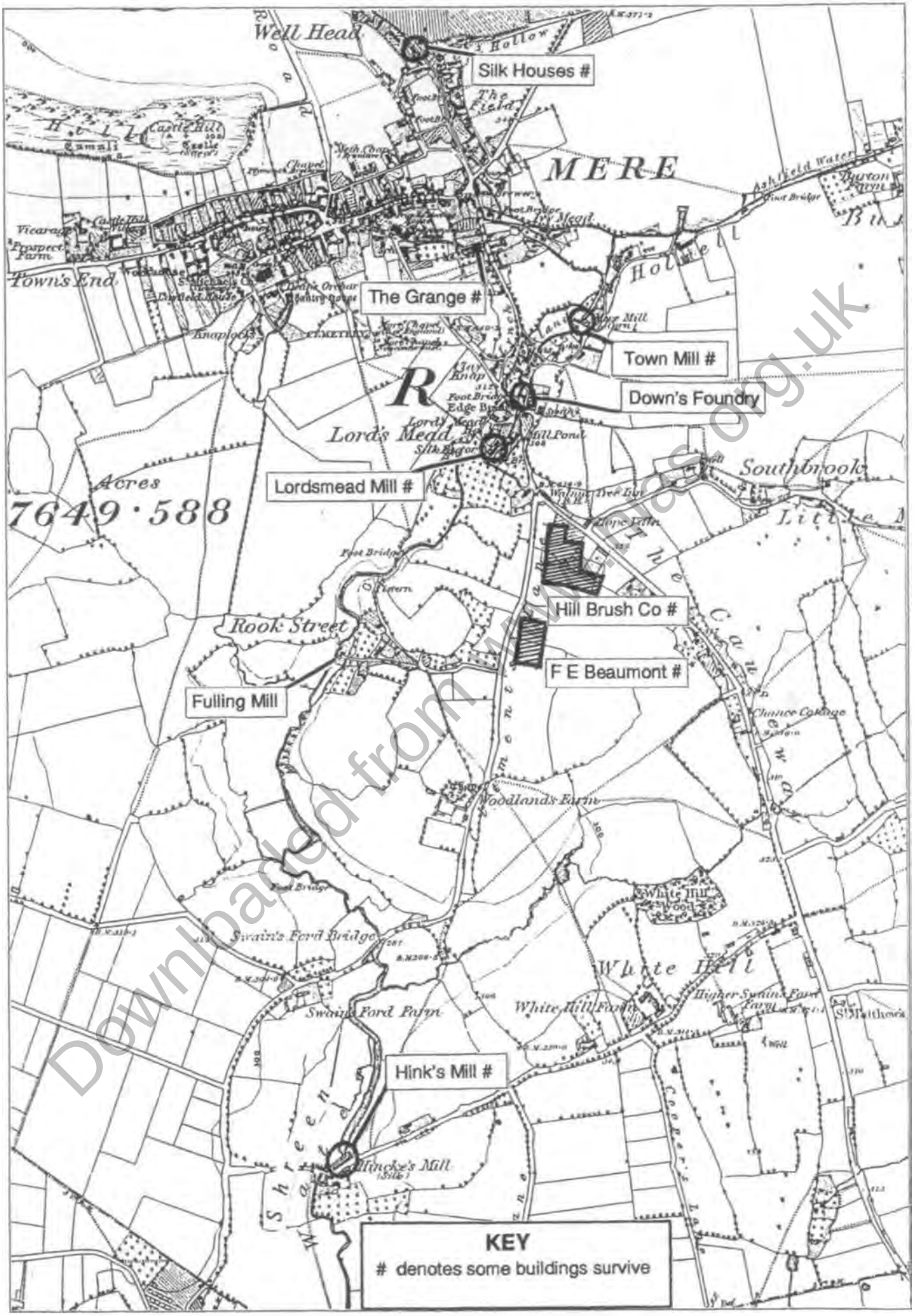
In the latter years of the eighteenth century changing fashions and increased prosperity nationally had led to an explosion in demand for silk – a demand which far exceeded the capacity of the throwsters who prepared yarn and thread from the raw fibres imported from southern Europe and the Middle and Far East. A number of entrepreneurs saw the opportunity of establishing throwing operations in country districts where there was ample female labour; this was an operation where the small nimble fingers of young girls were at an advantage. These "silk houses" were set up in districts where older textile trades were in the doldrums, far removed from the established silk centres of Spitalfields, Coventry and Macclesfield. Their operators worked on a commission basis, not owning the materials they handled. The trade was of course very different from linen; the silk was of small bulk and high value so that security in its handling was vital and transport costs of less influence.

Around 1760 one of these silk houses had been opened 12 miles to the west at Sherborne, Dorset, and ten years later its then partners, George Ward and Williams Willmott, split up; they both decentralised and set up a number of "houses" right across Wessex. The word "house" was a correct description at this stage; they actually consisted of a cottage, or a row of cottages, where young girls could carry out the various throwing processes entirely manually, the trade not yet having become mechanised. At some stage Willmott opened a silk-house in Mere in rented premises; though we do not know the date of its opening, the buildings remain as a row of eight cottages on the outskirts of the town (ST814327), and until the late 1820s it was worked as part of Willmott's Dorset chain of houses. However, by 1830 the house had been acquired by Isaiah Maggs, formerly a tick merchant of Silton, a couple of miles to the west, in Dorset; he was uncle to Henry and Charles Jupe, and formed a partnership of himself and his two nephews, Ambrose Butt and Charles Jupe, under the style of "Maggs & Co, Silk Throwsters". Maggs also owned Hinks Mill to the south of the town (ST813304), and it was here that the firm built a large factory building able to house Lombe machinery on two floors. As at Lordsmead a powerful new water-wheel was installed. The machine age had arrived in Mere with a vengeance, and the old silk house reverted to being a row of cottages. Although they were burnt out in 1861, they were rebuilt and stand to this day.

Isaiah Maggs died in 1827, his son Henry inheriting his substantial wealth. Henry himself died in 1840, leaving Hinks Mill and the business there to Charles Jupe and Ambrose Butt; the latter died in 1852 leaving the business entirely in the hands of Charles Jupe, who was already in the process of expanding it. On his brother Henry's retirement he took over Lordsmead Mill, where he continued to use the wheel, mainly for woodwork, producing all the bobbins the firm needed; the mill was used for cleaning the fibres. Charles was by now living almost in the middle of the town at the Grange in Water Street (ST816323), where he demolished old farm buildings and built yet another silk works; there is no evidence of any power ever having been available there, and it was probably engaged in manual operations and warehousing. By 1851 he was employing across these three works 3 foremen and 3 semi-skilled men, and a labour force of 167, mainly girls between the ages of 9 and 25 [9]. At least they were all local – a similar factory 4 miles to the south in Gillingham for a time had an arrangement with Marylebone Workhouse to employ pauper girls.

Ward, Willmott's partner, had taken over an old woollen mill at Crockerton (ST874436), 5 miles north of Mere, and turned it into a throwing mill of some 9,000 square feet with a 30hp wheel. In 1849 Ward was bankrupt and Jupe bought the mill, which he ran in conjunction with the Mere operation, employing at one time 110 hands there. Not content with this, in 1874 he built a completely new 2-storey factory nearby in Warminster with steam and gas power. He transferred 70 hands from Crockerton and at its peak the new factory employed over 160, using 2,000 swifts.

Downloaded from www.nias.org.uk



Downloaded from www.mhas.org.uk

Figure 27: Extract from the 1:10,560 Ordnance Survey map dated 1886

This expansion had been carried out at the final peak of the trade. Indeed, already similar firms elsewhere, such as those at Sherborne and Gillingham, were failing. The industry had always been vulnerable to foreign competition and had been struggling since tariff reform; the import tariff on thrown silk, mainly imported from France, had been abandoned while the French had maintained their tariffs on finished silks [10]. Charles Jupe died in 1883, having devoted a large share of the profits of the business to the Congregational movement, of which he and his wife were the largest supporters in the county. He was followed by his son, Isaiah Maggs Jupe, who continued the business against all odds until 1894, when he suddenly closed all the factories. Family papers deposited at Wiltshire Record Office [11] by Paris Smith and Randall of Southampton (Randall was a relation of the Jupes) reveal that by then the business had been trading at a heavy loss for some time and was quite insolvent. Jupe seems to have escaped bankruptcy, and indeed established a new silk weaving business at Malmesbury in north Wiltshire, which lasted for a number of years, though so far nothing substantial has been found about its operations.

At the time of the collapse nearly 200 people were employed in Mere, half of them under 20. Part timers received 2/6d (25p) per week, and the grown girls possible 7 shillings (35p); these rates have to be seen against the background of agricultural wages of only 10 shillings (50p) per week for a trained man. The contribution these girls made to the family budget was probably all that separated the family from the workhouse.

This was virtually the end of textile industry in the town. Part of the works at the Grange were rented a few years later by the Wilton Carpet Company, and used as an outstation where a small number of specialised carpets were made entirely by hand until 1939, when even this ceased. The premises were used as a furniture store until the late 1950s when they were demolished, part being converted to a private house. Hinks Mill was abandoned completely, the wheel and factory buildings being demolished, and Crockerton met the same fate. Only Lordsmead Mill found another use after nearly 20 years of dereliction, though it was for a relatively short time, and the buildings are now private dwellings.

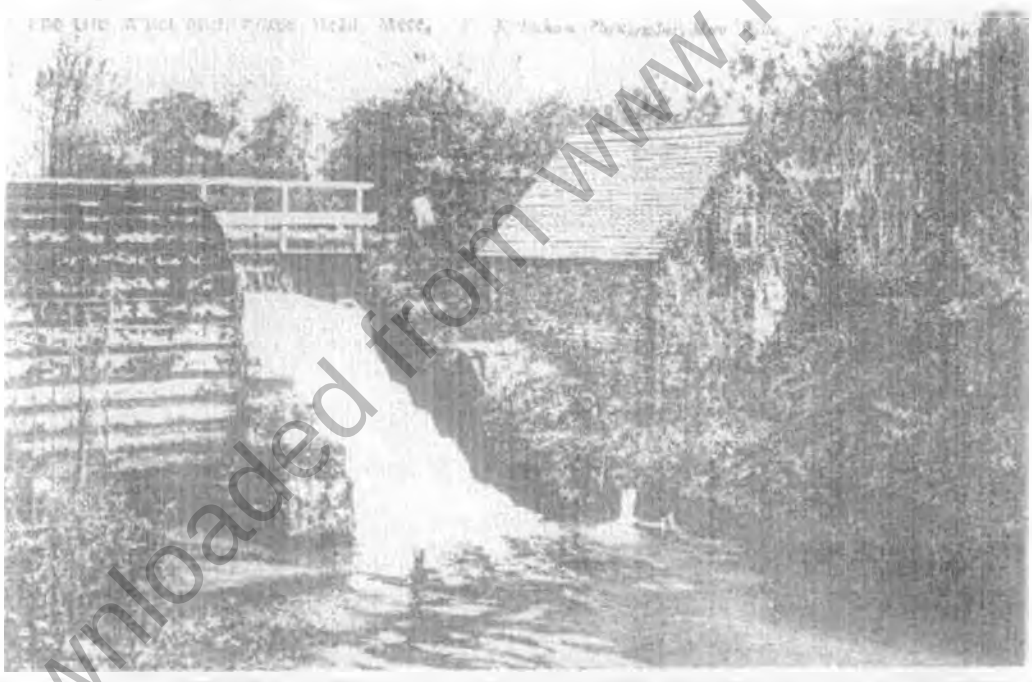


Figure 28: The water wheel at Lordsmead Mill, Mere, in the early 1900s

Downloaded from www.hias.org.uk

Edge Tool Making

In addition to the textile industries, a metallurgical industry grew up which was of importance to the local farming community, and in its turn disappeared from Mere in the mid nineteenth century. The manufacture of edge tools, and similar agricultural tools, was widely dispersed before centralisation at Sheffield; the famous works of Fussells of Mells were at no great distance from Mere. The local family of Down were edge tool makers for centuries. In his will of 1683 Michael Down leaves his son "the Great Anuell" to him and his heirs for ever. The accompanying inventory lists 3 anvils, each with bellows, and a grinding mill with 3 stones, all of which suggests a workforce of some 16. There were substantial stocks of raw materials and fuel – 3 tons of iron, 4 cwt of steel and 30 quarters of coal. While no completed goods are listed, there are 20 dozen reaphook moulds and 10 dozen "spad Toufre" moulds, believed to be spade moulds. The transport section had 4 horses and 2 pacl saddles [3]. The business has been traced to the Edge Bridge area (ST816320), immediately upstream from Lordsmead Mill, and from various references is known to have been in operation there to around 1850. A small number of locally made tools bearing the Down name have been traced.

Whilst the general area of the Down works is known, it has not been possible to identify the site accurately; local hearsay is contradictory, and there have obviously been a number of alterations to buildings, and to the water course. One strong feature, however, is that the Shreen Water takes two parallel courses between the Town corn mill, 400 yds upstream, and the bridge with every indication being that one is a mill leat to a vanished water power site. It seems inconceivable that an operation of this size would not have used water power for blowing, hammering and grinding. No physical remains can be seen of this or indeed of most of the sites of all these centuries of industry. It is with great regret that it has to be admitted that whilst Mere is of great interest to the industrial historian, there is not even the smallest artefact left there to attract the industrial archaeologist.

Modern Industries

In 1922 two brothers, Frederick and William Coward, from a family whose roots in the town go back to the earliest days, both with distinguished war records, decided to break away from their father's small building business and commenced making brushes in a shed in his yard. Their sales methods were successful and before long they had formed The Hill Brush Company, with the trademark of a salmon, reflecting their love of fishing. In 1925 they took a lease of Lordsmead Mill and installed woodworking and other machinery there, driven by the water wheel, which still functioned. The business continued to expand, making all types of both domestic and industrial brushes, and a new purpose-built factory nearby (ST817327) was opened in 1935, and has expanded several times since. Royal Warrant holders, the company has a thriving export trade to the U.S.A.

In 1968 F.E. Beaumont Limited, makers of custom-built industrial chimneys with a considerable export trade, had outgrown their London works and built a new factory next door to the brush factory. Their operation is more akin to the "metal bashing" of such works in the north of England, and may seem incongruous in the rolling pastoral setting of Wiltshire. However, with access to the road network through the A303, they have become part of the local scene, and they and the brush company provide considerable employment opportunities to a town which might otherwise be wasting away. With the wide availability of electricity and the growth in road transport, location has lost much of its industrial significance.

Michael Tighe

References

[1] Quoted in translation in Richard Colt Hoare, *"The Hundred of Mere"*, 1822.
[2] Andrews' and Drury's Map of Wiltshire, 1773; published in reduced facsimile by Wiltshire Record Society 1952, vol VIII.
[3] Will and Inventory at Wiltshire & Swindon Record Office [WSRO], Salisbury Diocesan Collection.
[4] WSRO 372.
[5] *"Wiltshire Textile Trades in the 18th Century"* Wiltshire Record Society vol XIX.
[6] Salisbury Journal 13 March 1775.
[7] see Edwin Course, *"Engineering Works in Rural Areas"*, I.A. Review, vol XVII No. 2.
[8] *"Bound to the Soil"*, Barbara Kerr, 1968.
[9] Census of England & Wales 1851.
[10] A result of prolonged Free Trade policies.
[11] WSRO 2632/1.

For more detailed studies of all the industries of Mere see *"Mere Papers"*, vols 3 [Silver Threads, the Textile Industries] and 4 [the Down Family] by Michael Tighe, published by The Friends of St. Michaels Church, Mere.

Along the Right Lines

When you first see the ruins of Darkhill Iron Works at Gorsty Knoll in the Royal Forest of Dean you wonder if you have stumbled on an "Inca" ruin or a setting for *"Hamlet"*, but this is Gloucestershire – not Peru or Denmark. The ruins lay largely undisturbed but for the destruction by nature as ivy and tree roots have done their worst. Attention was drawn to the site by Fred Osborn in his book *"The Story of the Mushets"* published in 1952. There were some archaeological excavations in the 1970s but, in the main, the site has been neglected. Perhaps because it is so peaceful and secluded, despite its national and international significance for the history of steel making, it has been greatly undervalued.

It is associated with David Mushet (1772-1847) and his son, Robert Forester (1811-1891), both outstanding metallurgists. David Mushet was a Scot who began his experiments with iron near Glasgow but, in 1810, he finally settled in the Forest of Dean. At first he was associated with the Whitecliff Furnace until, in 1818, he built his own works at Dark Hill. He was followed by his son, Robert Forester, who is celebrated for his

Downloaded from www.hias.org.uk

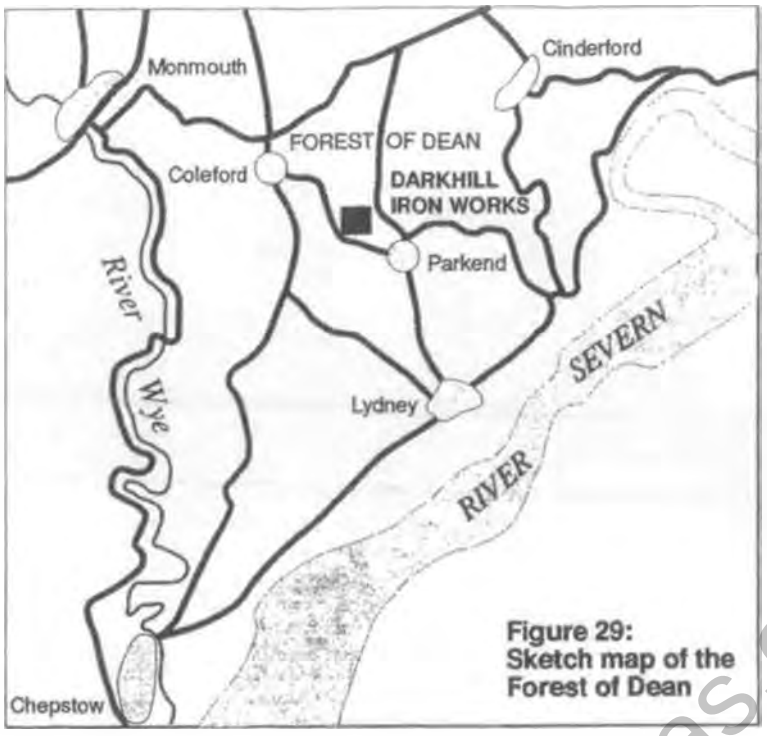


Figure 29: Sketch map of the Forest of Dean

tungsten steel, the first of the alloy steels. He was closely associated with Henry Bessemer, whose name is sometimes given all the credit for developing the large scale production of steel. For instance, the first use of Bessemer steel for railway track is recorded at Crewe Station on the LNWR in 1863, where the rails lasted for eighteen years.

However, steel rails produced by Mushet were laid at Derby Station on the Midland Railway in 1857. They replaced iron rails which had needed replacing every three to five months. For ten years Mushet's rail showed no signs of wear although seven hundred trains a day passed over it. It was scrapped in 1873. It is perhaps unfortunate that the relationship between Bessemer and Mushet was a difficult one, partly because Bessemer was successful commercially and Mushet was not. (Bessemer's generosity to Mushet may not have helped). However, the use of Mushet steel at Derby Station in 1857 is the reason for the title of this paper.



Figure 30: The ruins of Darkhill Ironworks

Downloaded from www.hias.org.uk

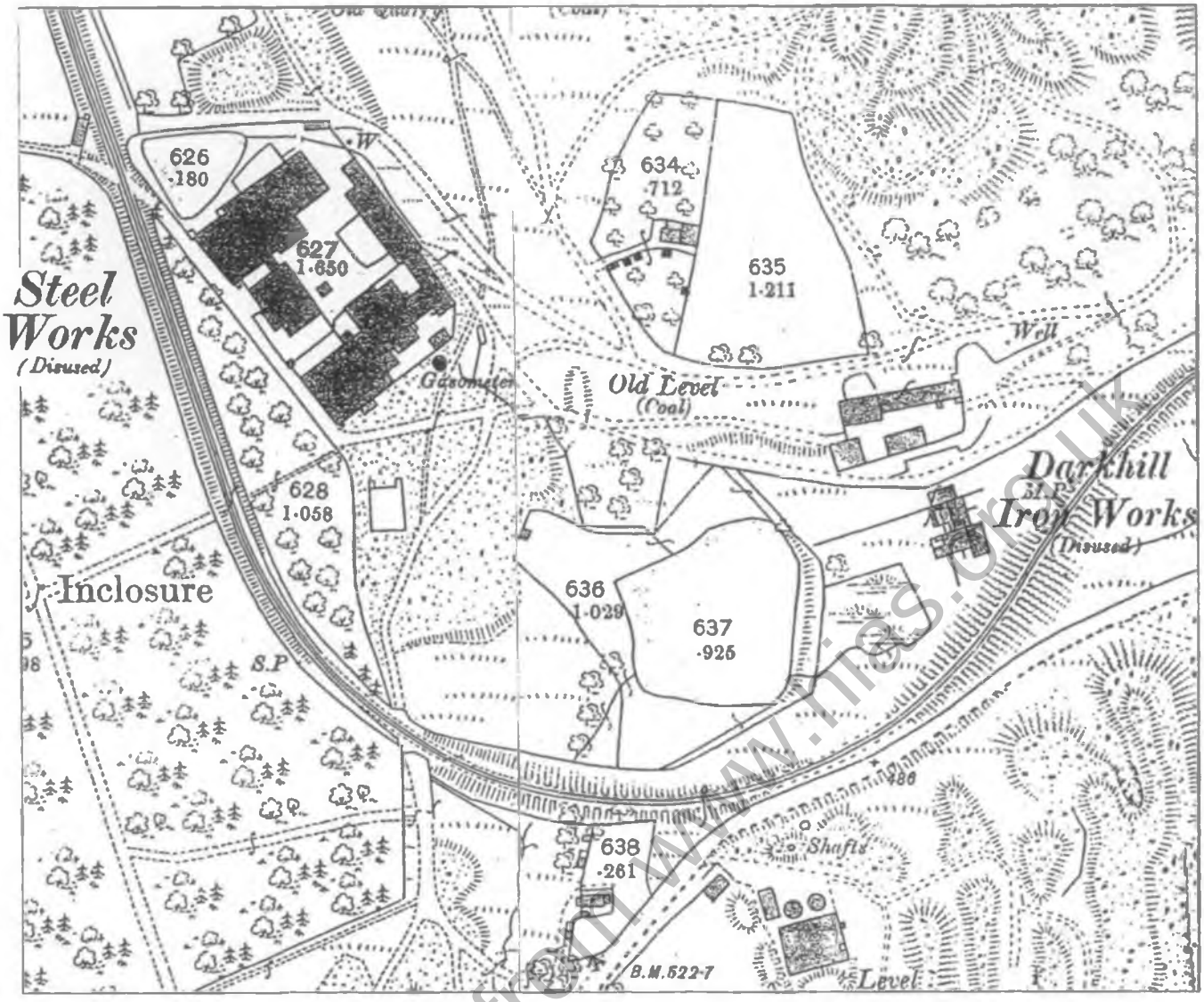


Figure 31: Extracts from the Ordnance Survey 1:2500 maps of Gloucestershire, Sheet XXXVIII.8 surveyed in 1877-9 and Sheet XXXIX.5 surveyed in 1877

Downloaded from www.fms.org.uk

On the site at Darkhill a plinth has been placed supported by railway track. It includes the following words

David Mushet 1772 - 1847 and son Robert Forester Mushet 1811 - 1891.

Outstanding Metallurgists.

In this valley early experiments in the making of STEEL and its alloys were carried out.

Thus the Age of STEEL began.

Forest Enterprise Forest of Dean Local History Society

If there are white vapour trails high in the sky from passing aircraft, they would not be there but for what happened in the Forest of Dean. The technical and economic world moves remorselessly on. Someone else would have made the discoveries. Many claim that distinction. David and Robert Mushet deserve their place on any relevant Roll of Honour.

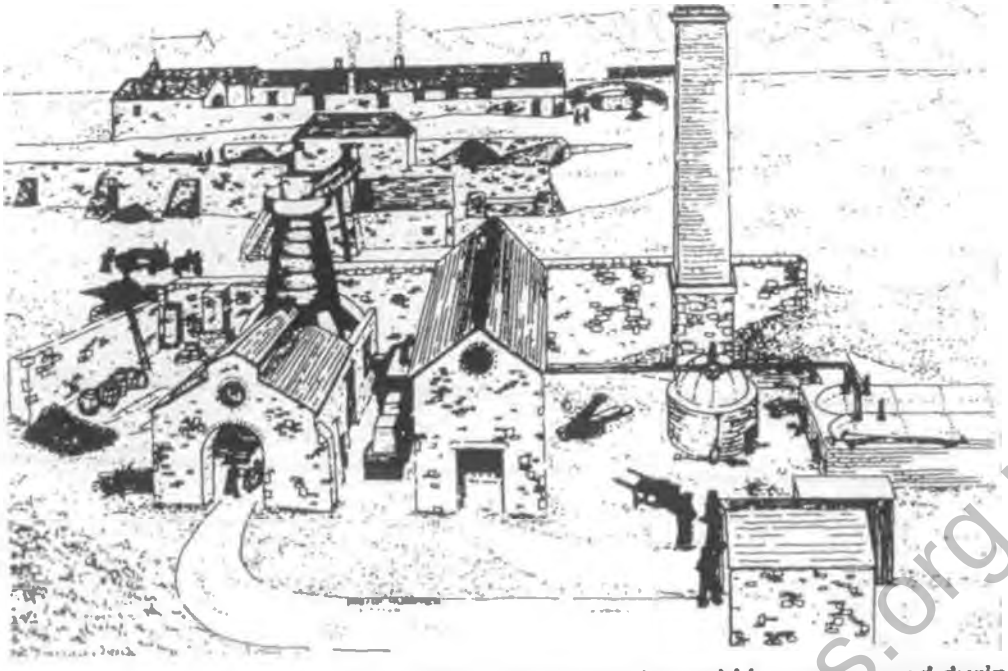


Figure 32: Sketch drawing of Darkhill Iron Works as it would have appeared during its production days (copied from brochure *"Darkhill Iron Works Walk"* produced by Keith Webb, Number 4 in the Forest of Dean Local History Walk Series)

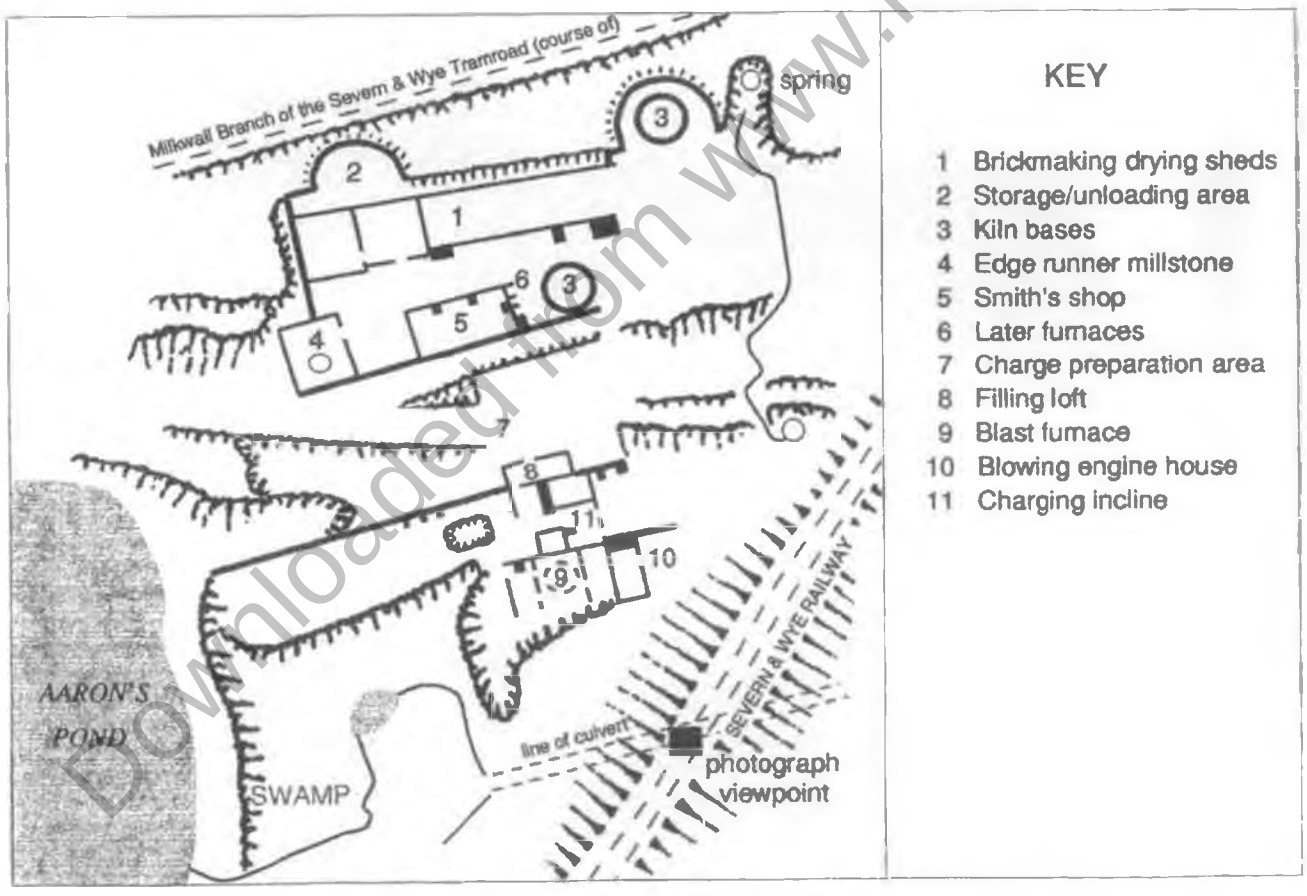


Figure 33: Plan of Darkhill Iron Works ruins

David Mushet brought down the curtain on the "Age of Iron". His son Robert raised the curtain on the world stage of the "Age of Steel Alloys". Darkhill is where the Prelude was performed.

Keith Lloyd Webb, B.E.M., JP
An Inclosure Commissioner for the Forest of Dean

Downloaded from www.fhas.org.uk

Bricks at Twyford Waterworks

On this occasion I am not referring to those volunteers who regularly attend working days but to those bricks made from clay and used in the construction of the waterworks. This is not meant to be an exhaustive or authoritative article on the bricks, but some information on those gathered from around the waterworks. Some notes made a few years ago by Mr. Martin Hammond have been used, and the debt to him is gratefully acknowledged.

Types of Brick

Several types, shapes and sizes of brick have been found around the waterworks. However, most of them are of the standard size, approximately 9" x 4½" x 2¾" (225mm x 110mm x 70mm).

Facing and Common Bricks

A few of these are yellow, but most are of the red colour traditionally associated with bricks. The collection includes bricks of this type from several sources, mostly fairly local.

Staffordshire Blue Bricks

Also known as engineering bricks, these are used where a strong and/or hard wearing brick is desired. Very much associated with railway structures, there are variants from the simple cuboid shape among the collection at Twyford. Bullnose bricks are used where a rounded corner is desired. They are also used as coping, but Twyford has the more usual half-round as well as examples of saddleback coping bricks. Plinth bricks have an angled corner for where the thickness of a wall changes or a projecting course of bricks is desired. Two patterns of paviors have also been found. As the name suggests, these were used for floors and Staffordshire bricks are used for the hard-wearing qualities.

Firebricks

With boilers and limekilns on the site it is not surprising that many firebricks have turned up. Clays used for stock bricks can only withstand relatively moderate temperatures; for high temperatures, firebricks have to be used. The clay – fireclay – used for these bricks has less impurities in them than that used for common bricks and is found in the coal measures, so they were never locally produced. The purest fireclays, and thus the best quality firebricks, come from the West Midlands and Central Scotland. There are examples from both places at Twyford; from several brickworks in the Stourbridge area and, from Scotland, Glenboig firebricks, which were considered to be of the highest quality.

Glazed bricks

Glazed bricks have one or more surfaces coated with a coloured glass which produces a shiny, hard, decorative surface. Probably the most common use of this technique is white sanitary ware, but at Twyford green glazed bricks are used on the lower part of the engine house walls and buff coloured on the boilers. These were probably supplied as part of the contract for the boilers and engine. The samples in the collection have damaged glazed surfaces and are more likely rejects from the installation of the engine and boilers rather than spare bricks subsequently damaged.

Ridge Tiles

The clay used for tiles comes from the same source as that used for common bricks. Two firms can be identified for the ridge tiles found at Twyford.

Production

Three different methods of producing bricks can be identified by inspecting the bricks at Twyford and all can be found still in use today. Each method leaves characteristic traces on the surface of the bricks. The earliest method is hand-made where evidence of striking off and being slid out of the mould may be found. Later came wirecut bricks where the clay was extruded in a continuous slab out of a die and then cut to length by wires, as demonstrated at Bursledon Brickworks. The marks of the die can be seen around the edges of these bricks and the rough surface from the wires are seen top and bottom. Pressed bricks are formed in an enclosed mould under pressure and almost always have a frog and a smooth surface.

Brickmaker's marks

Not all bricks carry brickmaker's marks and several examples at Twyford are devoid of any identification. Where they occur, the marks are of great benefit to the historian as they can indicate where the bricks were made, who made them and a range of dates between which the bricks must have been produced. Unfortunately for the 'detective', the marks are usually in a position which is covered when the brick is part of a structure, which is why it is only bricks we have found lying around the waterworks that can be identified from the maker's marks.

Downloaded from www.hias.org.uk

If there is a frog in the brick, the maker's name or trademark is found there, usually indented rather than raised. Machine-made, pressed bricks are thus identified, and handmade bricks may have the maker's identification on the bottom plate of the mould. Wirecut bricks have no frog unless put in by a subsequent operation which adds to expense, but often have the maker's mark stamped on by hand.

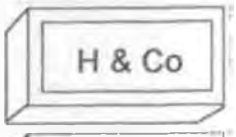
Common Bricks



G C O Co. A yellow hand-made brick. The outer structure of the two original limekilns of 1903 have yellow bricks at charging floor level and, as they are not seen elsewhere, it is assumed that this brick is left over from construction/repair of the limekilns.



B B Co. A red brick from Bursledon Brickworks. In production 1897-1974. These red bricks were pressed after being wire-cut and produced in early years of the brickworks. The older part of the works are now preserved as the Centre for the Conservation of the Built Environment.



H & Co. A dark maroon colour, this is a pressed facing brick of poor quality both in the mixing of the clay and in the finish surface. Identity of maker unknown.



London brick. A modern pressed brick, post-1974. At this late date, the bricks must have been purchased for modern alterations or repair work around the waterworks.

Staffordshire Blue Bricks



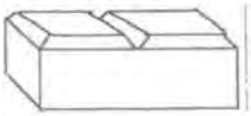
Joseph Hamblet, Piercy Brickyard, Oak Road, West Bromwich. The firm is now incorporated with Barnett & Beddows, Atlas Brickworks, Aldridge, Staffs. A typical Staffordshire brick, these are pressed bricks with the maker's name in the frog.



There are also single and double bullnose shapes from this firm, which again are pressed bricks, with maker's mark. Single bullnose bricks are found in the doorways of the two original limekilns. In addition, examples of anonymous wire-cut bullnose bricks are present.



The saddleback coping bricks are anonymous. They would have been made upside down in the mould. The small channels (throats) on the underneath are to prevent water running back when in position on top of a wall.

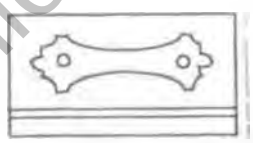


The 2-panel paviors have 'W' within a Star of David device maker's mark on the underside. Paviors of this type are found near the chimney outside the door into the refreshment room.



The plain paviors (not illustrated) are thinner than a normal brick and again are made by Joseph Hamblet. In the limekiln area all the floors of 1903 are plain paviors which contrast with the concrete floors of the 1929 extensions.





The throated plinth stretcher found has the device shown on the underneath. It is not known whose mark this is. Examples of these bricks can be seen incorporated in the walls of the main building of the waterworks.



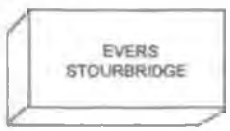
An anonymous channel brick and a channel return (90° change of direction) are also blue brick. The channels would have been mounded upside down. Channel bricks can be found around the edges of the 2-panel pavior area.

Firebricks

More than half the bricks collected are firebricks. None have frogs but most have maker's marks.

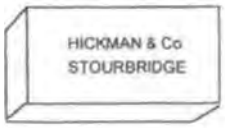


Best, Stourbridge. The mark is hand-stamped on the bricks after moulding. It is assumed that 'Best' is the name of the maker rather than the quality.

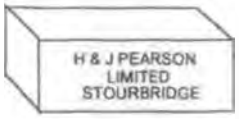


Evers, Stourbridge. These bricks are again hand made and hand-stamped after moulding. Nothing is known about this maker.

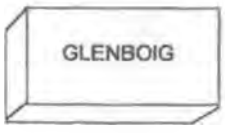
Downloaded from www.hias.org.uk



Hickman & Co. Another hand made and hand-stamped brick. The offices of this firm were at Cradley Heath, West Midlands.



H & J Pearson. Dating from about 1963 the maker's mark is unusually on the stretcher face of these bricks. This should make sighting in boilers or limekilns easier but none has been discovered there so far. Again these firebricks are hand made andhand-stamped.



Glenboig Union Fireclay Co Ltd. Star Works, Glenboig, Lanarkshire. Firebricks were first made on the site around 1836, but the Union Co was formed in 1882. In its heyday (1890-1910) it was the largest firebrick works in the world, exporting firebricks world-wide. Taken over in 1936, the works closed in 1976. The bricks are pressed, incorporating the name in the mould.

Glazed Bricks

These bricks are all marked, and date from the installation of boilers and engine.





Brooke, Halifax. Buff glaze applied to one stretcher face of these pressed fireclay bricks. Frogs are present top and bottom with 'BROOKE' in one and 'HALIFAX' in the other face.



Farnley Iron Co. Buff glazed on one stretcher face, the mark incorporated in the frog for this pressed fireclay brick. There are also examples of single bull-nose bricks in the collection by the same maker to match the cuboid bricks.

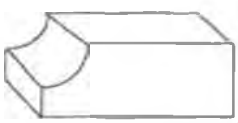


Leeds Fireclay. The Leeds Fireclay Co Ltd was located at Wortley, south of the city. They also manufactured firebricks (no examples at Twyford), gas retorts, sanitary ware and terracotta.



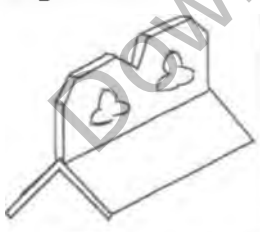
'CLIFF' refers to Joseph Cliff & Sons which was a branch of the Leeds Fireclay Co. The bricks at Twyford are buff glazed on one stretcher face. There are frogs top and bottom with 'Leeds Fireclay' in one and 'Cliff' in the other.





JCE. James Coster Edwards 1829-1896 of Trevor Hall near Wrexham was sometime sheriff and deputy lieutenant for Denbighshire. He owned three brickworks in nearby Ruabon. Much of the production was exported world-wide in the heyday of the brickworks around the turn of the last century. Several different shaped bricks from this maker have been found, all with a green glaze on one or more faces. One example is shown. All have the maker's mark in a frog. Some sides of these bricks show minor distortion of the surface from other bricks when they were stacked for drying or firing.

Ridge Tiles



The tiles are made by extruding the basic 'Y' shape and then the cutting of the cresting by hand using a template. The maker's mark is hand-stamped on in both instances. The angle between the 'wings' of the tile varied to suit the pitch of the roof.





The maker's mark to the left is that of Colthurst Symons & Co Ltd, Bridgwater, Somerset. Thomas Colmer Colthurst and John Symons owned two brick and tile works in Bridgwater, the tile mark being used between 1861 and 1939.
The maker's mark to the right is probably the mark for Rowlands Castle Brick and Tile works (E.P.Basten) and thus more local than Colthurst and Symons.

There may have been changes in the industry since these notes were penned, which renders some of this information out of date. Any updates or additional information on the collection would be welcome.

Dr Rodney Hall

Downloaded from www.hlas.org.uk

SUIAG Surveys

During the 1970s and 1980s members of the Southampton University Industrial Archaeology Group were continually involved in the recording of remains of industrial activity in Hampshire. Three standards of records were recognised. First, superficial records consisted of no more than a few notes with a six-figure grid reference and a few photographs. Second, the intermediate level included more systematic and detailed description, plus location, adequate photographic coverage and plans with sketches of particular features. Third, full surveys incorporated some analysis of the history of the monument, formal drawings of the main features and full photographic coverage.

The subjects covered were mills, roads, breweries, brickworks, aerodromes and farm buildings. SUIAG policy was that all the original returns should be deposited and that summaries should be published. Particular importance was attached to publication. The reports for the first five subjects were deposited, with other SUIAG papers, in the Hartley Library of the University of Southampton, and the farm buildings survey, which had received considerable financial support from the Hampshire County Council, was deposited in the Hampshire Record Office. Publication of summaries of the first five was in the Proceedings of the Hampshire Field Club and of the farm buildings, by SUIAG.

The policy has always been that members should accept personal credit and responsibility for their work. All the original reports are signed by the people who produced them. They were made with the guidance of a standard check list and validated, but the degrees of detail varied. Publication consisted of summaries with the initials of the surveyors, so that readers could consult the original returns at the University or the Record Office. (Both are open to the public by arrangement).



Figure 34: Ford Mill, Lockerley

To qualify for inclusion, a site had to have at least one feature which was visible, but the method of selection depended on the subject. In 1968 we began our first survey, of Mill sites using wind or water power. The list was based on Ordnance Survey maps and plans, followed by preliminary visits. Applying the county boundaries of 1968, we decided to see what was left at the 200 mill sites marked around the turn of the century. Needless to say some sites, particularly of windmills in towns, were missed, and so the map record was supplemented by consulting local societies. After preliminary visits, we finished with reports on 170 sites. Most of them were concerned with the production of foodstuffs for people or livestock, but a number had changed their product over the years. There were examples which had been used for paper making, iron and explosives while present uses included sawing timber and private residences. Only 14 sites remained in industrial use, including one textile mill. While a number of these retained the facility to use water power, the only mill producing animal feed on a commercial basis, using stones and a water wheel, was that of John Ellis at Headley. The reports submitted, by 18 SUIAG members and 9 belonging to local history societies, were edited for publication by Monica Ellis [1].

Downloaded from www.hias.org.uk



Figure 35:

Toll house at Romsey

Our second subject, that of Roads in 1969, was suggested by the County Surveyor, one of his concerns being the illicit removal of metal plates from mile markers. We decided to look at all the roads with an A or B classification – there were no motorways in Hampshire at that time. The recorder travelled by motor car, with a driver and a navigator, observing a list of features, including mile markers, road signs, toll houses and wayside and coaching inns. The frequent stops were not without their dangers for ourselves and other road users. For instance, the photographic recording of all eleven mile markers on the Winchester and Southampton Turnpike of 1757 had to be undertaken when traffic was light. The survey was completed by 20 SUIAG members plus four students from evening classes. David Viner's editing for publication was particularly difficult as he had to devise a method of shorthand for the various features [2].



Figure 36: Maltings from roof of brewery at Alton

In 1970 we tackled Breweries. In this case, trade directories were the main guides to sites. We included all commercial breweries plus brewhouses attached to public houses. (The brewhouse attached to the *'Golden Lion'* at Southwick was later restored to working order). 63 sites were recorded in the survey. At least 15 were still working in 1939, but only four at the time of our survey. However, despite improvements in transport, brewing has not continued on the trend towards mass production. The 15 of 1939 had reduced to 4 at the time of our survey and in the 1990s to one modern and one updated commercial brewery. However numerous

Downloaded from www.hias.org.uk



Figure 37 (above): Gales Brewery, Horndean



Figure 38 (right): Brewery tower, Alton

Downloaded from www.hias.org.uk

microbreweries, some ephemeral, have started brewing. The reports of 15 members of SUIAG were prepared for publication by Michael Tighe [3].

For 1971, the subject was clay-based industry, covering bricks, tiles and drainage pipes. Selection was confined to permanent works as opposed to the many temporary clamp burning sites adjoining the construction of buildings. Reference was made to Ordnance Survey maps, trade directories and local history groups. In some cases, kilns had survived but frequently there was nothing beyond an office and the outline of the pit from which the clay had been extracted. 41 sites were visited of which 6 were still working. (By 1999 there were two still producing). The original reports were made by 12 members of SUIAG and were edited for publication by Bill White [4].



Figure 39: Ramsdell Brickworks

The 1972 survey was of Aerodrome sites. Perhaps because of its Hampshire situation, SUIAG has always included defence industrial sites, such as naval dockyards, within its field of interest. With this in mind, plus the difficulty of classifying aerodromes with mixed functions – commercial, military, pleasure, testing – it was decided to include all permanent airfields. The essential feature were the areas dedicated to the landing and takeoff of aircraft; which before World War Two, were grassed. The assorted buildings varied from large hangars and wooden huts to extensive terminal buildings, as at Eastleigh. Although a number of SUIAG members assisted him, all 38 visits were made by John Bagley, who wrote the report for publication [5].



Figure 40: Upper Posbrook farmhouse, Titchfield

After a break, in 1981 SUIAG began its most ambitious recording project – on Farmsteads – which was not finished until 1994. The visits were made by 63 people of whom 35 were members of SUIAG, the remainder being from local history societies. The survey was in response to the increasing rate of demolition or conversion of farm buildings. Of the 3126 farms in Hampshire, 393 were viewed and 300 visited and described in the 13 year period. As with earlier projects, each report was attributed to the people who produced it. A pilot exercise indicated that visits to about a tenth of the farms, with careful selection, might provide a useful sample. As in previous surveys, Ordnance Survey maps were essential but in this case there was also assistance from planning authorities, local groups and national bodies such as the Historic Farm Buildings Group. This was the only survey which received specific financial assistance. Hampshire County Council met the cost of producing 2627 photographs, and also that of publication. This finally materialised in 1999, having been written by Edwin Course [6].

For future surveys, SUIAG has considered public utilities (water supply, drainage, gas, electricity), chalk-based operations (lime kilns), iron-based industries (smelting sites, smithies) and great estates (home farms, lodge houses, stables, boundary walls). It is felt that subjects such as ports and railways have already received sufficient attention. However, it is also considered that it would be worthwhile to update some of the earlier surveys. (Also a new edition of the Itchen Navigation). A hope for the new Millennium is that all the surveys will be updated.

Edwin Course

Downloaded from www.hias.org.uk

References

[1] Proceedings of the Hampshire Field Club. Vol. XXV (1968) pp 119-140. C.M. Ellis. *A Gazetteer of the Water, Wind and Tide Mills of Hampshire.*

[2] Pro.H.F.C. Vol. XXVI (1969) pp 155-172. D.J. Viner. *The Industrial Archaeology of Hamphire Roads: A Survey.*

[3] Pro.H.F.C. Vol. XXVII (1970) pp 87-106. M.F. Tighe. *A Gazetteer of Hampshire Breweries.*

[4] Pro.H.F.C. Vol. XXVIII (1971) pp 81-97. W.C.F. White. *A Gazetteer of Brick and Tile Works in Hampshire.*

[5] Pro.H.F.C. Vol. XXIX (1972) pp 93-108. J.A. Bagley. *A Gazetteer of Hampshire Aerodromes.*

[6] Edwin Course. *Hampshire Farmsteads in the 1980s.* Southampton University Industrial Archaeology Group. 1999.

SUIAG Publications

Adrian Rance (ed.) *Seaplanes and Flying Boats of the Solent*
1981 **£5.00**

Southern Railway *A Souvenir of Southampton Docks* (replica of publication c.1930)
1982 **£5.00**

Monica Ellis *Ice and Icehouses Through the Ages* (with Hampshire gazetteer) 1982 **£4.00**

Edwin Course *The Itchen Navigation* 1983 **£3.00**

Pam Moore (ed.) *A Guide to the Industrial Archaeology of Hampshire and the Isle of Wight* 1984 (with supplement) **£3.00**

Edwin Course and Pam Moore *The Changing Railway Scene in Hampshire*
1991 **£5.00**

Edwin Course *Twyford Pumping Station* 1997 **£5.00**
(Published by Twyford Waterworks Trust)

Edwin Course *Hampshire Farmsteads in the 1980s* 1999 **£5.00**

Edwin Course (ed.) *SUIAG Journal No.1*
1992 **£4.00** (to non-members)

Edwin Course (ed.) *SUIAG Journal No.2*
1993 **£4.00** (to non-members)

Edwin Course (ed.) *SUIAG Journal No.3*
1994 **£4.00** (to non-members)

Edwin Course (ed.) *SUIAG Journal No.4*
1995 **£4.00** (to non-members)

Edwin Course (ed.) *SUIAG Journal No.5*
1996 **£4.00** (to non-members)

Edwin Course (ed.) *SUIAG Journal No.6*
1997 **£4.00** (to non-members)

Edwin Course (ed.) *SUIAG Journal No.7*
1998 **£4.00** (to non-members)

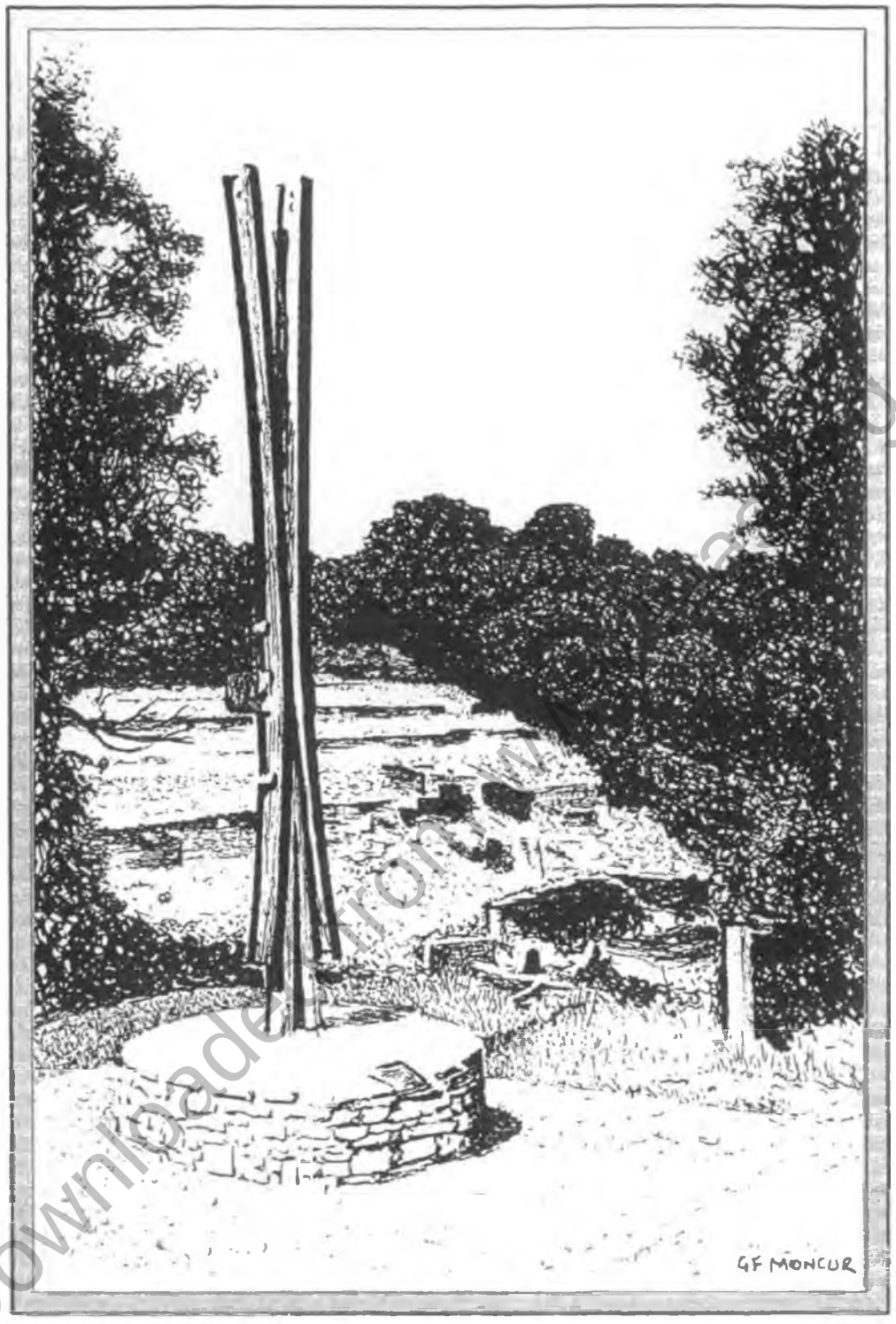
All the above are obtainable from Eleanor Yates, *Publications Officer, SUIAG,*
Danesacre, Worthy Road, Winchester, Hampshire, SO23 7AD
(All prices include postage and packing).
Other publications, including *Shipbuilding in Victorian Southampton* and *Water and Windmills in Hampshire* are out of print.

Downloaded from www.hias.org.uk

Southampton University Industrial Archaeology Group

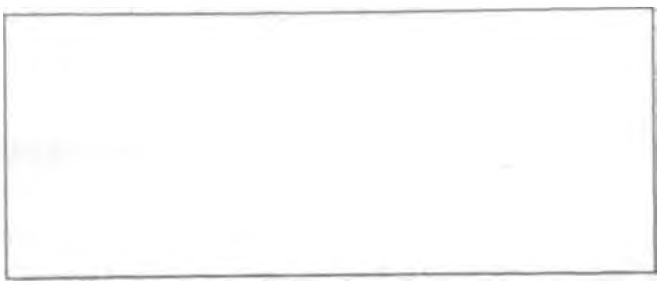
Southampton University Industrial Archaeology Group was founded in the 1960s from members of University Extra-Mural classes who wished to continue and develop the practice of industrial archaeology. Recording has included surveys of mills, breweries, brickworks and farm buildings. Restoration work is undertaken directly or by associated groups, such as Tram 57 Project, the Hampshire Mills Group or the Twyford Waterworks Trust. In addition to the Journal, the Group publishes a newsletter and also has published several monographs. Lecture meetings are held every month of the year at the University. Current membership fees are £9.00 (Single Member); £13.50 (Joint Membership); £14.00 (Family or Corporate); £6.00 (Out of County).

To join, contact the Membership Secretary:
Keith Andrews, 13 Ashley Close, Harestock, Winchester, Hampshire, SO22 6LR



DARKHILL IRON WORKS
"Railway Crossing Monument"
Sketch by Gillian Moncur of the railway track point on a plinth with the commemorative plaque, overlooking the ironworks site, erected as a tribute to David and Robert Mushet

Downloaded from www.ag.org.uk



Contents

Paddle Steamers built in Southampton and Cowes
A Note on Stationary Boilers
The Tram Shelter at The Junction, Southampton
Industry in a Small Wiltshire Town
Along the Right Lines (Darkhill Ironworks)
Bricks at Twyford Waterworks
SUIAG Surveys

Downloaded from www.hias.org.uk