

VIII

Thomas Elliot Harrison: North Eastern
Railway Engineer*John Addyman and Bill Fawcett*

SUMMARY

In the course of a career lasting sixty years, the civil engineer Thomas Elliot Harrison (1808–88) made an enormous contribution to the development of the railways of north-east England; he was also much in demand throughout Britain as a consultant on railway and dock schemes. This paper explores that career, the central feature in which is Harrison's role in creating the North Eastern Railway, of which he was Engineer-in-Chief until his death.

INTRODUCTION

WHILE THE STEPHENSON NAME LOOMS LARGE in the history of railways in the North East, Thomas Elliot Harrison (1808–88), the engineer responsible for many of the great monuments of the East Coast route to Scotland — including Durham viaduct and York station — has been all but forgotten. As 2008 is the 200th anniversary of Harrison's birth, now seems a good moment to reassess the career of this overlooked engineer. A friend and colleague of Robert Stephenson, Harrison played a major role in the development of the railways of north-east England, and in the formation of the North Eastern Railway (NER), which for a time was Britain's largest railway. During the three decades in which he was Engineer-in-Chief of the NER, its mileage more than doubled. Harrison also had an extensive private consultancy practice, through which he advised on railways all over the British Isles.

EARLY YEARS

Thomas Elliot Harrison's father and uncle had been involved in various mining and colliery railway ventures in the North East (for more on the family background see the Appendix), which had led to the Harrison family settling in Sunderland. Thomas was thus ideally positioned for a career in engineering, and indeed, after an education at the long-established Kepier Grammar School in Houghton-le-Spring, he was attracted by the possibilities of the profession and left school at sixteen to become a pupil of the civil engineer, William Chapman (1749–1832).¹

Chapman was then the leading civil engineer on Tyneside, with extensive experience of docks and canals throughout Britain. His current projects included a scheme for a railway from Newcastle to Carlisle, on the alignment of his earlier canal proposal, and improvements to Leith Docks. One of Chapman's pet schemes was a new coal-shipping harbour at Seaham, an idea taken up by the Marquess of Londonderry, though construction did not begin until

1828.² This gave young Tom a sound knowledge of harbour construction and also aroused a lifelong interest in docks and the mechanised shipping of coal from railway wagons into ships' holds. It also seems to have given him his first opportunity to plan a railway. One was required to link the harbour with Londonderry's collieries at Rainton, and in November 1828 Shakespeare Reed undertook to finance and build it. Thomas' father, William Harrison, acted as intermediary between Reed and the Marquess, and a letter of his credits the design to Tom, presumably acting under Chapman's guidance.³ The Seaham Railway was eventually engineered and built by Benjamin Thompson.

In 1829, aged twenty-one, Harrison came to the end of his pupillage and set off for London to gain a broader experience of civil engineering, armed with an introduction from William Chapman to Thomas Telford (1757–1834), first president of the Institution of Civil Engineers and doyen of the profession. Harrison later recalled the astonishing rebuff: 'He received me most kindly, and when I explained the object of my visit, he said, "Young man, you have made a great mistake in choosing civil engineering for your profession, and the sooner you turn your attention to something else the better, for there are very few that rise to eminence; all the work is centred on them, and the rest have little or nothing to do." For twelve months I was cast down, and thought what he said was only too true.'⁴ As a result he spent a year in the London office of an accountant, who was a family friend. That experience stood him in very good stead in later life when he had to provide statistics, unravel complex railway accounts and arbitrate in many of the financial disputes that were inevitable within the expanding engineering profession.

PROFESSIONAL CAREER

Harrison's initial reason for going to London had been to become involved in the building of railways, then on the cusp of rapid expansion. October 1830 saw the start of Robert Stephenson's survey for the London & Birmingham Railway (L&B), and Harrison was employed until November 1832 in preparing parliamentary plans and sections for the 30 miles from Wolverton to Rugby.⁵ Had his father and uncle not embarked on a railway scheme in County Durham, Harrison would have certainly ended up as an assistant engineer on the L&B.

STANHOPE AND TYNE RAIL ROAD

In 1831 William and John Fairweather Harrison became the chief promoters of a railway to link quarries near Stanhope and collieries near Consett to the River Tyne. The site chosen for the shipping staiths was South Shields, and the scheme became known as the Stanhope and Tyne Rail Road (S&T). The promoters decided, unwisely, to build the line without an Act of Parliament, and, therefore, to pay annual wayleaves over all the land it crossed on its 38-mile journey; this did not help its financial prospects. Harrison was appointed engineer and in September 1832 Robert Stephenson was prevailed upon to act as consulting engineer.⁶ The topography between Weardale and the Tyne did not lend itself to the building of a conventional locomotive-worked railway. An initial two-mile climb of 650 feet, worked by two stationary engines, was needed to reach the maximum altitude of 1445 feet, just above Weardale. Then the irregular descent northwards to sea level meant a combination of stationary engines, self-acting inclines, horses or locomotives, were used as gradients and cost dictated. The earthworks were kept to a minimum, and an expensive viaduct across the ravine at

Hownes Gill, near Consett, was avoided by the use of a stationary engine to work the wagons up and down its steep sides.

Even before the S&T opened, on 10 September 1834, its promoters had become involved in another railway. On 16 June 1834, this line, which should have helped the S&T to acquire more traffic, was incorporated as the Durham Junction Railway (DJR). It left the S&T near Washington, crossed the River Wear and ran southwards to Rainton Meadows with the aim of connecting with either the Hartlepool or Clarence railways. Unfortunately, both these railways ran into difficulties, and did not complete their authorised northern extensions, so the DJR's hopes of joining up with them to provide a viable Tyne-Tees rail-link were dashed.

THE VICTORIA BRIDGE OVER THE WEAR (FIG. 1)

The DJR was an expensive project, as it required a large viaduct to cross the River Wear, near Penshaw, and first thoughts were for this to have a wrought-iron main span of 170 feet.⁷ Harrison consulted James Walker (1781–1862), now president of the Institution of Civil Engineers, and he suggested a masonry structure, using local freestone, with the design based on Emperor Trajan's bridge at Alcantara, in Spain.⁸ By September 1835 the survey for the line had been completed and a preliminary design for a masonry bridge had been produced. However, old coal workings had been discovered around the Wear crossing and John Buddle and Nicholas Wood, both experienced colliery viewers, were consulted about this problem. Surprising as it may seem today, the information was provided within a fortnight, and the bridge design was finalised by increasing one of the two main spans from 147 to 160 feet and reducing the other to 144 feet to give the safest foundations.⁹ The contract was let to Alexander Gibb, of Aberdeen, and work commenced on 17 March 1836. The structure was completed on Queen Victoria's coronation day, 28 August 1838, and named the Victoria Bridge. Its cost was £40,000. The main span of the bridge still remains the largest for a masonry railway bridge in England — not a bad achievement for the first major structure by an engineer still in his twenties.

PROPOSAL FOR DARLINGTON TO NEWCASTLE RAILWAY AND FAILURE OF THE STANHOPE & TYNE (FIG. 2)

1834 saw the Great North of England Railway (GNER) being mooted to build a main line from York to Newcastle, and Acts were granted in July 1836 and July 1837. By then it must have been obvious to the DJR and S&T directors that the Clarence and Hartlepool railways were not going to complete their extensions towards the DJR. In 1837 T. E. Harrison and Nicholas Wood (1795–1865) produced a much cheaper alternative to the Darlington to Newcastle section of the GNER called the 'North Union Railway'. This could utilize the DJR and parts of the Clarence and Brandling Junction, thus requiring a much smaller mileage of new railway.¹⁰ The GNER opened from York to Darlington in 1841 but could not fund the continuation to Tyneside. This opened the way for the adoption of the Harrison & Wood scheme, modified to use 5½ miles of the S&T but excluding the use of the Clarence Railway. By this time it was too late to save the S&T, which had run into severe financial difficulties.

T. E. Harrison had no financial stake in the S&T fiasco, but his uncle and father were drastically affected. John Fairweather became bankrupt in March 1841, and William Harrison only narrowly escaped this fate. This ended William's business career, though he lived on

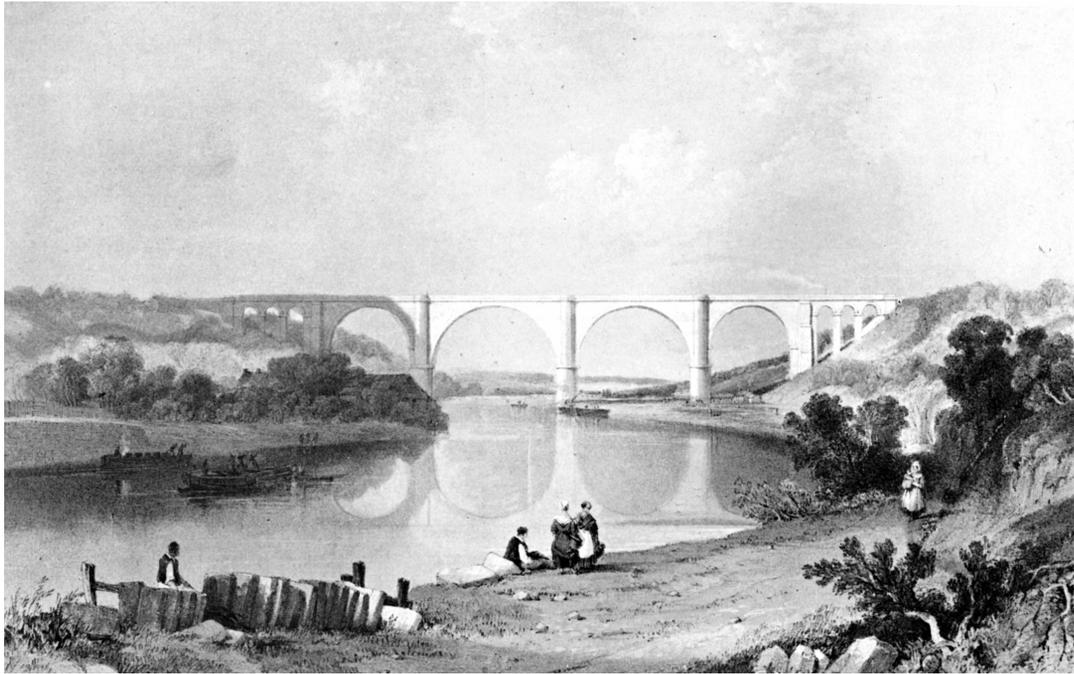


Fig. 1 Victoria Bridge over the River Wear. The main spans reading from left to right are: 100, 160, 144 and 100 feet.

until 1846. T. E. Harrison's relationship with Robert Stephenson seems to have cooled. Robert was not even mentioned in any of the numerous toasts at the celebrations following the completion of the S&T, perhaps because his workload on the L&B had allowed only cursory visits to the North East.

LOCOMOTIVE DESIGN 1837

At this time Harrison dabbled in locomotive design, but preferred to work to Brunel's wholly impractical specification rather than Robert Stephenson's almost universally accepted, practical solutions, which had been established following his design and construction of Rocket in 1829. Brunel's specification required low piston speeds, light axle loads and a 'force of traction' much less than achieved by Robert's *Northumbrian* of 1830. Surprisingly Harrison fell for this nonsense, and designed two locomotives for the Great Western Railway and one for the S&T (fig. 3). To fulfil Brunel's criteria the boiler had to be placed on a separate carriage from that which carried the driving wheels, cylinders and motion, thus eliminating most of the adhesive weight. Steam was carried from boiler to the cylinders through long flexible pipes, which inevitably leaked and allowed substantial heat losses. To reduce piston speeds one locomotive had 10 feet diameter driving wheels and the other had 6 feet wheels with 2.7 to 1 gearing giving an effective diameter of 16 feet. The locomotives were described in a technical magazine of 1901 as: '... a curious twist of an otherwise sound mind.' But, of course,

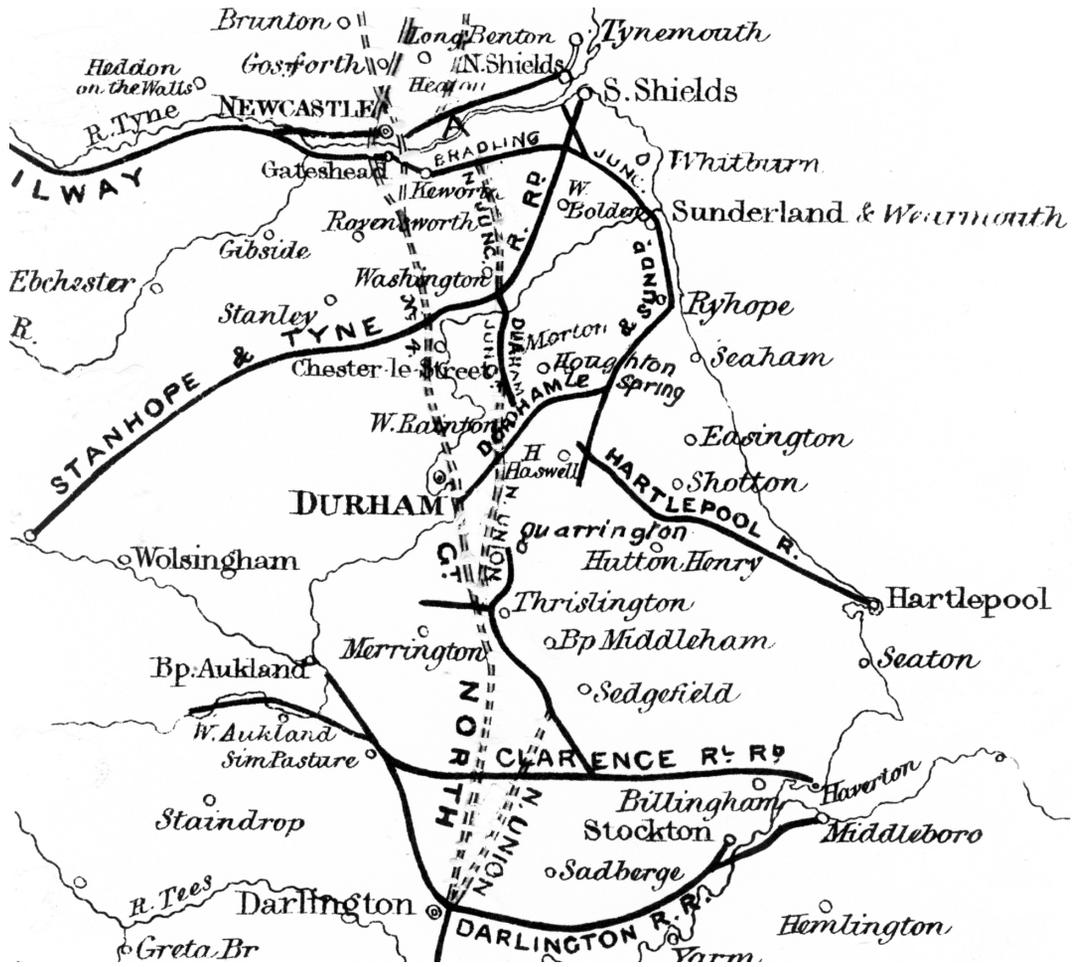


Fig. 2 a detail from the map in the Smith-Barlow Report¹⁰ showing completed (solid lines) and proposed (double lines) railways in 1840. The Harrison-Wood scheme was the North Union Railway, and it included an idea to cross the Tyne at Bill Point (A).

no blame could possibly be attached to Brunel, who had come up with the specification in the first place!

RAILWAYS FROM DARLINGTON TO GATESHEAD

Robert Stephenson took over as Engineer-in-Chief of the GNER in 1841 and, with the assistance of Harrison, went on to complete the East-Coast route from Darlington to Berwick. George Hudson, the 'Railway King', gave all his considerable support to the schemes. Some of the parliamentary route of the GNER was accepted for the new construction from Darlington to the start of the DJR near Rainton Meadows, but the use of existing railways from Rainton to Gateshead reduced the amount of new construction by a third, compared with the

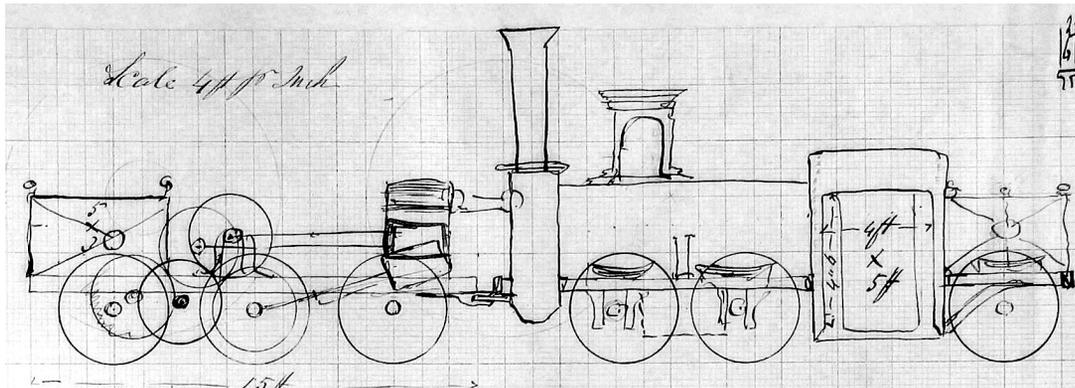


Fig. 3 a sketch from T. E. Harrison's notebook dated 1 December 1837, showing his proposed geared-locomotive for the Stanhope & Tyne Rail Road based on Brunel's specification.

original GNER scheme. The GNER route was modified 'to avoid very heavy earthworks through the high ground near Croxdale and a bank which would have been 100ft. high over the Shincliffe valley, also a very long tunnel under Gilesgate Moor, near Durham.'¹¹ North of Shincliffe the line boasted three spectacular timber viaducts over the valleys of the Shincliffe, Cassop and Sherburn Becks, designed by Harrison. These came about through a lack of suitable fill within economic distance to form the large embankments that would otherwise have been used. The *Railway Chronicle*, in 1844, described them as 'amongst the finest specimens of the adaptation of timber to bridge building, which, up to the time, had been designed.'¹²

The 'Newcastle & Darlington Junction' railway was completed speedily and economically, the actual costs being reduced by £2,000 per mile from the estimated £20,000. These savings permitted the outright purchase of the DJR, in 1844, for £88,500. The line opened on 18 June 1844, exactly two years after the passing of its first Act, and a special train ran the 303 miles from London (Euston) to Gateshead to trigger the celebrations on that day.

NEWCASTLE TO BERWICK

Although schemes had been produced before 1840 for a line from Newcastle to Berwick little progress had been made. George and Robert Stephenson's scheme had run into difficulties with a major landowner, and, although they had altered their alignment, Brunel had been brought in to produce the alternative 'Northumberland Railway' worked by atmospheric power. Fortunately for prospective shareholders, Brunel's scheme was defeated, but the Stephenson line had to include an expensive high-level bridge over the Tyne, carrying both rail and road traffic.

The Newcastle & Berwick Railway (N&B) gained its Act on 31 July 1845, and work north of Newcastle started almost immediately. The Act authorised 95 miles of main and branch lines, including 10 large viaducts and 250 bridges. The contracts for the High Level Bridge and its approaches were not let until July and August 1846. On 14 March 1846 Harrison had written about the High Level Bridge: 'The plans have been prepared under my direction: the

designs are not mine but my friend Mr. Robert Stephenson's'.^{13, 14} The major decisions on the remainder of the railway were all Stephenson's and no deviations from the contracts were permitted without his written authority. However, as Stephenson was involved in building 30 other railways, and was having to waste many weeks attending Select Committees on Bills arising from the 'railway mania', Harrison became almost totally responsible for the works. Stephenson acknowledged Harrison's contribution in his own retirement speech at Newcastle on 30 July 1850, which also marked the completion of the line:

Over the works in this district which his name had been associated, he had exercised only general superintendence — he had done little more than lend his name — it was to others the merit of their construction was chiefly due; and he felt it most fortunate for him to have conjoined with Mr. Thomas Harrison. On that gentleman the whole responsibility devolved; and it was owing to his exertions and skill that those works had been executed without a single flaw.¹⁵

One of George Hudson's achievements was the amalgamation of the railways between York and Berwick into the York, Newcastle & Berwick Railway (YN&B), and, following Stephenson's retirement, Harrison took over as its Engineer-in-Chief. However, 1849 had brought Hudson's downfall, amidst general dissatisfaction among shareholders with the management of the YN&B. A committee was set up to thoroughly investigate the affairs of the company, and Harrison was asked to report on the important questions of the maintenance and renewal of permanent way, locomotives and rolling stock. This he did with such clarity, conviction and honesty that the new board of directors recommended his appointment as both engineer and general manager of the company.¹⁶

PROPOSES FORMATION OF THE NORTH EASTERN RAILWAY

In 1852 the Leeds Northern company (LN) completed its line from Leeds to Stockton, and, with the aid of the Clarence Railway, achieved access to the YN&B at Ferryhill. Competition for traffic south of Ferryhill soon degenerated into a rates war so fierce as to imperil the finances of both companies. Having experienced the benefits accruing from the merger that created the YN&B, Harrison felt that the solution might lie in another merger, and he put this proposal to his board. At first he got little support, but when the directors investigated the circumstances more fully they came round to his view. A problem arose in that the merger could not occur without bringing the York & North Midland Railway (Y&NM) into the partnership. After some delicate negotiations the three boards accepted the principle of amalgamation, and entered into a provisional agreement for the joint working of their traffic from 1 April 1853. The Amalgamation Bill received the royal assent on 31 July 1854, and over 700 route miles were merged into a benevolent monopoly known as the North Eastern Railway (NER). Harrison became general manager of the new company for the first two months of its existence, but relinquished the post so that he could devote his whole time to engineering matters both for the NER and his growing private consultancy. At the time, the NER was Britain's largest railway, and it remained among the top four throughout its existence. Its head office was established at York but Harrison ensured that the engineering departments would be run from Newcastle, and based his office in the Central Station.

Harrison's obituary notice in the Proceedings of the Institution of Mechanical Engineers stated: 'A full account of his subsequent labours in surveying and engineering would practically be a record of the rise and development of the NER ...' As W. W. Tomlinson has since provided that account it is only necessary to emphasise certain aspects of his work for that railway.¹⁷

EARLY DEVELOPMENTS FOR THE NORTH EASTERN RAILWAY

In 1854 the NER was still feeling the capital restraints resulting from Hudson's downfall, but Harrison got the new board to accept his pet scheme for a coal-shipping dock on the Tyne near Jarrow, estimated at £350,000. His two previous attempts on this site had been thwarted in 1839 and 1849 by the financial problems of the S&T and YN&B. The 50 acre dock, which was completed in 1859, was a great commercial success and earned 5% of the NER's total revenue (fig. 4). For many years it was regarded as the largest and most advanced coal-shipping dock in the world, and it went on to export over 330 million tons of coal by the 1930s. Concurrently with constructing the dock he built a line to transport coal to it from the South Durham coalfield around Bishop Auckland — in deepest Stockton & Darlington Railway territory. The Durham Viaduct was on this line, but it did not become part of the London-Edinburgh route until 1871-72 when the original main line of 1844 was superseded between Ferryhill and Gateshead.

The NER was particularly busy with new construction from 1865 to 1871, when almost 60 miles of main line 'cut-offs' were completed to shorten various routes, e.g. between Ferryhill and Gateshead. Included in these works were the two hydraulically-powered swing-bridges

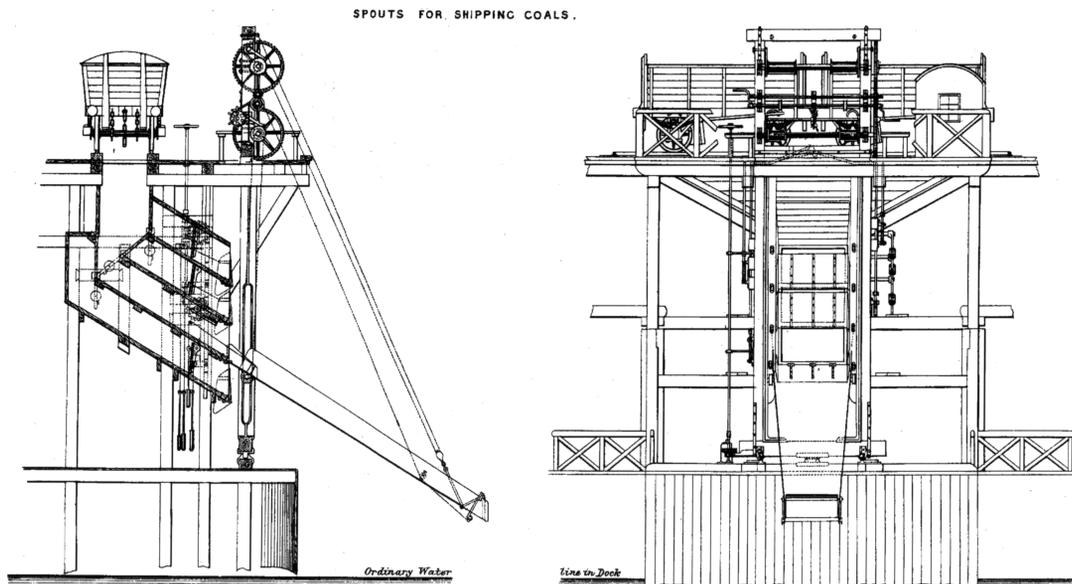


Fig. 4 details of the arrangements of the trap doors and chutes on the staiths at Tyne Dock to enable the discharge coal from railway wagons to different sized vessels. Proc. I. C. E.



Fig. 5 Goole Swing Bridge was, reputedly, the second largest railway swing bridge in the world when it was completed in 1869. The main span is 250 feet long and weighs 650 tons.

over the Ouse at Naburn and Goole (fig. 5). In 1868 the board authorised £100,000 for the reconstruction of a number of the early timber bridges and viaducts throughout the system including Ripon, Ruswarp, Scotswood and the large laminated timber ones over the Ouseburn and Willington Dene. These works were just a minor part of the continual upgrading of the system to increase its capacity to handle additional and heavier traffic.

All the major stations were remodelled, extended or rebuilt during Harrison's lifetime. He took a keen interest in this, particularly in the planning of tracks, platforms and buildings, but also in their appearance. At his instance, the NER had set up an architect's office, which carried out the detailed design of buildings and trainsheds, but was answerable to Harrison. His finest achievement in this line is probably York station (opened 1877), whose arched trainshed and ingenious layout can both be credited to his vision.

CONSULTANT FOR OTHER RAILWAYS

The retirement or death of many of the railway pioneers meant that by 1860 Harrison was much in demand as an adviser to other British railways, and he came to an agreement with the NER board to devote half the year to their business and half to his own, while his brother-in-law, Robert Hodgson (1807–77), acted for him in supervising all new construction on the NER.¹⁸ Between 1834 and 1886 Harrison gave evidence on about 110 Parliamentary Private Bills for railways and docks, in addition to those promoted by the NER.¹⁹ 'As a parliamentary witness his services were much sought after, and his evidence was always listened to with respect, as coming from a man who had thoroughly mastered the subject. His straightforward answers, his frank look, his impressive and dignified bearing, acted as a counterfoil to the sharpest cross-examinations of opposing counsel.' His integrity earned him the sobriquet of 'Honest Tom'.²⁰

Following the deaths of Joseph Locke, in 1860, and his partner John Errington, in 1861, Harrison became consulting engineer to the London & South Western Railway, whose territory extended into Cornwall. He was also consultant for a number of railways around the Welsh border. His expertise on docks led the Gloucester & Berkeley Canal to engage his services, in the course of which he designed Sharpness New Docks, opened in 1874, and also

became consultant for the 21-span Severn Railway Bridge near Sharpness, completed in 1879 to the design of George William Keeling.²¹ In 1870 he supported Thomas Bouch on his proposed Tay Bridge, and a decade later was the NER's representative on the Forth Railway Bridge design committee. In 1866 he was appointed to a Royal Commission on upland reservoirs, and the following year to one on London's water-supply. When the Telegraph Act of 1868 authorised the postmaster general to take over private telegraph companies, he acted as arbitrator in negotiations which followed. He was much in demand as an arbitrator 'on account of his vast experience, his sound judgement and his unimpeachable honesty.'

NORTH EASTERN RAILWAY AMALGAMATIONS

The NER's mileage was to more than double before Harrison's death, mainly by taking over existing lines including the Stockton & Darlington (1863) and Newcastle & Carlisle (N&C) (1862). These take-overs often caused problems, for example; it was found impossible to run the N&C's flimsy rolling stock off its own territory, and its engines 'were useless for the purpose of the present traffic.'²² The worst railway the NER took over was an uncompleted one along the Yorkshire coast north of Whitby. The original contractor had gone into liquidation, and little of his work was found acceptable. A considerable length had to be realigned to avoid it disappearing into the sea, and the five viaducts were to remain liabilities despite the combined efforts of Harrison and the new contractor, John Waddell. On the other hand, Harrison was so impressed by the thoroughness of William George Laws (1836–1904), on the Scotswood, Newburn and Wylam Railway, that he took him on as his assistant following the death of Robert Hodgson in 1877. He immediately appointed him as resident engineer for the difficult extension from Monkwearmouth through Sunderland, which required the 300 feet span Wear Bridge, two tunnels and the new Sunderland station.

IMPROVEMENTS TO RAILWAY SAFETY

Harrison's record on safety and signalling is rather mixed. In 1852 he had urged, to no avail, a Railway Clearing House Committee to accept a communication cord system between guard and engine driver that was, sensibly, also accessible to passengers.²³ In 1869 he had introduced a wedge-type facing point lock, and by 1872 all the junctions on the more important routes were equipped with them and interlocking between points and signals. Signalling then operated on a time-interval system, but a much safer approach was to divide the whole line into self-contained 'block' sections, each with its own signal box and strict working rules. Although a small length of block signalling had been introduced near Darlington in 1865 little progress had been made in installing it elsewhere until 1872; by this time the NER had become one of the most accident-prone railways in Britain. The introduction of block signalling throughout the railway required an expenditure of £3 million and a greatly increased number of signalmen. Harrison argued in his presidential address, to the Institution of Civil Engineers in 1874, that as 75% of accidents were caused by human error 'on the completion of the block system, the number of signalmen will be increased from five hundred to two thousand, thus augmenting in the same ratio the risks of human fallibility.' He concluded by asserting that increased reliance on safety appliances would reduce the vigilance of enginemmen and others.²⁴ These were popular views at the time and, no doubt, many

prominent railwaymen present that evening would have nodded their heads gravely in assent.

His appointment to the Royal Commission on Railway Accidents, in 1874, was probably due to his current position as president of the Institution of Civil Engineers. Although railways had been carrying passengers for nearly 50 years the efficient braking of trains, like proper signalling, had been largely ignored. The Commission set up a series of brake trials at Newark in 1875, and Harrison became enthusiastic in improving and promoting the new Westinghouse air brake as the most practical. The NER and some other railways accepted it immediately, but it took a further hundred years for the air brake to be universally adopted in Britain. However, from 1880 the improvements in signalling and brakes meant that the NER's accident record took a distinct turn for the better.

FINAL YEARS

The death of Robert Hodgson, in 1877, and Harrison's fast-approaching seventieth birthday, led him to run down his London consultancy which was closed in June 1879. He had 'found his private work growing larger than he could conscientiously undertake, in addition to his duties in the North. ... He therefore decided to sacrifice his private business with its large emoluments, to give up his London house and office, and devote the remainder of his days entirely to the service of the North Eastern Railway.' For a time he continued to maintain a private staff, though wholly engaged on NER business, but they were transferred to the railway's payroll at the start of 1884, when the NER directors showed their appreciation of his services by raising his salary from £3,000 to £4,000.²⁵ Later that year they commissioned for their boardroom the portrait illustrated here (fig. 6). Harrison's last branch line, and the longest to be constructed by the NER, was the 35 mile Alnwick & Cornhill Railway, deep in rural Northumberland.²⁶ The last works being completed at the time of his death were the new Blyth staiths and the loop between Newsham and Blyth Quay, and his final report to the board was for deepening and widening the entrance to Tyne Dock.

Harrison continued to work as usual for the NER until 20 March 1888, but the next morning he was taken ill and died suddenly. The Institution of Civil Engineers summed up his life's work as follows:

... a great man and a great engineer has been taken from us amidst the affectionate regrets of all that knew him. The memory of his long and distinguished career, his eminent ability and unsullied reputation, will long survive him, whilst his numerous important works will tell future generations of the soundness and skill which devised them, and of the integrity and care with which they were carried out.

It is odd that the achievements of such a distinguished engineer, whose stations still serve millions of people every year and whose bridges still carry express trains today, should have been overlooked for so long by railway historians.

APPENDIX: FAMILY BACKGROUND

Harrison's father and uncle, William and John Fairweather Harrison, were born in Totnes, Devon, to James Harrison (c. 1746–1815) and his wife, Jane Webber (1739–1834). James was an



Fig. 6 Thomas Elliot Harrison at age of 76, painted by Walter William Oules for the North Eastern Railway Board Room.

enterprising character, whose activities included a transport venture: the *Royal Devonshire and Auxiliary Mails*, owned jointly with his eldest son, also James, born 1772.²⁷

William (1778–1848) and John (1775–1869) sought their fortunes in London, starting as junior clerks with the Royal Navy's Commissioners for Sick and Wounded Seamen, based at Somerset House.²⁸ The 'Sick and Hurt Board' had responsibilities including the provision of hospitals and engagement of ships' surgeons. John Fairweather joined in February 1793 and was fortunate since the war with France created opportunities for promotion: in July 1799 he

completed his rise to become 'First Clerk' (office head) of the Department for Sick and Wounded Seamen in Home Parts. His salary was then a comfortable £400, later raised to £550. William joined in December 1796, following the surge in recruitment, and resigned after only five years, in October 1801, in order to pursue a business career.

Though John stayed on at Somerset House until 1810 this did not get in the way of developing outside business interests. In November 1806 he was admitted free of the Vintners' Company of London, by payment, becoming a freeman of the city two years later.²⁹ He became a partner with brother William and John Breaches Furze, trading as Harrison & Furze, brandy and cider merchants of London.³⁰ The brothers also took on contracts to supply provisions to the armed forces, while another string to their bow was the Totnes Union Bank, in which John and William were the sole partners.

Alongside their commercial success, John and William both made good marriages. John married the daughter of William Soltau, a prosperous London merchant. William did even better, and married Elizabeth Anna Maria Hall, daughter of a wealthy London attorney, Thomas Hall, and his wife Ann Elliot. Mrs. Hall's family were Border gentry, originating from Stobs Castle in Roxburghshire, and the Harrison children were brought up to take a pride in the Elliot connection.³¹ This was marked in the christening of William and Elizabeth's second son: Thomas Elliot Harrison, born on 4 April 1808 at Thomas Hall's country villa at North End, Fulham.

1808 also saw the Harrison brothers embark on a venture designed to cash in on the booming coal trade between north-east England and London. Their partners in this were another William Harrison — distinguished here as William (elder) — and his nephew William Gorst (both wine merchants), together with Samuel Cooke, of Sunderland, who was the only one with any expertise in the business. They traded as Harrison & Cooke and leased a number of collieries as well as owning ships for the London trade. They invested heavily in the development of the collieries and in a new waggonway to serve one of them, Urpeth, but all this was financed by borrowing.³² Before they could receive any significant return, the business was brought down by the collapse of one of their major lenders, a small London bank. The partners had no option other than to become bankrupt, and a commission in bankruptcy was awarded against them in July 1810. This meant that all their assets, business and personal, were assigned to their creditors.

Samuel Cooke seems to have fared worst in this affair. William Harrison (elder) bounced back immediately, resuming his wine business and serving as Master of the Vintners' Company only five years later. William and John Harrison were cushioned by their wives' money, which was held in trust and therefore unavailable to the creditors. John Fairweather Harrison resumed a business as wine merchant but William left London to make a new career in County Durham.

William Harrison had made a number of friends and contacts in the North East during the unfortunate coal venture, and he and his family had moved to Sunderland by 1813.³³ From 1816 they lived at Thornhill House, Sunderland, sharing it with a wealthy friend — Shakespeare Reed (1761–1837) — who bought the house that year. Reed and his wife, Jane, had no children but this was offset by the burgeoning numbers of Harrison offspring.³⁴ About 1830 the Harrisons moved out to Fulwell Grange, not far away. Eventually, they settled a few miles north in Whitburn, a handsome coastal village, with stately villas lining the main street. William Harrison had been rebuilding his fortunes, with some more cautious but successful ventures into the coal industry, and the twenty years from 1814 to 1834 seem to have been

prosperous ones with few business worries. They included William's first profitable railway venture: the Brunton & Shields Rail Road (1826), engineered by Benjamin Thompson (1779–1867), who was his partner in the scheme, though they had to call in Shakespeare Reed to bolster the capital.³⁵

ACKNOWLEDGEMENTS

We would like to acknowledge some helpful discussions with Dr R. W. Rennison concerning Harrison's family life and the careers of his brothers.

NOTES

- ¹ *Proceedings of the Institution of Civil Engineers*, vol. 44, 1888, pp. 301–13: Obituary of T. E. Harrison.
- ² R. W. Rennison, 'William Chapman' in *Biographical Dictionary of Civil Engineers: vol. 1*, pub. Thomas Telford, 2002.
- ³ DCRO D/Lo/C270 Londonderry/Buddle correspondence. John Buddle to William Harrison 14 & 18 October 1828; Harrison to Buddle 16 November; 6 & 15 December 1828, 6 January 1829; Shakespeare Reed to Marquess of Londonderry 10 & 16 December 1828. Mining Institute, *George Johnson Reports vol. 9*, p. 108 *et seq.*
- ⁴ *Proc. I.C.E.*, 37, p. 226.
- ⁵ *Proc. I.C.E.*, 44, p. 303.
- ⁶ Letter from Robert Stephenson to George Stephenson, 24 September 1832.
- ⁷ PRO RAIL 165, Durham Junction Railway Board 29 August 1834. Although these minutes state wrought iron, the first wrought-iron railway bridge did not appear until 1841 on the Polloc & Govan Railway, and it had a span of only 31ft. 6in. The I.C.E. paper (below) says cast iron.
- ⁸ *Proc. I.C.E.*, 2, pp. 97–8.
- ⁹ Mining Institute, Buddle Papers: Bud/19/31L (10 & 25 September 1835).
- ¹⁰ Sir Frederic Smith & Peter Barlow, *Commission on Railway Communication between London, Dublin, Edinburgh & Glasgow: Fourth Report*, 1841.
- ¹¹ Report to the GNER half-yearly shareholders' meeting, 7 September 1841.
- ¹² For drawing of the timber viaducts see Colin Foster (Editor) *North Eastern Record Volume 1* (HMRS 1988) p. 42.
- ¹³ *Gateshead Observer*, 3 August 1850.
- ¹⁴ For more, see John Addyman and Victoria Haworth, *Robert Stephenson: Railway Engineer* (NERA/RST, 2005); and John Addyman and Bill Fawcett, *The High Level Bridge and Newcastle Central Station* (NERA, 1999).
- ¹⁵ *Ibid.*
- ¹⁶ *Proc. I.C.E.*, 44, pp. 305–6.
- ¹⁷ William Weaver Tomlinson, *The North Eastern Railway: Its Rise and Development*, Andrew Reid & Co., 1914.
- ¹⁸ PRO RAIL 527/10 NER Board 15 July 1860. This confirmed the arrangement from 1 January. Harrison received a salary of £2,000 plus £100 per mile for new lines during their Parliamentary progress and £220 per mile for all plans and supervision thereafter. Out of this he had to pay his office expenses and staff salaries, including Hodgson's.
- ¹⁹ Parliamentary Archives: Index of Private Bill Evidence.
- ²⁰ *Proc. I.C.E.*, 44, pp. 310–1.
- ²¹ Parliamentary Archives: Private Bill Evidence. 1870 vol. C12 Bill 4972 & 1872 vol. C59 Bill 9681: Gloucester & Berkeley Canal. 1872 vols. 4 & 5 Bill 5684: Severn Bridge Railway.
- ²² *Proc. I.C.E.*, 24, pp. 492 & 495.

²³ *Proc. I.C.E.*, 26, pp. 112–3.

²⁴ *Proc. I.C.E.*, 37, p. 241.

²⁵ PRO RAIL 527/16 NER Board 11 January 1884 Min. 8994.

²⁶ For more, see John Addyman and John Mallon, *The Alnwick and Cornhill Railway* (NERA, 2007).

²⁷ Early biographical information comes from the usual genealogical sources, including the parish registers of St. Mary, Totnes. James was born at Malborough, near Salcombe in Devon, and married in 1771. Totnes Grammar School Deed No. 514 records his lease of Totnes Town Mill, while his will, proved 29 December 1815, reveals some other ventures.

²⁸ PRO ADM 99/51 & 52 Minutes of the 'Sick & Hurt' Board; ADM 99/70 the Transport Board, which succeeded it; ADM 7/865 Record of quarterly payments, including salaries; ADM 844 Return to the Commons Select Committee on Finance, 1798.

²⁹ Guildhall Library, London. Freeman's admissions and Records of the Vintners' Company.

³⁰ PRO B/3/251 contains voluminous bankruptcy papers for the partners in Harrison & Cooke. This provides much of the information about their business interests, augmented by contemporary directories.

³¹ This is touched on in a MSS sketch of the Harrison children's lives at Sunderland and Whitburn made available by Dr R. W. Rennison: Emily Freke Williams (formerly Harrison), *A sketch of my life for my grandchildren*. Emily Harrison (1818–1911) was a sister of TEH. The MSS is used to illuminate later parts of this account.

³² PRO B/3/251 Harrison & Cooke bankruptcy papers.

³³ Harrison addresses come from directories, surviving letters, and Sunderland Library local research volumes; the latter reveal Reed's purchase of Thornhill in 1816. Fulwell Grange is also referred to as Monkwearmouth Grange.

³⁴ Reed had been born in Stepney, London, in 1761 but married Jane in South Shields in 1788 and evidently spent most of his life in County Durham.

³⁵ NRO 1183, Brunton & Shields Railway Papers.

