

Association for Industrial Archaeology
Annual Conference 1997, Newcastle upon Tyne

Tour Notes

Prepared by
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5th -12th September 1997

SATURDAY 6th SEPTEMBER

EXCURSION A BOWES RAILWAY

Guides - Phillip Dawe and the members and volunteers of the Bowes Railway Company

The Bowes Railway was one of a number of extensive colliery railways in North East England which date from the pioneering period of locomotive development, its first sections being laid out in 1826. The first section was built for Lord Ravensworth and Partners and ran from Mount Moor Colliery at Black Fell (south of Gateshead) to Springwell Colliery (then being sunk) and then on to new staithes on the River Tyne at Jarrow, a distance of 6.25 miles. As their engineer the Partners employed George Stephenson, though in view of his commitments to the Stockton and Darlington Railway at the same time it is unlikely that he supervised its construction. Although the line was to use three rope-worked inclines for its first 2.25 miles , the last four to Jarrow were to be worked by two locomotives, these almost certainly being the first two to be ordered from the famous locomotive builders Robert Stephenson & Company of Newcastle. However their delivery was delayed and so the section from Springwell to Jarrow was opened using horses on 17th January 1826; the extension to Black fell followed about six months later.

In May 1842 an extension to this line was opened to Kibblesworth Colliery, 2.5 miles further west on the opposite side of the Team Valley and comprised two more inclines. Meanwhile John Bowes, the son of the 10th Earl of Strathmore had formed the Marley Hill Coal Company to re-open the Marley Hill Colliery near Sunnyside, four miles west of Gateshead.. The colliery was completed in 1840 and was originally linked to the Tanfield Railway and the line extended by another rope-worked incline to Burnopfield Colliery. The involvement of Charles Mark Palmer in the Marley Hill Company led to its expansion and under the name of John Bowes and Partners bought up all the line and collieries from Marley Hill to Burnopfield and the line and collieries from Kibblesworth to Jarrow. The link between these two systems was made in 1854. With the final extension of the line to Dipton in the following year the Bowes Railway was complete - fifteen miles in length and working under the name of the " Pontop and Jarrow Railway " - a name which it kept until 1932 when it took its present title. For most of its working life the first 4.75 miles from Dipton were worked by locomotive, then followed six miles of inclines - Birkheads (gravity), Kibblesworth (haulage engine with load), Black Fell (engine against load) Blackham's Hill West (against load) and East (with load), both worked by a stationary engine at Blackham's Hill and finally Springwell (gravity). At Springwell Bank Foot locomotives from the shed there took over for the run to Jarrow.

Apart from the closure in 1940 of the Dipton -Burnopfield section the Railway continued to handle well over a million tons of coal per year well into the nationalisation period, and from 1959 it also handled coal from Pelaw Main Railway as well via a link between the two at Blackham's Hill. It remained in tact until August 1968 when by degrees the line began to close. The closure of Kibblesworth Colliery in 1974 meant the end of the Railway's five remaining inclines and its engineering and wagon shops at Springwell. At its closure three stationary electric haulers, one gravity inclined plane and diesel locomotives were all used; this being the last such system in Great Britain.

Special features of the line are the Blackfell and Blackham's stationary haulers and their associated inclines. The Blackfell engine rope-hauled full wagons up from the bottom of the Team Valley and lowered empties at the same time. The Blackham's engine took up the full wagons at Blackfell and drew them up to the summit. It also lowered empties back down, but in separate operation. Moreover it also worked the Blackham's East incline down to Springwell, the hauler having two separately clutched winding drums. Both of these engine houses originally housed steam powered haulers and signs of that system can still be seen in the provision of water, coal sidings, re-used boilers etc. Stone sleeper blocks edge the tracks near Blackham's West crossing and the rope sheaves, pulleys, kip and dish system, rope marks, jack points etc. can all be studied here.

Springwell Yard is the foot of the Blackham's East incline from which the full wagons passed to the head of the Springwell self acting incline plane where descending full wagons were used to pull empties back up. Springwell Colliery was located to the east of the tracks in the yard and the site of one of the shafts can still be determined. The former coal store for that colliery, a heavily buttressed building, was converted to a wagon repair shop when the colliery closed. On the opposite side of the tracks are the railway and coal mine repair shops.

Railway systems such as these were born and nurtured in the north east and gave George and Robert Stephenson and other great railway engineers their earliest railway building and operation experience.

This section of the Bowes Railway, which is a Scheduled Ancient Monument, is managed by a voluntary body - The Bowes Railway Company Limited - on behalf of the Sunderland and Gateshead District Councils.

EXCURSION B

THE STEPHENSON RAILWAY MUSEUM/NORTH TYNESIDE RAILWAY AND WALLSEND COLLIERY 'B' PIT EXCAVATION.

Leader : John Clayson

Guides : SRM/NTR John Clayson, Mike Forrester
 Wallsend Bill Griffiths, Roger Oram

1. DIAL COTTAGE, KILLINGWORTH (North Tyneside Council)

On the way to the Stephenson Railway Museum the coach will pass Dial Cottage in Great Lime Road, the home of George and Robert Stephenson from c1804 until 1823 (IATW p9). The sundial over the front door was set up by the Stephensons in 1816.

2. THE STEPHENSON RAILWAY MUSEUM/NORTH TYNESIDE RAILWAY (North Tyneside Council, Tyne and Wear Museums, The North Tyneside Steam Railway Association)

This is a developing project which was established in 1981 on the present site, though it actually originated several years before in Sunderland. The Museum opened in the summer of 1988, and the associated Railway commenced operation in 1991. A major City Challenge funded extension programme was substantially completed earlier this year, providing a new administration and services building at the Museum and a mile-long extension of the Railway. The extension awaits final completion, and it is expected that trains will begin to run to a new terminus (adjacent to the redevelopment of extensive former railway and docks land now known as Royal Quays) in Spring 1988. Meanwhile trains run about 1½ miles to Percy Main and return. The site is jointly managed by the three organisations listed above.

The location is of particular note as the site of the second of three haulage engines (for returning empties) on the route of the Brunton & Shields colliery wagonway of 1826 - hence the name of the approach road, Middle Engine Lane. Later, three other railways funnelled together from the north at this point from which they ran, independently but on adjacent alignments, down to the river Tyne two miles to the south (IATW p9). The ruins of the B&S engine house remained visible here until the present building was constructed in the 1970s as a test centre for the Tyne & Wear Metro. The display *From Pits to Staiths* explains something of the changes wrought in the landscape locally in recent years.

Among the exhibits at the SRM are Robert Stephenson & Company's *Billy* of c1826, a Kitson (Leeds)-built but locally designed long-boiler locomotive of 1883 (the Consett Iron Company's *A No.5*), a NER Tyneside electric parcels van of 1904 (on loan from the NRM), and a Berlin-built Siemens Schuckert electric locomotive *E4* of 1909 from the Harton Coal Company/NCB system in South Shields. Tyne and Wear Museums has recently received an award from the Heritage Lottery Fund toward the restoration and display of this locomotive, and a specification is currently in preparation.

3. HYDRAULIC ACCUMULATOR TOWER, ALBERT EDWARD DOCK (Tyne and Wear Development Corporation)

Built c1881 for the Tyne Improvement Commission's new dock at Coble Dene, named Albert Edward Dock in 1884 upon its opening by Prince Albert. The nearby dock gates (now powered by modern oil hydraulics) were, until quite recently, operated by hydraulic machinery supplied by Sir W.G. Armstrong & Co. of Elswick, and the tower houses the necessary deadweight accumulator (an invention of Armstrong's). It is significant as the only remaining *in situ* representative on Tyneside of Armstrong hydraulic dock gate equipment. A major renovation scheme was recently completed as part of the redevelopment of the area, though this regrettably also involved the demolition of many other interesting buildings.

4. WALLSEND COLLIERY 'B' PIT ARCHAEOLOGICAL SITE (part of the Segedunum project promoted by North Tyneside Council and Tyne & Wear Museums)

Wallsend Colliery's 'A' and 'B' shafts were sunk, 95 yards apart, between 1778 and 1781. The colliery became probably the most successful and productive mine of its day. The quality of the coal won here was such that the top grade of household coal was henceforward marketed under the name *Wallsend* no matter where it had been hewn. Wallsend Colliery closed because of flooding in 1854/55, by which time its workings extended over a large area and were accessed by seven shafts - 'A' to 'G'. In the late 1860s and early 1870s the workings were pumped out through a new shaft, 'H', and the mining of the vast reserves recommenced, though the coal was drawn from shafts at Hebburn, south of the Tyne, until 1898. The Rising Sun Colliery, opened in 1908 some two miles to the north, enabled further exploitation of the same reserves. It closed in 1969 and the remaining older shafts, including 'B' pit, were infilled.

The present excavations began early in 1997 as part of the Segedunum project to excavate and display the Roman fort of that name at the eastern end of Hadrian's Wall (hence Wallsend - Wall's End). Although the presence of the shaft was known, the appearance of the foundations of one (or possibly more) engines, of boiler settings and of ventilation passages was unexpected. Fortunately, the importance of the site was recognised at an early stage; its excavation has been supervised and thoroughly documented by TWM archaeology staff and the remains will be preserved *in situ*. Interpreting the site is proving to be a considerable challenge to local archaeologists and industrial historians, and contributions to the debate are welcome!

EXCURSION C

WOODHORN COLLIERY MUSEUM AND BLYTH 'A' POWER STATION

Guides : Woodhorn - Barry Meade, Curator, and colleagues
Blyth Power Sta. Ray Charlton, Ann Purdy and colleagues

1. WOODHORN COLLIERY (Wansbeck District Council)

Woodhorn Colliery was the third pit to be sunk by the Ashington Coal Company, the work on the first shaft beginning in 1894, sunk to the Plessey Seam at 873ft, first drawing coal in 1898. The second shaft

began production in 1901. The relatively short distance between the Woodhorn site and the main Ashington Colliery meant that the two could share washing facilities and could be easily linked underground. The opening of the Bothal Drift in the 1960s provided a combined coal drawing point. When the steam winder was removed from the site in 1975 it marked the end of steam winding in Northumberland. The pit closed in February 1981. Now a mining museum for Northumberland the site is centred on a fine pair of turn of the century winder houses but particular attention has been given by the Royal Commission on Historical Monuments for England to the survival of the Cappel fan house and the Blacksmith's shop and stables.

The fan at Woodhorn, installed in 1900 originally was powered by a horizontal steam engine supplied by Robey and Company of Lincoln. The engine at Woodhorn was capable of turning the fan's 16ft diameter chamber at 160 revolutions per minute at which speed the fan extracted 120,00 cubic feet of air per minute from the workings below. The later installation of a 300 horsepower electric motor increased these capacities to 225 revolutions and 180,000 cubic feet per minute. The building which houses the fan is of yellow Ashington brick. The engine house has gauged arches to doors and windows and a cogged and stepped eaves cornice. The curved outline of the fan casing is visible behind the engine house.

The survival of the blacksmith's shop and stables is testimony to the long history of the use of horses underground in the Great Northern Coalfield. Horses were working underground in larger mines by the middle of the eighteenth century and were still in use in 1992 when 24 pit ponies were being used for salvage work at Ellington Colliery. Although underground stabling was common practice, collieries also maintained surface stabling - examples of which can be seen at Woodhorn.

2. BLYTH 'A' POWER STATION (National Power plc)

Blyth Power Station is situated at Cambois (pronounced 'Cammus') on the northern bank of the river Blyth. The site comprises two stations, Blyth 'A' and Blyth 'B' with a combined generating capacity of 1,180mW (originally 1,730mW). The 'A' station, commissioned in 1959/60, contains four Babcock and Wilcox boilers and four 120 mW Metropolitan Vickers turbogenerators the earliest of which, when commissioned, was the largest in the country. These units are now believed to be the oldest large-scale generating plant remaining in full commission in the world, and Blyth 'A' is certainly the oldest coal-burning main generating station in Britain. The 'B' station was completed in 1966.

3. THE HARTLEY COLLIERY DISASTER MEMORIAL, NORTH TYNESIDE

Within Earsdon Churchyard is the memorial "erected to the memory of the 204 miners who lost their lives in Hartley Pit, by the fatal catastrophe of the engine beam breaking 16th January 1862". The disaster was instrumental in the passing of legislation requiring mines to have at least two means of escape. Perhaps the most moving and eloquent of the County's memorials, the names and ages of all those lost are recorded, including that of a visitor to the mine who also died in the tragedy. The site of the doomed Hester Pit of Hartley Colliery is marked within the village of New Hartley in Northumberland.

SUNDAY 7th SEPTEMBER

GUIDED WALKS

NEWCASTLE AND GATESHEAD QUAYSIDES - AN INTRODUCTION

Until the decline in the economic importance of the River Tyne in the years following the end of the Second World War, Newcastle's Quayside area had been at the heart of the growth and development of the city as both a regionally and nationally important location. The origins of the Quayside lay in the origins of the town itself, for the two are inextricably linked. The formation of the settlement known as Pons Aelius was based initially upon the Roman river crossing. The later growth of the town as an important trading port developed partly from these origins but also as a result of the topography of the dramatic Tyne Gorge and the geological strata of the surrounding land. On both sides of the river the land climbs steadily and rapidly over 250 feet. The valley sides are at their steepest immediately behind the riverside. This terrain led to the concentration of the early town around the river and in time led to the notoriously overcrowded living conditions which survived near the Quayside until the nineteenth century.

The post-medieval economic development of both the Quayside and the town of Newcastle was based on coal - initially through the mining of the outcropping seams in the river valley but later by the wholesale exploitation of the Great Northern Coalfield. The transportation of this vital fuel became the lifeblood of the river. In time not only did an elaborate rail system develop to bring coal to the river but also the whole industrial basis of the region was built upon it. The development of the railways and the locomotive, the rise of the North East shipbuilding industry and the region's reputation as a centre of heavy engineering and industrial innovation were all a result of the mining and transportation of coal. The profit to be made in overcoming the obstacles presented in the navigation of the narrow, shallow channels of the River Tyne and plying the coal trade was at the centre of the growth of the town and the river - a trade which generated the national and international importance of Newcastle. By the end of the seventeenth century 90% of the ships leaving the port carried coal to London and other British ports as well as European markets. For many centuries ships on their return journey to the Tyne carried only ballast. A number of industries, notably the pottery industry, grew up utilising the chalk and flint contained within the ballast stone. On occasion some items of use were carried as ballast, clay roofing pantiles being one example. By the early eighteenth century, however, ships began to bring in the many and varied cargoes which fostered and supported the development of the thriving town and port of Newcastle upon Tyne. The Quayside was at the centre of this bustling activity.

SUNDAY 7th SEPTEMBER

WALK D - NEWCASTLE - RIVERSIDE AND RAILWAYS

1. SOUTH STREET LOCOMOTIVE WORKS, NEWCASTLE

The site was first developed in c1821 at a time of industrial expansion on the west side of Newcastle city centre. The development, on land leased from the Hospital of St Mary the Virgin, was known as Forth Street after the new service road to the site. The first building was erected in South Street as a foundry by Isaac & John Burrell. George Stephenson was a partner in the firm. The locomotive and general engineering firm, in his son's name, Robert Stephenson & Co was founded on the adjacent site in 1823. The Stephenson Company premises were the World's first locomotive factory. The company became one of the premier manufacturers of locomotives and other steam engines in home and overseas markets. The pre-1830 development occupied the east side of South Street. The buildings survive, albeit with partial alteration to roofs and interior layout. The site on the west side of South Street underwent progressive development and alteration throughout the nineteenth century. The main years of development were 1837, 1846, 1855 and 1867. The Burrell foundry site was absorbed in 1867.

Robert Stephenson & Co Ltd left the site in 1902 having established a new factory in Darlington. The various leases and premises were acquired by the General Post Office who occupied the oldest buildings (being the former Burrell's premises) and by R & W Hawthorn, Leslie & Co, the locomotive and marine engine company of the adjacent Forth Banks site, who absorbed the major part of the site to the west of South Street.

The Stephenson Company returned to the site in 1937 on its merger with Hawthorn, Leslie. The manufacturer of industrial locomotives by Robert Stephenson & Hawthorns Ltd and its successors continued at the enlarged 'Forth Banks' works to the West of South Street. Production at the site ceased in 1960 and the site was released for other purposes.

Whilst many of the buildings are incorporated within a DIY retail warehouse, No. 20 South Street survives relatively intact. It includes parts of the former offices but more significantly it features an important fully glazed wall which gave light into what was the boiler manufactory. The building is currently held by the Robert Stephenson Trust who are looking to develop the site as a museum to the life and works of one of the country's foremost engineers.

2. FORTH BANKS AND THE SKINNERBURN

The Skinnerburn was one of a number of streams which ran down to the Tyne, the existence of which is now almost completely forgotten. The stream ran along the west side of Forth Banks and in medieval times its steep sided valley helped to protect the western approach to the town. For many years the burn formed part of the boundary between the medieval town of Newcastle and the township of Elswick, until the two were united in 1835. The burn was later filled in.

In the eighteenth century the Skinnerburn, along with the banks of the Ouseburn to the east of the City, became one of the area's early centres of industrial activity. Along the burn were glasshouses, lime kilns, a large brewery, a pottery and a foundry. Houses grew up round these concerns but conditions for residents were unpleasant, the burn being, according to one historian, ' little better than an evil-smelling sewer '.

In the nineteenth century this area became closely linked with the growing railway and heavy engineering industries. In 1818 Robert Hawthorn opened a small engineering works on Forth Banks and was joined by his brother William in 1820 to form R. & W. Hawthorn. The firm was to become one of the largest engineering concerns in the region, with interests in both railway and marine engineering. Adjacent to the

Hawthorn Engine Works was that of Robert Stephenson, perhaps the most important early locomotive works in the world. Little can now be seen of these mighty works and a small outlet in the river wall is now the only indication of the existence of the Skinnerburn.

3. THE WESTERN BRIDGES

Overshadowing the west end of the Close is the Metro Bridge, opened in 1981 by Queen Elizabeth II and named in her honour. It was constructed by the Cleveland Bridge Company.

The westernmost of the three bridges which span the river near this point is the Redheugh Bridge, opened in 1983. The bridge was designed by Mott, Hay and Anderson who also designed the Tyne Bridge, and built by Nuttall HBM. The first Redheugh Bridge, which opened in 1870, was built by a private company and carried both gas and water mains across the river, the pipes forming structural components of the bridge. The engineer was Thomas Bouch, designer of the ill-fated Tay Bridge which collapsed during a storm in 1879. Doubts expressed about Bouch's design were partly responsible for the rebuilding of the Redheugh Bridge, to the design of Sandeman and Moncrieff in 1901. The southern toll house and the northern and southern masonry abutments were retained when the bridge was dismantled in 1984.

The middle of the three bridges is the King Edward VII Railway Bridge. This was opened in 1906 and built by the Cleveland Bridge Company. Originally called the New High Level Bridge it was renamed in honour of the monarch who performed the opening ceremony. Built for the North Eastern Railway Company, to the design of Charles Harrison, it gave direct access to the west end of Central Station and so greatly relieved congestion at the station. The two centre spans of the bridge are each 300ft across and the massive stone piers are sunk into the river to a depth of 70ft below high-water level.

4. THE CLOSE

The Close developed on land reclaimed from the river between the thirteenth and fifteenth centuries by the tipping of rubbish behind successive waterfronts. From this time it became colonised by merchants, burgesses and members of the aristocracy.

On the north side of the road there was building space only on narrow strips of level ground at the foot of the steep slope. On the south side, however, land reclamation allowed buildings to be longer and narrower and enabled their extension to the river edge for the loading and unloading of goods. An example of this type of medieval merchant's house survives at 35, The Close, now converted to a restaurant. Among the most prestigious buildings on the south side of the Close was the Mansion House, built in 1691-2, which acted as the Mayor's residence and the venue for elaborate dinners and balls.

The Close remained a prosperous quarter of the town until it began to decline in the early eighteenth century. In 1736 the historian Henry Bourne observed that "Of late Years these Houses have been forsaken, and their wealthier Inhabitants have chosen the higher Parts of the Town". In their place industry grew up. The Mansion House, was abandoned in 1835 and used as a warehouse until it was destroyed by fire in 1895, its role of having been taken over by the property at 1 Ellison Place. Of the industrial concerns which developed along the Close one of the most significant was the Phoenix Flour Mill. Built in the mid-nineteenth century, it became the home of the now famous Spiller's Company who remodelled the mill when they moved from Bridgwater in Somerset to Newcastle in 1896.

5. THE TYNE BRIDGES

A bridge has crossed the Tyne since at least the 2nd century. Although the precise location of the Roman bridge is uncertain, Roman objects, such as a coin from the reign of Hadrian, dating from AD 132-4, have been dredged from the river in the vicinity of the modern Swing Bridge.

A new bridge was built across the Tyne, probably in the late twelfth century, on what is thought to have been the site of the Roman bridge. This medieval bridge is said to have had twelve arches, of which three were land arches. It was defended by three towers and on it toward the southern end was the Blue Stone which marked the boundary between Newcastle and the Palatinate of Durham. The bridge survived until 17th November 1771 when the great flood on the Tyne swept away four of the arches.

The medieval bridge was replaced by a sturdy stone bridge of nine arches with fine masonry and elegant balustrades. However, within a century it was recognised as a serious obstacle to the prosperity of the river. The inability of anything other than the smallest boats to pass upstream of the bridge not only allowed the Tyne keelmen to maintain their stranglehold on the movement of coal on the river but also prejudiced the development of the riverbanks to the west of the quayside. This factor was of particular significance to William Armstrong, whose industrial empire at Elswick was restricted by this drawback. As a consequence the old bridge was replaced firstly by a temporary wooden bridge and then by the Tyne Swing Bridge.

6. THE SWING BRIDGE

Built by W. G. Armstrong & Co., the Tyne Swing Bridge opened in 1876. The moving central span is still operated by Armstrong's hydraulic machinery, although the steam pumps have been replaced by electric ones. The turning bridge allowed shipping traffic to travel up-river and in its busiest year, 1924, more than 6,000 ships passed through. Now the bridge opens rarely. In its time, however, the bridge has been a major influence on the history of the river. By allowing access to the upper reaches for large sea-going vessels the industrial development of the north and south banks of the river beyond the centres of Newcastle and Gateshead was facilitated. Armstrong's works at Elswick expanded rapidly following the combination of the construction of the bridge and the dredging and improving of the river channels by the Tyne Improvement Commission. Armstrong was now able not only to arm ships built at other yards but also construct ships within his own yard, developed as part of the works complex in the 1870s. Whilst the Elswick Works has now disappeared one of the major constructions on the south bank, the Dunston Staiths, built by the NER at the turn of the century, survives to this day and, like the Swing Bridge itself, is a Scheduled Ancient Monument.

7. THE HIGH LEVEL BRIDGE

Towering above the Close is the oldest of Newcastle's surviving river bridges. The impressive stature of the High Level Bridge, designed and engineered by Robert Stephenson and Thomas Harrison, was constructed between 1845 and 1849. Its design was the conclusion of a long period of suggestions and proposals by some of the leading engineers and architects of the day, including not only John Dobson but also the great Isambard Kingdom Brunel. When completed the bridge was a vitally important link in the region's railway network, bringing trains across the Tyne and into Newcastle's newly built Central Station. The bridge stands 120ft (36.5m) above low water and has an overall length of 1,400ft (425.6m). The two tiered bridge is now a Grade One Listed Building and to this day carries rail traffic on the upper deck and road traffic on the lower deck. With the demise of the upper rail deck of the Queen Alexandra Bridge across the River Wear the "High Level" is the region's only twin deck bridge.

8. THE TYNE BRIDGE

The building of the Tyne Bridge was a dominant factor in the eventual decline of the quayside as an important element in the commercial life of the city. Bestriding the river, dominating the quayside, it whisked traffic directly into the new heart of the city. The gradual movement away from the lower parts of the town begun in the late seventeenth and eighteenth centuries had developed into the building of Dobson and Grainger's new town centre in the nineteenth. The High Level Bridge allowed both rail and road traffic to avoid the quayside. However, overcrowding and delays ensured a constant vehicle usage of the Swing Bridge and the roads along the quayside. The new Tyne Bridge, built by Dorman, Long & Co. of Middlesborough to a design by Mott, Hay and Anderson and opened in 1928, allowed even easier access

into the higher parts of the town. The quayside became isolated from the commercial and business activity of Newcastle.

9. SANDHILL

In the reign of Richard the Second a Proclamation was made commanding the removal of all merchandise from the " Common Place, in Newcastle called Sandhill, where the Inhabitants were wont to assemble for their Recreation." . " The Sandhill " wrote Henry Bourne in 1736 " is so called because it was formerly a Hill of naked Sand, when the tide was out. For formerly the Tyne overflowed all this Place... It is a spacious Place and adorned with Buildings very high and stately, whose Rooms speak the Ancient Grandeur, being very large and Magnificent. It is now that Part of the Town where the chief Affairs of Trade and Business are transacted. The Shops in this Street are almost altogether those of Merchants, which have many of them great Conveniences of Lofts, Garners and Cellars. Here is the Market for Fish, Herbs, Bread, Cloth, Leather, etc.... "

As well as the houses and shops of merchants, such as Bessie Surtees House, the major public buildings of the developing town were built here. The original Town Hall or Exchange was constructed here, as was the Guildhall. A statue of James II was erected here and later torn down and hurled into the river. Like the Close, however, the area declined in prosperity as the urban aristocracy moved away from the increasingly squalid quayside area. Although the original Town Hall was demolished, the Guildhall was rebuilt in the 1650s and although altered over the years survives to this day. The addition of the collonaded fish market in 1823, designed by John Dobson, ended the need to have the numerous fish stalls which previously crowded the quay. Fishing boats continued to bring their catch to the heart of the quayside until much later in the century, as the historian Charleton noted in 1885.

" Here, not so long ago, the ' Five man boats ' with their load of freshly caught north sea fish, made fast alongside, while on the quay stood crowds of bare-headed, bare-armed, kilted-skirted, white-aproned women, with round shallow baskets and twisted ' weazes ' in their hands, ready to crowd on board as a soon as a plank was laid ashore. "

10. CENTRAL STATION

An important monumental station with classical frontage by John Dobson, although his total conception was never fulfilled in its entirety. Built mainly by 1850, the massive portico with arched openings was added in 1863 to design by Thomas Prosser and not to Dobson's original design. West of the portico the straight frontage terminates in a later revenue accountants office with an arched door opening and pediment above, whilst to the East, the 1892 Royal Station Hotel of six storeys maintains the classical style but has a glazed entrance canopy with good cast iron tracery incorporating the letter NER. Behind this long and straight frontage lies one of the most important train sheds in the country, its roof utilising for the first time, arched wrought iron beams to support the roof cladding of timber with glazed ridge ventilators. The original roof has three 60' (18.3m) segmental spans, the central span being somewhat higher than the outer two. The whole is aligned on a distinct curve giving platforms of up to 1335 ft (407 m) long. In detail the main curved wrought iron beams were formed from built up I beams fishplated together to give a full span. Every third rib is supported on plain tapered cast iron columns except at the junction with the rear of the station frontage, (which is curved on the inside although straight on the outside). Here the ribs are supported on pilasters located between the arcades which form the rear of the station offices. The cast-iron columns have two tier cross girders which support the intermediate arch rib. The trainsheds were extended to the south with less adventurous but still quite elegant arches in 1894. Note complete diamond junction at east end of main station.

WALK E - GATESHEAD - RIVERSIDE AND RAILWAYS

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Towering above the Close is the oldest of Newcastle's surviving river bridges. The impressive stature of the High Level Bridge, designed and engineered by Robert Stephenson and Thomas Harrison, was constructed between 1845 and 1849. It's design was the conclusion of a long period of suggestions and proposals by some of the leading engineers and architects of the day, including not only John Dobson but also the great Isambard Kingdom Brunel. When completed the bridge was a vitally important link in the region's railway network, bringing trains across the Tyne and into Newcastle's newly built Central Station. The bridge stands 120ft (36.5m) above low water and has an overall length of 1,400ft (425.6m). The two tiered bridge is now a Grade One Listed Building and to this day carries rail traffic on the upper deck and road traffic on the lower deck. With the demise of the upper rail deck of the Queen Alexandra Bridge across the River Wear the "High Level" is the region's only twin deck bridge.

4. THE TYNE BRIDGE

The building of the Tyne Bridge was a dominant factor in the eventual decline of the quayside as an important element in the commercial life of the city. Bestriding the river, dominating the quayside, it whisked traffic directly into the new heart of the city. The gradual movement away from the lower parts of the town begun in the late seventeenth and eighteenth centuries had developed into the building of Dobson and Grainger's new town centre in the nineteenth. The High Level Bridge allowed both rail and road traffic to avoid the quayside. However, overcrowding and delays ensured a constant vehicle usage of the Swing Bridge and the roads along the quayside. The new Tyne Bridge, built by Dorman, Long & Co. of Middlesborough to a design by Mott, Hay and Anderson and opened in 1928, allowed even easier access into the higher parts of the town. The quayside became isolated from the commercial and business activity of Newcastle.

5. BRANDLING JUNCTION RAILWAY

Railway development began in Gateshead in the early and mid 1830s. The area east of Oakwellgate was a key site in this early development. The Brandling Junction Railway was planned in 1834 as a private venture to connect Gateshead, South Shields and Monkwearmouth and thus provide an outlet to the sea for the coals from the collieries owned by the Brandling family in Felling and elsewhere. The proposed route was inspected by George Stephenson and Nicholas Wood and given a favourable review. The venture did not lack eminent advice - Robert Stephenson and Isambard Brunel both gave further observations. The Company formed in 1835 also obtained additional powers by arrangement with the Newcastle and Carlisle Railway, to form a line from the most easterly point reached by the Newcastle and Carlisle Railway at Redheugh into Gateshead and to re-lay the old Tanfield Wagonway.

Construction of the BJR began in 1836. At a meeting of the town council in 1837 it was agreed to take the line from Redheugh to Oakwellgate through the town on a viaduct over Oakwellgate and High Street. The decision to use an elevated viaduct brought with it the need to build the Oakwellgate Station on a similarly elevated platform, 30ft above the level of the street.

6. OAKWELLGATE STATION

Formerly the West terminus of the Brandling Junction Railway and now a scrapyard, but the gracious inclined approach drive suggests that the station buildings, of which only fragments remain, may have been quite imposing. The north end of the yard is built up on a high, arched retaining wall and at the east end of this the inclined railway down to the Tyne can still be traced.

The station was in use from 1839. It closed for passenger traffic in September 1844 and from that time became a goods handling terminus. Its decline was interconnected with the rise of the Greenesfield area as the hub of railway activity in Gateshead, and in time with the construction of the cross river bridges.

7. MAIDEN'S WALK COAL DROPS

A set of eleven coal "chutes" built around 1840 which served to load coal from the elevated terminus and yard of the Brandling Junction Railway to an inclined tubway running to the nearby riverbank. The structure is of coursed squared sandstone built to form bays over which the rail track ran. Stout timber purlins at four levels support timber chutes which guided the coal into waiting wagons below. The drops survive in a substantially complete form and are "listed".

8. GREENESFIELD ENGINE WORKS

The hotel off Hudson Street, originally built in the 1840s for the Brandling Junction Railway and the former boiler shop dating from the late 1870s on Rabbit Banks Road survive. Constructed in stone and two-storeys, increasing to three-storeys as the hill slopes down, the shop is an impressive sight from the riverside below. It is now used for vehicle repairs. The Greenesfield Works was for many years the largest employer in the town. It was opened in the 1850's and by the early years of the present century over 3,000 men relied on it for their livelihood. But the cramped site limited its expansion and in 1910 locomotive building was transferred to a new works at Darlington. Locomotive repairing continued at Greenesfield until 1932 when that ceased also; the works reopened during the Second World War but was finally closed in 1959. The Station Hotel of 1844 is a stone building whose unmodified facade to the north is plain, with 7 bays and a hipped roof. Adjacent are some pre-1856 works buildings with arcaded extension and good internal structural cast iron work; later additions, mainly of the 1880s, extended the works to the west, the range of buildings overlooking the steep river banks representing a dramatic high level feature. Most of the buildings remain in use although not for railway purposes.

9. WESTERN BRIDGES

At the western end of the Greenesfield Works is the Metro Bridge, opened in 1981 by Queen Elizabeth II and named in her honour. It was constructed by the Cleveland Bridge Company.

The westernmost of the three bridges which span the river near this point is the Redheugh Bridge, opened in 1983. The bridge was designed by Mott, Hay and Anderson who also designed the Tyne Bridge, and built by Nuttall HBM. The first Redheugh Bridge, which opened in 1870, was built by a private company and carried both gas and water mains across the river, the pipes forming structural components of the bridge. The engineer was Thomas Bouch, designer of the ill-fated Tay Bridge which collapsed during a storm in 1879. Doubts expressed about Bouch's design were partly responsible for the rebuilding of the Redheugh Bridge, to the design of Sandeman and Moncrieff in 1901. The southern toll house and the northern and southern masonry abutments were retained when the bridge was dismantled in 1984.

The middle of the three bridges is the King Edward VII Railway Bridge. This was opened in 1906 and built by the Cleveland Bridge Company. Originally called the New High Level Bridge it was renamed in honour of the monarch who performed the opening ceremony. Built for the North Eastern Railway Company, to the design of Charles Harrison, it gave direct access to the west end of Central Station and so greatly relieved congestion at the station. The two centre spans of the bridge are each 300ft across and the massive stone piers are sunk into the river to a depth of 70ft below high-water level.

10. KING EDWARD VII BRIDGE PIER

The bridge was originally planned to have only two lattice girders but the discovery of old coal workings caused a change of design to four steel spans. Five ashlar piers, of which three are in the river, are pierced by two tall arches. Of particular visual impact is the land approach on the south bank which divides into two viaducts, that to the east with two arches and that to the south west with three arches. At the junction of these two viaducts a large rock-faced support pier with six arches, the central three being two storey on their south face.

WALK F - NEWCASTLE QUAYSIDE

1. THE CLOSE

The Close developed on land reclaimed from the river between the thirteenth and fifteenth centuries by the tipping of rubbish behind successive waterfronts. From this time it became colonised by merchants, burgesses and members of the aristocracy.

On the north side of the road there was building space only on narrow strips of level ground at the foot of the steep slope. On the south side, however, land reclamation allowed buildings to be longer and narrower and enabled their extension to the river edge for the loading and unloading of goods. An example of this type of medieval merchant's house survives at 35, The Close, now converted to a restaurant. Among the most prestigious buildings on the south side of the Close was the Mansion House, built in 1691-2, which acted as the Mayor's residence and the venue for elaborate dinners and balls.

The Close remained a prosperous quarter of the town until it began to decline in the early eighteenth century. In 1736 the historian Henry Bourne observed that "*Of late Years these Houses have been forsaken, and their wealthier Inhabitants have chosen the higher Parts of the Town*". In their place industry grew up. The Mansion House, was abandoned in 1835 and used as a warehouse until it was destroyed by fire in 1895, its role of having been taken over by the property at 1 Ellison Place. Of the industrial concerns which developed along the Close one of the most significant was the Phoenix Flour Mill. Built in the mid-nineteenth century, it became the home of the now famous Spiller's Company who remodelled the mill when they moved from Bridgwater in Somerset to Newcastle in 1896.

2. THE WESTERN BRIDGES

Overshadowing the west end of the Close is the Metro Bridge, opened in 1981 by Queen Elizabeth II and named in her honour. It was constructed by the Cleveland Bridge Company.

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3. THE TYNE BRIDGES

A bridge has crossed the Tyne since at least the 2nd century. Although the precise location of the Roman bridge is uncertain, Roman objects, such as a coin from the reign of Hadrian, dating from AD 132-4, have been dredged from the river in the vicinity of the modern Swing Bridge.

A new bridge was built across the Tyne, probably in the late twelfth century, on what is thought to have been the site of the Roman bridge. This medieval bridge is said to have had twelve arches, of which three were land arches. It was defended by three towers and on it toward the southern end was the Blue Stone which marked the boundary between Newcastle and the Palatinate of Durham. The bridge survived until 17th November 1771 when the great flood on the Tyne swept away four of the arches.

The medieval bridge was replaced by a sturdy stone bridge of nine arches with fine masonry and elegant balustrades. However, within a century it was recognised as a serious obstacle to the prosperity of the river. The inability of anything other than the smallest boats to pass upstream of the bridge not only allowed the Tyne keelmen to maintain their stranglehold on the movement of coal on the river but also prejudiced the development of the riverbanks to the west of the quayside. This factor was of particular significance to William Armstrong, whose industrial empire at Elswick was restricted by this drawback. As a consequence the old bridge was replaced firstly by a temporary wooden bridge and then by the Tyne Swing Bridge.

4. THE SWING BRIDGE

Built by W. G. Armstrong & Co., the Tyne Swing Bridge opened in 1876. The moving central span is still operated by Armstrong's hydraulic machinery, although the steam pumps have been replaced by electric ones. The turning bridge allowed shipping traffic to travel up-river and in its busiest year, 1924, more than 6,000 ships passed through. Now the bridge opens rarely. In its time, however, the bridge has been a major influence on the history of the river. By allowing access to the upper reaches for large sea-going vessels the industrial development of the north and south banks of the river beyond the centres of Newcastle and Gateshead was facilitated. Armstrong's works at Elswick expanded rapidly following the combination of the construction of the bridge and the dredging and improving of the river channels by the Tyne Improvement Commission. Armstrong was now able not only to arm ships built at other yards but also construct ships within his own yard, developed as part of the works complex in the 1870s. Whilst the Elswick Works has now disappeared one of the major constructions on the south bank, the Dunston Staiths, built by the NER at the turn of the century, survives to this day and, like the Swing Bridge itself, is a Scheduled Ancient Monument.

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into the higher parts of the town. The quayside became isolated from the commercial and business activity of Newcastle.

7. THE QUAYSIDE

Whilst the completion of the Swing Bridge in 1876 allowed the berthing facilities of the quayside to extend beyond the confines of the traditional bridging point, it was the work of Newcastle Corporation in the second half of the nineteenth century which extended the quay facilities eastwards to the mouth of the Ouseburn. For many centuries prior to these events, however, the Quayside stretched only from the old Tyne Bridge to Sandgate. Along the quay ran the medieval Town Wall until it was dismantled in 1763. Its removal allowed greater use of the quay and easier access to the buildings of the town. Following their development in the 1840s Armstrong's hydraulically operated cranes proliferated along the length of the quay and various wharves were established which served places both home and abroad.

8. REBUILDING THE QUAYSIDE

The western end of the Quayside was virtually destroyed by the great fire of 1854. Of the 16 chares situated between the Sandhill and Broad Chare before the fire only seven survived. However, hundreds of families were moved out of the ancient centre into the newly expanding suburbs. John Dobson, whose son Alexander had been a victim of the disaster, designed a new layout of broad streets, - King Street, Queen Street and Lombard Street - in a formalised pattern to replace the lost medieval buildings and ancient alleys.

With the removal of much of the housing the quay became a predominantly trading and commercial area. Many of the shops (there had been 33 butcher's shops on the Quayside at one time) and small industries were lost, although the inns, boarding - and bawdy -houses retained the trade of visiting seamen and merchants, as they had for hundreds of years as Bourne noted in 1736 "*It is not so much to be wondered at, if in going along it you see almost nothing but a whole Street of Sign-posts of Taverns, Ale-houses, Coffee houses, etc.*"

A further feature of the Victorian development of the area was the rebuilding of the quay itself. Years of neglect and the deepening of the river by the dredging work of the Tyne Improvement Commission had made the quay unstable. Between 1866 and 1884 the walls were rebuilt and the quay extended to the mouth of the Ouseburn.

9. VICTORIAN REDEVELOPMENT

With the rebuilding of much of the quayside in the middle of the nineteenth century a number of dominating buildings were added to the river frontage.

The Customs House had been at the centre of the quayside since its construction in 1766. The building was refronted in 1830 to a design by Sidney Smirke. It replaced an earlier customs house which stood at the western end of the quay. On completion of the new building the old house was used as an inn for many years.

At the centre of Dobson's new street layout was Exchange Buildings, a large stone built office block designed by William Parnell in the early 1860s. Between here and the Customs House equally impressive offices were added later in the century. Mercantile Building (Nos. 15-23) was constructed in 1883 by J.C. Parsons and No. 25 & 27 were built as a shop and offices by John Wardle in 1869. To the east of the Customs House Coronation Buildings and Baltic Chambers were developed in the early years of the twentieth century. With the exception of a small number of earlier buildings which had survived both destruction and redevelopment, in the fifty years following the fire the quayside from Sandhill to Broad Chare was transformed.

10. BROAD CHARE

With the development of prestigious Victorian offices at the west end of the quayside, Broad Chare became an informal boundary between the new business premises and the older warehouses and factories. Broad Chare itself had been one of the most prominent of the early alleyways being, as the name suggests, wider than its counterparts.

The quayside chares had been a network of cramped alleyways. Most of the chares, according to the historian MacKenzie, could be easily spanned by the extended arms of a middle-sized man and some with a single arm. In Dark Chare the houses nearly touched each other and the thoroughfare was no longer passable. The names and spellings of the twenty lanes changed frequently. Some were named after inns in the streets, such as the The Three Indian Kings and the Black Boy Chare. Others were known for different reasons. Mackenzie reports that Plumber Chare was noted as "*the receptacle of Cyprian Nymphs whose blandishments were of the most coarse and vulgar description. Indeed, " he lamented " most of these dark lanes were inhabited by very dangerous though not very tempting females. "*

The area had nevertheless been the home of many of the influential and prosperous people of the town who had gained wealth and position in the coal trade, the name Fenwick's Entry testifying to the whereabouts of the home of Alderman Cuthbert Fenwick.

MacKenzie's description of the quayside chares includes Broad Chare which "*is broad enough to admit a cart. Most of the old houses have been pulled down and lofty commodious warehouses erected in their place. A narrow flagged foot path runs up the west side, but is neither a safe nor a pleasant passage.*"

11. MILK MARKET

There has been a " Milk Market" at the Quayside since at least 1717. The agricultural overtones of its name bear testimony to the site of the sale of milk and other produce and of the " hirings " where agricultural workers congregated waiting to be hired by local farmers. The bucolic picture painted by some observers had certainly disappeared by the middle of the nineteenth century. The " hirings " moved to the Westgate in 1827 and the area took on a much more prosaic appearance.

When Thomas Oliver wrote his Picture of Newcastle in 1831 he described the Milk Market as a place where "*on Saturdays is a sale of old clothes laid on straw upon the street.*" This tradition, known as Paddy's Market, continued, without the straw, into the second half of the twentieth century. The remains of the old Town Wall and other structures were also used for displaying wares. The area also contained a daily butcher market. The Sunday market continues to this day, perhaps now as much a tourist attraction as a place of serious trade.

12. WAREHOUSES

From the dawn of the nineteenth century until the late twentieth century the area between Broad Chare and the Milk Market was dominated by large purpose built warehouses. Prior to this their construction had been achieved by adapting existing quayside properties, particularly in the narrow chares and along Dog Bank. The new nineteenth century warehouses respected the lines of the medieval alleyways and retained the character of the area as one of high buildings and narrow lanes. One particular group was built in the years from 1801 to 1830. In 1801 in return for agreeing to the construction of Forster Street through property he was leasing, a man named Pollard with considerable business interests in the area was allowed the use of stone from the old town wall for construction. He is thought to have been responsible for a major group of warehouse built between 1801 and 1830, some of which survive to this day, converted into apartments.

The recent transformation of the eastern end of the quayside, in particular the conversion of the impressive Love Lane warehouse with its long thirteen bay, seven storey frontage, has returned much of

this area to the residential use it enjoyed over two hundred years ago. The former status of the whole quayside as the heart of the town has also been partly restored by the return of dwellings and commerce to the area and by the construction of the awesome Crown Court building.

13. THE C.W.S. WAREHOUSE

One of the warehouses which rose up behind the new quayside at the turn of the twentieth century was that of the Cooperative Wholesale Society. Always progressive in its thinking, the C.W.S. chose to build out of the very latest materials. This period saw increased use of ferro-concrete (concrete reinforced with iron) for the construction of industrial and commercial buildings. Its use was developed principally by the French engineer Francois Hennebique and his agent L.G. Mouchel. Mouchel's assistant, T. J. Gueritte, worked in Newcastle on the design and construction of the C.W.S. quayside warehouse, in conjunction with the architect F.E.L. Harris, between the years 1897 and 1900.

The site was found to have marshy silt and quicksand to a depth in places of 60ft. The building was therefore constructed on a ferro-concrete raft. The whole frame of the building was of the new material and the exterior, also of concrete, was finished to resemble the more traditional Portland stone. The architectural style chosen for the building was austere and classical. A barrel vaulted roof was added to the warehouse in 1901 bringing a decorative element to the top of the six storey building. It is now probably the oldest surviving large scale ferro-concrete building in the country.

14. TRACKS AND TUNNELS

The Quayside Railway line serving the warehouses, wharves and manufactories along the river frontage was first planned in 1845 but the 1 in 30 gradient was too steep for the locomotives of the time. The railway, which was almost semi-circular in plan and connected the quay to Manors Station, was however finally opened on the 1st June 1870 . The construction of the line involved the resculpturing of Ropery Banks and the digging of the Lime Street cutting. A large and impressive masonry retaining wall held back the cut away Ropery Bank, and a steeply graded tunnel carried the track up and away from the quay to join the North Eastern Railway line at the Trafalgar Street Sidings. The ascent from the quayside was so steep that engines suffered wheel-slip and the amount of impetus required to power the locomotives up the hill was so great that the tunnel quickly became smoke filled and made the task of driving both unhealthy and difficult. Two special locomotives were built in 1904 to overcome these difficulties following the electrification of the system. The line worked until 16th June 1969 after which the cutting was infilled and the tunnel entrances blocked. The Quayside entrance to the railway tunnel had been through a still visible portal behind the Hamburg Wharf. The railway along the quay was constructed by the Corporation but the expensive and elaborate connection to the main line was the work of the NER. Their task was given added difficulty by having to cross above the line of the second subterranean structure in the area - the Victoria Tunnel.

15. THE NORTH SHORE

The North Shore encompassed the riverside from the Swirle to the mouth of the Ouseburn and included the long mound known as Ropery Banks. The mound was thought to be the first of the ballast hills, created by the dumping of waste material brought as ballast by collier ships coming into the Tyne, which developed along this stretch of the river. Whilst the raised terrain became the home of the St. Ann's Ropery, a windmill and in time a number of manufacturing works, the riverside developed as the centre of the town's shipbuilding and repairing industry. Until the quay extensions and improvements of the mid-nineteenth century took place the North Shore was home to several early shipyards: Farrington's Shipyard which stood at the foot of Wide Open, (one of the streets running from Sandgate to the shore), Hopper's Yard, Fulton's Yard, Hopper's Slipway, Wright's Yard and at the mouth of the Ouseburn another of Hopper's Yards. Also here was the " Dandy Gears " a timber coal staith with three spouts which transferred coal brought from Shieldfield into waiting keels for shipment to the river mouth.

MONDAY 8th SEPTEMBER

The morning session comprises a trip to Newcastle's Lower Ouseburn area, specifically a walk inside the Victoria Tunnel and a walk to the Ouseburn bridges, and a bus tour of the west side of Newcastle, taking in a range of different sites, which are not otherwise included in the Conference but are of particular interest, notably Lemington Glass Cone and the Dunston riverside area. The afternoon comprises a river trip from Newcastle Quayside to the mouth of the Tyne and back.

Stout, preferably waterproof footwear is advised, particularly for use in the morning.

There will be two coaches, one of which will undertake the bus tour first and then visit the Ouseburn, and the second will visit the Ouseburn first and do the bus trip second.

Ian Ayris will lead the activities in the Ouseburn, aided by members of the Ouseburn Heritage Trust. John Clayson will provide a commentary and information on the bus tour.

Lunch will be a buffet in the "Cooperage" on The Close, beneath the High Level Bridge, one of Newcastle's oldest buildings - being a sixteenth century timber framed merchant's house - and one of its finest inns.

1. THE OUSEBURN

" We are now in a truly desolate-looking region " (Charleton 1885)

At the eastern end of Quayside is the mouth of the Ouseburn and the intriguing blend of housing and industry which forms the lower Ouseburn valley.

The development of the lower Ouseburn Valley has been in sharp contrast to the sylvan stretches of the river which flow through Jesmond Dene and Heaton. Whereas the whole valley had once been predominantly agricultural and is thought to have taken its name from a corruption of " Ewes Burn ", the valley became one of the cradles of industrialisation in the region. The faster flowing sections of the upper reaches led to the use of the water to power corn mills in a number of locations. Some of these, in later years, were altered to grind flint for the pottery industry of the area. In the lower parts of the valley the combination of water power, easy access to the Tyne, raw material in the ever-growing ballast hills and the location beyond the inhibiting walls of the late medieaval town fostered the early growth of industrial activity.

In the upper Ouseburn the eighteenth and nineteenth century mills gave way to the development of the Victorian parks of Jesmond Dene, Heaton and Armstrong Parks, but nearer to the mouth potteries, glassworks, mills (corn, flour, flax, flint, and spinning), leadworks, soapworks, glue and copperas manufactories, foundries, roperies and small shipbuilding yards all grew up in the confines of the Ouseburn valley.

The many works and the wretched conditions of some of the streets led to the disparaging comments of both the historians Mackenzie in 1827 and Charleton in 1885.

" A Plebeian district covered with extensive and important manufactories, consisting of corn steam- mills, foundries, potteries, a flaxmill and other works " (MacKenzie, 1827)

" We find it, black and sullen, flowing among the most forbidding surroundings. Slaughter-houses, coal wharves and dwelling houses of not the most desirable appearance keels may be seen lying and delivering coal into carts, which are backed axle-deep into the stream to receive their load, while the

horses stand impatiently in the cold water. In the cold water too we see groups of ragged people with baskets and bags, wading and groping with their hands for the coal which has fallen overboard." (Charleton, 1885)

2. OUSEBURN BRIDGES

The series of bridges across the Ouseburn is both visually and architecturally impressive. Rivalled only by those spanning the Tyne itself, the Ouseburn bridges are a fine monument to the history of transport on Tyneside. In the Ouseburn area there are eight bridges of varying size and importance. Crawford's bridge is the oldest of the surviving crossings, built in the early to mid-eighteenth century of coursed, squared sandstone. Rising high above Crawford's Bridge is a group of three lofty bridges spanning the valley. The oldest of the three is the Ouseburn Viaduct - a railway viaduct originally built in 1837-39 and designed by the architects, John and Benjamin Green. The bridge was built for the Newcastle and North Shields Railway Company. When it was built the arches were of timber but these were replaced by iron-work when the bridge was widened by the North Eastern Railway Company in 1869. Like its twin spanning Willington Gut, the Ouseburn Viaduct carries rail traffic to this day.

Close by is the Byker Bridge, carrying the road across the Valley. Built in 1878 it encouraged traffic into the eastern suburbs of the City by removing the need to descend and ascend the steep roads of the Valley. A toll was charged for crossing the bridge until 1895. Snaking between the two nineteenth century structures is the slender curving line of the modern Metro bridge, designed in the late 1970s by Ove Arup.

Downstream from this fine collection at the junction of Cut Bank and Lime Street, is Ouseburn Bridge. Now a modern minor road bridge it was previously the important main crossing point for the turnpike road from Newcastle to North Shields. The previous bridge probably dated from the mid eighteenth century.

Close to the mouth of the burn was the old Glasshouse Bridge which was demolished when the Quayside was extended in the opening years of the twentieth century. William Gray writing in his "Survey of Newcastle upon Tyne" in 1649 says that "*upon the north side of the river is the Ewes Burn, over which is a wood bridge, which goeth down to a place called the Glasse Houses where plaine glasse for windowes are made which serveth most parts of the Kingdom.*" This early Glasshouse Bridge was replaced in stone in 1669 by Thomas Wrangham, a renowned Newcastle shipbuilder. Wrangham's bridge was altered and made level and more convenient in 1727 but still retained a striking and pleasant appearance, giving an almost romantic look to the mouth of the burn. The more prosaic but more practical high level Glasshouse Bridge was constructed to the north of the old bridge in the late 1870s and linked what is now City Road with Walker Road. The seventeenth century stone bridge was dismantled during the extension of the quayside in the years between 1907 and 1910.

In the upper reaches of the Ouseburn two further important crossings survive - Armstrong Bridge - constructed by Sir William Armstrong in 1878 and of considerable engineering interest - and Salter's Bridge, a medieval bridge of two arches which formed part of the route of the Salt trade in the area.

3. EAST OF OUSEBURN

The area immediately east of the mouth of the Ouseburn, stretching along the Tyne to the old Corporation boundary with St. Peter's Parish, was known as St. Lawrence. It was one of four areas which formed the south side of Byker township, the others being St. Anne's, St. Peter's and St. Anthony's. The St. Lawrence area was based upon the chapel of St. Lawrence, said to date from the early thirteenth century.

The earliest signs of industrial development can be traced to the early seventeenth century. From 1619, and possibly earlier, Sir Robert Mansell, the Vice Admiral of England, had been establishing glass-houses on the Tyne on land in St. Lawrence leased from the Corporation. By the late eighteenth century the site of the chapel had been subsumed within one of the glassworks.

The St. Lawrence glass industry was, perhaps, the most significant early glass-making site in the country. The attractions of the area lay in the plentiful supply of coal and the easy access to regular shipping traffic to London and other ports. In 1635 King Charles the First prohibited the import of any sort of glass from abroad during the term granted by King James the First to Mansell for the sole making of glass. By the mid seventeenth century there were three sets of works established in this area, after which the industry spread to other parts of the river - Howdon Pans, Bill Quay and Close Gate.

By the 1770s it was reported that fifteen large glass works (one for plate glass, three crown glass houses, five for broad or common window glass, two for white or flint glass, and five bottle houses) were situated on the Tyne in and around Newcastle - the cluster at St. Lawrence being the earliest and largest.

4. VICTORIA TUNNEL

The Victoria Tunnel was built in the 1840s as a two mile long underground wagonway running from Spital Tongues to the River Tyne. It culminated at staiths near the mouth of the Ouseburn. The entrance into the tunnel is one of the few remaining access points into the tunnel.

The tunnel was designed to carry coal from the colliery at Spital Tongues to waiting ships on the river. The colliery was opened in 1835 by which time the town of Newcastle was extensive. The coal from the colliery had to be carried through the busy streets which was both troublesome to the owners and disagreeable to the Corporation. To solve this problem the owners of the colliery applied to build a railway across the Town Moor, through Jesmond and down to the river. The Corporation would not allow this but instead agreed to accept a tunnel. Consequently work was begun on what was to become the " Victoria Tunnel " in June 1839 and completed in January 1842. The tunnel was formally opened, in the presence of the Mayor of Newcastle, on 7th April 1842.

The tunnel was driven through solid clay without encountering rocks or stone. The whole two mile length was constructed with a brick arched roof and a stone inverted arch at the bottom. The height and width varied but was generally 6ft to 7ft 8in high by 6ft 3in wide. From the colliery to the staiths at the river was a drop of 222 ft. At its deepest point it is 85 ft below the ground surface. Inside the tunnel ran a standard gauge railway which was controlled by a stationary steam engine at the colliery. Loaded trucks ran down the gradient to the river and returned empty.

The tunnel proved to be an efficient and less expensive way of transporting coal. It was reported that the owners had cut their transport costs to an eighth of their previous level. However, the colliery itself was not a success. Within ten years it was not regularly working and by 1857 it was being offered for sale and by 1860 was closed entirely.

The tunnel was disused until the Second World War when with little adaptation it was used as air raid shelters. A number of entrances were driven into it, the sole accessible one being now at Ouse Street in the Ouseburn. The tunnel was truncated by the building of the Glasshouse Bridge in 1878/80 but much of the remaining parts of the tunnel survive in tact. Approximately a third of its length is used as sewer but the rest remains disused. Occasional tours are organised into the tunnel from Ouse Street.

COACH TOUR TO ELSWICK, SCOTSWOOD, LEMINGTON, NEWBURN, DERWENTHAUGH DUNSTON AND TEAMS.

Leader/Guide: John Clayson

Route: Quayside/Close/Skinnersburn Road/Newcastle Business Park/Scotswood Road/Lemington Road/High Street/Station Road/High Street/ Lemington Road/Scotswood Road/Scotswood Bridge/Derwenthaugh Road/Riverside Way/Handy

Drive/St. Omer's Road/Colliery Road/Gas Works Bridge Road/Clockmill Road/Derwentwater Road/Redheugh Bridge/Railway Street/Forth Banks/Close/Quayside.

The following should be visible from the coach on the above route, though some may only be glimpsed briefly as we pass. Almost all of the existing sites are included in the Guide to The Industrial Archaeology of Tyne and Wear - page references are given.

Elswick Wharf	(IATW p25)
Dunston Staiths	(IATW p37)
CWS Dunston Soap Works	(IATW p80)
CWS Dunston Flour Mill (site of)	
Dunston Power Stations (site of)	
Armstrong/Armstrong Whitworth/Vickers-Armstrongs Elswick Works (site of)	
Hydraulic Crane Pub (site of)	
Michell Bearings factory	
Benwell Abbatoir (now the Whitehouse Enterprise Centre)	
Armstrong Whitworth Scotswood Works (site of)/Vickers Defence Systems	
Armstrong Works	
Adams Fireclay Works ('Adamsez') (site of)	
Anglo Great Lakes graphite works (site of)	
Lemington Power Station	(IATW p71)
Lemington Gut/Staiths	(IATW p38)
Tyne Iron Works (remains of)	(IATW p50)
Lemington Glass Works (under demolition - except for glass cone)	(IATW p47)
Stella North and South Power Stations (sites of)	
Newburn Steelworks (Spencer's) (site of)	(IATW p50)
Newburn Road Bridge	(IATW p17)
Scotswood Railway Bridge	(IATW p17)
Scotswood Chain (suspension) Bridge (site of)	(IATW p17)
Derwenthaugh Staiths (remains of)	(IATW p38)
Delta Ironworks (Raine & Co.) (site of)	
Tyneside Flats	(IATW p74)
R.S. Newall and Dixon Corbitt ropeworks (sites of)	
Redheugh Iron Works (Spartan Redheugh)	
Gas Works at Redheugh and Elswick	
Elswick Lead Works (Cookson's)	(IATW pp52-3)
Forth Banks Goods Depot (site of)	

RIVER TYNE

By the early twentieth century the Tyne was at the heart of the nation's industrial economy. In 1924 the river Tyne was described by the historian W. Richardson in these words: " Everywhere from the dancing waters of the harbour to the ebb and flow of the throbbing city, industry, resource and expansion, coal staiths, shipyards, engine shops, dry docks, chemical works, forges, electrical lighting laboratories, warehouses, merchant's offices, steamships, railway trains, without end, without number - from Shields to Scotswood, there is not its like in 13 miles of river the world over ".

Until the 1850s the Tyne was largely undredged and unnavigable. It was in fact notoriously dangerous. There were no docks, few quays and no piers at the entrance. Progress up and down the river was hampered by sand banks, restricted by the old Tyne Bridge. The work of the Tyne Improvement Commission in the dredging of the river, the opening of the Northumberland Dock (1857) and the Albert Edward Dock (1882), the replacement of the old Tyne Bridge with the Swing Bridge (1860s) and the removal of a large island led to the improved use of the river, increased activity on the riverbanks and to the furthering of Tyneside's prosperity.

This prosperity was centred upon the riches to be gained in pursuing the lucrative coal trade. The river based economy of the region saw the development of many industries which, for one reason or another, were based upon the burgeoning coal industry. In the seventeenth and eighteenth centuries. Tyneside became a major centre of glass and pottery production. In the first half of the nineteenth century the alkali and general chemical industry thrived along the river and in the later nineteenth century there developed the heavy industrial economy which survived until the post war period. The three staple industries of Tyneside's last great industrial period were coal, shipbuilding and heavy engineering.

The importance of the coal industry cannot be overstressed. The development of shipbuilding on Tyneside was a result of the need to ship coal to coastal and overseas markets; the origins of the railway and the invention of the locomotive - items of global importance - were centred on Tyneside in the search for improved methods of moving coal to the river. The movement of coal up the river and the bringing of ballast into the river by collier ships returning otherwise empty to the Tyne was a dominant factor in the changing nature of the river, from the detrimental effects of ballast dumping to the building of new and improved coal handling facilities ranging from the Tyne Dock at South Shields to the mighty NER coal staiths at Dunston. The origins of coal mining in the area lay in the medieval period and began to grow significantly in the eighteenth century but it was the nineteenth and early twentieth centuries which saw massive expansion of the industry culminating in the period before the First World War when around 20 million tons of coal left the port of Tyne annually.

Not all the industrial activity on the river was concentrated in these lowest reaches. The earliest wagonways brought coal to staiths near Lemington on the north side and to the Derwenthaugh area on the south bank. At Lemington there was a concentration of industries which began in the late eighteenth century, including the Northumberland Glass Works and the Tyne Iron Works. At Newburn industrialisation took place in the mid nineteenth century fostered by the building of the Newburn, Scotswood, and Wylam Railway. Further up the Tyne Valley potteries prospered, whilst around Haltwhistle a further pocket of coal reserves gave rise to a localised mining industry. In the valley of the North Tyne other deposits of coal saw mining activity in small communities such as Falstone and Plashetts. The South Tyne valley in comparison was part of a once hugely important industrial landscape in the form of the North Pennine Orefield. Lead mining was well established in the orefield by the fifteenth century and over the following four centuries the lead industry dominated that part of Northumberland.

The range and diversity of industries which have been established by or near the Tyne is too great to be covered in a general summary of this nature. Some sites should perhaps be given particular mention, such as the site of the former mighty Armstrong Works at Elswick and the concentration of shipyards at

Walker, Wallsend and Hebburn. One further industry worthy of note for its particular relevance to the river is the water industry itself. Organised general provision of water was not undertaken until the early nineteenth century when much of the supply was taken from the increasingly polluted Tyne. Whilst the setting up of reservoirs began in the 1840s water was still being pumped from the river at Elswick until the cholera infested years of the mid 1850s. The building of the still surviving pumping engine houses at Newburn (1855) and Wylam (1874) reflect attempts to extract cleaner water from the river.

The social and demographic effects of all this activity along the banks of the Tyne has been considerable. From the patterns of settlement influenced by the coal industry throughout the Great Northern Coalfield to the construction of the terraced suburbs of western Newcastle as a direct result of the opening and expansion of the Armstrong works the development of the area has been inextricably linked with its industrial history.

The decline of the traditional industries has been recent and change is now occurring rapidly. However, the past is not to be denied - the transport routes and the engineering achievements which followed in the wake of, and grew with, the burgeoning coal industry are still an intrinsic part of the landscape. Many remarkable nineteenth century bridges survive and are still in use, the routes of the eighteenth and nineteenth century wagonways and railways have survived in parts of the County where neither urban expansion nor opencast mining has disturbed the landscape.

Along the river banks the story is different. The riverside industries of the late eighteenth and early nineteenth centuries, particularly the Tyneside chemical industry, were overlaid in the following hundred years by a plethora of heavy engineering, shipbuilding and repairing yards which themselves have now also been lost. The removal of redundant plant and the reclaiming of the river corridors for new uses has left only threadbare patchwork remains of what has been a rich tapestry of activity along the river.

A separate guide will be provided for the River Trip on boarding the Ferry.

TUESDAY 9th SEPTEMBER

DERWENTCOTE AND THE LEAD DALES

Leaders :	Coach A - Ian Ayris/ Ian Forbes
	Coach B - John Clayson/ Dave Cranstone
Guides :	
	Derwentcote English Heritage
	Killhope Ian Forbes and colleagues
	Nenthead Peter Jackson and colleagues

1. DERWENTCOTE STEEL FURNACE (English Heritage)

The furnace was probably built in the 1720s, one of a series of steelworks along the river Derwent. It converted wrought iron into spring and tool steel by the cementation process - using charcoal as the source of carbon and locally-mined coal as the fuel. Because of the availability of coal, water power, woodlands for charcoal and the ease of import of suitable wrought iron from Sweden, the Derwent Valley and Tyneside produced about half Britain's steel in the 18th century, and this 'Newcastle' steel had an international reputation. Although late in the same century, following the commercial development of the crucible furnace by Benjamin Huntsman, the steel manufacturing industry gravitated away from Tyneside to Sheffield, the furnace at Derwentcote remained in use until the 1870s. Taken into guardianship by English Heritage in 1985, Derwentcote was carefully conserved from a ruinous state in the late 1980s.

2. KILLHOPE LEAD MINING CENTRE (Durham County Council)

Killhope Lead Mining Centre is based on the former Park Level Lead Mine which was driven in 1853 to meet a series of 14 veins further up the valley previously worked from hushes, shorter adits and shafts. Development of the Park Level Mine was completed over the following 25 years. The surviving mine shop building dates from the 1860s, the washing rake also from the 1860s and the Park Level Mill - with its famous wheel - from the late 1870s. The mine was at its most productive in the 1870s and 1880s and closed in the early twentieth century. It reopened briefly in 1916. Consolidation and interpretation of the remains began in 1980. A considerable amount of archaeological excavation has been carried out and new parts of the sites opened out, culminating in the recent past with the opening of a fine exhibition area, the restoration of the great wheel and most recently the opening of a tour within the workings of the level.

A visit underground to the Park Level Mine should be possible for most delegates in the time available. Wellington boots (if you happen to have a pair with you!) or stout footwear are advised.

3. NENTHEAD MINES HERITAGE CENTRE AND HISTORIC SITE (The North Pennines Heritage Trust)

The site, covering 200 acres, is a Scheduled Ancient Monument within which are the extensive remains of the lead mining industry of the North Pennines. The village of Nenthead was founded in the 1820s by the London Lead Company for the housing of miners and their families. However, lead and silver had been both mined and smelted/refined in the area for centuries before. The new heritage centre, which occupies former mine workshops, explains the complex history of the site, the technology of the processes carried out there and the lives of the miners and their families.

Guided walks are being provided for delegates, and there will be a choice of route. Stout footwear, and clothing appropriate to anticipated weather conditions, is advisable.

was moved bodily and erected at the end of the newly extended North Pier. This remarkable task was performed under the supervision of the Chief Engineer to the Commission, John Murray.

In 1856 a fine wrought iron lighthouse was built on the old South Pier. At the top of the tower was a cast iron dome and internal access to the light was by a cast iron staircase. The 50ft. high structure was designed by Thomas Meik who also designed the Hendon Dock and one of the nearby dock-side grain warehouses, which survived until the early 1990s. The lighthouse, itself, can also be seen today - but not in its original position. The house was dismantled and re-erected in 1983 when the Sunderland Port Authority shortened the South Pier to create an easier and safer entrance into the river. Public concern led to the resiting of the structure on the Roker sea front.

The Aberdeen Granite lighthouse built at the end of the Roker Pier at the turn of the century still stands in its proud position guarding the entrance to the Wear.

The North and South Docks

The massive increase in shipping activity on the River Wear, brought about by the seemingly ever-expanding coal trade, was causing great congestion on the river by the beginning of the nineteenth century. By the 1820s pressure on the riverside facilities was immense and trade was being lost to rival port facilities. As a result competing schemes were formulated for docks to be built on the north and south banks to handle the increased traffic.

In 1837 the North Dock was opened by the Wearmouth Dock Company, formed by Sir Hedworth Williamson, the major landowner in Monkwearmouth and Whitburn. The engineer for the project was, perhaps the most famous of the Victorian age, Isambard Kingdom Brunel. The dock, however, was too small to be of any significance and its importance was diminished by the building of docks on the south side of the river.

The South Dock was opened in 1850 by the Sunderland Dock Company, headed by George Hudson, the "Railway King" who became one of Sunderland's two Members of Parliament in 1845. The South Dock included the staiths of the Durham and Sunderland Railway, which formed part of Hudson's Railway Empire. A major part of the capital for the Dock was supplied by the York, Newcastle and Berwick Railway Company. The design of the Dock was by John Murray, the River Wear Commission Engineer. Robert Stephenson, son of George and highly acclaimed in his own right as one of the leading engineers of the day, was employed as a consultant.

In 1859 the Sunderland Dock Company sold out to the River Wear Commissioners who had been able to levy port dues on the dock traffic and thus financially crippled the Company. In the late 1860s the Commissioners added the Hendon Dock, designed by Thomas Meik, as a southern extension. The original dock became known, from this time, as the "Hudson Dock".

In 1922 the River Wear Commissioners gained control of the North Dock from the North Eastern Railway. Whilst never as successful as the south side docks the North Dock was used for timber and lime loading. The Eastern side was filled in during 1953 to provide a quay for vessels being repaired at Greenwell's Yard. In 1976 a bulk loading conveyor, used principally for limestone, brought a surge of activity to the North Dock. Further modernisation took place in the early 1980s when roll on - roll off facilities were installed.

9. SEAHAM HARBOUR

The party will be met at the Seaham Coastal Centre by the Centre Manager David Etheridge. The tour of the old port will be led by Mr. Etheridge and Stafford Linsley.

Of all the coal shipping facilities built in the North East of England in the first half of the nineteenth

century , the most ambitious was the Marquis of Londonderry's harbour at Seaham. In the early 1820s Londonderry was making plans to build a railway and harbour to ship out coal from his wife's pits at Rainton, thereby saving himself the 10,000 a year that he paid keelmen to transport his coal down the River wear from Penshaw Staithes to the collier brigs moored downstream. The foundation stone of Londonderry's new harbour at Seaham was laid on 28th November 1828 and on July 31st 1831 the first coal was transported down to the harbour on the newly completed Rainton and Seaham Railway and loaded on to the brig *Lord Seaham*. Soon after, a wagonway was built from Seaham to a new pit at South Hetton, the first coal being shipped from North Dock in 1833.

Seaham Harbour was extended a number of times in the course of the nineteenth century, the first addition being the South Dock which was. Soon after, a wagonway was built from Seaham to a new pit at South Hetton, the first coal being shipped from North Dock in 1833.

Seaham Harbour was extended a number of times in the course of the nineteenth century, the first addition being the South Dock which was opened in July 1835. 1782 vessels used the harbour and 370,000 tons of coal were carried down to it along the railways from Rainton and South Hetton. The new harbour, like its counterparts on the Tees and Wear, provided a considerable boost to the coal industry of County Durham. Liefchild wrote of Londonderry's port that 'Seaham harbour itself has in reality arisen out of coal, though in appearance it rises out of the sea' (1856). However, by the middle of the century the coal trade and the ships which served it were both beginning to outgrow small harbours such as Seaham. In the 1850s Londonderry built a railway from Seaham to Sunderland in order to be able to ship coal out through George Hudson's newly built South Dock at the mouth of the River Wear.

A feature of Seaham Harbour was the unusual type of coal drop used to transfer coal from the wagons to the waiting colliers. The wagons were run on to platforms, which were then swung outwards and downwards to a position immediately above the ships' hold by means of a pivoting arm with a counterbalance. In 1966 the last drops at the South Dock were dismantled and later placed in store at the North of England Open Air Museum.

(Extract from 'Images of Industry- Coal' by Robin Thornes, RCHME.)

FRIDAY 12th SEPTEMBER

TANFIELD RAILWAY AND CAUSEY ARCH

Leader : John Clayson

Guides : Tommy Knox, Derek Charlton and colleagues

1. THE TANFIELD RAILWAY

Delegates will arrive at the railway's Marley Hill headquarters, on the site of the former Marley Hill Colliery and cokeworks. The locomotive shed is believed to be the oldest such building still in use for its original purpose. In the shed, and stabled on nearby sidings, is an important collection of locomotives, wagons and carriages collected primarily from North East colliery and industrial systems, including many examples of the products of local builders. It is hoped that our train will be hauled by a 1930s Armstrong-Whitworth diesel locomotive.

In its preserved form, the railway links Sunnyside, to the north of Marley Hill, with East Tanfield to the south - a distance of about 3 miles. However, the route is part of an 18th century waggonway alignment built to transport coal from pits in the Tanfield area to the river Tyne west of Gateshead. Most of the waggonway was later upgraded to railway, which closed to normal traffic in 1962. At Marley Hill the Tanfield line was crossed on the level by the Bowes Railway running east-west through a cutting now largely infilled, giving rise to the unorthodox layout in the vicinity of the signal cabin. South of the crossing is Andrew's House station, where our train will be boarded for the journey to Causey Arch via Sunnyside and East Tanfield.

2. CAUSEY ARCH

A branch of the original waggonway crossed the Causey Burn by a single semicircular-arched bridge of 100 feet span built in 1725 - the celebrated Causey Arch, built by local master mason Ralph Wood. However, before passing Causey Arch station, the line crosses another major feat of civil engineering - a huge man-made embankment beneath which the burn runs in a culvert. The train will continue to East Tanfield - a newly-opened terminus, and again a former colliery site - along the delightfully picturesque Causey Gorge. We then return to Causey Arch, where delegates should alight for a closer inspection of the historic bridge and a short walk to the Causey Arch Inn for lunch (options of a level route and a steeper but more scenic path via the base of the aforementioned embankment).