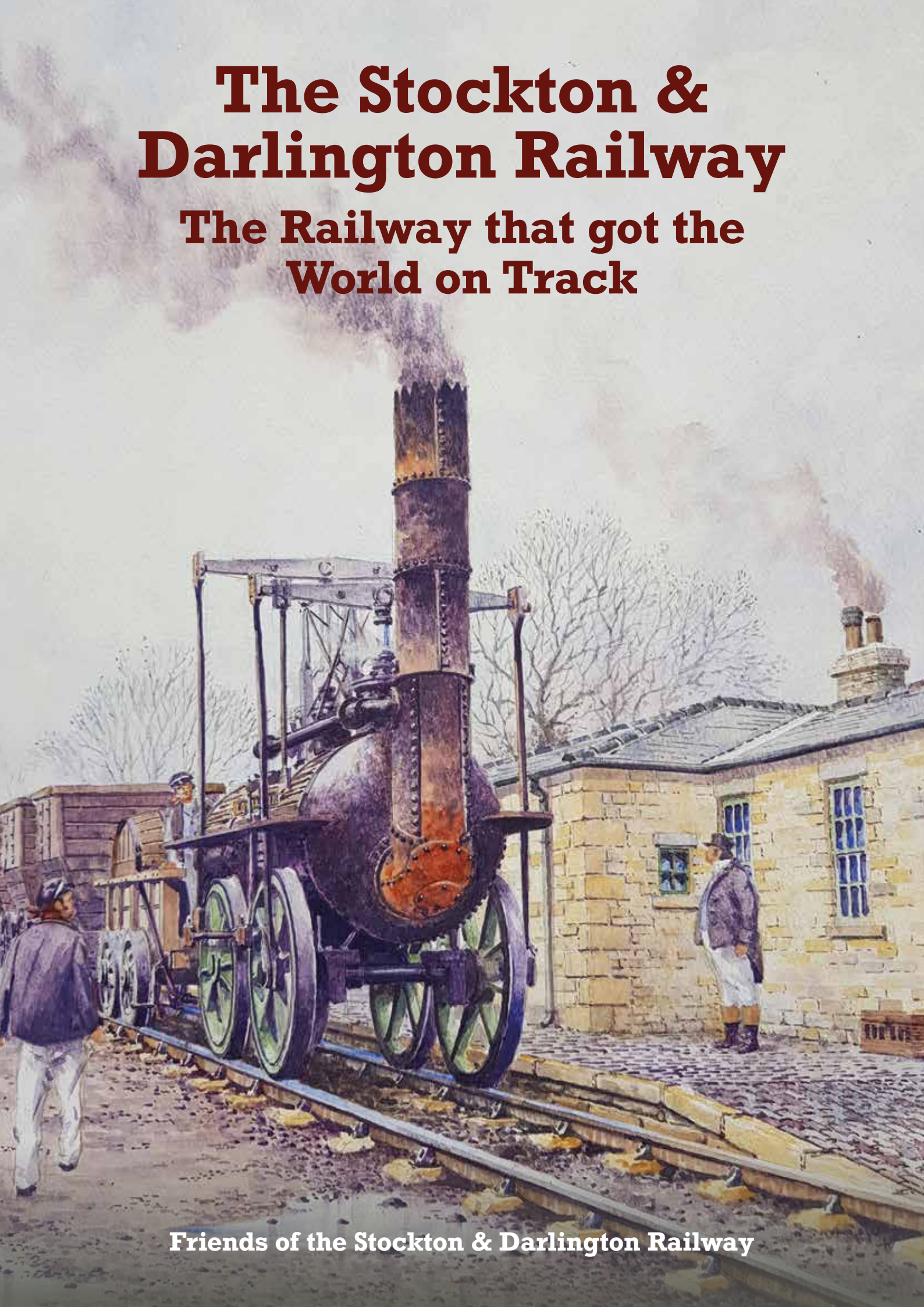
The Stockton & Darlington Railway

The Railway that got the World on Track



Friends of the Stockton & Darlington Railway

Two hundred years ago in the early 19th century, as plans took shape for the Stockton & Darlington Railway, Georgian Britain was a place of innovation in a rapidly changing world. America had won its independence within living memory and war with France had only ended in 1815 with the defeat of Napoleon. While the slave trade in the British Empire was made illegal in 1807, the practice of owning slaves on plantations in the Caribbean and southern United States was to continue for many more years. Much of the sugar and cotton from these plantations made their way to British factories.

Britain was the world's leading commercial nation based on an expanding trading empire of colonies around the world and an industrial revolution at home. Steam engines had been successfully applied to industrial use by James Watt and Mathew Boulton in 1775, and soon many factories and mines were using large, stationary steam engines to power machinery and pumps. This resulted in rural cottage industries such as textile production, being moved to large more efficient mills and factories in growing industrial towns. Workers moved from the land to work in industry and the gap between rich and poor was becoming increasingly clear. Wages and livelihoods were often an issue; in 1822 the keelmen who carried coal downriver to Newcastle upon Tyne went on strike and many would lose their jobs. Elsewhere the lack of votes and parliamentary representation for the working classes living in new industrial towns, resulted in campaigning and unrest leading, most famously, to the Peterloo Massacre of 1819.

The cultural enlightenment of the 18th century continued, with the wealth generated by trade and industry allowing the rich to build grand country houses in the neo-Classical and Gothick styles surrounded by fashionable landscaped parkland. Art and poetry celebrated the landscapes of wild nature such as the Lake District or the Highlands of Scotland seen in the work of J. M. W. Turner and Sir Walter Scott. In the year that the Stockton & Darlington Railway Company was formed (1818), Jane Austen died leaving her last two novels *Northanger Abbey* and *Persuasion* to be published posthumously and a 20-year-old Mary Shelley published Frankenstein. In March 1825 Beethoven premiered his 9th symphony in London.

'…its [the S&DR's] completion in 1825 may be said to have given birth to all others in this world.' (from Edward Pease's Diary looking back to 1825, entry dated 30 March 1841).

While an extensive canal network in some parts of the country provided an efficient if slow bulk transport network for raw materials and goods for the new factories and industrial towns, road transport consisted of the age-old methods of foot, horseback, and horse drawn vehicles. Stagecoaches ran a scheduled service between different towns stopping at coaching inns, but it could take five days to get to London from Darlington.

It was into these times that a group of business owners and bankers from Darlington, Stockton and Yarm met to discuss a long-standing problem of how to move coal cheaply and efficiently from inland collieries to the coast for export to London and elsewhere. Their answer to this problem was going to create the model for the modern railway and inspire the railway revolution which would change the face of the world.

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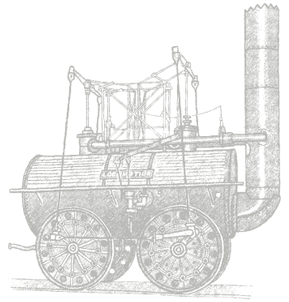
Photographs have been generously provided by various members and partners of the Friends of the Stockton & Darlington Railway and are credited.

Cover image: Locomotion No.1. in steam outside the railway tavern at Aycliffe Lane, Heighington, *c.*1827-8. Watercolour by John Wigston on behalf of the Friends of the Stockton & Darlington Railway.

Brusselton Incline looking west with stone sleeper blocks stretching into the distance towards West Auckland and the Durham Coalfield. Photo: Niall Hammond



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The S&DR marked a significant milestone in the development of the modern railway. In its planning before 1825 and in its development in the years afterwards it proved to be 'the great theatre of railway operations', lighting the fuse for the explosive expansion of railways across the world; it was the railway that got the world on track!

Where was the Stockton & Darlington Railway?

The Stockton & Darlington Railway (S&DR) opened on the 27th September 1825. The 26-mile-long mainline was located in the north east of England in the historic County of Durham. It ran from the coal mines near Witton Park to the River Tees at Stockton, via Darlington and Yarm where there were two branch lines. Within the next five years it had an additional three branch lines at Croft, Haggerleases and Middlesbrough. Over the following decades, as railways spread across the world, the S&DR also expanded its network of tracks reaching as far as Barnard Castle, Tebay, Redcar, Saltburn and Weardale. It was amalgamated with the North Eastern Railway in 1863.

Left: Detail from The Opening of the Stockton and Railway 1825. Painted by John Dobbin in 1875. Dobbin attended the opening day in 1825 when he was ten years old. The train is passing over the Skerne Bridge in Darlington, hauled by Locomotion No.1. The passenger coach Experiment can be seen amongst the waggons. Photo: Darlington Borough Council.

Right: Brusselton Incline in the sunset. Photo: Jonathan Ratcliffe.

STOCKTON & DARLINGTON RAILWAY | 1825–1830

INTRODUCTION

Map showing the extent of the S&DR by 1830. It also went on to expand to Barnard Castle, Tebay, Redcar, Saltburn and Weardale. It was amalgamated with the North Eastern Railway in 1863.

KEY

1825 Main line and the route of the opening day on 27th of September 1825.

S&DR Branch Lines

S&DR line still in use

Map Locations

MAP

1 Etherley Incline

2 Gaunless Bridge

3 Brusselton Incline

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5 Heighington Station

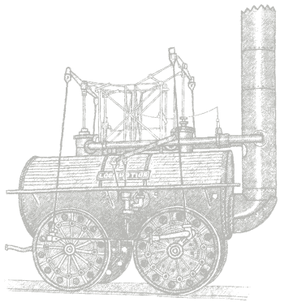
6 Darlington Railway Museum

7 Skerne Bridge

8 Fighting Cocks

9 Preston Park Museum & Grounds

10 Stockton



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Why build a railway?

Coal was the lifeblood of society in the early 1800s, powering factories and heating homes, schools, shops and offices and warming the stoves that cooked the food. In addition to local demands, London had become the largest city in the world and was hungry for coal.

Coal could only be mined where it was found. It then had to be transported to where it was needed. In south west Durham that meant being loaded onto carts hauled by horses and travelling slowly along poor-quality roads. A cheaper more efficient solution was needed.

Business and colliery owners debated about the best method of transporting the coal. Many favoured a canal and others favoured a railway or tramway. While there was disagreement, there was no progress.

Edward Pease, a Quaker and retired wool merchant from Darlington broke the deadlock in 1818 when he invited influential business owners together and they commissioned the Welsh engineer George Overton to look at canal and railway options.

Overton sided with a horse drawn railway and supplied costs. Towards the end of the year, the committee met, discussed the likely budgets and created shares in order to raise the capital to build the line. A prospectus was written by the then 19-year-old Joseph Pease (son of Edward) entitled:

'Proposals for making a public railway from the collieries near Auckland to Darlington, Yarm and Stockton, for the Supply of the South and East parts of the County of Durham and the North Riding of Yorkshire with coals, and for the general conveyance of merchandise' ...

and the Stockton & Darlington Railway Company was formed.

The costs of building the railway were estimated at £113,600 [1] which in today's money would be over £10.5 million.[2]

Permission to buy land, build and run a permanent railway required an Act of Parliament. The first attempts failed largely due to the opposition of the Earl of Darlington who had no industrial interests, but plenty of land upon which he enjoyed fox hunting and which the railway would cut across. He rallied enough support for the bill to be narrowly defeated. While the railway company worked on revised plans to avoid the Earl's Estate, the Earl attempted to bankrupt the railway company.

The Earl of Darlington's Dastardly Plan and Backhouse's Balancing the Books

Backhouse's Bank was one of the Quaker run banks bankrolling the railway. It was located on the High Row in Darlington where Barclays Bank is today; Barclays was formed in 1896 when Backhouse's merged with other Quaker banks. In 1819 it was possible to take a bank note to a bank and exchange it for its equivalent value in gold.

In an attempt to derail the railway, the Earl of Darlington ordered all of his tenants to secretly collect Backhouse's banknotes so that they could all be presented on one day in exchange for gold. No bank would have enough gold in their vaults to meet this demand and it would result in closure, loss of confidence and bankruptcy for the bank which was funding the railway.

Hearing of the dastardly plan, in late June 1819, Jonathan Backhouse, carried out a daring rescue plan. He headed south in his carriage pulled by four horses and visited other Quaker banks, borrowing as much gold as possible and then hurried northwards laden with gold to beat the Earl's agents to the bank.

Three miles from Darlington at Croft Bridge, disaster struck as one of the four wheels came off Backhouse's coach, and it tipped forward. With considerable urgency, he rearranged the gold so that it sat over the good rear wheels causing the broken axle to lift up off the ground. According to the imaginative Chris Lloyd:

'And so, pulling a wheelie, he dashed the remaining miles into High Row – apparently welcomed into town by cheering people.' [3]

With the gold reserves in place the Earl's plan was thwarted, the bank survived, and the railway stayed on track.

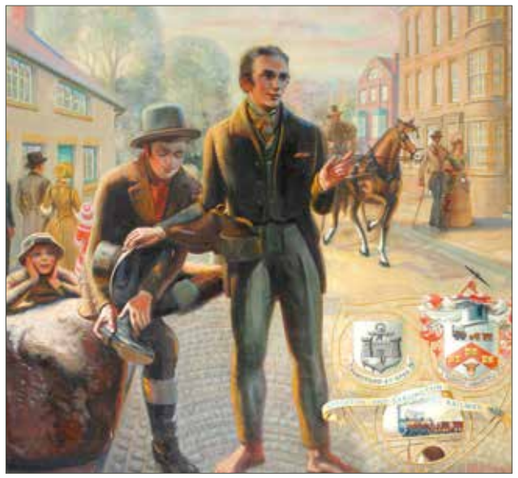
While the story may have grown in the telling, it is true that the Earl opposed the railway because of the damage to his fox hunting. Support from Quaker banks and families is also true and in the archives of Barclays Bank, the books from 1819 survive with accounts of cash being taken to London and an itemised cost of a broken wheel at £2. 3s. [4]

Painting of Backhouse's coach charging across Croft Bridge, created 60 years later by Backhouse's employee and renowned Darlington artist, Samuel Tuke Richardson. The painting hung for decades in the Darlington branch and is now in Barclay's archives. Image: Barclays Group Archives

The revised plans for the railway avoiding the Earl's land were submitted in February 1821 and Edward Pease had to invest a further £7,000 of his money (about £773,563.45 today) to reassure Parliament that the railway had sufficient finances. The Bill was successful and became an Act of Parliament in April 1821, but at almost the same time Edward Pease, recently inspired by ideas of steam locomotives, decided to make some significant changes to the proposed railway and that would require delay and yet another Act.[5]

Who were the Quakers?

After the Reformation of the 1540s breaking with the Catholic Church, the protestant Church of England became the official state religion. Other people who also believed in a Christian God chose to worship in breakaway groups broadly referred to as non-Conformists. Quakers, also called The Society of Friends, rejected the idea that a priest, a church or a bible was required to speak to God. Quakers were also known for their plain clothing, use of 'thee' as an ordinary pronoun, a refusal to participate in war, and their support of women's rights and opposition to slavery. In the early 19th century if you were not a member of the official church, you were excluded by law from aspects of society. By the 1820s Quakers were still not permitted to attend university or hold public office where an oath must be sworn such as being a Member of Parliament. Quakers with talent were instead drawn to private business such as manufacturing, banking and philanthropy. Quaker communities often looked after their own and were more likely to commission other Quakers for work and support Quakers in new ventures. They also sought to strengthen family and business ties by marrying within the Quaker community. A preference for simple, plain living without ostentation was reflected in Quaker building styles. On the S&DR, buildings were designed with a paired down classical design, so when John Carter produced proposals for the company depots, the committee ordered that his proposed design 'be divested of the ornamental part of the work'. [6]



Painting by Ralph Leslie Swinden dating to 1955 of Nicholas Wood and George Stephenson changing their footwear at the Bulmer Stone before a meeting with Edward Pease in April 1821. Courtesy of Darlington Borough Council

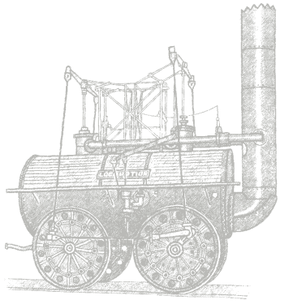
At this point in our story, we meet George Stephenson, already an engineer of some renown on Tyneside who had built successful locomotives at Killingworth Colliery and recently designed the Hetton Colliery Railway near Sunderland. Edward Pease knew of Stephenson and his work and was curious to see if locomotives would be more efficient than horses. In turn Stephenson had heard of the proposed S&DR and believed that it could be powered with steam engines instead of horses as proposed by Overton.[7] After a few meetings, including the legendary one where Stephenson and his friend and collaborator Nicholas Wood changed their footwear on the Bulmer Stone[8] outside Pease's home, before knocking on his door, Stephenson was appointed by the S&DR Committee to survey a revised route more suitable for locomotives.[9]

While Stephenson surveyed a revised route, construction started on 13th May 1822 on those parts of the trackbed that didn't need to change because of the use of locomotives. On the 23rd May 1822 the first rails were laid at St John's Well in Stockton.[10] In 1823 the new Act of Parliament was approved, allowing the use of locomotives, and importantly adding passengers to an already long list of goods in addition to coal that the railway would transport.

By September 1825 works to the mainline engineered with cuttings, embankments and bridges wide enough for double tracks, were largely complete.[11] Shortly after the 16th September, Locomotion No.1, then called 'Active' was delivered on three trolleys by road from Robert Stephenson & Co in Newcastle.[12] It was assembled and placed on the rails at Aycliffe Lane (now Heighington Station). The fire to heat the boiler was lit with focused sun's rays using a magnifying glass (the striking match was not to be invented until 1826-7 in Stockton),[13] and it was tested along the railway between Aycliffe Lane and Shildon. On the evening before the official opening, the newly delivered passenger coach Experiment was hauled by Locomotion No.1 and carried the S&DR Committee to inspect the line.

Who built the line?

Unskilled labour to build the line including cuttings and embankments was obtained locally through private contract, but many Tyneside keelmen were brought down to the line to work having being made redundant after the great strike of 1822. Most of the contractors, special blasters and tunnel makers were recruited by Stephenson himself from the Northumberland coalfield.[14] The newly invented malleable iron rails, strong enough to bear the weight of locomotives and which made up two-thirds of the railway line came from the Bedlington Ironworks in Northumberland. The more fragile cast iron rails which made up one-third of the line, and the iron 'chairs' used along the whole line and which held the rails in place, came from south Wales. The 64,000 stone sleeper blocks that the rails were fixed into came from Brusselton, Etherley and Haughton Bank Quarries[15] and were used along the west end of the line as far as Darlington (young boys were paid 8d a day (equivalent to about £1.91 a day (allowing for inflation)) to drill two holes in 24 blocks suitable for fixing the 'chairs' into.) [16] Oak sleeper blocks were used at the east end and they came from Portsmouth in Hampshire and arrived at Stockton by ship. Building the line was a national effort!



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What happened on the opening day - 27th September 1825?

The official launch of the railway was arranged for the 27th September 1825 and attracted considerable interest; in Darlington a holiday was declared. People including newspaper reporters travelled from all over the region, selecting different parts of the route to observe from. The more adventurous arrived at Shildon early in the morning in order to hitch a ride.[17] So many people did this without booking a place, that the first incident of extreme overcrowding on a train took place that very day!

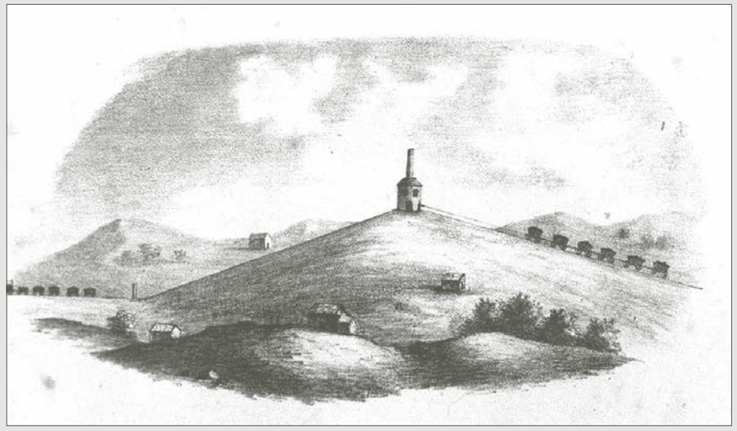
At seven in the morning,[18] twelve waggons of coal were led by horses from the Phoenix Pit near Witton Park, and then hauled just over a kilometre (1100 yards) up the North Bank by the stationary engine at the top. The waggons then descended Etherley South Bank to the road at St. Helen Auckland where the train was joined by another waggon filled with sacks of flour, and then led by horses across the Stephenson designed Gaunless Bridge to the foot of Brusselton West Bank. Here thousands of people were waiting on the slopes of the ridge to see another stationary engine haul the waggons to the top and then lower them down to New Shildon.

Reaching the level ground at New Shildon,[19] the waggons, along with 21 others for the general public, surveyors and workmen, were coupled to Locomotion No.1 along with the first purpose-built railway passenger carriage 'Experiment'. The next destination was Darlington for lunch.

George Stephenson's Gaunless Bridge in Victorian times. The ironwork forms a clever lenticular construction which, with opposing forces, creates a stable structure.

What is a stationary engine?

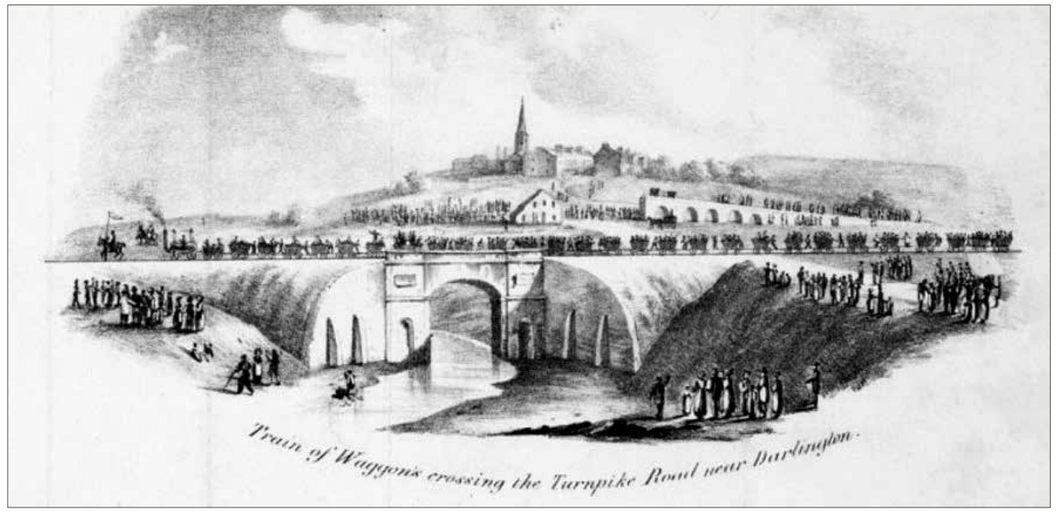
The first five miles of the S&DR at the west end were too hilly for early locomotives to travel over. George Stephenson designed a system of placing an engine at the top of each of the two hills at Etherley and Brusselton which would pull waggons attached to ropes up the incline and lower them down the other side again.



An 1827 lithograph showing a stylised Brusselton Incline and engine house with waggons being hauled to the top by the stationary engine while Locomotion No.1 waits on the level ground at New Shildon to the east to haul them to Stockton.

The engine driver for the day was George Stephenson while his brothers James (usually called Jem or Jemmy) and Ralph acted as firemen. Timothy Hackworth recently appointed as the company's engineer and locomotive superintendent acted as guardsman. Also from Wylam like Stephenson, Hackworth had also worked on the design and construction of Locomotion No.1 in Newcastle. All the crew, including brakesmen who were positioned between couplings on the waggons, wore blue sashes on

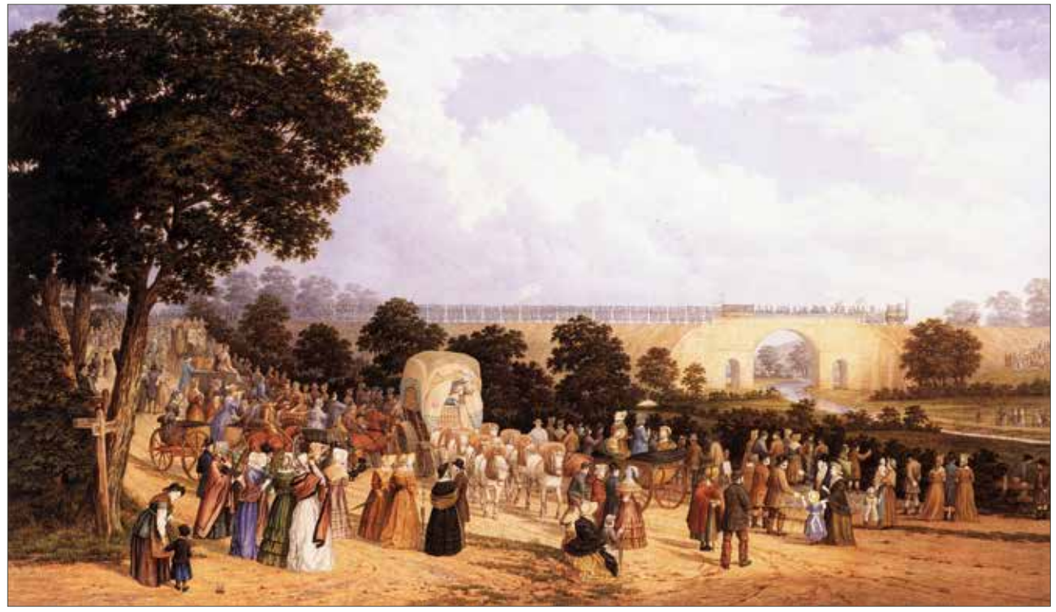
The former Masons Arms pub in Shildon in July 1948 where Locomotion No.1 set off with its long train of coal, flour and passengers on the 27th September 1825. The pub was remodelled in c.1875 but some parts of the original inn remain. Photo courtesy of the Ken Hoole Collection Head of Steam Darlington Railway Museum



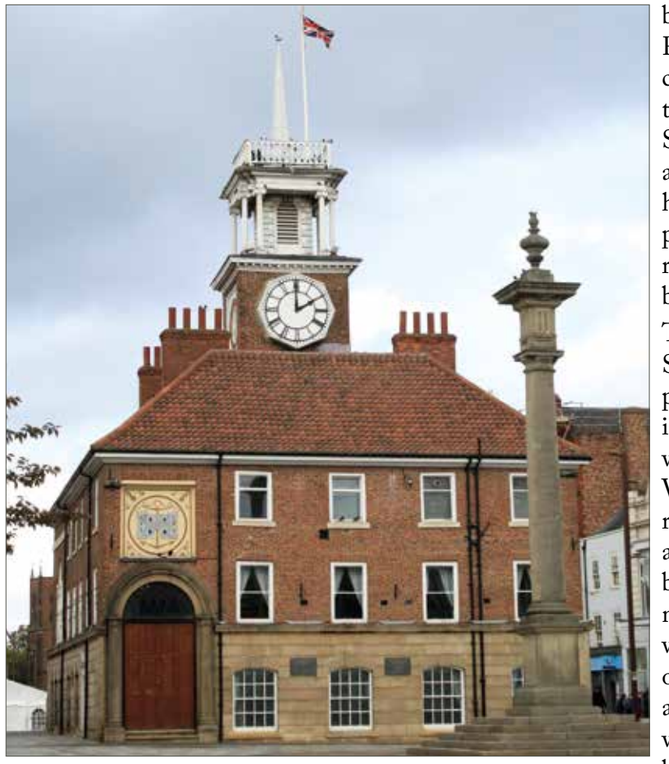
The opening day, Skerne Bridge and the town of Darlington as depicted in an 1826 lithograph

their right shoulders while other railway employees had blue ribbons in their buttonholes. On that first day, it is estimated that Locomotion No.1 left Shildon hauling 80-90 tons.[20]

At Darlington, six waggons of coal were sent down the branch line towards North Road to be given to the town's poor. The workmen and all the waggoners (apart from a keen and competitive J. Lanchester who didn't want to relinquish his place at the front of the train) left to take part in the 'convivialities' arranged for them.[21] The engine refuelled and watered and Mr Meynell's brass band from Yarm embarked on two waggons behind Experiment so that the rest of the journey was accompanied



The opening day painted by John Dobbin in 1875. Dobbin attended the opening day when he was ten years old so much of this scene was painted from memory. The train is passing over the Skerne Bridge in Darlington, hauled by Locomotion No.1. The passenger coach Experiment can be seen amongst the waggons. Photo: Darlington Borough Council



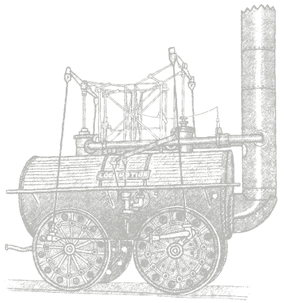
Stockton Town Hall. The large doorway was where the guests arrived for the banquet. Photo: Brendan Boyle

by music. Crossing the Durham Road (now North Road) by a level crossing, the train passed over the S&DR's largest structure, the Skerne Bridge, designed by Durham architect Ignatius Bonomi. From here they could look down into the pasture fields, grazing cattle and the river Skerne quietly winding its way below.

The line from Darlington to Stockton was relatively level and passed smoothly with only one incident when a brakesman fell off a waggon which then ran over his foot. Whenever the line ran alongside a road, such as the Yarm Road, horses and carriages would attempt to race, but the locomotive hauling much more was clearly superior. More waggons were detached near Yarm onto the branch line and the train arrived at Stockton's quayside, now with 600 passengers clinging on board, greeted by a 21-gun salute. The band led a procession into town where the railway staff dispersed to their appointed eating places to celebrate.

One hundred and two official guests were entertained to a banquet at Stockton's Town Hall. Mr Meynell, a shareholder and the Chair of the S&DR, moved from Brass Band leader to the Chair of the banquet and, along with the town's mayor, led 23 toasts while carefully chosen music played. The music included 'Weel May The Keel Row' celebrating the keelsmen of the Tyne, many of whom had moved south to work on the railway. The toasts aimed to encourage the very industries that the railway needed to serve if it was to succeed. The coal industry and its owners were celebrated, along with the Tees Navigation Company who controlled traffic on the river from where the S&DR would export its coal to London. The lead trade and other mining industries were toasted along with the farming sector. Embryonic railway companies were toasted and encouraged to join the railway age including the Liverpool & Manchester and the Leeds and Hull Railways. The last toast was to George Stephenson, but by this time he had left, exhausted.

Every 50 years since 1825 that day has been celebrated. 2025 will be the 200th anniversary of the Stockton & Darlington Railway - the Railway that got the world on track.



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Why was the S&DR important and what made it different to other early railways?

There had been railways before 1825. The idea of horse drawn waggons on wooden rails was brought to this country by German miners in the 16th century and went on to be developed at mines across the country including the extensive Tyneside coalfield in the 18th and early 19th centuries. A number of people developed an engineering expertise in making and running locomotives and railways were inspired not just by technical curiosity but by the potential cost savings of steam power over horsepower made all too evident by the high costs of horses and fodder during the Napoleonic wars.[22] By the early years of the 19th century there had been some experiments with steam locomotives on rails by men such as Richard Trevithick in Wales, John Blenkinsop at the Middleton Railway near Leeds, William Hedley at Wylam on the Tyne and of course George Stephenson at Killingworth and Hetton.[23] Stephenson and Timothy Hackworth, both from the little village of Wylam would be influential in making the S&DR a success and building confidence in the use of reliable locomotive power. [24]

S&DR milestone marking 20 ½ miles from Stockton.

The S&DR was a permanent, public railway designed to carry anything. You paid your money - you used the railway.

Many early railways were temporary forms of transport, designed to move coal or minerals from the mine to the river or canal for onward travel. Only the mine company or private industrialist could use them and when the mine closed, the railway closed too.

From the outset the S&DR was different; designed to have a permanent main line and branches, available for anyone to use for a fee at an agreed and advertised rate. By 1830 it had branch lines serving Darlington, Yarm, Black Boy, Croft, Haggerleases and had extended its main line to the newly created Port Darlington - modern Middlesbrough. The mainline on the opening day was 26 miles long, and longer than any steam powered public railway before.

'Here, however, was a public railway projected and carried out on a scale of magnitude and novelty not hitherto approached, and furnished with the then unfamiliar accessory of steam locomotion.' [25]

The S&DR Company Seal, designed and adopted before the decision was fully made to use locomotives instead of horses

The S&DR was not a single use line built to haul one thing such as coal, or just to move passengers. The first Act of Parliament set out the sort of things the promoters thought the railway could carry including: limestone, road repair materials, manure, 'Coal, Coke, Culm, Cinders, Stone, Marl, Sand, Lime, Clay, Ironstone and other Minerals, Building Stone, Pitching and Paving Stone, Bricks, Tiles, Slates, and all gross and unmanufactured Articles, and Building Materials… Lead in Pigs or Sheets, Bar Iron, Waggon Tire, Timber, Staves and Deals, and all other Goods, Commodities, Wares, and Merchandizes', and finally coal. [26]

To this list was added passengers two years before the railway opened.

The S&DR passenger traffic flourished beyond initial expectations and by early 1826-7, it was carrying some 30,000 passengers a year, a more than eightfold increase in local travel. This was considerably more per head of population than subsequent early railways such as the Liverpool & Manchester Railway of 1830.[27]

The successful business of a mixed goods and passenger railway became the model for our modern railways.

It was the first part of a national railway network

It was clear to the promoters of the S&DR that this was the start of a national network. Four years before the railway opened when Edward Pease visited George Stephenson at Killingworth in 1821 to see how locomotives worked on the coalfield, he knew that the railway could become the new 'king's highway' which would supplant the steamship as the purveyor of the nation's post. [28] And when the Croft Branch was formally opened in 1829 by Francis Mewburn, the company's solicitor, he speculated that one day the railway would allow travellers to lunch in Darlington and take an opera in London the same evening. Such a vision was met with considerable mirth at the time, but the Croft Branch was to have a role in making that national network a reality when part of it became what remains to this day, the east coast mainline.[29] The spread of a national railway network with faster travelling times would eventually impact time itself.

A time of change

Before the railway spread across the UK, different parts of the country operated on slightly different time zones. For example, Bristol was ten minutes behind London time. When travel was by horse along slow roads, travellers could adjust their watches along the journey, but such discrepancies caused problems with railway timetables. Travellers needed to know if they were catching the 2.30 from Edinburgh in Edinburgh time or 2.30 London time? Time therefore had to be standardised, clocks fitted to stations and eventually local time zones were forgotten.

The railway was designed to use locomotive power

The railway was designed to be locomotive hauled as set out in the 1823 Act of Parliament. This was so unusual a Clerk at the Houses of Parliament had to check to see what a locomotive was! [30] Five locomotives were initially commissioned from Robert Stephenson & Co.,[31] a company

Hackworth's business card featuring the Globe.

set up with considerable foresight in the knowledge that locomotives were not just going to be needed by the S&DR but by future railways. Despite the early Stephenson locomotives being unreliable and an early need to use some horse power due to a lack of locomotives, the S&DR Company fervently promoted locomotive power as the way forward. It was clear to the engineers and railway company representatives who subsequently visited the S&DR that horses were only being used because there was not a fast enough supply of locomotives in this embryonic industry.

'From the foot of the inclined plane to Stockton the waggons are conveyed by locomotives, horses only being used because they have not locomotives enough, the trade having increased more rapidly than had been expected.' (Allen, Horatio (Liverpool) to Jervis, John B. (New York) 1828). [32]

Timothy Hackworth, the S&DR's chief engineer, saved the day through his constant research and design, rebuilding of Locomotion No.1 and eventually the building of the Royal George in 1827. Its construction was the turning point in locomotive design and paved the way for the general adoption of steam. By 1830 the company had twelve locomotives including the Globe, designed by Hackworth specifically for passenger use.[33]

Robert Stephenson & Co

In June 1823 key players from the S&DR set up Robert Stephenson & Co in Newcastle to make and supply locomotives to a potentially large and expanding market. Two months earlier, George Stephenson had been instructed by the S&DR to obtain estimates for steam engines on the mainline. With few businesses able to provide locomotives, he clearly saw an opportunity to provide this in-house and in doing so set up a new business for his son Robert. Robert had helped him to survey the line in 1821 and had studied at Edinburgh. Half of the capital came from Edward Pease and other partners included Michael Longridge (the owner of the ironworks at Bedlington who provided the recently invented (1821) malleable iron rails to the railway) and Thomas Richardson, fellow Quaker and cousin to Edward.[34] Although the business got off to a shaky start and Robert left to work in Colombia for three years, he eventually became one of the greatest engineers of the 19th century.

Funding & Profit - the railway was a financial success - eventually!

The type of financial backing was an important factor in the success of the railway because it meant that it was no longer reliant on a single industry such as coal. Financial backing was also available to the company through the shares it sold and loans acquired through a network of Friends, or Quakers, many with banking interests such as the Backhouses, Gurneys and Barclays.[35] The handsome profits the company delivered in its first five years also convinced a sceptical public that railways were a sound investment, not just a technical novelty. This encouraged more people to invest in more railways in other parts of the country and the world.

Innovation: the S&DR was at the right time, right place!

When the S&DR was being designed and built, there was no model of a successful railway to copy. No one had yet invented the railway station or signals and other aspects of what we now think of as defining a railway. The S&DR Company had the vision to use the technology that had been evolving over many years and adapt it for a bigger more ambitious purpose. This set it apart from other early railways such as the Swansea and Mumbles (1806), Kilmarnock and Troon (1812), or the Canterbury and Whitstable (1830) each of which is important in the development of aspects of the modern railway, but which ultimately failed to adopt and develop new technology successfully. It was to be the role of the S&DR to bring several technical innovations together in one place and through hard work and perseverance prove that it could be made to work. In the process the modern railway was invented.

An undated, but early, possibly contemporary oil painting of the line as working after the goods station was built between 1826-1827 – the Merchandise (goods) station to the left and a horse drawn passenger carriage behind the train (original is in Preston Park Museum and Grounds, Stockton Borough Council Accession: STCMG:1971.0566). Photo: Preston Park Museum and Grounds

Key innovations prior to the opening included the surveying of the line to ensure locomotives could be used and the adoption of newly invented malleable iron rails which could support heavy engines. Once the S&DR opened, the company found themselves on a steep learning curve. The reliability of locomotives and stationary engines had to be improved and safety mechanisms devised to halt runaway waggons.[36] To meet the demand for the wide range of goods being carried, the company had to develop facilities to handle them. These ranged from retail depots[37] along the line and at the termini of the branch lines, riverside staithes to load coal and freight and in Darlington a new type of building, a

The S&DR's Merchandising Station after it was converted into a passenger station in 1833 with a cottage on the lower floor and a shop, booking office and waiting room above. The dwelling house and shop were let to Mary Simpson at £5.p.a. in return for which she was to 'keep the coach office clean and afford every necessary accommodation to coach passengers'. [38] *Mary Simpson was the first woman named as an employee of the S&DR.*

Merchandising Station completed in 1827. When it was replaced with a single storey goods shed in 1833, it was turned into a passenger station. Sadly, it was demolished in 1864.

Early, and at times fraught, arguments about who had the right of way on the line, quickly led to developments such as signalling and detailed management of passenger traffic. The huge weight of traffic, far more than originally hoped for, resulted in technical improvements such as the size of sleeper blocks and the reinforcement and widening of bridges such as the Skerne Bridge.

The S&DR quickly understood the importance of serving growing public demand if it was to make a profit.[39] In 1825 the railway station had yet to be invented and so in 1826 in response to a need for shelter and refreshments for customers and travellers near their depots, the company had inns built at Stockton, Darlington and Heighington. All still survive and the Railway Tavern in Darlington is in fact still an inn! [40] Others were provided by private businesses such as the New Inn at the Yarm Branch depot (now the Cleveland Bay) opened by Mr Meynell who was also chair of the S&DR (and who's brass band played at the opening day). The railway inns at Heighington and Stockton also collected parcels and packages for customers and at Heighington, the inn was also a stopping off point for passengers and goods.[41] These buildings are some of the earliest railway buildings in the world and while not true modern stations are their first purpose built and recognisable ancestors.

Growing passenger traffic also created the first commuting to work by rail. Soon after the railway opened, S&DR staff had to use the railway to commute between their varied and largely undefined jobs in a profession that was only just unfolding. Joseph Anderson appointed in May 1827 to manage the weigh house at Shildon, kept himself useful by collecting tickets at the foot of Brusselton Incline, monitoring the time worked by the mechanics at New Shildon and reporting breaches of bye laws. He had to travel between Stockton, Yarm and Darlington at least twice a week, with his wife covering his duties while he was away.[42]

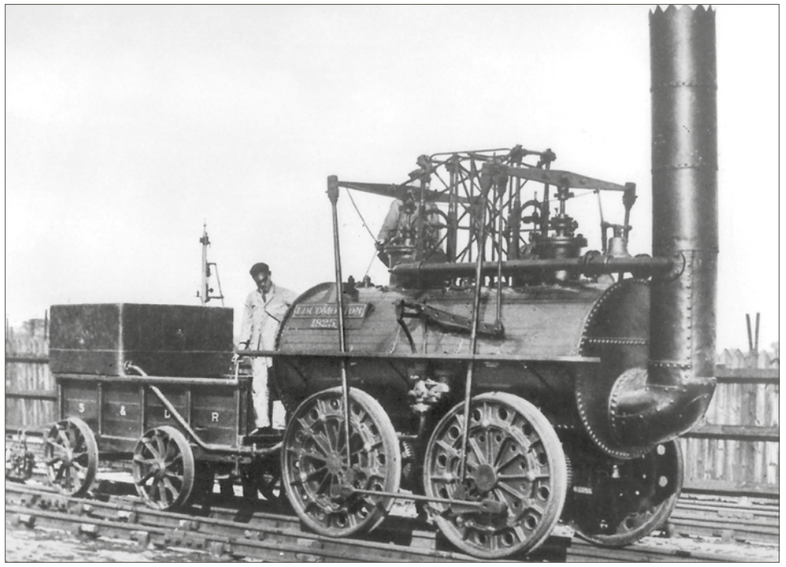
The S&DR's Railway Tavern at Stockton (central three-bayed building) with a later lower extension to the right. The weigh house is on the extreme right and the Goods Agent's offices on the left. The depot was to the rear. Photo: Barry Thompson

The surviving and still in use Railway Tavern in Darlington. Commissioned in 1826, built in 1827, but its licence not obtained until 1829. It was built to serve the workers and customers using the S&DR's depot across the road. Photo: Ross Chisholm

Heighington Station. This is where Locomotion No.1 was put on the line in September 1825 before the opening day after being transported from Newcastle. The building was a railway inn commissioned by the S&DR in 1826 to serve workers and customers using the depot adjacent. Photo: Jonathan Ratcliffe

In 1829, Archibald Knox stated that he travelled 'along the railway two or three times a week' and Robert Crowther testified that his business often took him to Stockton or Darlington and that he always travelled by railway 'which is a great convenience to the public'.[43]

While the first day of passenger travel was on the opening day when the passenger coach Experiment was hauled by Locomotion No.1, there were not enough locomotives to haul passenger coaches and waggons in the early days of operation. Based on the coaching inn model, the company therefore offered local inns the opportunity (for a fee) to provide a scheduled passenger service from the inns using specially adapted coaches which could run from the inn on to the mainline. It was while this service evolved, that baggage allowances, railway timetables, variable ticket prices and fines for non-payment of tickets were all developed - familiar to the railway user today.



Locomotion No.1 in 1925. It has been altered over the years from its original appearance on the opening day with later wheels and a water tank instead of a barrel.
Photo: from the John Proud Collection courtesy of Win Proud.

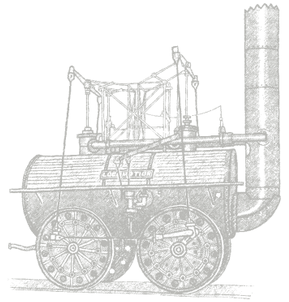
The S&DR Committee had been keen to ensure that horses were never used on the line after 1828,[44] but passenger traffic was the last haulage to make the transition to locomotive. In 1829 the S&DR Committee asked Timothy Hackworth the S&DR's engineer, to design a locomotive suitable for hauling coaches and waggons for passengers. This was the Globe and was used to open the Middlesbrough branch line in December 1830 hauling adapted waggons full of passengers. The company also started to experiment with other lighter locomotives such as the Planet and the North Star more suited to hauling passenger coaches at higher speeds than freight waggons. [45]

The S&DR linked the largest settlements in the area at that time of Darlington, Yarm and Stockton and also created the first railway settlement at New Shildon from 1825.

To encourage businesses to use the railway, they were given free access to build their own sidings and spurs on to the line if they were located within 5 miles of it. That created a 10 mile wide and 26 mile long corridor (excluding branch lines) of economic growth between south west Durham and Stockton.[46] This led to more mines and quarries being opened on former farmland and increasing industrialisation of the countryside which in turn generated the need for more workers' housing such as Hopetown north of Darlington.[47]

The S&DR's surveyor Richard Otley set out the planned new town of Middlesbrough in 1830, creating a commercial zone along the river front. This encouraged businesses to set up close to the S&DR's shipping staithes and generate customers for coal and transport. [48] It was a symbiotic relationship between coal users and businesses requiring transport placed close to the railway where they generated additional traffic and sales.

The S&DR boosted local industries, changed the landscape and by promoting the railway as the new revolutionary form of transport, it helped to trigger a second wave of the industrial revolution.



5

Inspiring and informing others.... getting the world on track

By being at the forefront of railway design and thought, others were keenly observing the lessons that the S&DR learned in its early years between 1825-30. Interest was on a national and international scale with engineers and promoters from other parts of the UK, France and America eagerly monitoring the construction of the line and attending the opening ceremony in 1825.[49]

'*The success of the Darlington railway experiment, and the admirable manner in which the loco-motive engine does all, and more than all that was expected of it, seems to have spread far and wide the conviction of the immense benefits to be derived from the construction of new railways.' (The Times 2nd December 1825)*

George Stephenson chose what became known as the standard gauge for the railway [50] and this subsequently became the most widely used railway gauge in the world. He also learned valuable lessons in building the S&DR which he could then apply elsewhere. For example, the challenges of constructing the railway embankment across Myers Flat, a swampy area north of Darlington, provided valuable experience when he designed the Liverpool & Manchester Railway across Chat Moss. [51] It also led some people from the Middridge Hill area to suggest that the repeated sinking of the embankment was due to the power of the faerie folk! [52]

Kilburn's Iron Warehouse (often called Soho Shed) in New Shildon on the right was built in 1826 by an iron company to take advantage of being able to transport their products on the new railway. It is the oldest surviving building in New Shildon. To the left in the distance is an additional Goods Shed built by the S&DR c.1855. Photo: Jonathan Ratcliffe

Timothy Hackworth, the Locomotive Superintendent based at New Shildon, continually experimented with the locomotive service and shared the results with other embryonic railway companies from the UK, the rest of Europe and America. [53] Engineers from Prussia (modern Germany), visited twice taking copious detailed notes on Hackworth's experiments between 1826-7. [54] His design of the reliable Royal George in 1827 resulted in other developing railway companies investing in locomotive power instead of horses.

9. February 1828

Esteemed Friend Hackworth,

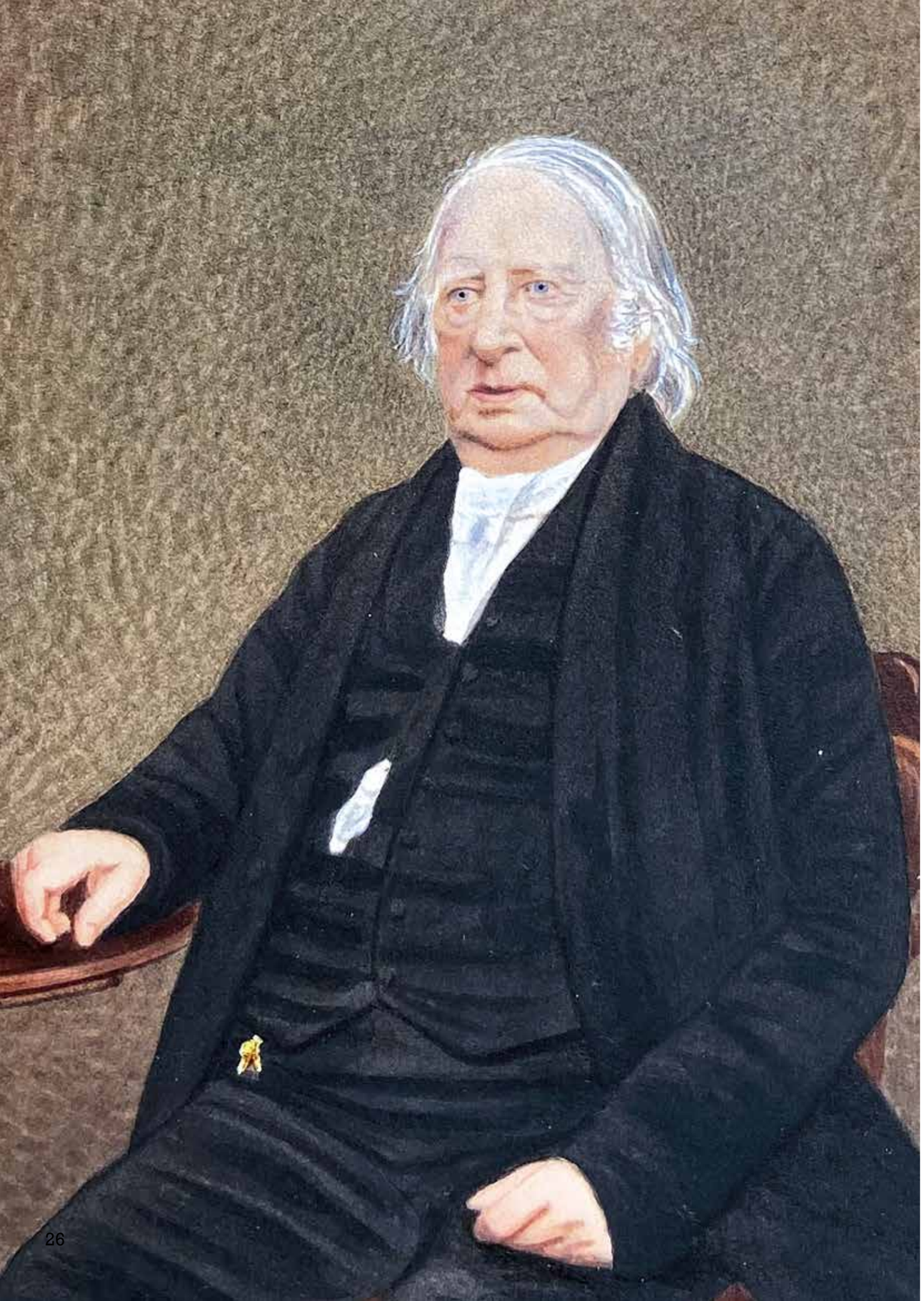
I am informed that a deputation is coming from Liverpool to see our way, but more particularly to make inquiry about Locomotive power – have the engines & men as neat & clean as can & be ready with thy calculations and only showing the saving but how much more work they do in a given time – have no doubt but thou will do thy best to have all sided & in order in thy department. Thy Frd, Edw Pease. [55]

Hackworth's House from 1831 in Shildon after recent restoration. Photo: Dr Sarah Price, Locomotion

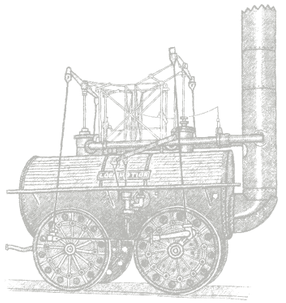
From its beginnings in 1818 to the creation of Middlesbrough in 1830, the company had learned how to run a steam powered, public railway, every day, in all weathers and in doing so it demonstrated to the wider world that such a railway could be a technical and financial success, giving birth to the modern railway that we know today.

'By Railroad Era, is meant the era commencing with the permanent and successful use of the locomotive on the Stockton & Darlington Railroad, in England, in the year 1825, that has seen within less than sixty years, the iron track laid in so many lands, on which locomotives are performing their great work in the transportation and freight.' (Horatio Allen: The Railroad Era 1884 (recollecting his 1828 visit from America)).

The Gaunless Bridge abutment. Photo: Jonathan Chapman.



A miniature painting of Edward Pease still in the ownership of the Pease family. Pease believed that having a portrait painted was a vanity to be avoided and so most of the images of Pease were derived from only two sittings. This image was painted in 1857 by Josiah Wood Whymper based on a photograph taken by his son Edward for the preparation of the illustrations for John Murray's publication of Samuel Smiles' book on the Life of George Stephenson. Image courtesy of the Pease family. Thank you to Matthew Pease who researched the artist and date for the painting.



6

S&DR superstars

There are a number of important personalities that made the S&DR the start of something new, rather than another dead end in railway history; prominent amongst them were Edward Pease, Joseph Pease, George Stephenson and Timothy Hackworth.

Edward Pease (1767-1858) was a wool merchant married to Rachel Whitwell and is often referred to as 'the father of the railways'. In fact, it was a family venture with his sons Joseph and Henry being actively involved in some of the more important decisions. [56]

Although the railway company was funded through shares and run by a committee, Edward, who had built up a vast personal fortune by 1818, was its main financial backer and as such held considerable influence over its development. [57] He, together with his Quaker banking friends and family, had the capital to take forward the vision of a permanent transport infrastructure capable of being extended across the country. He was innovative and a risk taker - prepared to change his mind on the method of traction from a horse drawn system to a locomotive drawn railway with a passenger service. Once the S&DR was up and running he remained a committee member but took a less active role in favour of his son Joseph.

His Quaker beliefs impacted on the nature of the railway. He believed that his wealth should be used for the good of others and the company motto '*Periculum privatum utilitas publica,*' Latin for 'at private risk for public good', reflects this. [58] His religion was opposed to outward displays of wealth so his house in Darlington was relatively modest, although his garden spreading down to the River Skerne millrace was renowned for its fruit trees and the largest acacia tree in town. [59] He shunned outward displays of celebration:

'….the drinking of healths and toasts which is followed often by unmeaning speeches and those maddening huzzas which better become the Lunatick than the man of sober sense, …'

was his response to the younger generation participating in such events.[60] It is often suggested that he didn't attend the opening day celebrations of the S&DR because of the death of his son Isaac, but it is unlikely that he or any of the other older Quakers would have attended anyway. [61] He continued to wear Quaker dress and use the traditional Quaker way of speaking even when the younger generation had modernised. He was renowned for his integrity and generosity to the family's employees and to schools. When he was ninety, some Darlington citizens led by his old friend Francis Mewburn, who had been the railway company's solicitor, started a campaign to recognise Edward's contribution to the start of the railways by creating a memorial, possibly a statue. Edward vetoed this and only permitted a modest congratulatory address outside his house. [62]

'In times less enlightened and more prejudiced than these, with amazing foresight, you penetrated the necessity of unbroken communication by railways, and in 1818 predicted the extension of that system which now spreads a net-work over the civilised world, binding nations together for the interchange of mutual interests.'

(Part of the address given at Edward Pease's House in Northgate, Darlington on the 23rd October 1857 as a public thank you from the people of Darlington and the pioneers of the S&DR to Edward Pease).

Statue of Joseph Pease erected near High Row, Darlington in 1875. Photo: Ross Chisholm.

Joseph Pease (1799-1872) was the third oldest child of Edward and Rachel Pease and started his S&DR career at the age of 19, setting out the prospectus for the new railway company to encourage investors. He went on to become the Company's Treasurer and oversaw the extension to Middlesbrough and subsequent improvements to the dock facilities between 1828 and 1830 [63] and he took over managing the company in 1829. By 1830 he owned more collieries than anyone else in south west Durham having acquired them in order to take advantage of the cheaper transport offered by the railway.

In 1832 he was elected Member of Parliament for South Durham but as a Quaker he was not permitted to take his seat because he refused to take the oath of office. Allowances were soon made, and he was able to take his seat in the House. He was prominent in campaigning against animal cruelty and in the fight against slavery.

His statue located near High Row in Darlington was unveiled on the 50th anniversary of the opening of the S&DR in 1875.

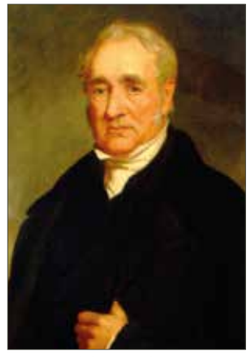


Image of George Stephenson courtesy of the Literary and Philosophical Society of Newcastle upon Tyne.

George Stephenson (1781-1848) was born in the village of Wylam in Northumberland and brought up in a tiny cottage shared with other families. [64] His parents, who could not read or write, couldn't afford to send him to school and so he worked as a colliery brakesman. Realising he must learn to read and write to get on in life, he attended night school at the age of 18. In 1811 Stephenson offered to improve the failing pumping engine at High Pit. He did so with such success that he was promoted to engine wright and became an expert in steam-driven machinery. From designing the Hetton Colliery Railway (opened in 1822) and several locomotives at Killingworth, his engineering skills became renowned and reached the ears of Edward Pease. Stephenson believed that the proposed S&DR could be much improved if locomotives were used instead of horses. Pease appointed Stephenson as the surveyor to the S&DR in 1822 and later as its Chief Engineer.

'The more we see of Stephenson…the more we are pleased with him…he is altogether a self-taught genius…there is such a scale of sound ability.'

(Written by Edward Pease to Thomas Richardson on 10th October 1821 after Stephenson's appointment as Engineer to the S&DR). [65]

Routes that George went on to survey and structures that he designed on the S&DR and other places all around the country are still in use today. His vision of a standard gauge, locomotive hauled railway, the 'Stephenson Model', went on to be adopted around the world.

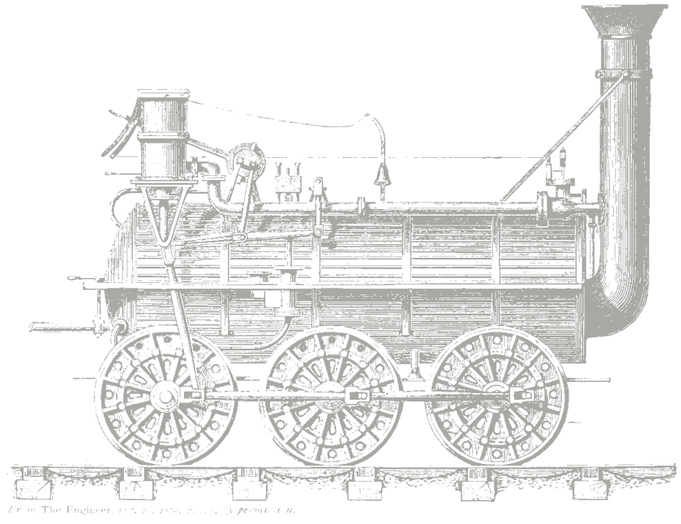
Timothy Hackworth c.1840. Credit © National Railway Museum / Science & Society Picture Library.

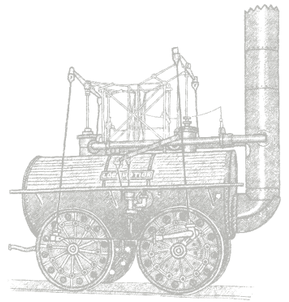
Timothy Hackworth (1786-1850) was also from Wylam. [66] He worked there from 1810 with Hedley and Foster on the design and construction of a number of steam engines, including Puffing Billy and Wylam Dilly. In 1815, he left Wylam, and the development of the locomotive subsequently stagnated. [67] In 1824, George Stephenson invited Hackworth to oversee his newly built locomotive works at Newcastle upon Tyne, where Locomotion N°.1 was being built. During his time at the Newcastle Works, Hackworth may have had considerable influence on the design of Locomotion (he later rebuilt the engine three times with a succession of improvements). Hackworth was appointed as the Superintendent of Permanent and Locomotive Engines for the S&DR in May 1825, where he kept all the engines, whether stationary or mobile, running, which, given the embryonic nature of these machines, was no mean feat. Stories have survived of Hackworth working through the night by candle light at the works in Shildon, trying to get the unreliable locomotives up and running for the morning.

'Locomotive engineering owes more to Timothy Hackworth, after George Stephenson, than to any other man.' [68]

It was Hackworth, with his constant research and design, rebuilding of Locomotion No.1 and eventually the building of the Royal George in 1827 that rescued the S&DR and put the use of the locomotive on a more secure and reliable footing.

The Royal George designed by Timothy Hackworth in 1827.





7

Is there anything left of the 1825 S&DR?

Yes! Just over 19km of trackbed remains as live railway line and so has been in continual use since 1825. This means you can still ride a train along parts of the original line between Shildon and Darlington. Much of the line, whether it is in use or not, still has a large number of engineering features dating to 1825 such as embankments, cuttings, culverts and bridges. The stretches of live line must therefore be the longest continually operating modern railway in the world.

Many parts of the trackbed survive but are no longer used as a railway. Much of this is accessible footpath including parts of the major inclines of Brusselton and Etherley and long stretches between Darlington and Goosepool via Fighting Cocks. Along the way are original culverts, level crossings, *in-situ* stone sleepers, steam engine reservoirs, accommodation bridges, boundary stones and milestones. At the crossing of the River Gaunless in St. Helen Auckland the stone abutments of Stephenson's revolutionary iron railway bridge survive (its iron decking is held at the National Railway Museum in York but is anticipated to move to Locomotion in Shildon). In fact, only about 9% of the original 1825 trackbed has been lost.

The three railway inns commissioned by the S&DR from John Carter in 1826 still survive.

One inn at Stockton forms part of a larger depot group including weigh house and agent's house at St. John's Crossing.

Right: Brusselton Accommodation Bridge on Brusselton Incline. Photo: Niall Hammond

Left: Hummerbeck Bridge – designed to carry the Brusselton Incline over the stream. Photo: Caroline Hardie

Brusselton Engine House and reservoir. Photo: Caroline Hardie

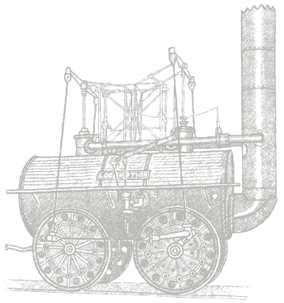
The former inn at Heighington stands empty; in its car park is the site of its associated depot where waggons travelled down a siding and off-loaded coal, lime or other goods for sale locally.

The Railway Tavern on Northgate in Darlington survives as an inn and fragments of the depot it served, survive on the opposite side of the road at Westbrook.

Mr Meynell's New Inn of 1825, now The Cleveland Bay and the oldest railway inn in the world, still welcomes customers on the northside of Yarm Bridge. This was the terminus of the Yarm branch line which also opened in 1825. The Skerne Bridge in Darlington still carries rail traffic. Later S&DR buildings such as the Goods Shed of 1833 and North Road Station of 1842 are close by. At Shildon, various early railway buildings can be found at Locomotion and in the town and there are plenty of walks to explore the railway safely.

Opposite: Skerne Bridge designed by Ignatius Bonomi and built 1824-5, subsequently altered by John Carter. Photo: Niall Hammond

The former New Inn of 1825, now the Cleveland Bay, at the terminus of the Yarm Branch. Photo: Brendan Boyle



8

Visit the Stockton & Darlington Railway:

No other place in the world can showcase the place where the modern railway network began.

Ride on a train

Part of the original route of 1825 is still live railway line, conveniently connecting the two main railway museum attractions of Locomotion at Shildon and the Head of Steam Railway Museum at North Road in Darlington. Stay on board after North Road station in Darlington and head east over the Skerne Bridge just as the opening day participants did. The rest of the route to Stockton drifts on and off the line, but alight at Eaglescliffe for a trip to Preston Park Museum.

Walk the Line

Much of the railway is accessible on foot; the two inclines at the west end of the line at Etherley and Brusselton are particularly well preserved. Self-guided walk booklets for the line can be downloaded for free or purchased from the Friends' web site www.sdr1825.org.uk or can be purchased at Locomotion in Shildon or the Railway Museum in Darlington.

Walking the Etherley Incline. Photo: Caroline Hardie.

Visit the Railway Museums

Locomotion Museum is located in Shildon and consists of early railway buildings and a large modern engine shed housing a range of engines. Find out more at their web site www.locomotion.org.uk. From here you can catch a train to Darlington's Railway Museum along the original 1825 route.

Darlington's Railway Museum (Head of Steam) is located near North Road. It consists of historic railway buildings and museum displays. Check their web site for further information www.head-of-steam.co.uk.

Preston Park Museum and Grounds near Stockton has the earthwork remains in its grounds of the 1825 route where Locomotion No.1 won the race against the horse drawn coach along Yarm Road. The museum also has a number of railway related accessions.

Join the Friends of the Stockton & Darlington Railway

The Friends of the Stockton & Darlington Railway is a registered charity and Community Interest Organisation. It is a group of people who care deeply about the railway heritage of the North East of England and want to see the 1825 Stockton & Darlington Railway line receive the recognition and the protection it deserves as the start of the modern railway network from which all modern railways across the world developed. The Friends run guided walks, carry out research and campaign to conserve and celebrate the remains of the S&DR.

Find out more and join us online at www.sdr1825.org.uk.

Oil Painting of The Opening of the Stockton & Darlington Railway, 1825 by Terence Tenison Cuneo (1907–1996) This shows the race alongside Yarm Road where Preston Park is today. Image credit: Cuneo Fine Arts/ National Railway Museum / Science & Society Picture Library.

Endnotes

1 Kirby 1993, 32 end 26

2 This is not an entirely accurate conversion based on inflation since 1825. There are other ways of converting modern equivalents which will produce different results.

3 Northern Echo 28th July 2019

4 Description of 'Jonathan Backhouse & Company 1774-1896 Darlington private bankers, Jonathan Backhouse & Company, Darlington, 1615 - 1916. Barclays Group Archives. GB 2044 A02' on the Archives Hub website, [https://archiveshub.jisc.ac.uk/data/gb2044-a02], (date accessed :10/02/2021)

5 Kirby is clear that it was Pease who decided to appoint George Stephenson to survey an alternative route suitable for using locomotives instead of horses. The committee were less keen to abandon their hard fought for scheme to have a horse drawn tramway. (Kirby 1993,39)

6 Fawcett 2001, 13

7 Davies, R 1925, 18

8 A glacial boulder which sat at the roadside opposite Pease's House on Northgate. Find out more here: https://www.therailwaystation.shop/sdr-myth-busting-was-the-meeting-between-pease-stephenson-and-wood-in-1821-a-bare-foot-lie/

9 Jeans 1974, 37

10 Ibid 1974, 46

11 Edward Pease in his letter to George Stephenson dated 7th July 1821 informed him of the Committee's decision that enough land be purchased 'for a double Railway' as soon as the exact route was known, but he also asked Stephenson to provide comparative costs for 'double and single Railway and whether it would be needful to have it only double in some part and what parts…' (Davies 1925, 14-15)

12 Young 1923, 108 and Tomlinson 1875, 105

13 https://heritage.stockton.gov.uk/articles/people/john-walker-inventor-of-the-friction-match/ [accessed 25.221]. Some of Walker's original 'Friction Lights' are held by Preston Park Museum and Grounds.

14 Kirby 1993, 44

15 Tomlinson 1914, 91

16 Jeans 1974, 52

17 Holmes 1975, 13

18 The London Morning Post of 4 October 1825 reported that events actually started at 5.30am when waggons were drawn by horse along the line from Darlington towards the stationary steam engine at Brusselton and at about the same time other people and Committee members set off in the post-chaises to watch from West Auckland (Smith 2012, 24).

19 Where the former Masons Arms is today

20 Holmes 1975, 14

21 Ibid

22 Smith 2012, 34

23 Young 1975, 16-80

24 Smith 2012, 38-44

25 Jeans 1974 (1875), 65

26 Act of Parliament 1821 para LXII

27 Guy 2015, 8

28 Orde 2000, 22.

29 Archaeo-Environment 2019. Historic Environment Audit the Croft Branch Line of the Stockton & Darlington Railway, 11 [accessible from https://www.aenvironment.co.uk/online-library-darlington/]

30 Davies, R 1925, 18

31 Pearce 1996, 28

32 The Railway and Locomotive Historical Society Bulletin No. 89 (November, 1953), pp. 97-138

33 Based on tables published by Pearce, T 1996, 233-5

34 Orde 2000, 2

35 Kirby 1993, 47-50

36 Holmes 1975, 18-19

37 This retail function at depots was later adopted by the North East Railway after it amalgamated with the S&DR in 1863

38 TNA RAIL 667/298.

39 Andy Guy 2015, 31-32

40 The inns at Darlington and Heighington were initially refused a licence and so had to offer a limited service without alcohol

41 Reported in Durham Advertiser 24.10.1829, p3. See Boyle forthcoming.

42 Tomlinson 1914, 134-5

43 Reported in Durham Advertiser 24.10.1829, p3. See Boyle forthcoming.

44 Kirby 1993, 68

45 Holmes, P 2000, 11

46 Act of Parliament 1821 LXXXVI

47 Boyle, 2019 'Hope Town - the World's First Railway Village?' in The Globe Dec 2019, 2

48 Archaeo-Environment Ltd 2018 Historic Environment Audit for the 1830 Branch Line to Middlesbrough Council. Available from www.aenvironment.co.uk/online-library-teesside/

49 Also present at the banquet on the 27th September 1825 was the chairman of the Liverpool and Manchester Railway Company (not to be opened for another 5 years) and the Chairman of the Liverpool and Birmingham Railway Company, (not be opened for another 12 years as the Grand Junction Railway having been amalgamated with the Birmingham and Liverpool Railway Company). William Strickland visited the line on behalf of the Pennsylvania Society for the Promotion of Internal Development (Tomlinson 1875, 104-5). His recommendations back in Pennsylvania were largely ignored with disastrous consequences.
Later in 1825, French engineer Marc Seguin and his brother Camille visited the S&DR. The brothers went on to be largely responsible for the construction of France's first railway, the Saint-Étienne–Lyon railway, between 1828-33 which used horses for its first few months as tractive power. In 1829, Marc delivered two steam locomotives of his own design to the new railway (earlier commissions from Stephenson had not been successful).
In 1828, Robert Stephenson wrote a note to Hackworth asking him to show a French visitor the 'railways and machinery' (HACK 1/1/13).

50 Standard gauge means the distance between the rails was 4 feet 8 ½ inches (1,435 mm). In fact the distance was 4ft 8 initially but an additional ½ inch was added once the S&DR started to operate to allow less friction between the wheels and the rails. This became the standard gauge.

51 Tomlinson 1914, 88-9

52 Ibid

53 Only the Mauch Chunk, Summit Hill and Switchback Railroad (its full name) and the Delaware and Hudson Canal Company were open railroads by 1828. The former opened in May 1827 was a canal feeder railroad which remained horse worked. Other American visitors to the S&DR included:

William Strickland	Philadelphia, Germantown & Norristown Railroad
Samuel Kneass	Mine Hill and Schuylkill Railroad
Moncure Robinson 1825-27	LeHigh & Susquehanna
Erskine Hazard 1826	Mauch Chunk
Horatio Allen 1828	Delaware & Hudson Canal Company
John Fessenden 1828-29	Boston & Worcester
Jonathon Knight 1828-29	Baltimore & Ohio
William McNeill 1828-29	Baltimore & Susquehanna
George Whistler 1828-29	Baltimore & Susquehanna
Charles Storrow 1829	Boston & Lowell

(above information from Ray State 2019, 2)

54 In 1826 two engineers from Prussia made their first visit to Darlington to learn more about the railway in order to inform progress back home where mineral railways had long been established (using wooden rails). They returned to Darlington the following year when they also explored other lines under construction, such as the Liverpool and Manchester and earlier colliery railways. The account they wrote, concentrated on the S&DR because it was the most advanced. They concluded by recommending wrought iron railways as the better type (malleable iron rails as used by the S&DR). It is clear from the text that they saw 'Darlington' as the finest railway in England followed by Hetton Colliery (Carl Von Oeynhausen and Heinrich Von Dechen. Their research led to a report: 'Report on English Railways in England 1826 - 1827' - translated by E A Forward in the Transactions of the Newcomen Society Vol 29 1953-5 - pp 1 - 12.) Oeynhausen, C. von and Dechen, H. von 1826 and 1827. Railways in England. Published for The Newcomen Society 1971

55 Letter from Edward Pease in Darlington to Timothy Hackworth in Shildon asking him to show a deputation from the Liverpool & Manchester Railway which was not yet open, how the locomotives were operating. It is clear that Edward Pease was keen that they should see the benefits. Pease was an older generation Quaker who spoke in a traditional Quaker style using these and thous. The next generation of Quakers including Joseph Pease were less likely to use this style of language. The original letter is in the Search Engine at the National Railway Museum in York.(HACK 1/1/12)

56 Orde 2000, 2-3

57 Ibid

58 Although the motto was in fact suggested by Rev. Daniel Peacock, presumably a Church of England vicar. (Holmes 1975, 5)

59 Orde 2000, 92

60 Ibid, 93

61 Boyle 2018, 13

62 Orde 2000, 94

63 Archaeo-Environment 2018, 18

64 Smith 2012, 38

65 Kirby 1993, 45

66 Smith 2012, 41

67 Young 1975, 81

68 Jeans 1974 (first published in 1875), 269

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The Stockton & Darlington Railway opened on the 27th September 1825. This was the start of the modern railway network that went on to cover the rest of the UK and the world.

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