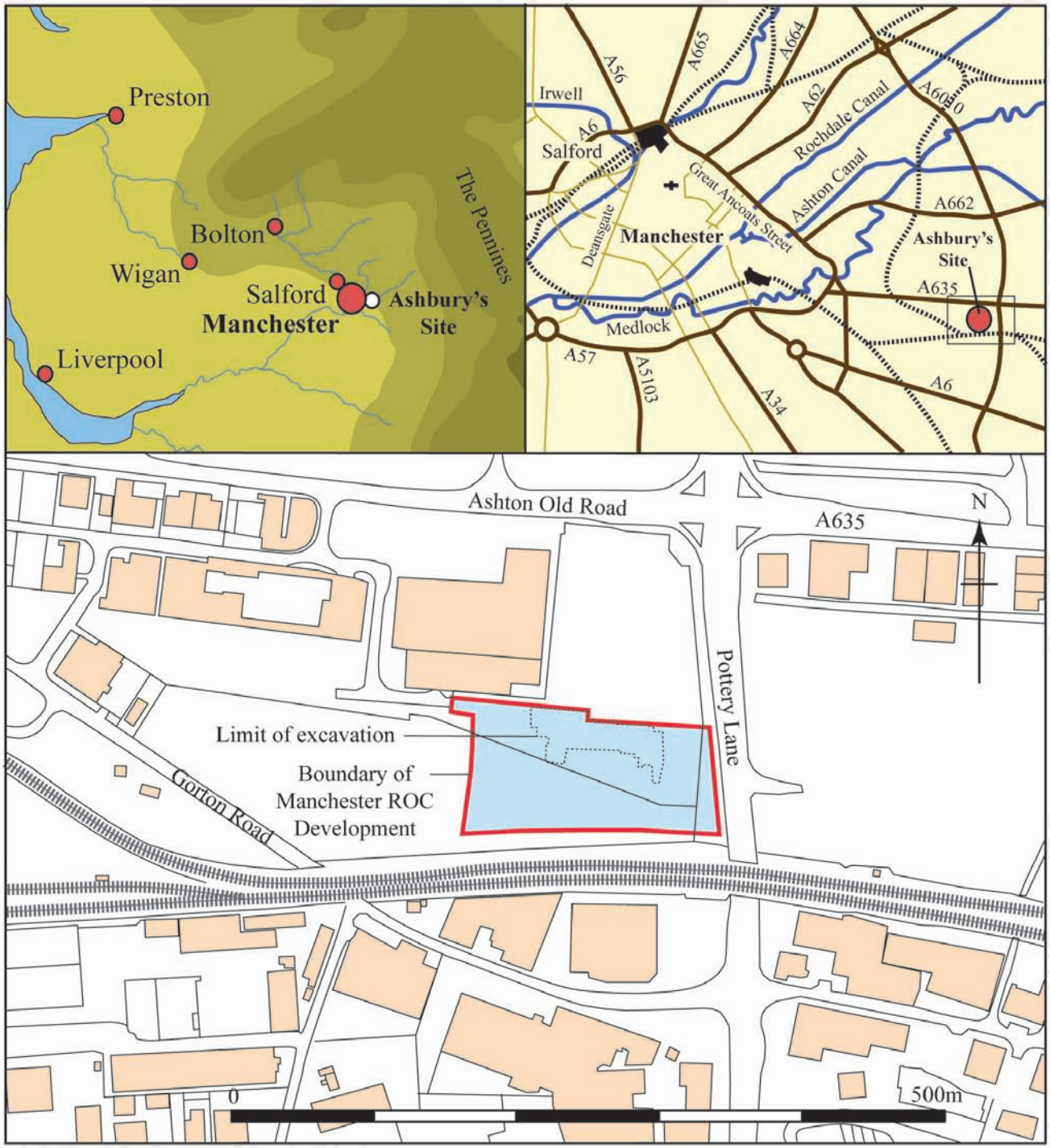
IRON & STEEL IN OPENSHAW

EXCAVATING JOHN ASHBURY'S CARRIAGE AND IRON WORKS



Location of the Ashbury's excavation site

FOREWORD

Some of this country's most significant nineteenth and early twentieth century industrial enterprises have disappeared leaving surprisingly little surviving evidence. This booklet highlights the work undertaken as part of recent archaeological investigations looking at two adjoining areas of the former Ashbury's Carriage and Iron Works, Openshaw, Manchester. Established in 1847, Ashbury's grew to be a major supplier both to domestic and global markets of iron, steel, rolling stock and railway components. Apart from the Ashbury's railway station little or no visible surface evidence survives today of where the works once stood. The company's archives also appear not to have survived.

The fragmentary cartographic, documentary and photographic evidence for the history and development of Ashbury's have been assembled but it has been the results of archaeological excavation that has provided new and exciting detailed evidence about the works, how it was organised, how it developed and the range of activities that were undertaken. The archaeological investigation was a requirement of the planning system and this booklet has arisen from work undertaken by archaeological contracting firm SLR Consulting Ltd, funded by the developer Network Rail. Another excavation, carried out nearby by Oxford Archaeology North, is also considered at the end of the book. The fieldwork benefitted greatly through contracting archaeologists working alongside volunteers from the Manchester Region Industrial Archaeology Society. The scale and significance of the fieldwork is testimony to the vital role that archaeology, funded by developers and undertaken by contracting archaeological units is playing in research and bringing to light new information about our industrial heritage; information that would otherwise be lost forever through redevelopment. It is hoped that this booklet makes the research accessible and re-establishes an awareness of Ashbury's as one of the most important yet virtually forgotten engineering concerns in Manchester's industrial past.

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INTRODUCTION

Fifteen years after the completion of the Liverpool and Manchester Railway in 1830, dramatic change to the character of the townships east of Manchester's commercial centre occurred, stimulated by the construction of the Sheffield, Ashton-under-Lyne and Manchester Railway in 1845. Extensive engineering works sprang up along its route in Ardwick, Openshaw and Gorton, including the famous works of Beyer Peacock, the Galloway Boiler Works, Gorton Tank and Joseph Whitworth. Not least amongst these was the Ashbury Railway Carriage and Iron Company established by John Ashbury, a Manchester-born engineer, in 1847.

The Ashbury works evolved to become one of the largest iron, carriage and wagon manufacturers in the country. With the capacity to undertake large contracts, every component needed for their products could be manufactured rapidly on site from raw materials.

Railway engineering products were exported around the globe as far afield as Argentina, India and New Zealand during a golden era of British manufacturing.

Despite the company's success in the later 19th century, the railway carriage manufacturing industry as a whole hit a period of crisis in the first decade of the 20th century. As domestic contracts dwindled, the Ashbury works merged with four other companies in 1902 to form the Metropolitan Amalgamated Railway Carriage and Wagon Company Ltd, under the overall management of Frank Dudley Docker, a visionary industrialist and financier who managed to revive the fortunes of flagging (and increasingly outdated) works in Lancashire and the West Midlands. In doing so he created one of the first truly national companies and one of the largest manufacturing employers in the country.

Manchester has gone on year by year absorbing the outlying townships which form its suburbs. One of the latest to yield to this encroachment, but most rapid in its growth and assumption of an urban character, was the township of Gorton, which until within the last five years, has preserved an almost rural aspect.

The increase of manufacturing industry has, however, given a stimulus to enterprise, and there has sprung up of late in Gorton parish a number of large engineering and other mechanical works, which, by affording employment to vast numbers of men, has led to the necessity of erecting dwellings in the neighbourhood for their accommodation.

Hence Gorton has been gradually, but steadily, acquiring a closer affinity of aspect to its huge centre. Green fields and hedgerows have given place to macadamised roads and trim rows of neat brick dwellings.

Manchester Courier and Lancashire General Advertiser, 20 July 1865

During the First World War the dynamics within the company changed. New munitions contracts for the war effort necessitated close working with other large steel manufacturing groups including Vickers and Cammell Laird. In the uncertain economic climate which followed the war, further

Excavating and recording the engine bed and flues

mergers with these groups to form Metropolitan-Cammell Carriage and Wagon Co Ltd led to the eventual sale and closure of the Ashbury works in 1928. The site was cleared and a rail depot constructed in its place. The name and records of the company are now largely forgotten.

In 2012 an opportunity arose to undertake an archaeological excavation at the site of the former Ashbury works. The excavation and post excavation programme followed an earlier phase of research and trial investigation, and was funded by Network Rail as part of the construction of the new 'Manchester Rail Operating Centre' (ROC). Groundworks for the new building's foundations would impact upon buried structural remains, and so an area concentrated upon the furnaces of the works' iron foundry (the south eastern part of the overall carriage and iron works) was selected for detailed investigation.

The single large trench covered an area of 2,380m^2. The fieldwork was carried out by SLR Consulting Ltd, with guidance from the Greater Manchester Archaeological Advisory Service

(Andrew Myers) and site support from Network Rail and principal contractor Morgan Sindall. Alongside the team of professional archaeologists, members of the Manchester Region Industrial Archaeology Society (MRIAS) contributed to the site work and provided input to the interpretation of the many furnace, boiler and flue structures which were uncovered. Great weight was placed on understanding the systems and technologies of iron and steel manufacture at the site, and so detailed advice and analysis was given on site and during the post excavation programme by brick, industrial residue and metal conservation specialists.

While a number of iron production sites have been investigated in the Greater Manchester area in recent years (notably the Bradford Iron Works a short distance to the north of Ashbury's, as well as the Soho Iron Works in Ancoats and River Street Works in Rochdale), the excavation at Ashbury's has produced one of the most complete archaeological records of a late 19th and early 20th century foundry in the North West, and one which serviced a much larger complex of inter-related trades as part of the wider carriage works.

Following the excavations carried out by SLR at the Manchester ROC site, a further portion of the Ashbury's complex was investigated by Oxford Archaeology North. This area included

The Manchester ROC is one of twelve that Network Rail is building as part of its National Operating Strategy. Eventually, almost all signalling will be controlled from these centres, reduced from about 800 diverse locations in use in 2014. In addition, the ROCs will control the distribution of traction power to all electrified rail lines and undertake traffic management of the rail network

part of the travelling crane, engineering and assembly sheds in the north east corner of the plant, as well as the location of former areas of terraced housing at the corner of Pottery Lane and Ashton Old Road.

This part of the works had also been cleared in the 1930s, as seen elsewhere on the site, as part of the establishment of Ardwick East Goods Depot. The foundations of Second World War air raid shelters were found cut into the remains of the Ashbury works structures beneath. The results of this excavation are also considered briefly within this booklet as they provide further context to the operation of the site and its development as a whole.

The discoveries of the fieldwork are presented in this booklet alongside a summary of the history and development of the Ashbury works and its neighbouring engineering works in the eastern townships of Manchester.

MRIAS volunteers at Ashbury's

THE HISTORIC SETTING

Clayton Hall Barn. An engraving dated 1780 which gives an impression of the pre-industrial character of the area. Courtesy Manchester Libraries, Information and Archives, Manchester City Council

Until the 19th century the site of the later Ashbury's Carriage and Iron Works was situated on farmland beyond the limits of urban settlement. Later industrial development crystallised around the Manchester, Sheffield and Lincolnshire Railway, which was constructed in the early 1840s and ran east from the city centre, traversing the townships of Ardwick, Openshaw and Gorton as it did so.

The local topography is relatively level, rising gradually from 40m AOD in Ardwick to 70m AOD in the east of Openshaw, before rising more steeply towards the western flanks of the Pennines beyond Hyde and Stalybridge. Watercourses drain westwards off the Pennines, though no significant natural watercourses pass through the immediate area of these townships. Evidence for prehistoric settlement in this area is slight, in part due to the problems of survival of fragile remains following intense industrial and residential development in the 19th and 20th centuries. The Openshaw area is unlikely to have represented a significant draw for prehistoric occupation; in the later Iron Age it is possible that the locality was an area of cleared agricultural land or managed woodland, with dispersed rural settlement.

While a Roman fort and vicus was established at Castlefield some 3.7km west of Ashbury's from around AD 79, occupation in the rural hinterland to the east of the fort is likely to have continued in the Iron Age pattern of settlement: native forms of roundhouse building have been identified in association with Roman ceramics in the region. A Roman road passed through the area from

the fort in the west, the Hyde Road, around 0.7km south of the site.

Historically the site spanned the township boundary between Openshaw in the north and Ardwick in the south (part of the parish of Manchester, Salford Hundred), and is situated near the convergence of the townships of Openshaw, Ardwick, Bradford and Droylsden. These township boundaries may have had their origin in the Anglo Saxon period: the southern boundary of Gorton township corresponds with the Nico Ditch, a scheduled monument which is considered to be of Anglo Saxon date, though it has not yet been formally dated.

Detail of Johnson's Map of Manchester produced in 1819, with the Ashbury's site shown in red

During the 2012 archaeological investigation of the Ashbury's site the township boundary between Ardwick and Openshaw was investigated with three trial trenches. It was found to have been destroyed at two points, while the third trench revealed that the ditch was filled with industrial debris indicating that, if it had an earlier origin, it was maintained as an open ditch into the 19th century prior to infilling.

The rural characteristics of the site and its surroundings are likely to have persisted through the early medieval and medieval periods. The township of Openshaw was an elongated area stretching for 2 miles along the Ashton Old Road, first referred to as 'Openshawe' in 1276. It was not identified in the Domesday Survey. The lord of Manchester (Robert Grelley) had a park at Openshaw in 1276. At his death in 1282 it was found that there was land under plough (2 oxgangs), which had increased to 4 oxgangs by 1320 alongside 100 acres of moor and turbary (bog or peatland) to which the tenants of Gorton, Openshaw and Ardwick had common rights for grazing and fuel.

Hearth tax returns in 1666 suggest a very small population in the township, with only 20 hearths recorded. Development of the area in the post medieval period was slow, and by the time Johnson's Map of Manchester was produced in 1819 it is clear that the area remained relatively undeveloped. Prominent features at this time comprised the east–west aligned Ashton Old Road, which bisected the length of the township, and the Stockport branch of the Ashton Canal which ran southwards from Droylsden through Openshaw and Gorton, opened in 1796. Nascent industry included lime and bleach works, and colliery sites.

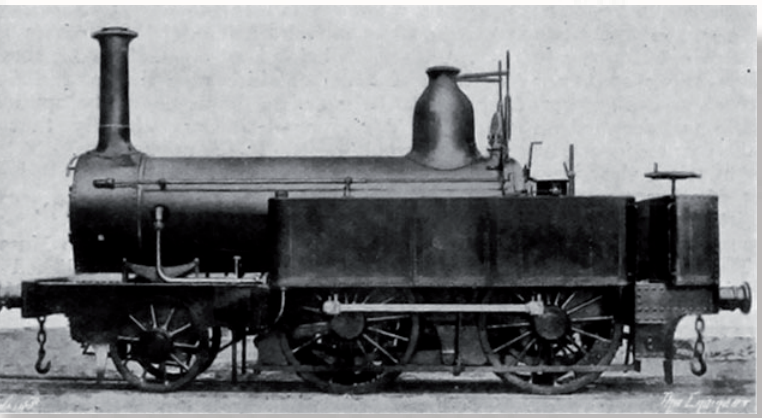
19TH CENTURY INDUSTRIALISATION

The completion of the Ashton Canal at the end of the 18th century and the opening of the Manchester to Saltersbrook Turnpike (the Ashton New Road) acted as a stimulus for growth and industrial development in townships to the north of Openshaw, particularly the expansion of collieries exploiting the coal seams of the Manchester Coalfield. These included the well-known Bradford and Clayton Collieries, and extended to some smaller operations including a small unnamed colliery to the east of Pottery Lane adjacent to the later Ashbury's site. However, unlike Bradford and Droylsden, the coal industry in Openshaw was not well developed and, in the 1841 census, hat manufacture was recorded as the principal form of employment in Openshaw.

Bradford Colliery brick recovered from the Ashbury's site

The first half of the 19th century saw a new era of railway building, commencing in the North East of England in the 1820s, and arriving in Manchester in 1830 with the opening of the Liverpool and Manchester Railway. In 1838 the Sheffield, Ashton-under-Lyne and Manchester Railway Company began building a new line between Manchester and Sheffield. The line was completed in 1845, running along the southern boundary of Openshaw and through the townships of Ardwick and Gorton. The 1848 Ordnance Survey map highlights the increasingly industrialised nature of the area around Ashton Road and Pottery Lane in this period. These industries included Gorton Brook Potteries, Openshaw Dye Works, Openshaw Bleach Works, brick kilns and firebrick works.

The Gorton Carriage Company was established shortly after the opening of the railway by the board of the Sheffield, Ashton-under-Lyne and Manchester Railway Company. The site (known locally as Gorton Tank) was chosen by Richard Peacock, Locomotive Superintendent with the company, situated to the south of the Ashton Old Road approximately 1.2km to the east of the later Ashbury's site. He took advantage of the level topography and the presence of the Ashton Canal to provide enough space for the purpose-built works and a steady water supply. The works were completed in 1848 and initially operated as repair shops for locomotives and rolling stock on what had by 1847, through amalgamation, become the Manchester, Sheffield and Lincolnshire Railway.



Richard Peacock left the Gorton Carriage Company in 1854 and together with Charles Beyer set up a new works opposite his former employers', creating Beyer Peacock and Co at Gorton Foundry, which would become a world famous name in locomotive production.

Bayer Peacock's tank engine, 1861

Census returns towards the end of the 19th century provide a ready indication of the impact that industrialisation had on the local population. In Openshaw the population increased from 11,108 (in 1871) to 23,927 (in 1891). The most common occupations for men in 1881 were in transport and communications, machines and implements, house, furniture and decorations, carriages and harnesses, textile fabrics and mineral substances. Women were chiefly engaged in domestic service, working in textile fabrics or of unknown/unspecified occupation. At the time 169 men and 2 women were employed as railway carriage/wagon makers, whilst 669 men and 4 women were in employment for the manufacture of iron. By contrast hat manufacture, which had been the dominant local industry in 1841, employed no more than 161 men and women combined by 1881.

1848 OS map showing the increasingly industrialised nature of the area

JOHN ASHBURY: THE EARLY YEARS

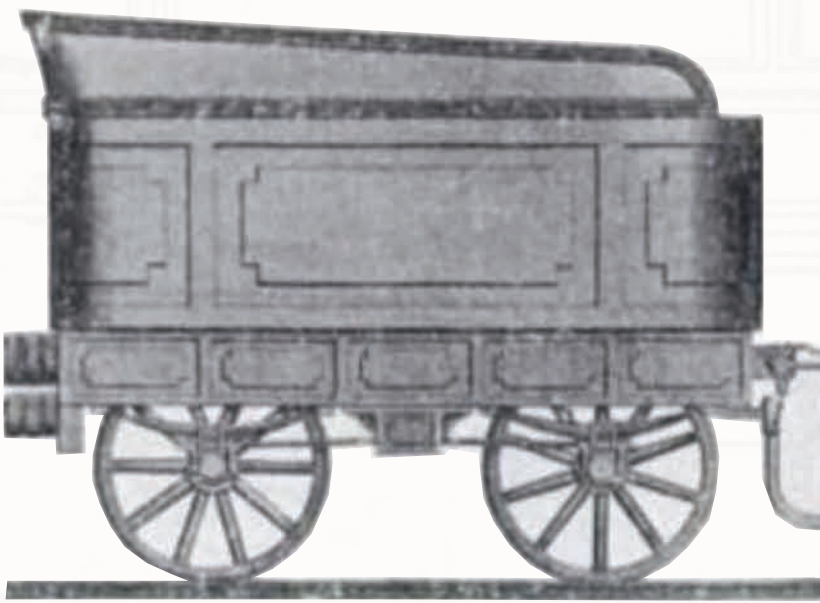
The founder of the Ashbury Carriage and Iron Company, John Ashbury, was born in 1806 to Thomas Ashbury (1765-1810), a storekeeper, and his wife Ann (née Hindley) (1766-1821), a shoe maker, at Pits O'th Moor near Barton upon Irwell in western Manchester. John had two older brothers, James and Thomas, who followed in the family business of shoe making. John's father died when he was 4 and his mother when he was 15, after which he moved to live with his uncle at Winton less than 1km to the north of the family home.

In 1825 at the age of 19 he was bound as an apprentice to a wheelwright in Manchester and developed skills in wood and iron working. In 1831 John was credited with fabricating the wooden wheels for the first locomotive engineered in Manchester by the firm Galloway, Bowman and Glasgow for the Liverpool and Manchester Railway.

John married Frances Lloyd in 1834 and they had a son, James Lloyd Ashbury, that same year. Their daughter, Mary, was born in 1835 but died at the age of 11 in 1846.

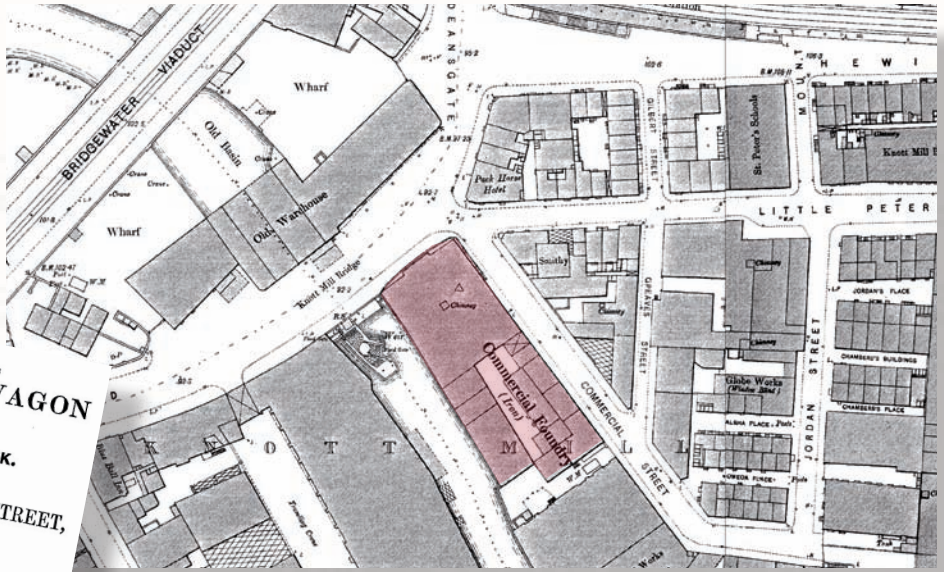
In 1837 at the age of 31 John founded the Ashbury Railway Carriage and Iron Company Limited at Commercial Street, Knott Mill, near to modern-day Deansgate/Castlefield. The works were in close proximity to other major iron production sites on the River Medlock, including the Knott Mill Iron Works which had been opened in 1835 by his contemporaries John and William Galloway for whom he had supplied locomotive components in 1830. His works produced rolling stock for the Liverpool and Manchester, East Lancashire, Manchester and Leeds and other early railway lines. The premises were quickly outgrown however and, following a fire in 1844, he opened a larger site at Oxford Road, Ardwick, trading under the name of the 'Ashbury Carriage Company', though the earlier site remained open.

'We then determined to make a locomotive, the first made in Manchester, which was not the heavy and trim looking piece of mechanism of the present day. [...] The wheels were made of wood, made by John Ashbury himself, a young man just out of his time, who afterwards founded the great waggon works at Openshaw bearing his name – on to these we shrunk iron welded tyres.' John Galloway c. 1890

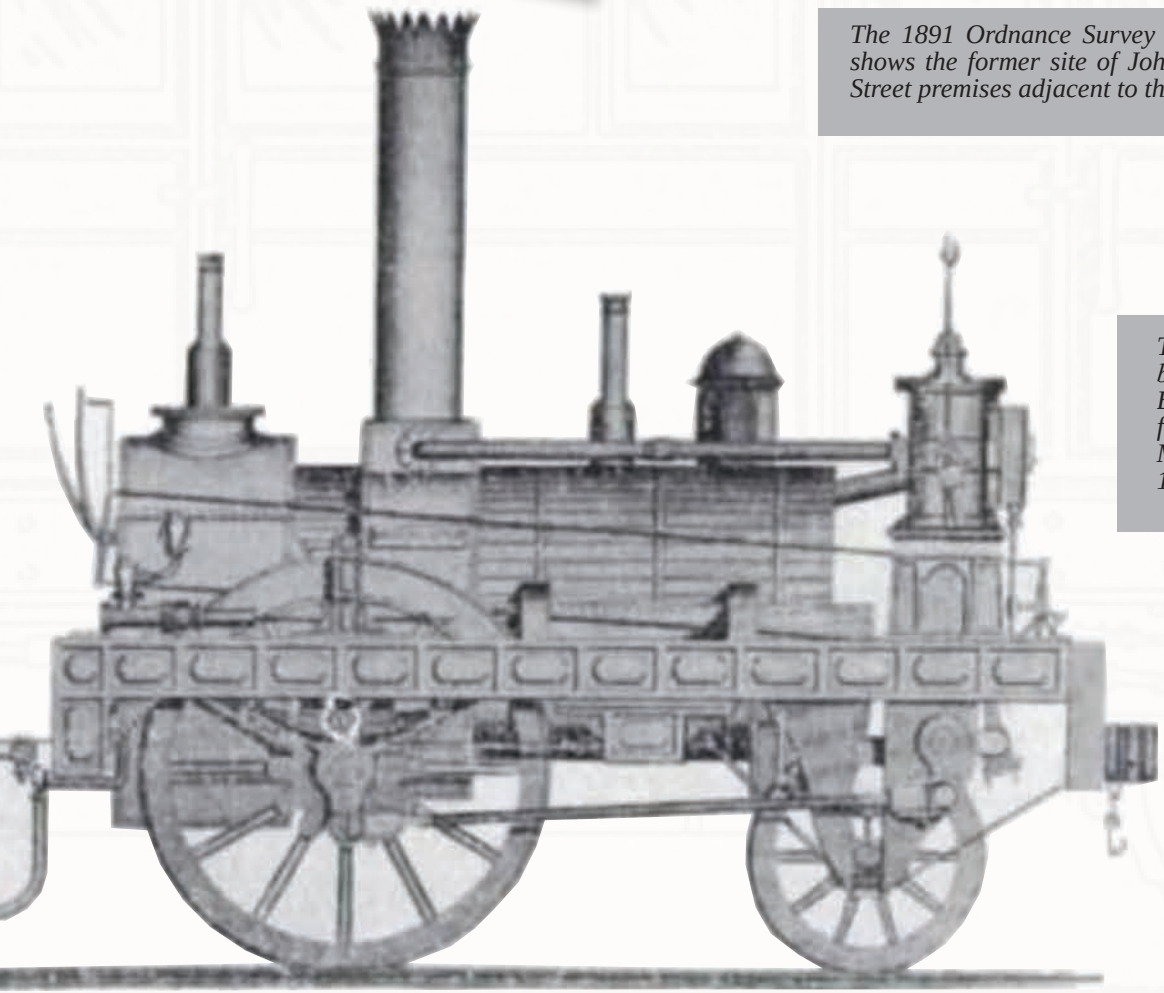


1847 advert includes addresses at Knott Mill, Oxford Street and Great Bridgewater Street


JOHN ASHBURY,
RAILWAY CARRIAGE & WAGON
MANUFACTURER,
AND OF
ALL DESCRIPTIONS OF RAILWAY WORK.
MANUFACTORIES,
OXFORD-STREET, GREAT BRIDGEWATER-STREET,
AND
Commercial-street, Knott Mill,
MANCHESTER.



The 1891 Ordnance Survey town plan (1:500 scale) shows the former site of John Ashbury's Commercial Street premises adjacent to the Knott Mill Iron Works



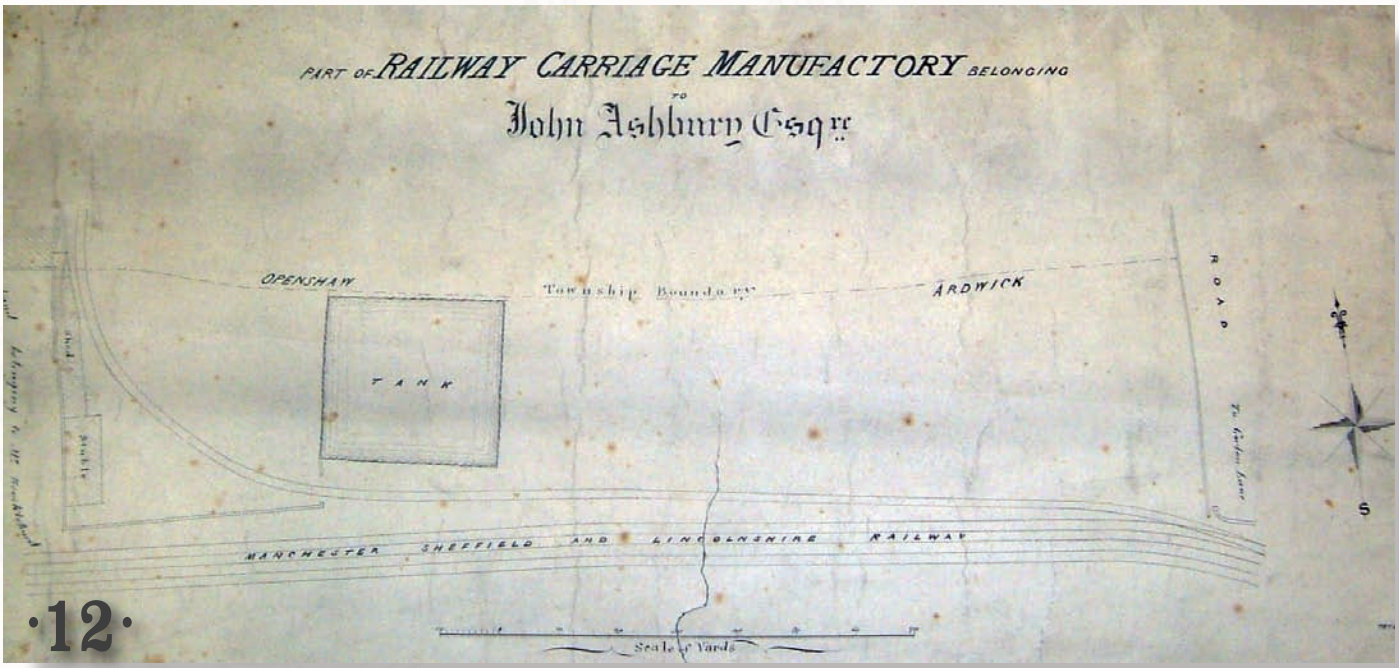
The 'Manchester' was built by the firm Galloway, Bowman and Glasgow for the Liverpool and Manchester Railway in 1831

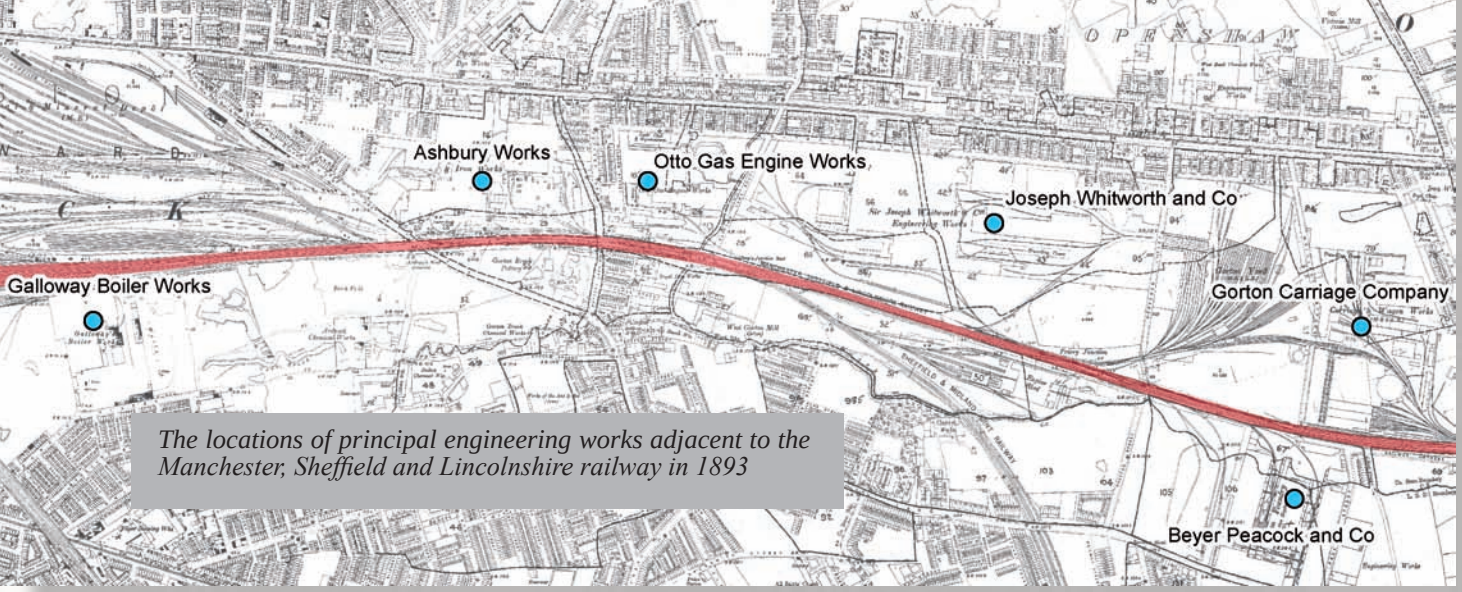
The Ashbury Railway Carriage and Iron Company

In 1847 John Ashbury moved his works to a new site located on the boundary between Openshaw and Ardwick. Ostensibly persuaded to move to the new location by Richard Peacock, the move enabled the business to exploit the newly constructed Manchester, Sheffield and Lincolnshire Railway both for the movement of materials and as a source of trade. It also enabled him to exploit his connections in the industry; the site chosen was adjacent to the boiler works operated by W and J Galloway and sons, supposedly the largest boiler works in the world and a major supplier of boilers, engines and milling equipment for the iron and steel industries, and was located in close proximity to ready sources of coal, firebricks and other component manufacturers. His Oxford Road premises would remain in operation for a further two decades.

The layout of the early plant is unknown. The earliest plan available, dated 1854, illustrates only part of the site south of the Ardwick township boundary. The Manchester, Sheffield and Lincolnshire Railway is shown with a private branch leading into the works through a perimeter wall, and a shed, stables and tank are indicated. This map suggests that the majority of the buildings within the complex were located towards the Ashton Old Road frontage.

By 1860, after only 13 years in operation, a total of 1,700 people were employed at the site.



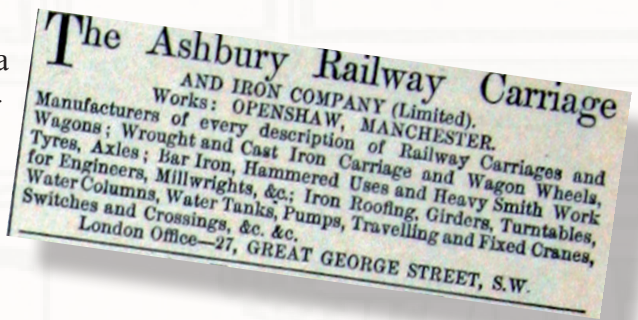


The locations of principal engineering works adjacent to the Manchester, Sheffield and Lincolnshire railway in 1893

After the passing of the Companies Act in 1862, the Ashbury works took limited liability as 'The Ashbury Railway Carriage and Iron Co' on 23rd September 1862. Under the terms of the company's establishment, John Ashbury held one-sixth of the capital, undertook not to sell more than 10% of his holding within 12 months, not to join any other railway carriage maker or iron manufacturer for 20 years, and remained as managing director at an annual salary of £1,500. The other original directors were James Ashbury, Benjamin Whitworth, John Higginbotham, Thomas Vickers, James Hurst, Henry Pochin, James Holden, WA Cunningham and Alfred Peak. In addition the company paid John Ashbury £93,000 for the buildings and plant as well as a further payment for the land.

On September 2nd 1866, at the age of 60, John Ashbury died at his home in Sussex Place, Hyde Park Gardens, London. He was buried at Kensal Green Cemetery. He had been a member of the Institution of Mechanical Engineers from 1848 and his death was reported in their proceedings in 1866.

For a short time John Ashbury had also been a member of the Anthropological Society of London. Letters to the society in 1865-66, shortly before his death, included a letter from John enclosing his subscription, with the embossed letterhead removed. The Anthropological Society tended towards conservatism, sceptical of Darwin's theory of evolution and supportive of the Confederacy in America.


The Ashbury Railway Carriage
AND IRON COMPANY (Limited).
Works: OPENSHAW, MANCHESTER.
Manufacturers of every description of Railway Carriages and Wagons; Wrought and Cast Iron Carriage and Wagon Wheels, Tyres, Axles; Bar Iron, Hammered Uses and Heavy Smith Work for Engineers, Millwrights, &c.; Iron Roofing, Girders, Turntables, Water Columns, Water Tanks, Pumps, Travelling and Fixed Cranes, Switches and Crossings, &c. &c.
London Office—27, GREAT GEORGE STREET, S.W.

Advertisement for the Ashbury Railway Carriage and Iron Company, 5 January 1866, 'Engineering'

Left: The 1854 plan of John Ashbury's works showing the part of the works lying within Ardwick. Courtesy Manchester Libraries, Information and Archives, Manchester City Council

No portraits or photographs of John Ashbury are known to survive. The only likeness recorded is a posthumous marble bust made by the sculptor Edgar George Papworth Jnr, which was exhibited at the 99th Royal Academy of Arts summer exhibition in 1867 (catalogue number 1029). The whereabouts of the bust are not known.

The Ashbury estate totalled £400,000, much of which was derived from the sale of his shares in the company. The company continued under chairman Benjamin Whitworth.

James Lloyd Ashbury inherited the business and fortune on the death of his father, who had also bequeathed money to his nieces and nephews and an annuity of £100 to his brother Thomas.

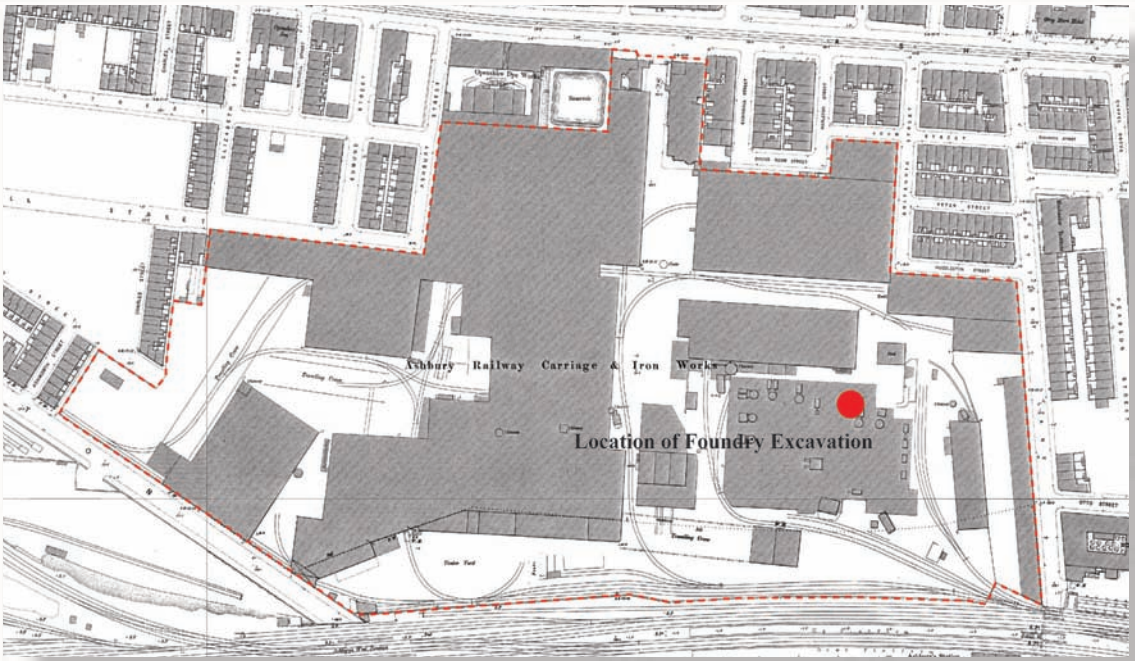
James Lloyd Ashbury © National Portrait Gallery, London

In the years immediately following his father's death and alongside pursuing his political ambitions in Brighton, James Ashbury became an active sailing enthusiast and race competitor. His first yacht *Cambria* was launched in 1868 and won the prestigious Town Cup, Ryde (Isle of Wight) in the same year. James was appointed commodore of the Royal Harwich Yacht Club based at Ipswich in Suffolk in 1870. In July of that year *Cambria* won the Great Ocean Race against the American yacht *Dauntless* owned by Gordon Bennett, owner of the New York Herald. One month later however, *Cambria* failed to win the America's Cup, although after the race Ashbury entertained Ulysses S Grant, President of the United States, on board his yacht.

James Lloyd Ashbury's yacht 'Cambria' © reserved

Left: John Ashbury's memorial at Kensal Green Cemetery, London

James Lloyd Ashbury served as a Conservative Member of Parliament for Brighton between 1874 and 1880. A series of unsuccessful business ventures in the UK and overseas during his lifetime resulted in bankruptcy and he was found dead in his London apartment in 1895, apparently from an overdose.



In 1891 the Ashbury's complex covered 6.7 hectares. Dedicated sidings entered the south east corner of the complex, running past the iron foundry towards the timber yard in the south west of the site and towards the carriage and fabricating workshops to the north

At the end of the 19th century the Ashbury works were described in an article in 'The Railway' magazine (1887) as a 'gigantic undertaking' employing between 1,600 and 1,800 men at any one time.

Contracts included the provision of 6,000 wagons for the construction of the Manchester Ship Canal, and the works had the capacity to produce 100 wagons and 10 railway carriages per week.

The 1891 Ordnance Survey map (above), surveyed at a scale of 1:500, provides the clearest picture of the form the Ashbury works had acquired by the late 19th century.

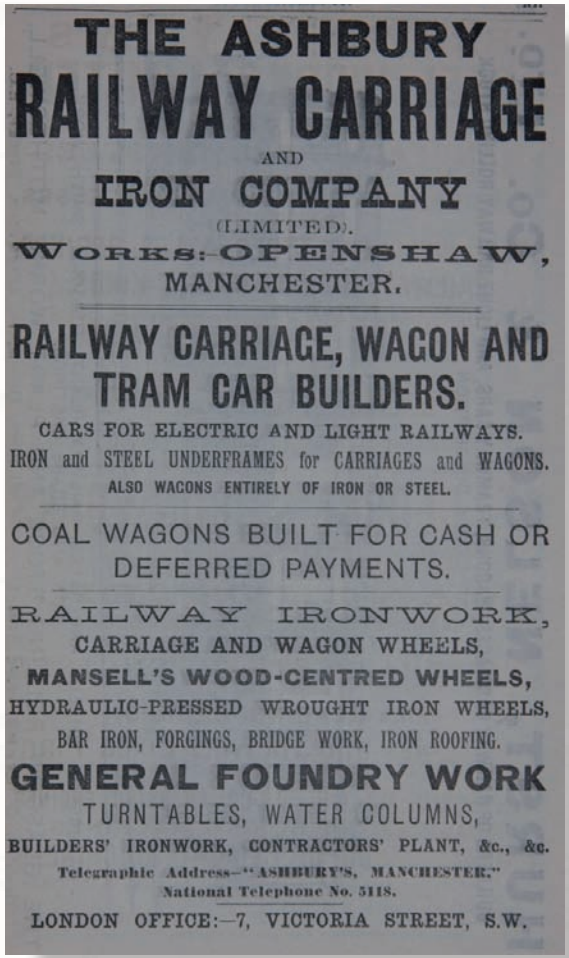
John William Maclure, Chairman of the Ashbury Railway Carriage and Iron Company Ltd in 1897

Unusually, the depiction of the foundry included the location of furnaces and boilers inside the building, in addition to the chimneys and ancillary structures, a feature of the map which was not replicated at any of the surrounding iron works. The works covered a total area of 6.7ha (16.5 acres).

The iron foundry was located in the south east portion of the site, the timber yard to the south, while the vast fabrication workshops covered the western and northern parts of the site. The main entrance was from Ashton Old Road, with offices and canteen located next to the entrance.

These buildings had been designed and built in 1859 by Edward Walters, an eminent architect working in the Palazzo or Cinqecento (Renaissance) style and responsible for the design of Manchester's Free Trade Hall (1853) and Nos 38 and 42 Mosley Street (1862), both now Grade II* listed, amongst many others.

The engagement of Edward Walters as architect of the administrative hub of the Ashbury works may be taken as an indication of the ambitions that John Ashbury had for the company.



Right: Advertisement for the Ashbury Railway Carriage and Iron Company, 1900, 'Bradfords'

The Metropolitan Amalgamated Railway Carriage and Wagon Company Ltd (1902-12)

In 1902 the Ashbury works received an offer concerning merger terms from the Birmingham-based Metropolitan Carriage and Wagon Company. The offer was accepted and in August 1902 the Ashbury works was liquidated, along with premises in Victoria Street, Westminster.

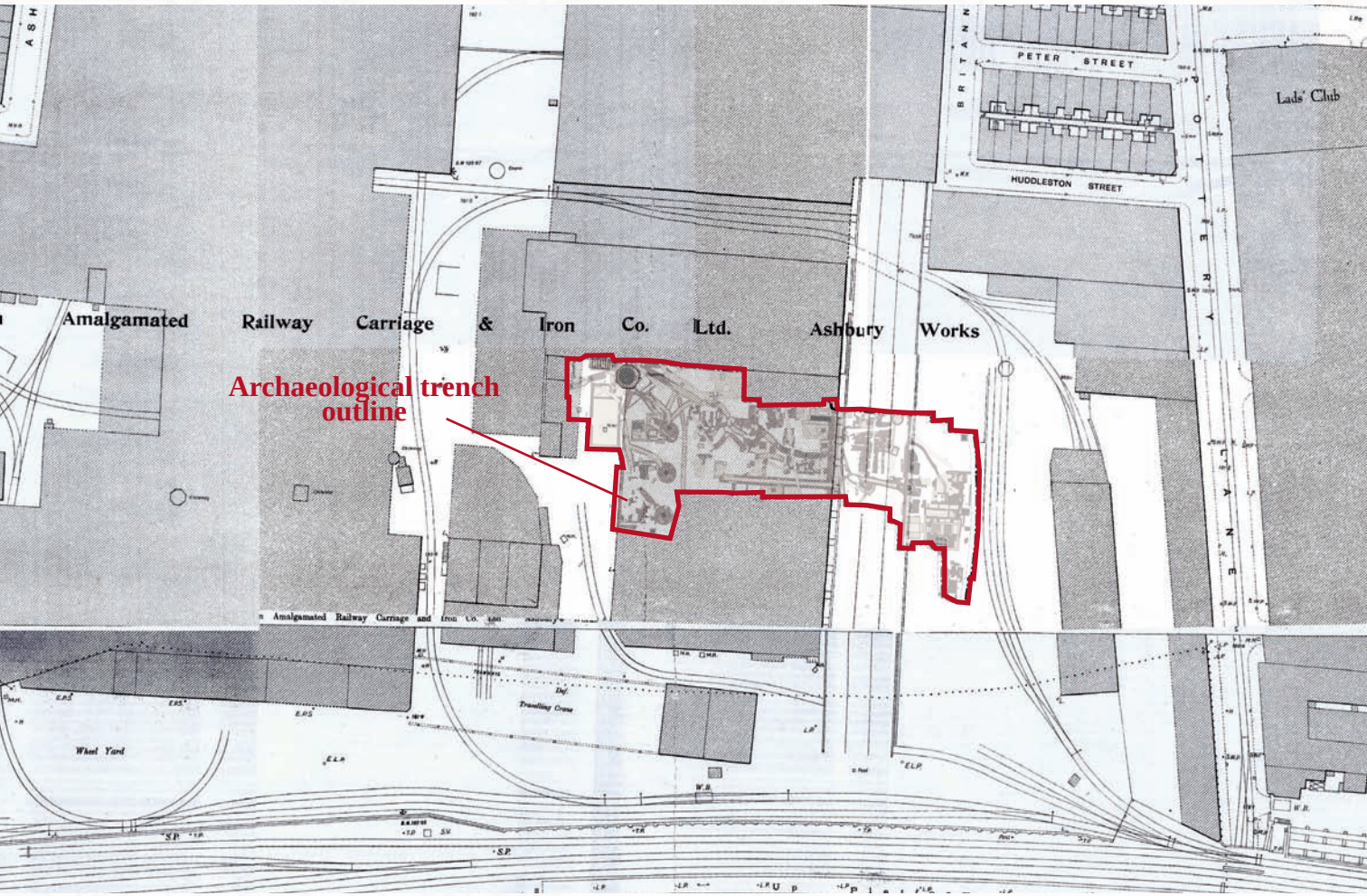
The Ashbury Railway Carriage and Iron Company was acquired by exchange of shares, along with Brown, Marshalls and Company Limited, The Lancaster Railway Carriage and Wagon Company Limited, The Metropolitan Railway Carriage and Wagon Company Limited and The Oldbury Railway Carriage and Wagon Company Limited. 'The Metropolitan Amalgamated Railway Carriage and Wagon Company Limited', valued at £1.5m, was registered on 3rd December 1902, and from 1903 the Ashbury works became a component supplier to the wider group. An article in the Light Railway and Tramway Journal dated April 1902 noted that the purpose of the amalgamation was to economise production, enabling the company to compete more effectively against overseas competition in the face of dwindling domestic contracts after the Boer War. Three board members from each of the amalgamating companies were nominated to form the board of the new company, allowing uninterrupted management.

The new chairman of the company was Frank Dudley Docker, formerly chairman of a small family varnish manufacturing firm, Docker Brothers, based in Birmingham. By contrast the Metropolitan Amalgamated Railway Carriage and Wagon Company Ltd was the ninth largest manufacturing employer in Britain with 13,868 employees in 1907. Docker was talented at finance and public relations but his organisational management of the firm was not well regarded initially. He gained wider recognition amongst his peers for the handling of a strike in 1908 at the Saltley works in Birmingham in which he kept the workforce on-side by telling them that all work had ceased, while diverting contracts which had been destined for Saltley and Wednesbury to the Ashbury works without their knowledge. Docker was also ruthless in his rationalisation of the amalgamated works to cut costs, closing the Lancaster Railway Carriage and Wagon Company and relocating production to Ashbury's in 1908 despite efforts by the Lancaster Corporation to keep the works open. He also threatened to close the Ashbury works in 1908-9 because of repeated prosecutions by the Manchester Corporation for the level of pollution at the plant.

Dudley Docker © reserved

'...the Manchester Corporation's attitude towards us in the matter of smoke nuisance, they having caused us great annoyance by harassing us with expensive prosecutions (which I am more than half inclined to term persecutions), notwithstanding that we are doing everything possible to avoid sullying the pure air of Cottonopolis.' Frank Dudley Docker

The events of the first decade of the 20th century correlate with a major reorganisation of the foundry complex which can be seen in the Ordnance Survey mapping. The 1908 1:500 scale map (surveyed in 1905) shows that the foundry building had been largely rebuilt covering a smaller area approximately half its former size, with a travelling crane running north to south across the eastern part of the old foundry.



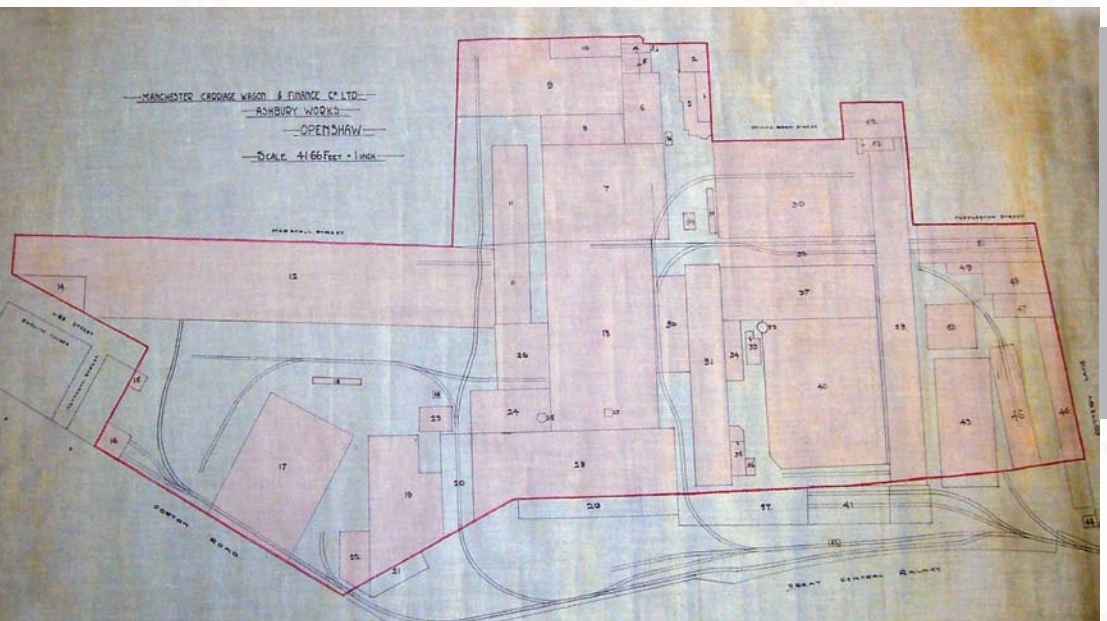
1908 Ordnance Survey map (1:500)

The Metropolitan Carriage, Wagon and Finance Company Limited (1912-28)

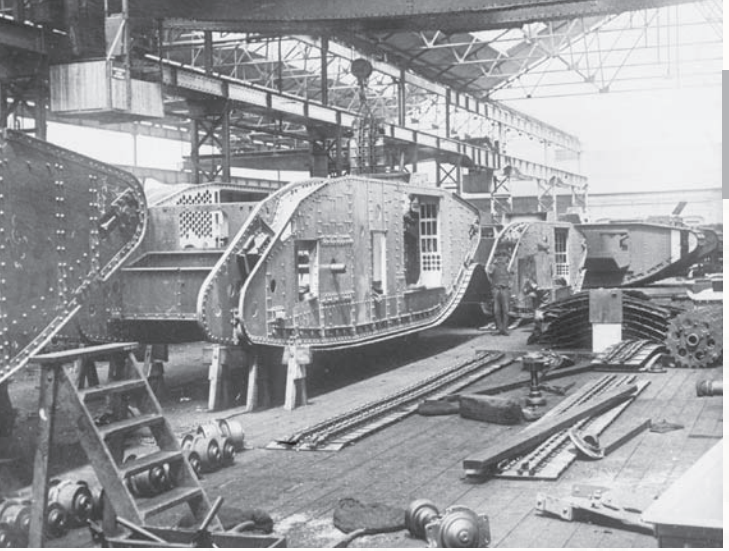
On June 3rd 1907 'The Times' newspaper carried an article describing a proposal by the Metropolitan Amalgamated Railway Carriage and Wagon Company Limited to form an industrial bank applying the co-operative principle to banking, as the directors felt dissatisfied with the banking facilities in England at the time. Chairman Dudley Docker proposed changing the name of the company to 'Metropolitan Carriage, Wagon and Finance Co Ltd', and this change eventually came into effect on 24th June 1912.

An undated plan held by Manchester City Archives shows the Ashbury works after the 1912 name change. This schematic plan indicates the external travelling crane as a single unit ('59') with new structures to the east and some reorganisation of the buildings immediately to the west of the foundry. Unfortunately there is no associated key to identify the functions of individual structures; however, unit 43 situated at the eastern limit of the 2012 excavation area corresponds with the location of an open hearth steel furnace which was uncovered by the excavation, indicating a shift in production technology at the site in this period.

It is possible that these alterations were associated with the production of materials for the war effort during the 1914-18 conflict. Ministry of Munitions files indicate that the company was selected to build some of the earliest prototype tanks ('landships'). In March 1915 a total of 12 'Pedrails' and 6 'Bigwheel' Landships were built by the Metropolitan Carriage, Wagon and Finance Company Ltd before contracts for manufacture were transferred to a separate company, William Foster of Lincoln. In 1916 the carriage works took on new contracts for tank manufacture, supplied with armour plate by Vickers and Cammell Laird. The contracts were administered from the Wednesbury works in Birmingham, though components for the tanks may have been supplied by ancillary sites such as Ashbury's.



Undated plan of the Metropolitan Carriage, Wagon and Finance Co Ltd Ashbury Works. Sadly although the individual buildings are labelled, the legend has been separated from the map and is now lost. Courtesy Manchester Libraries, Information and Archives, Manchester City Council



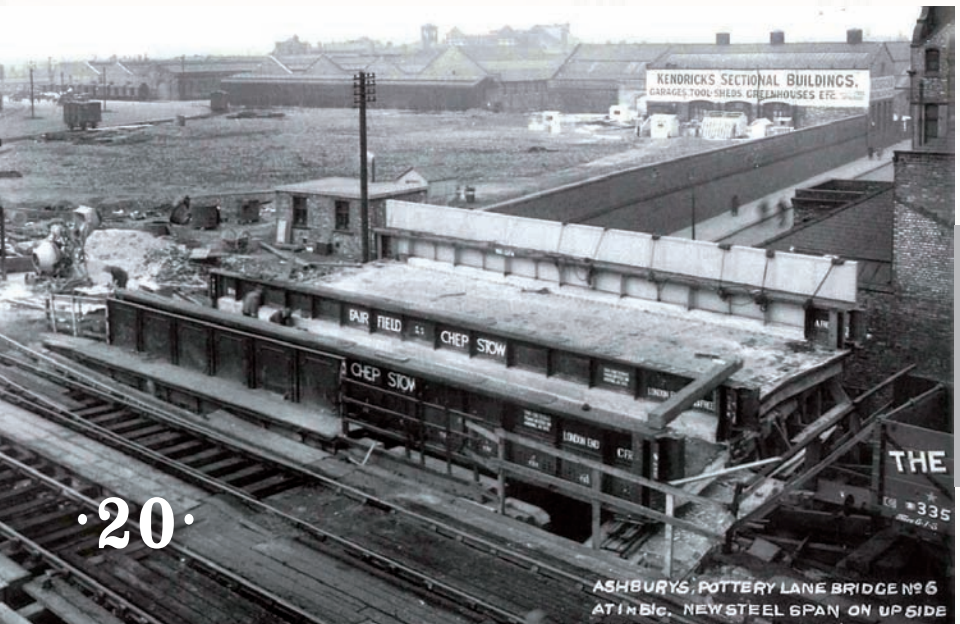
Mark V One Star tanks in the process of manufacture at the company's Saltley Works, Birmingham. © Imperial War Museum

Closure and Site Clearance (1928)

Vickers Limited acquired the shares for the Metropolitan Carriage, Wagon and Finance Co Ltd in 1919, and the group rationalised and closed the works at Openshaw completely in 1928 after 81 years of operation. Rolling stock production was transferred to Saltley in Birmingham and in 1929 Vickers Ltd and Cammell Laird & Co Ltd merged to form Metropolitan-Cammell Carriage and Wagon Co Ltd.

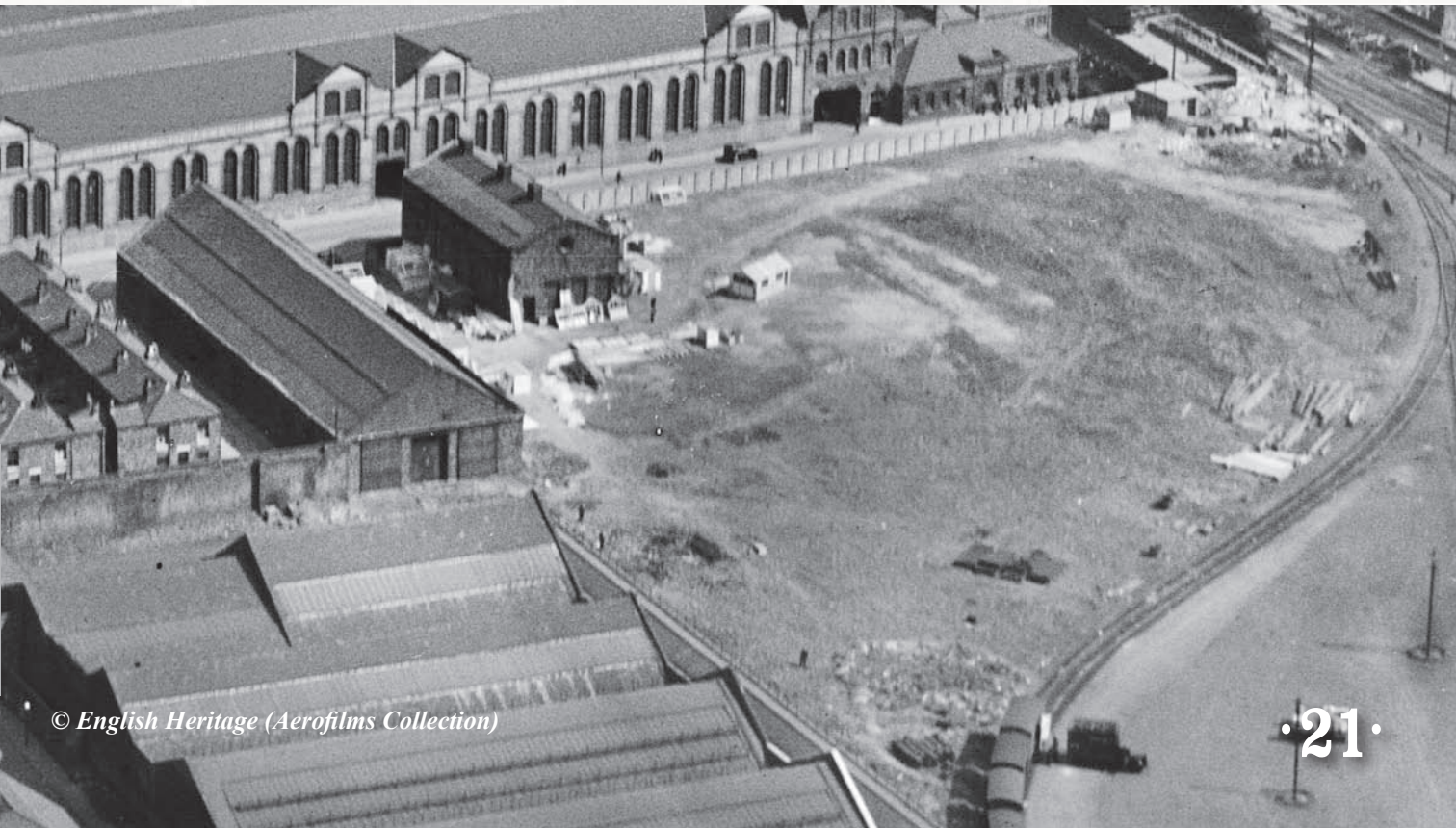
The site was sold to the London North Eastern Railway Company and the majority of the works buildings were demolished in the early 1930s, after which it operated as the 'Ardwick East Goods Depot', a road transport distribution centre from the railway.

The gradual erosion of the Ashbury name through integration with the Metropolitan Amalgamated works and subsequent closure of the site has meant that, with the exception of the railway station which still bears its name, it has become largely forgotten as a local enterprise and is less well known than some of the surrounding locomotive engineering sites. However, heritage railways and railway societies still operate some of the carriages produced at Ashbury's, notably the Bluebell Railway in Sussex and the Ffestiniog and Welsh Highlands Railway. The Vintage Carriages Trust maintains a database known as the Railway Heritage Register On-line which records all known surviving historic carriages, wagons, trams, turntables and tenders, as well as horse-drawn vehicles. Under the Ashbury manufacture there are 36 known carriages, 6 wagons and 1 tram in various states of repair in the UK.



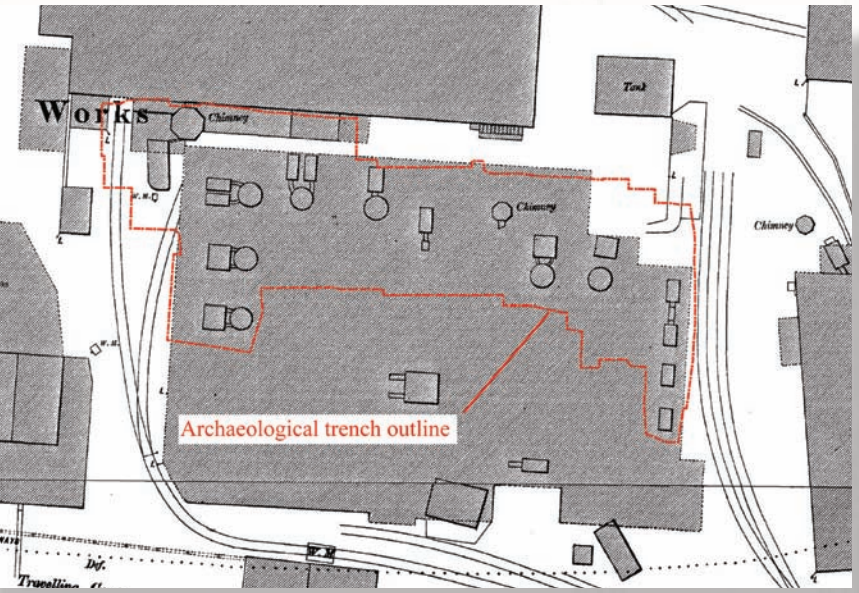
Left and right: Photographs from the 1930s indicate the scale and totality of the site clearance operation. This aerial view (right) of the site in 1836 looks east across the location of the old foundry; the Otto Gas Engine Works front onto Pottery Lane at the top of the picture

The original Ashbury's office buildings and site entrance on Ashton Old Road, designed by Edward Walters in 1859, were retained for the Ardwick East Goods Depot. Courtesy Manchester Libraries, Information and Archives, Manchester City Council



EXCAVATION OF THE FOUNDRY

In 2012 an archaeological excavation was carried out which centred on the iron foundry in the south east corner of the former Ashbury works. The area of the investigation was determined by the zone of impact that the construction of a new Rail Operating Centre would have on buried remains, but was also laid out to target all of the furnaces depicted on the 1891 1:500 scale Ordnance Survey map shown below.



The Changing Technology of Iron and Steel Production

The investigation uncovered the full sequence of iron and steel production technologies employed during the site's 81 year history, including features predating the 1891 mapping, evidence for reconstruction of the works in the 1900s following amalgamation, and the adoption of steel production in the 1910s. Industrial residue sampling also provided evidence for less 'visible' technologies on the site.

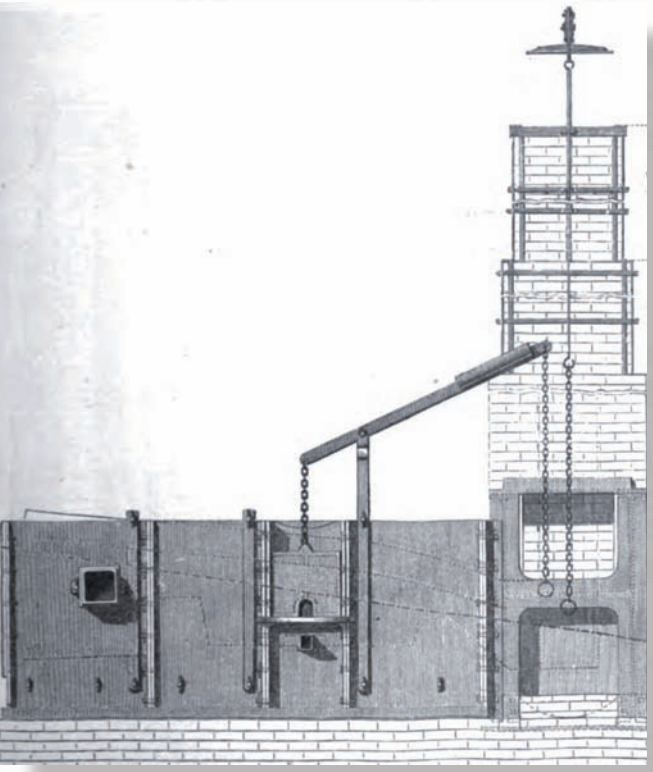
Apart from the available Ordnance Survey mapping and a plan of the works during its period operating as the Metropolitan Carriage, Wagon and Finance Company Ltd after 1912, little further documentary information is available regarding the appearance of the works. In the course of extensive archive research no detailed photographs of the site or descriptive plans have been unearthed. An 1897 'Railway Magazine' article provides a rare account of the operating foundry:

'...the foundry occupies a spacious building in three bays, each of which is fitted with a powerful overhead travelling crane. Three cupolas [furnaces] are employed, and the average weekly consumption of pig iron alone is 100 tons. There is also a brass foundry with 5 furnaces. The forge is equal to an output of 300 tons per week. A considerable proportion of this quantity is used on the premises, the outside market taking the remainder. There are upwards of 20 puddling furnaces and 20 boilers in the department, most of the latter being vertical, and heated with the waste gases from the puddling furnaces. There are two rolling mills - one for rolling large sizes and the other for small sizes. In addition to the necessary appointments for the due manipulation of the work there is noticed an immense saw for cutting hot iron. Several steam hammers of varying types weighing from 3 to 5 tons are in the building, and the whole of the plant is driven by two powerful engines'

One of the earliest furnaces on site, the flue end of this reverberatory furnace at the top of this picture was connected to a dedicated chimney. An iron rail for the support of the outer plating of the furnace is visible along the right-hand side

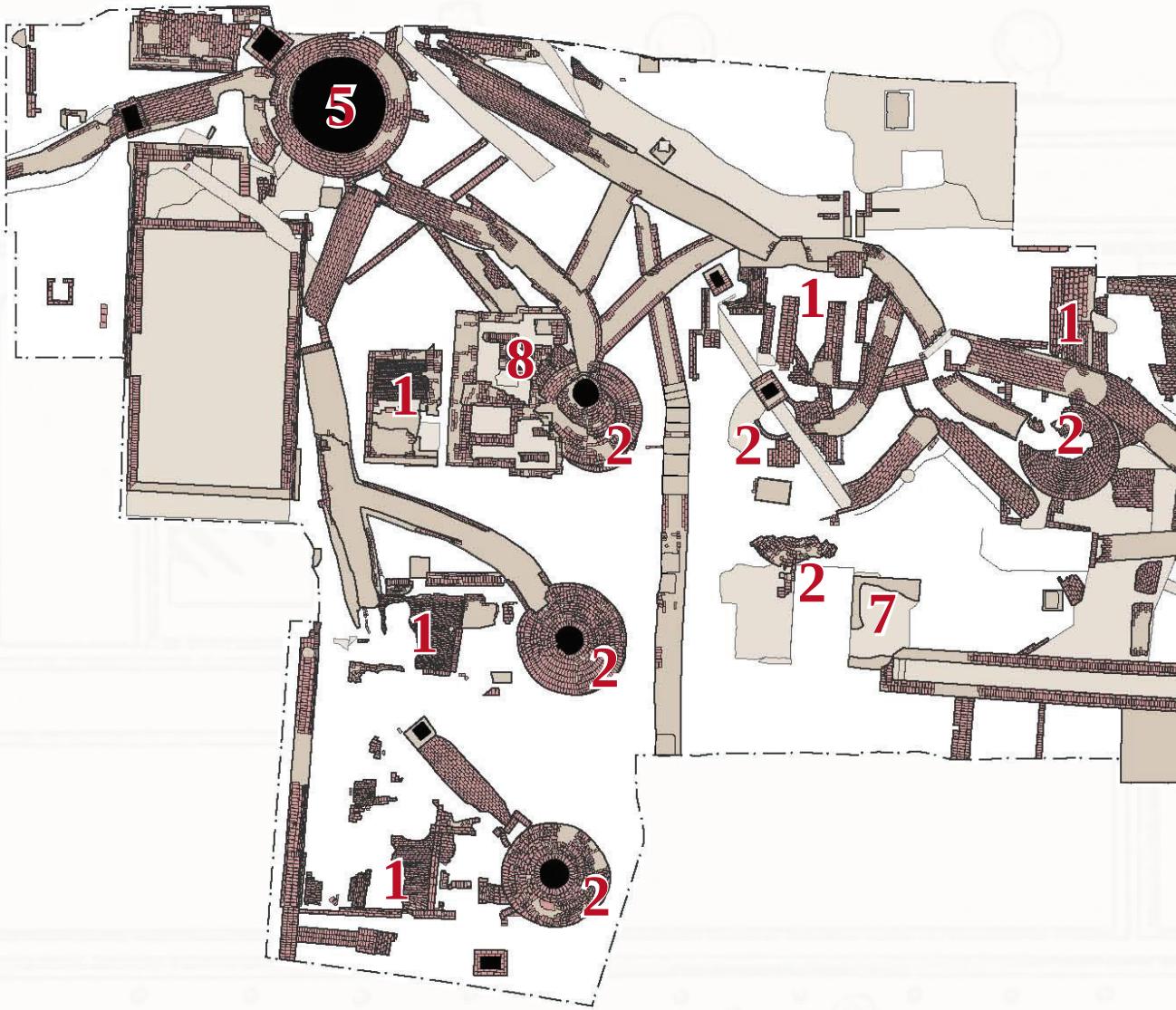
Puddling

The core product of the Ashbury works foundry in the second half of the 19th century was wrought iron, produced in the site's many puddling and reheating furnaces. The puddling process was refined by Henry Cort in the 1780s, and involved the heating of scrap and pig iron in a reverberatory furnace until a pliable ball of molten iron was produced, which was then purified by a dual process of hammering (also known as shingling), rolling into bars and repeatedly reheating.



The furnace charge was worked by a puddler using a rake-like instrument known as a rabble through openings in the side of the furnace until molten. The spongy ball of molten iron was removed from the furnace and transferred across the race - the open space between the furnace and the hammer/rolling area - to the hammer. The shingler would hammer the ball of iron into a rectangular bloom, removing some of the incorporated slag, then roll into bar form through a rolling mill to a successively thinner cross section. This served to remove more slag from the iron than could be achieved through shingling alone.

Reverberatory furnaces were not permanent structures and were built in such a way that they could be easily dismantled for maintenance. They were usually repaired once a week and completely rebuilt approximately every 6 months. The internal structure of the furnace was constructed from firebrick set onto a permanent foundation. The firebrick structure would include the firegrate, support for the hearth and the sides/roof of the furnace with an internal iron frame. The exterior of the furnace was clad in plate iron, and included the door for charging the hearth (a lever or chain lift was often employed to allow opening of the furnace door), and apertures for working the iron and tapping slag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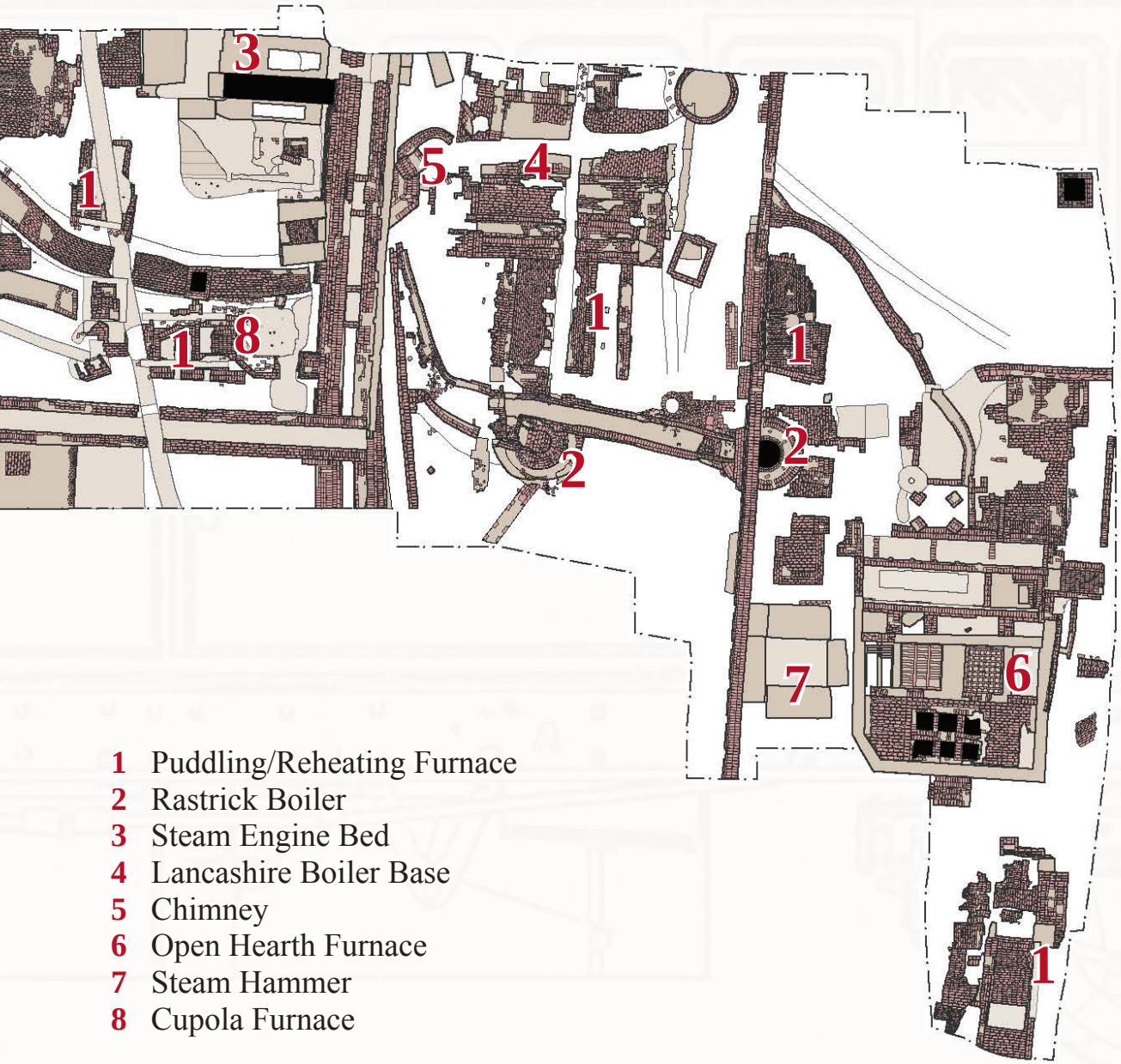
Excavation Plan Of The Iron Foundry At Ashbury's



1 Puddling/Reheating Furnace
2 Rastrick Boiler
3 Steam Engine Bed
4 Lancashire Boiler Base
5 Chimney
6 Open Hearth Furnace
7 Steam Hammer
8 Cupola Furnace

The bar iron was then cut into short lengths with shears, stacked into piles and heated again to white heat in a reheating (or 'balling') furnace to fuse the plates together prior to secondary rolling into merchant bars. Depending on the quality of the wrought iron desired, this process could be repeated many times over giving a successively finer product composed of many layers, and giving the characteristic laminar or 'wood-grained' appearance of the finished product. Alternating the orientation of bar iron within the piles, or incorporating iron from different sources within the piles, could produce wrought iron for different specialist uses, notably alternating the orientation of bar iron for boiler plate and differing grades of iron within the piles for the production of rails. In total the foundations of ten reverberatory furnaces were uncovered during the excavation, some in more complete condition than others. These may have operated as puddling or reheating furnaces. However, the absence of the furnace superstructures meant further interpretation was not possible.

The foundry was laid out to accommodate the puddling furnaces. The sides of the building were open to allow air to freely pass through, and the furnaces were arranged around the northern, western and eastern sides close to the open air. Some of the earliest puddling furnaces stood alone or in pairs, venting directly to in-built chimneys.

In plan the reverberatory furnaces were rectilinear, with a characteristic interior 'bottle neck' at the flue end, visible in the foundation plans, through which the waste gases would pass. Plans of puddling furnaces in use at Bromford Iron Works in South Staffordshire in the 1860s suggest that approximate dimensions for the body of the furnace would be 12ft in length x 6ft wide x 5 ft high (i.e. 3.65m x 1.83m x 1.53m). The standalone examples excavated at the Ashbury works were around 3.5m long and 2.3m wide. The foundation of the furnace shown left had been altered at a later date to house a cupola furnace

The later reverberatory furnaces were connected in pairs to vertical 'Rastrick' boilers for the recovery of heat from the exhaust gases. The foundations of eight vertical boilers were identified in the 2012 excavation. The steam generated by these boilers could be reused within the plant for other processes, chiefly driving steam hammers and engines. The spent gases passed through vents in the base of each boiler into an underground flue system, the draught being provided by one of two chimneys. Analysis of the flues confirmed that the system was repeatedly altered, with gases being diverted from one chimney to another as need determined.

At the Blists Hill iron foundry, Ironbridge, an operating Rastrick boiler is connected to two pairs of puddling furnaces. The steam generated is used to power an engine which drives the rolling mills and a steam hammer nearby

Heat recovery boilers constructed from iron boiler plate had a very poor safety record, and many industrial accidents occurred throughout the 19th century with frequent loss of life. At the Millfield works, Wolverhampton, 5 workers were killed in 1857, 27 killed in a single boiler explosion in 1862 and 3 workmen killed in 1884. At the Atlas Forge in Bolton one person was killed in a Rastrick boiler explosion in 1873, followed by 6 people in a further explosion in 1874. These explosions were notorious for causing wide-scale destruction of surrounding foundry buildings as well as the boiler and furnace structures themselves. The critical weakness of the boilers was attributed to the highly variable temperature of gases circulating around them during short furnace firing sessions, the corrosively acidic nature of the exhaust gases, and localised extreme heating of the boiler plate caused by steam bubbles adhering to the inside of the boiler shell. From the 1880s onwards vertical boilers were constructed from steel, with the result that no further accidents are known to have occurred

Rolling and Shingling

Steam hammers were a key development of the mid-19th century in the evolution of wrought iron production. They enabled the shingling of larger balls of iron for larger forgings, and could cope with the output of a greater number of furnaces than had been possible using the earlier forge tilt-hammers which used gravity as the driving force.

The direct acting steam hammer was originally proposed by James Watt in 1784, and was developed further by Nasmyth in 1842. 'Double acting' steam hammers used high pressure steam to lift the hammer head above the anvil and then drive it down again with greater force than could be achieved under gravity alone.

Two steam hammer foundations were excavated at the Ashbury's site. In both cases the only remaining features were the stone blocks enclosing the anvil foundation.

Circumstantial evidence was also seen during the excavation for the foundry's rolling mills. An engine bed and a Lancashire boiler along the northern side of the foundry are likely to have provided the driving mechanism for rolling mills located within the plant to the south. These appear to have been replaced by another system in the later 19th century, because the orientation of the drive shaft from the steam engine was blocked by puddling furnaces shown on the 1891 OS map.

The steam hammer's anvil foundation comprised a large rectilinear pit, with a timber pad set in the base on which the anvil was mounted. The pit was then backfilled with beaten cinders. The frame of the overlying hammer was mounted on an iron sole-plate at ground level, through which the anvil passed with a surrounding clear space of around 10mm to prevent contact between the sole-plate and anvil during striking

Cupola Furnaces

The description of the site in 1897 indicates that three cupola furnaces were in operation. The cupola furnace was patented in 1793 by William Wilkinson. It provided a means of casting

The engine bed comprised stone mountings for the engine and gearing mechanism, with a pit for the flywheel. The horizontal boiler foundations to the south east were brick built and had been heavily truncated, though remnants of a short curved flue connecting the boiler to an adjacent octagonal chimney survived below ground

larger objects than had been possible in the past using blast or air furnaces, and met the growing demand for large castings from the shipping and engineering industries. This included structural components of bridges, which were a key product of the Ashbury works.

The excavation produced ephemeral evidence for these structures. However, it is not certain whether the examples identified were the same as the features described in 1897. In all three cases the identified cupolas had been constructed on top of puddling furnaces which had been operating in the 1890s. The only traces of their presence were pools of cupola tap-slag which had accumulated in and around retaining brick structures, and the bases of iron legs which would have supported the cupola structures above ground. It is likely that these structures relate to the rebuilt foundry in the early 1900s after transition to the Metropolitan Amalgamated Railway Carriage and Wagon Company Limited.

Thick deposits of splashed slag were found overlying a number of earlier brick foundations. The slag consisted of graphite grey, relatively dense metalliferous slag with flow patterns on the upper surface and small fragments of coke trapped within. This slag is typical of the output from a cupola furnace

A typical cupola furnace comprised a cylindrical plate-iron flue with a temporary lining of refractory bricks. The furnace was mounted at a low height of around 1m above the ground on cast iron supporting legs, and was charged from a scaffold near the top of the flue with coke, pig and scrap iron, and sometimes limestone flux. Similar in operation to a blast furnace, though not operated continuously, the furnace was blown through air vents ('tuyeres') near the base of the column by a steam or water driven blowing engine. Molten iron was tapped from a hole near the base of the cupola into ladles to be poured into casting boxes

Open Hearth Steel

At the eastern end of the excavation area were the structural remains of a large, basement-built Siemens open hearth gas regenerative furnace. The furnace replaced a range of puddling furnaces which had been present within the late 19th century foundry building, and can be correlated with structure 43 of a plan produced for the Metropolitan Carriage, Wagon and Finance Co Ltd after 1912.

The open hearth furnace was patented by Frederick Siemens in 1856. The principle involved passing spent combustion gases from a furnace through a chamber containing checkerwork firebrick (the 'regenerator') to recover and store heat, and subsequently reversing the gas flow to preheat the gases before entering the furnace and post-heating a second chamber. Repeatedly switching the direction of air flow enabled the furnace to be operated at high, stable temperatures of 1500-1800°C, and resulted in a huge saving in fuel consumption compared with less economical earlier techniques.

Gas regenerators were typically constructed as a single row of four low, vaulted chambers built from refractory brick, though the precise arrangement varied according to preference at individual steel works. Generally the chambers were constructed to one side of the overlying hearth to limit any potential damage in the event of a metal break-out from the hearth, and to facilitate cleaning of the chambers, but they were always at a lower level than the hearth so that the heated gas and air rose naturally. The velocity of gas flow through the system and removal of spent gas was determined by the draught from a chimney, the rate of flow also being regulated by a damper

The use of coke as a fuel was found to choke the checkerwork in the regenerator chambers with ash from the flue gas. The solution was to fire the furnace with relatively clean coal gas from a separate gas producer. Two chambers were provided at each end of the furnace system, one for preheating the gas and one for preheating air. The gas producer was not identified in the 2012 excavation area; however, a gas holder and pipeline possibly serving the open hearth furnaces were seen on the adjacent site to the north in 2014.

After their initial development, gas regenerative furnaces were used for the melting of crucible steel and in the manufacture of glass, though the principle was also adapted for heat recovery from puddling furnaces. In 1864 the technique was coupled with the Martin process of malleable steel production (melting wrought and cast iron in a molten bath of pig iron) resulting in a cheap and efficient method for rapidly manufacturing large quantities of malleable steel. The technique was widely adopted in the UK. In 1890, 44% of Britain's steel was manufactured using the open hearth processes. By 1900 this had increased to 65%.

The interior of each regenerator chamber was stacked with a latticework of refractory bricks to act as a heat exchange mechanism, and the arched openings of the chambers were sealed from the outside. The regenerator required an adjacent working area to allow cleaning and re-stacking of the chambers at periodic intervals. At Ashbury's, stacks of unused bricks were found in the basement area ready to be assembled in the regenerator chambers. The refractory bricks used in the chambers and flues were all from a single supplier - Harris & Pearson, Stourbridge

Flues beneath the chambers led to a switch mechanism in which a reversing valve altered the direction of hot air/gas and waste gas flow between the inlet and outlets of the furnace. At any one time, air from an inlet vent and coal gas from a gas producer were drawn into the first pair of chambers and heated prior to rising through flues in the chamber ceilings and combusting in the furnace above. Spent gases were drawn down from the opposite end of the furnace into the second pair of chambers, heating the latticework bricks before being drawn off to the chimney. The direction of air and gas flow was alternated every 15 to 20 minutes during firing

The overlying hearth was dish-shaped, with an inturned refractory brick roof which operated in a similar manner to a reverberatory furnace. The gas/air inlets were also directed to project heat directly onto the furnace charge. The backfill of the demolished furnace contained a single massive bowl of steel slag (above left) from the final firing of a hearth which had sections of the hearth's brick lining adhered to it

Analysis of the slag indicated that the last firing of the furnace had used the acid-type method of steel production. However, a steel sampling ladle (above right) also recovered from the demolished remains contained slag indicative of basic-type production, suggesting that both methods had been in use at the site

The later chimney was located in the north west corner of the foundry. Flues connected to the chimney below ground level, drawing gases and air through the system from the connected boilers and furnaces

Chimney Foundations

The foundations of two chimneys were identified at Ashbury's. The earliest was an octagonal brick structure located in the northern half of the foundry adjacent to an early Lancashire boiler bed. It is possible that when first constructed this chimney served the boiler alone, the surrounding puddling furnaces initially having their own connected chimneys. However, the later development of furnaces with attached boilers meant that it was necessary to connect underground flues to the chimney, and while a number were connected into the octagonal chimney this appears to have also necessitated the need for an additional large chimney in the north west corner of the foundry building. This later structure had a circular foundation with flue openings controlled by iron 'sluices' or dampers to vary the draught through the flue system.

Alterations to the underground flues indicate that the furnaces were connected to both chimneys at various stages, which permitted continued operation of all furnaces during periods of maintenance or repair of each chimney.

Travelling Crane

After the Ashbury works merged to form the Metropolitan Amalgamated Railway Carriage and Wagon Company Limited in 1902, the foundry building was redesigned, and a travelling crane was built across the former eastern extent of the building.

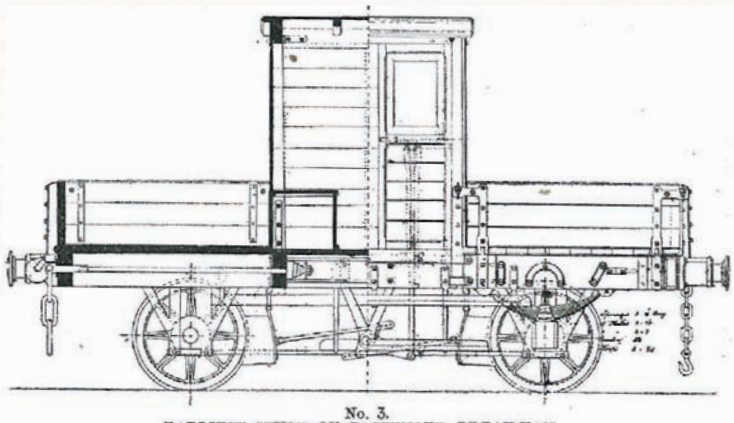
The sides of the travelling crane were defined by two low parapet walls, between which was a layer of clinker bedding material which supported four parallel rows of timber sleepers interspersed with large rubble-filled soakaways. Each sleeper contained the mounting holes for a rail shoe, indicating that the crane gantry moved on rails. The crane bed extended north and south beyond the excavated area, covering a distance of around 160m and serving all structures on the eastern side of the works.

The walls and clinker bedding material for the travelling crane overlay the demolished remains of flues, furnaces, chimney and boilers which had formerly been located within the foundry

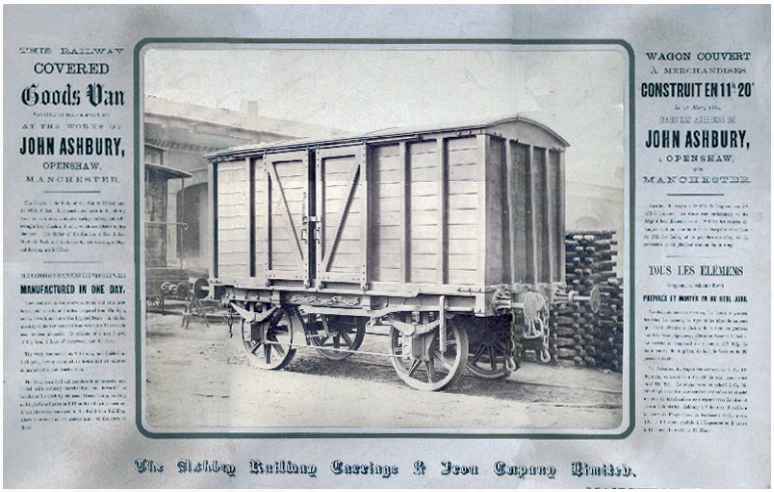
PRODUCTS OF THE ASHBURY WORKS

From the outset the Ashbury works operated on such a scale that large contracts could be easily accommodated and rapidly turned around. The factory departments included workshops for treating and storing timber, a saw mill, carpentry shops, upholsterers, painters and varnishers, alongside the heavier industrial works such as the iron and brass foundries, smithy, assembly workshops and bridge yard.

The speed of Ashbury's goods wagon production was advertised in an exercise in 1862, in which a four-wheel timber-framed railway wagon was constructed from raw materials within 11 hours. This included the preparation of 500 individual (teak) wooden components, as well as 3.5 tons of wrought iron parts forming tyres, wheels, axles and 342 nuts and bolts. The wagon was subsequently used in advertisements for the company and was shown at the London Industrial Exhibition in 1862. In 1863, 34 bogie coaches were built for the Metropolitan Railway in just seven weeks after the Great Western Railway had given the Metropolitan notice that it would withdraw its broad-gauge trains then working the lines. The works also took on a contract to supply 6,000 wagons and other engineering forgings for the construction of the Manchester Ship Canal between 1887 and 1894.

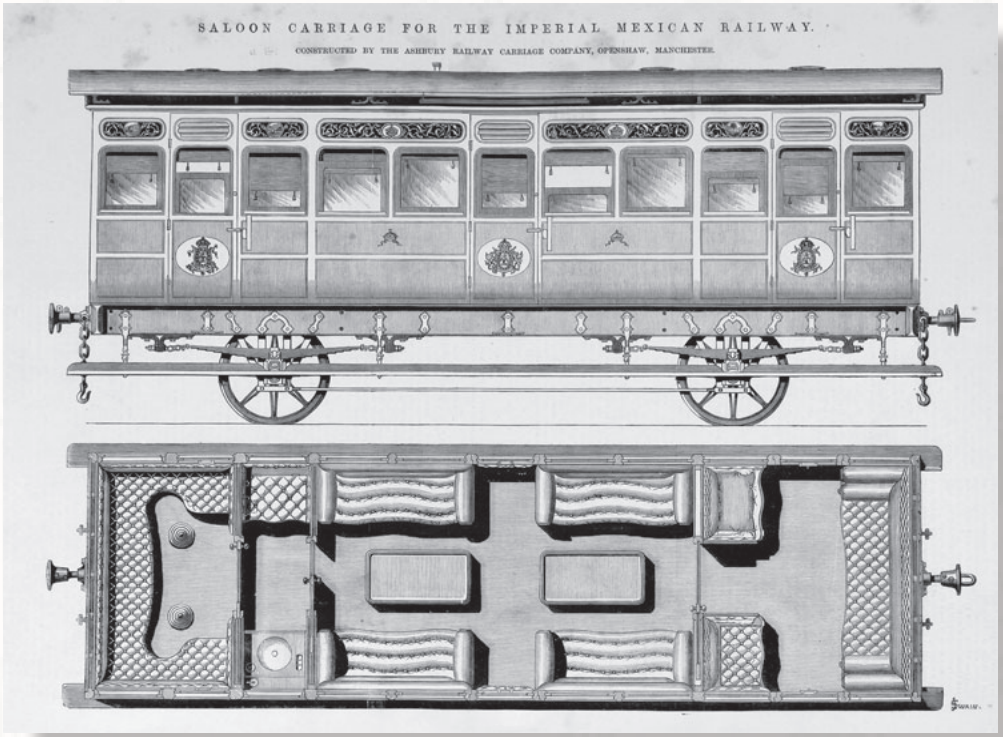


No. 3.
EARLIEST STYLE OF PASSENGER BREAK-VAN
Built by Ashbury's in 1848



Goods wagon produced at Ashbury's in 24 hours, 1862

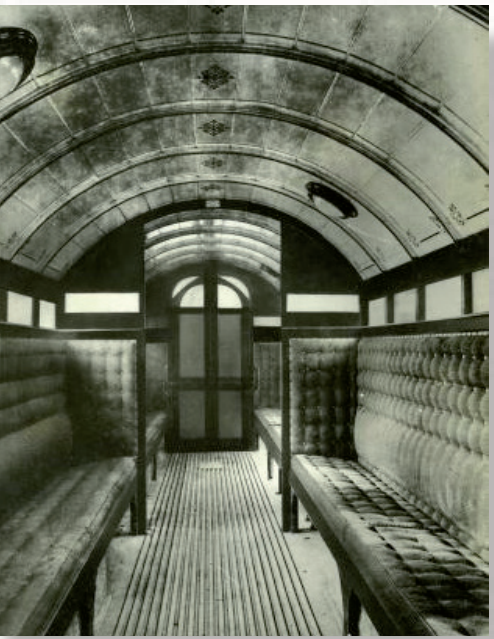
At the time of John Ashbury's death in 1866, trade advertisements give an idea of the diversity of the works' output, with the production of railway turntables, water tanks, fixed and travelling cranes, bridge components and bar iron as well as a range of off-the-shelf and built-to-order rolling stock and trams. Known cast iron bridges in the North West that were made at Ashbury's include those over the rivers Lune, Ribble, Irwell and Troutbeck. The production of iron roofing materials for fireproof mill



A saloon carriage built for the Imperial Mexican Railway in 1867

construction, as well as offering bespoke forgings of milling equipment, allowed the Ashbury works to benefit from its proximity to the region's textile manufacturing industry.

In 1890 Ashbury's built the first London underground carriage cars and secured the order for the original 30 cars of the City and South London tube railway of 1890. The carriages were nicknamed 'padded cell' carriages, with narrow, horizontal windows and high-backed padded seats arranged along the sides of the carriage, much as the present London Underground carriages are arranged today. Orders were also secured for the provision of railway carriages and other products for railways in India, Argentina, Africa and New Zealand. The company supplied the Manchester, Sheffield and Lincolnshire Railway and the Great Central Railway with much of their passenger rolling stock until the Great Central Railway began to make its own at Dukinfield in 1910.



Between 1898 and 1900 the Ashbury works produced carriages for the London Metropolitan Line known as 'The Chesham Set', used for the Chesham Shuttle until 1960. These carriages are now restored and working on the Bluebell Railway in East and West Sussex. The carriages featured in the filming of the John Betjeman poem 'Metroland'.

Left: Interior view of a 'padded cell' carriage taken in 1890. © TfL from the London Transport Museum collection

This third class 'Bogie' carriage was built for the London Metropolitan Line in 1900. It now runs as part of the 'Chesham Set' on the Bluebell Railway in East and West Sussex. Courtesy Steve West

Left: Photograph of an illustration from Illustrated London News showing a City & South London Railway Mather and Platt electric locomotive pulling a train of Ashbury 'padded cell' carriages. Passengers prepare to board the train from an island platform, possibly at Stockwell Station. © TfL from the London Transport Museum collection

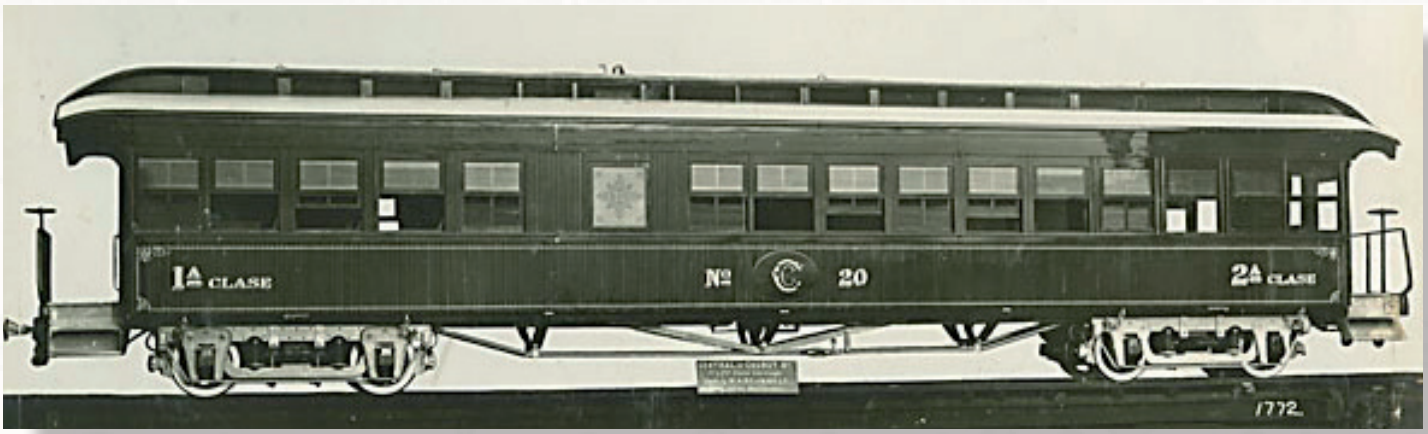
This 4-wheeled ballast wagon was built for the Metropolitan Railway in 1897, and is currently in the ownership of the London Transport Museum. Courtesy Brian Stanway

Left: 31 foot third class carriage, used on Vintage Train built in 1896. Courtesy Steve West

North Wales Narrow Gauge seven compartment, third class carriage, built 1894, now on the Ffestiniog and Welsh Highland Railway. Courtesy Ian Miller

More detailed descriptions of the company's carriages are included in an account of a 'train' built by the Ashbury Railway Carriage and Iron Company Limited in 1898 (Anon 1898). This source describes a series of six carriages built at Ashbury's which formed the train, detailing the overall length (244 ft 1 in. = 74.4m), with individual carriages 39 ft 6 in. (= 12.04m) long.The technical description recounted some of the features of the carriages, including the fact that they were constructed on spring suspensions over steel frames and bogies. Notable features included storage heaters, ventilation and electric lighting, as well as horsehair soundproofing in the floor. The bodies of the carriages were fashioned from teak, with detailed mouldings and decorative inlay. The furnishings of the carriages were a carefully structured hierarchy in upholstery to differentiate the degree of luxury across first, second and third class carriages.

A number of innovations were associated with the Ashbury works. In 1848 John Ashbury secured a patent for 'improvements in the construction and manufacture of wheels for use upon railways and common roads, and in the methods of preparing and constructing the tyres used thereon'. The company's chief designer, John Eades, also patented the 'Eades Patent Reversible' tram car, most of which were built between 1877 and 1886. The works also produced the first known refrigerated food transport wagon in England to an American design in 1878.



The Chubut Railway, Patagonia, was built by settlers from Wales who arrived in the area in the 1860s. In 1908 composite carriage no. 20 (above) was imported from the Ashbury works of the Metropolitan Amalgamated Railway Carriage and Wagon Co Ltd. The photographs above and opposite show the exterior and interior of the first and second class saloons, as recorded before dispatch

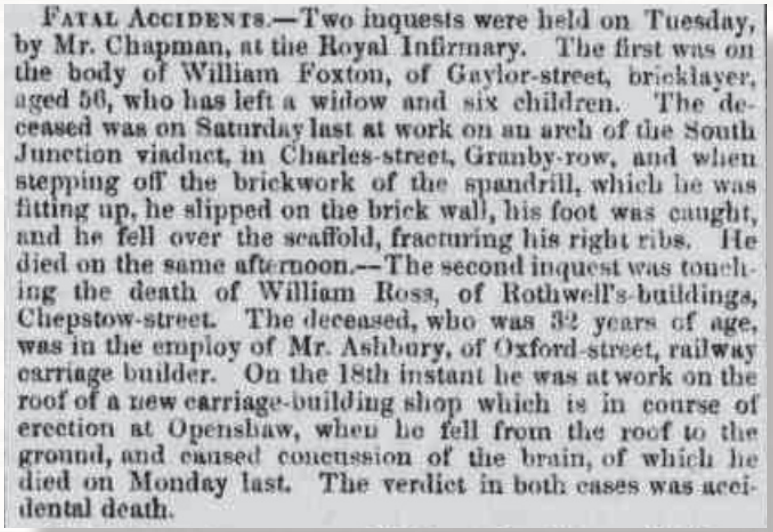
Interior of the first class saloon

Interior of the second class saloon

WORKING AT THE PLANT

During the 19th century the Ashbury works were well respected within industrial circles for the scale, efficiency and quality of the operation. However, it is apparent from contemporary newspaper articles that working conditions were not necessarily so well regarded.

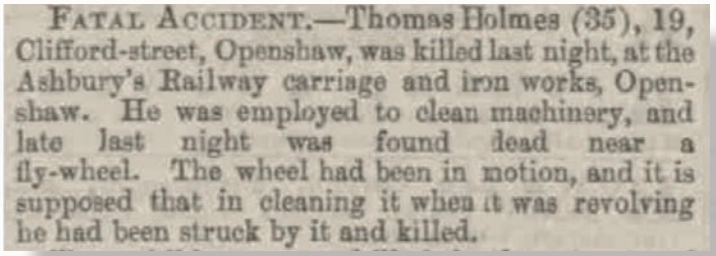
Unsurprisingly, as with other contemporary heavy industrial sites, fatal accidents did occur. Local newspapers recorded deaths of three workers in 1847, 1861 and 1871 due to crushing or impact injuries. There were also industrial disputes, for example a strike of 100-200 workers in March 1851 over changes in working conditions. A report in the Glasgow Herald in June 1869 recounted a strike and threats of violence, including a 'riot' of 800 workers, to remove an unpopular manager who had dismissed a number of long-standing employees at the plant, seemingly without reason. Cases were also brought against John Ashbury in person by a number of his domestic servants who were struck off without notice (rather than the customary 14 days), including Thomas Adams, Thomas Williams and John Walker who were awarded £6, £10 and £4 4s respectively in compensation for loss of earnings.



FATAL ACCIDENTS.—Two inquests were held on Tuesday, by Mr. Chapman, at the Royal Infirmary. The first was on the body of William Foxton, of Gaylor-street, bricklayer, aged 56, who has left a widow and six children. The deceased was on Saturday last at work on an arch of the South Junction viaduct, in Charles-street, Granby-row, and when stepping off the brickwork of the spandrill, which he was fitting up, he slipped on the brick wall, his foot was caught, and he fell over the scaffold, fracturing his right ribs. He died on the same afternoon.—The second inquest was touching the death of William Ross, of Rothwell's-buildings, Chepstow-street. The deceased, who was 32 years of age, was in the employ of Mr. Ashbury, of Oxford-street, railway carriage builder. On the 18th instant he was at work on the roof of a new carriage-building shop which is in course of erection at Openshaw, when he fell from the roof to the ground, and caused concussion of the brain, of which he died on Monday last. The verdict in both cases was accidental death.

Manchester Examiner, 29 May 1847

It has been suggested that the conditions of employment at Ashbury's were unfavourable in contrast with other local engineering works. The Gorton Foundry, for example, is noted to have offered paid holidays to its staff, while the owners Richard Peacock and Charles Beyer contributed to the building of two new local churches in 1865 as well as supporting local welfare charities and women's suffrage. The Ashbury works would occasionally feature in the Manchester press on the basis of social events; a dinner was held for 2,000 workmen in 1863 to celebrate inauguration of the limited liability company and the Prince of Wales' marriage to Princess Alexandra of Denmark. The meal included one whole roasted ox, eight whole sheep, two tons of other meat, one ton of pudding for the after course and thirty barrels of beer. The focus of the meal may however have been more a celebration of the fortune made by shareholders in the flotation of the company; it is also the case that in 1863 John Ashbury gave a donation of £1,000 for the construction of a new Wesleyan Chapel at Openshaw. The treatment of workers in the years which followed, leading to the strikes and unrest noted above in 1869, may have come about as an attempt by the management to maximise shareholder returns through rationalisation of the workforce.



FATAL ACCIDENT.—Thomas Holmes (35), 19, Clifford-street, Openshaw, was killed last night, at the Ashbury's Railway carriage and iron works, Openshaw. He was employed to clean machinery, and late last night was found dead near a fly-wheel. The wheel had been in motion, and it is supposed that in cleaning it when it was revolving he had been struck by it and killed.

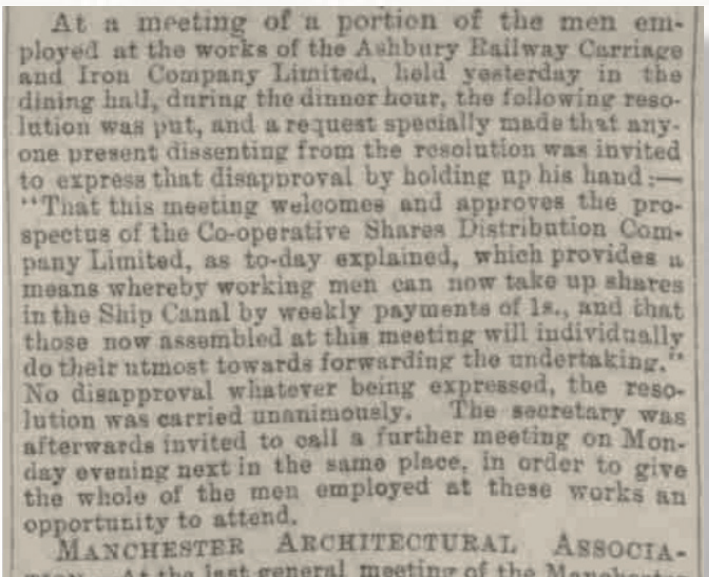
Manchester Evening News, April 1871

Although work at Ashbury's could be dangerous, it was relatively well paid and it is suggested that the late 19th century marked the start of upward mobility of the working classes. The typical weekly wage could be almost double that of mill-working counterparts, giving workers disposable income after rent had been paid. The job brought other benefits in addition to basic pay: an article in the Manchester Courier and Lancashire General Advertiser in 1886 records a meeting at the plant at which the workers were offered shares in the Manchester Ship Canal by weekly payment of 1 shilling. The shares were unanimously accepted.

The 1901 census returns include the occupations of residents in the streets immediately surrounding Ashbury's. It is notable that tenancy of the houses was not dependent on employment within the Ashbury works, and while many iron trades are included (such as striker in iron works, furnaceman (iron), iron turner (improver), iron driller, general labourer in iron works and iron puddler), there are a range of other occupations ranging from domestic servants and mill workers to painters, shopmen and leather makers.

An article in the Manchester Evening News in June 1972 contained a short transcript of the memories of the plant, given by 86-year-old John Forsyth, who had worked as an apprentice in the coach-body shop:

'My wage was 4s a week minus one penny for the provision of hot water in Dining Room Street. The timber used in carriage construction was 'pickled' to eliminate fire risk. An inspector would occasionally gather up some of the wood shavings to see if they would ignite. The works was locally called 'Starvation', the Dyer Street Citadel (a Salvation Army barracks), 'Salvation', the school opposite (Ashton Old Road school), 'Education', and the Metropole Theatre, 'Damnation.'



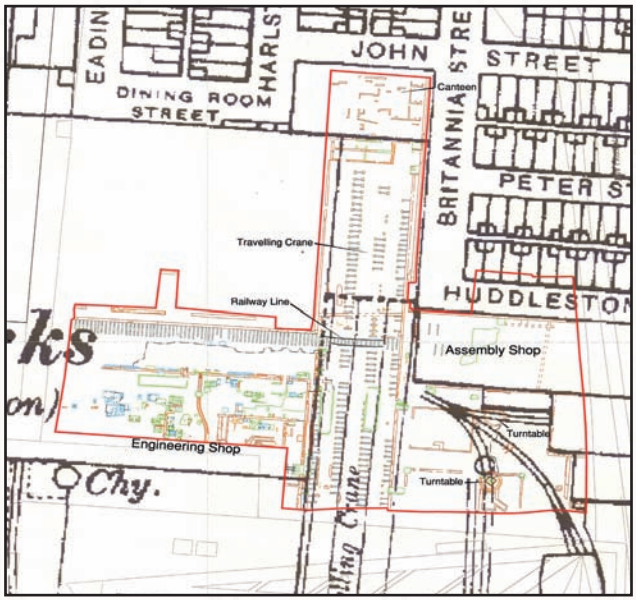
At a meeting of a portion of the men employed at the works of the Ashbury Railway Carriage and Iron Company Limited, held yesterday in the dining hall, during the dinner hour, the following resolution was put, and a request specially made that anyone present dissenting from the resolution was invited to express that disapproval by holding up his hand:—"That this meeting welcomes and approves the prospectus of the Co-operative Shares Distribution Company Limited, as to-day explained, which provides a means whereby working men can now take up shares in the Ship Canal by weekly payments of 1s., and that those now assembled at this meeting will individually do their utmost towards forwarding the undertaking." No disapproval whatever being expressed, the resolution was carried unanimously. The secretary was afterwards invited to call a further meeting on Monday evening next in the same place, in order to give the whole of the men employed at these works an opportunity to attend.

MANCHESTER ARCHITECTURAL ASSOCIA-

Manchester Courier, 19 March 1886

FURTHER INVESTIGATION

The site of the former Ashbury works covers an area of brownfield land which has seen sporadic redevelopment around Wolverton Street for industrial uses in recent years. As part of this continuing trend, new opportunities to investigate the fascinating remains of the Ashbury works have arisen. One such opportunity occurred when land immediately to the north of the area, excavated in 2012, was chosen by PP Plasma Ltd as the preferred site for their new state-of-the-art factory. In 2014, prior to any development work, an area measuring some 5,220m^2 was excavated by Oxford Archaeology North, with invaluable support again provided by members of MRIAS. The excavation was focussed on the north-eastern part of the Ashbury works, and included the footprint of several large engineering and assembly shops, railway lines and associated infrastructure, and a continuation of the travelling crane that had been discovered in 2012. The foundations of the works canteen were also revealed at the northern end of the complex, together with late 19th century housing on Huddleston Street, although these had been subject to comprehensive demolition that left only fragmentary remains in place.



Extent of the 2014 excavation superimposed on the Ordnance Survey map of 1908, showing the location of principal features revealed

The remains of a large engineering shop exposed in the western part of the excavation area contained an array of foundation beds for a variety of different machinery. Most of these retained steel bolts set into their upper surface, which had been used to secure the machinery. Some of the beds were built entirely of stone, and probably represented the position of the earliest machines, whilst later additions were formed in concrete. It was not possible to elucidate precisely what machinery had been installed on these beds, although they may have included large lathes and milling machines, drills, presses and forges, used for the manufacture of large components.

The Ordnance Survey map of 1891 depicts a standard gauge railway line situated immediately to the north of the engineering shop. This private

The stone and concrete machine beds exposed in the western part of the site

Surviving section of the standard gauge railway line

line had originally branched off the Manchester, Sheffield and Lincolnshire Railway, and looped through the works. The wooden sleepers for the line were unearthed during the excavation, together with a short section of rails that survived *in situ*.

Associated with the railway line was a small turntable, the foundations for which were revealed in the south-western part of the excavation area, occupying the approximate position of a circular feature shown on the Ordnance Survey map of 1909. The turntable had a diameter of 4.3m, and comprised machine-made bricks bonded with a dark grey mortar, consistent with a late 19th century construction date. A concrete-capped brick base in the centre of the foundations retained a plain housing for the pedestal that had supported the turntable platform. The remains of a second turntable of similar dimensions were also discovered a short distance to the north. This example may have been short-lived, however, as it does not feature on any of the historical maps.

The railway line and turntables served a series of sheds along the eastern boundary of the works. Whilst the footprint of these buildings lay partly beneath the modern course of Pottery Lane, some elements were available for excavation. This revealed that the demolition of the buildings had removed all interior floors, fixtures and fittings, leaving only the brick-built foundations *in situ*. Nevertheless, it is most likely that some of the assembly processes had been carried out in these buildings.

Brick-built foundations of the two turntables

The travelling crane built by the Metropolitan Amalgamated Railway Carriage and Wagon Company following their merger with the Ashbury works in 1902 was laid across the railway line that had served the assembly shops. The travelling crane crossed the centre of the excavation area, representing the northerly continuation of that discovered in 2012. The surviving remains comprised four parallel rows of timber sleepers, which had concrete bases and small concrete pads at each end. The outer rows of sleepers, however, lay partly beneath brick-built walls that were associated with the later use of the site as a railway goods depot.

High-level view looking south, showing the remains of the track bed for the travelling crane

Further evidence for the use of the site following the clearance of the Ashbury works in the 1930s was provided by three rectangular concrete structures, two of which had been set into the track bed of the travelling crane. Excavation showed that these were the remains of air raid shelters, presumably intended to offer railway workers at the goods depot some protection from aerial bombing during the Second World War.

As seen from the excavation work undertaken in 2012 and 2014, new opportunities to investigate the remaining portions of the Ashbury works will enable a greater understanding of the range of specialist activities carried out at the site, the spacial layout of activities and the interconnections between these. This work will continue to provide a permanent archaeological record and part of the legacy of one of Manchester's great engineering works of the 19th and early 20th century.

Aerial view of two of the concrete-walled air raid shelters that were set into the track bed of the travelling crane

GLOSSARY

COKE: A solid fuel manufactured by baking coal at high temperatures in a kiln in the absence of air.

FLUX: A substance such as limestone added to a furnace which rids molten metal of its chemical impurities and results in a less viscous slag by-product.

GAS PRODUCER: Produces combustible gas fuel by passing air across heated coke.

MERCHANT BAR: Iron bars and plates produced for sale in agreed standard sizes and forms for specific uses. These included bar iron, rails, boiler plate and boat plate. There were agreed quality standards for the finished product: 'Ordinary Crown Quality' and 'Superior Crown Quality'. Further still, within each standard the quality could be improved at escalating cost, with improvements identified as 'Best', 'Best Best', 'Best Best Best' and so on, relating to the fineness of the finished product.

PIG IRON: The initial product of iron ore smelting in a blast furnace. Pig iron was purchased and used at Ashbury's in the manufacture of wrought and cast iron.

REFRACTORY BRICK: Bricks or bars made from 'refractory' ceramic, able to withstand high temperatures. At Ashbury's the firebricks, manufactured by Harris and Pearson in Stourbridge, had very high silica and alumina concentrations (73% and 15% respectively).

REVERBERATORY FURNACE: Any furnace in which the fuel source is separated from the hearth of the furnace and its charge. The combustion gases from the fuel are directed onto the charge by reflecting them down off an in-turned roof.

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A copy of the detailed excavation report has been deposited with the Greater Manchester Historic Environment Record.

Other books in the *Greater Manchester's Past Revealed* series include:

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Fieldwork was carried out with support from the principal contractor Morgan Sindall which provided a number of important functions during the works, including ongoing contamination testing of spoil when it became apparent that asbestos was present in some of the demolition material.

A number of images have been used in this booklet with the permission of the owners. Particular thanks are given to Tony Wright of MRIAS, Hugh Llewelyn for the use of the Ashbury maker's plate photographs, John Pitman for the use of his photographs of the bricks during the foundry excavation, Ian Miller, and to the Vintage Carriages Trust with the help of Michael Cope for securing the use of photographs of various surviving carriages and wagons taken by Steve West and Brian Stanway. Images are credited throughout and have been used with permission. Sources include the English Heritage Aerofilms Collection, London Transport Museum, Imperial War Museums, Manchester Archives, Grace's Guide, The National Portrait Gallery and The Library of Congress. All other images and illustrations have been supplied by SLR Consulting Ltd, Oxford Archaeology North and Network Rail.

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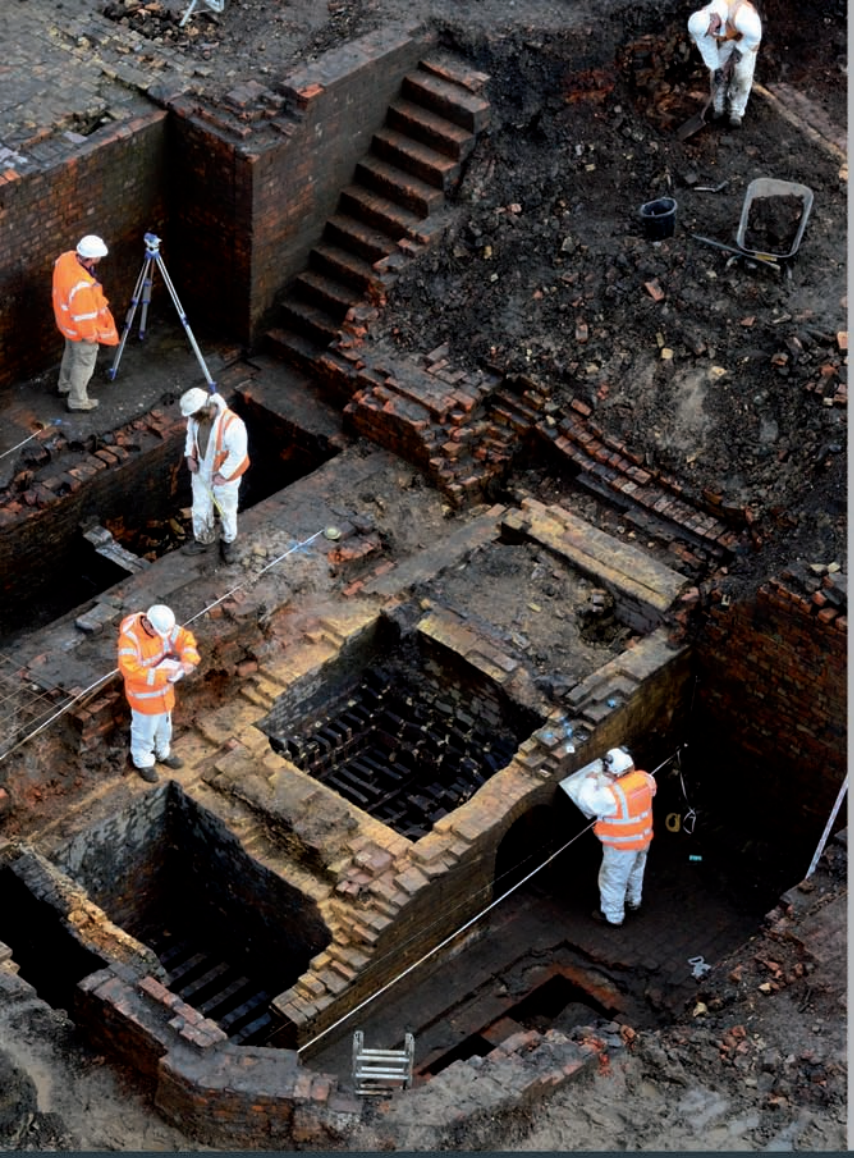

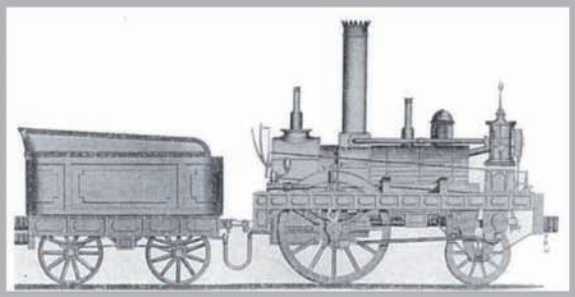

The Ashbury Railway Carriage and Iron Company was established in Openshaw in 1847 and evolved to become one of the largest carriage and wagon manufacturers in the country, exporting railway engineering items around the globe during a golden era of British manufacturing. After successive mergers in the early 20th century, the Ashbury works closed in 1928 and is now largely forgotten. Recent development of the site by Network Rail permitted the excavation of many of the furnaces and associated structures within the iron foundry of the works. This booklet presents the findings of those excavations, and provides an account of the company's origins and eventual fate.

Front cover: Archaeological excavation at the Ashbury's site

Back cover: Recording the gas regenerator chambers at the Ashbury's site. Engraving of 'The Manchester', first locomotive to be made in Manchester, its wheels made by the young John Ashbury

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