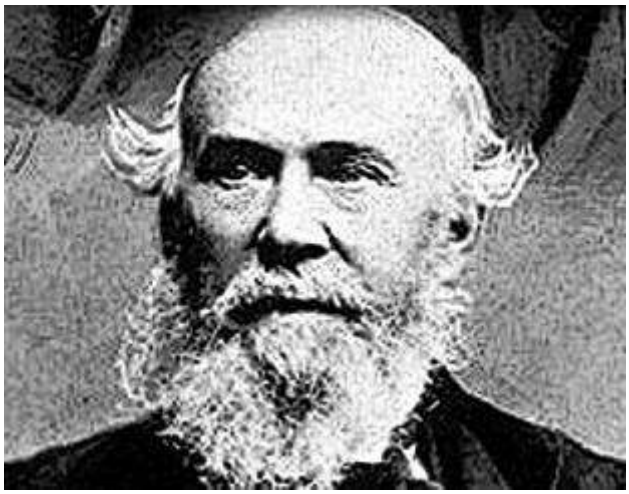
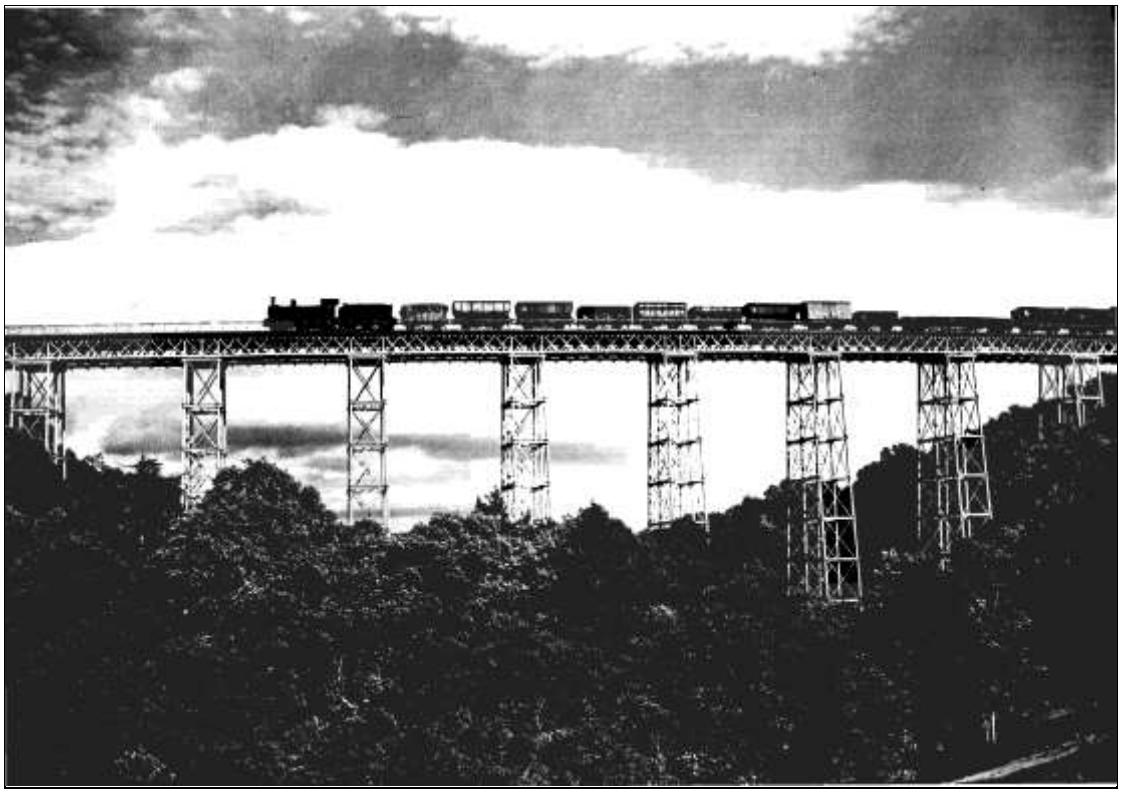
# The Deepdale Viaduct

# 1861 to 1963





# The Deepdale Viaduct

This account has been compiled from a number of sources, mainly the Teesdale Mercury Archive. Most of the text is quoted from this source, indicated with dates and quotation marks. The designer and the construction of the viaduct are detailed, and then there are some later anecdotes, in chronological order.

The cast and wrought iron viaduct, opened in 1861, was designed by Thomas Bouch as part of the South Durham and Lancashire Union Railway. The Tees Viaduct on the same railway had a different construction, with stone pillars supporting the span.

Consisting of 11 spans totalling 740 feet, (256 metres) the structure crossed Deepdale Beck at a height of 161 feet (49 metres). Closure of the line came in 1962 and the viaduct was dismantled a year later - a process captured by a foresighted local photographer.

## Thomas Bouch

Sir Thomas Bouch was a British railway engineer in Victorian Britain. He was born in Thursby, Cumberland, on 25th February 1822 and lived in Edinburgh. As manager of the Edinburgh and Northern Railway he introduced the first roll-on/roll-off train ferry service in the world. Later, as a consulting engineer, he popularised the use of lattice girders in railway bridges.

Bouch later set up on his own as a railway engineer, working mostly in Scotland and Northern England. Lines he designed included several between the North-east and Cumberland, including the South Durham and Lancashire Union Railway, from a junction near West Auckland via Barnard Castle, over Stainmore via Kirkby Stephen to a junction with the West Coast Main Line at Tebay. This was 50 miles of railway, completed in 1863.

He made considerable use of lattice girder bridges, some with conventional masonry piers and others with iron lattice piers. The most notable examples of iron lattice piers were the Deepdale and Belah Viaducts. A contemporary treatise on iron bridges praised the detailed engineering of the Belah viaduct piers and described it as one of the lightest and cheapest of that kind that had ever been erected.

Bouch's forte was cheapness and an ability to construct branch lines at a capital cost that might allow them to pay their way, especially if operated frugally.

Bouch designed the Redheugh viaduct, a road bridge across the Tyne at the same height as and close to Stephenson's High Level Bridge. He also designed Howns Gill Viaduct in Consett, County Durham, which at 700 feet (210 m) long and using a 12-arch design constructed in brick, carried the Stanhope and Tyne Railway 175 feet (53 m) above Howns Gill. It now forms part of the Sea to Sea Cycle Route.

He designed the first, ill-fated River Tay Rail Bridge and the official opening took place in May 1878. Queen Victoria travelled across it in late June 1879, and she awarded Bouch a knighthood in recognition of his achievement. The bridge collapsed on 28 December 1879 when it was hit by strong side winds. A train was travelling over it at the time, and 75 people died.

A public inquiry revealed that the contractors to the railway company had sacrificed safety and durability to save costs. Sloppy working practices such as poor smelting and the re-use of girders that had been accidentally dropped into the estuary during construction were factors in the bridge's collapse.

The inquiry concluded that the bridge was "badly designed, badly built, and badly maintained". All of the high girders section fell during the accident, and analysis of the archives has shown that the design of cast-iron columns with integral lugs holding the tie bars was a critical mistake. The lugs were composed of cast iron, which is brittle under tension. Many other bridges had been built to a similar design using cast-iron columns and wrought iron tie bars, but none used this design detail.

As the engineer, Thomas Bouch was blamed for the collapse of the Tay Bridge.

He retired to Moffat, his health, already poor, declined under the stress caused by the disaster, and he died 30 October 1880 a few months after the public inquiry finished. He is buried in Dean Cemetery in Edinburgh. "In his death", said the journal of the Institution of Civil Engineers, "the profession has to lament one who, though perhaps carrying his works nearer to the margin of safety than many others would have done, displayed boldness, originality and resource in a high degree, and bore a distinguished part in the later development of the railway system".

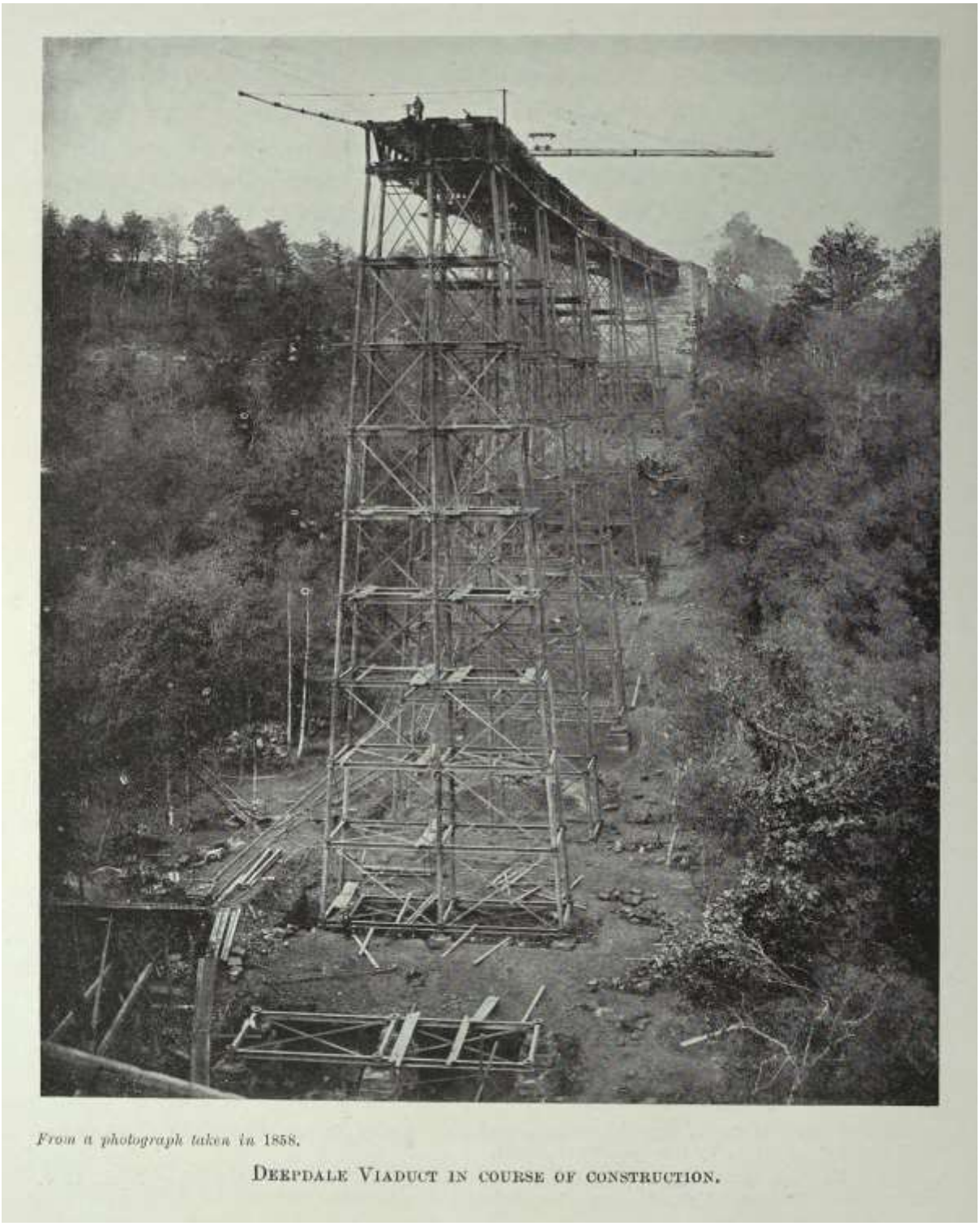
## The Deepdale Viaduct

“The foundation stones of the Tees and Deepdale Viaducts on the South Durham & Lancashire Railway, were laid on Thursday last, the 8th inst.
The morning was somewhat gloomy, notwithstanding which there was a fair attendance of the Directors, their friends, and the public.
The procession, with banners, and headed by Mr Brandon's band, moved off at 10 o'clock. The site of the Tees viaduct was first visited, and here the foundation stone was laid by John Wakefield, Esq.“

“Brief addresses were delivered by Mr Wakefield, and H.Pease, Esq. M.P., after which the company moved across the fields, and through the village of Lartington, to the Deepdale valley, where the foundation stone of the viaduct was laid by the Rev. T. Witham. Appropriate speeches were made by the Rev. T. Witham, and J.Whitwell, Esq. Both ceremonies were performed on the Lartington estate, of which the Rev. T. Witham is proprietor.
In the afternoon, the directors, engineer, contractors, and company dined together at the King's Head Inn, and toasts suitable to the occasion were proposed and drunk. “

“The two works have been contracted for by Messrs Gilkes, Wilson, and Co., of Middlesbrough, and Mr Kinnaird, the builder of the Crumlin viaduct, the former firm having that of Deepdale and the latter the one over the Tees. Messrs Gilkes, Wilson and Co. have also contracted with the company for the construction and erection of another wrought iron viaduct, 200 feet in height and from 900 to 1,000 feet in length, over the river Beelah. Both these viaducts are to be similar in character to the celebrated Crumlin one, and supported upon compound metal columns. Their contracts (for iron-work only) amount, we hear, to about £12,700 for the Deepdale structure, and about £16,500 for that over the Beelah; that of Mr Kinnaird amounting to something like £7,600. Mr Appleby, who built the Barnard Castle station, has contracted for the stone foundations and piers of the Tees Bridge, the stone bridge over Percy beck, rather more than a mile of line from the junction to the west side of the Tees, and the foundations of the Deepdale and Beelah viaducts,—his whole undertaking amounting to nearly £16,000. From this it will be seen that the principal works are all in the hands of responsible men, and that there is a certainty of efficient and satisfactory completion. “

Incredibly, the viaduct was built in just 80 days by a team of 60 men, putting together pre-fabricated sections of the metalwork.



*From a photograph taken in 1858.*

DEEPDALE VIADUCT IN COURSE OF CONSTRUCTION.

On December 2nd 1858, the two ends of the new viaduct were joined together.

March 2 1859

“The report of the Engineer –will afford the necessary information respecting the progress of the works; about one-third of the whole between Barnard Castle and Tebay has been executed.

Your directors have the satisfaction to state, that one very important structure, the Deepdale Viaduct, has, with the exception of painting, been finished. This erection has been proceeded with in a manner very satisfactory to the directors. The bridge over the river Tees is in a fair state of advance, and with some trifling exceptions the lend negotiations are concluded. “

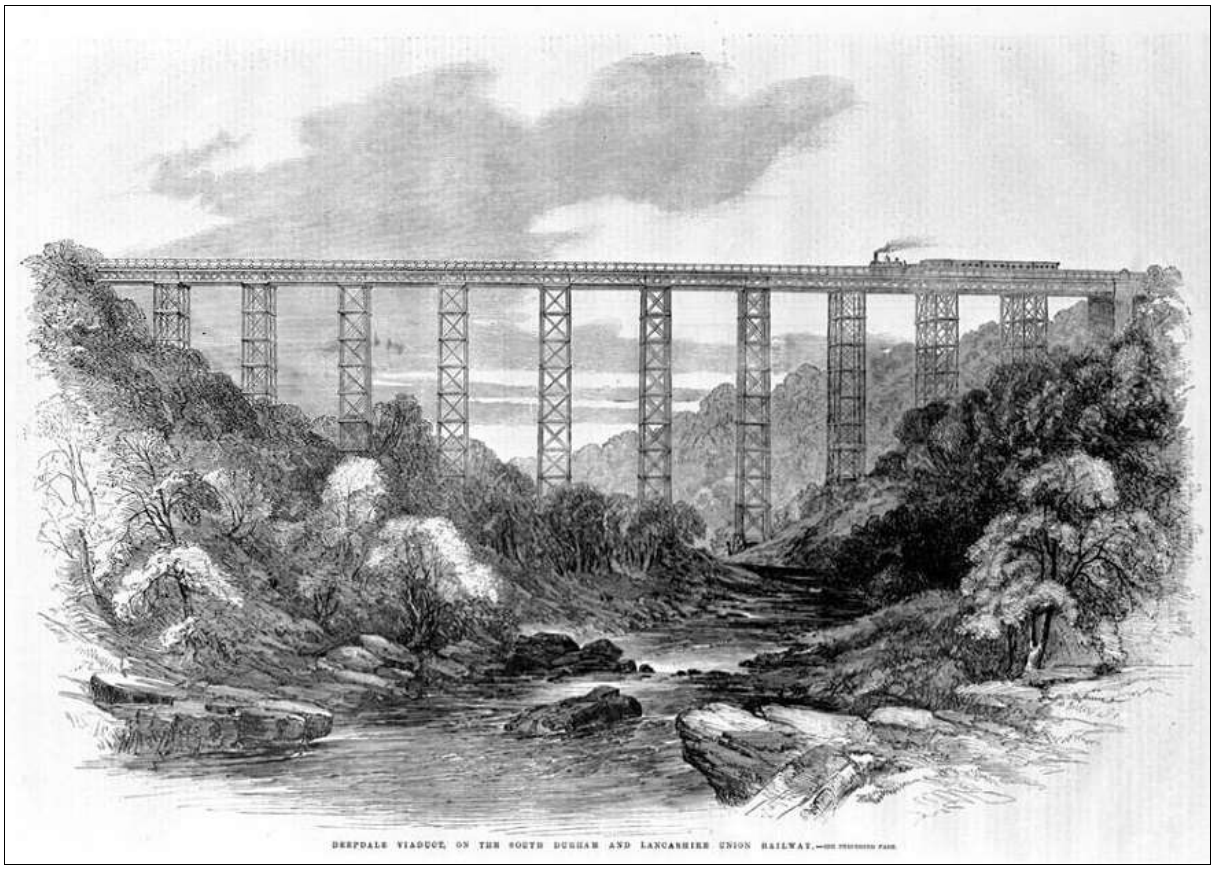
The viaduct was opened on 7th August 1861.

“The Deepdale Viaduct is an iron structure with stone foundations and abutments. It consists of columns of iron with cast and malleable iron struts and tie-beams, tapering from the foundation to the main girders, at which latter point they are 24 feet wide.

Each pier is composed of six columns of iron, and the bridge is a little over 160 feet high from the surface to the formation level. Its length is 740 feet. It contains 11 openings of 48 feet, clear and 60 feet if measured from centre to centre of piers. It contains 553 tons of cast iron, and about 285 tons of wrought iron. It is on a curve of 30 chains radius, and spans one of the loveliest glens in the district.

The effect when seen from a point about 200 yards south west, is singularly imposing. The iron work was executed by Messrs Gilkes & Co. of Middlesbro,' and the masonry by Mr D. P. Appleby of Barnard Castle. The foundation stone was laid in October, 1837, by the Rev. T. Witham, of Lartington Hall.“

In 1879, 18 years after the Deepdale Viaduct opened, the Tay Bridge collapsed.




“16/12/1903
Platelayer Injured at Cat Castle
For some time past extensive restoration-work has been going on at the Cat Castle, or Deepdale Viaduct, which is over 160 feet high.
The rails have been disturbed and new metals laid. In consequence all trains, either on the up or down line, are switched on to one set of rails, and great care is exercised signalling and what not. All trains slow down on approaching Cat Castle, and, on Saturday, Joseph Chatt, told off to give warning, had indicated the approach of the morning train from Barnard Castle to Tebay, when, in stepping out of the way be was caught by the passenger train engine, and knocked down. His arm was broken, and, besides the shock, he sustained other injuries, the poor fellow having been hurled on to a heap of chains, where he was found to be in a semi-conscious condition. Escape from a terrible death was miraculous. The driver informed the other men, who went to Chatt's assistance. He was at once attended by Dr. Adams, and conveyed to his home at Startforth. Mr Chatt is a most useful church-worker at Barnard Castle, and is much esteemed.”

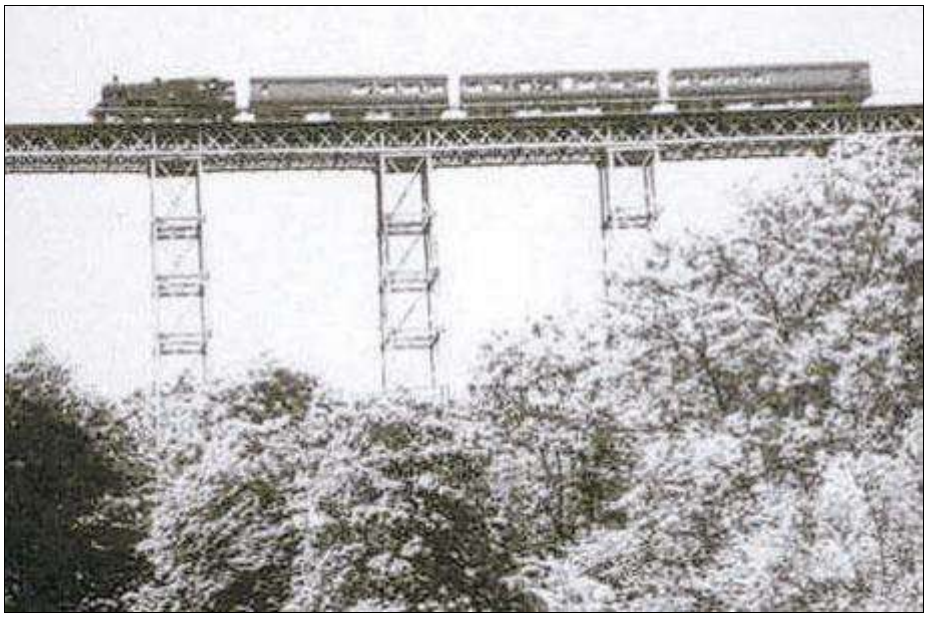
14th January 1914

“Local interest at this moment is concentrated on the possible reconstruction of the three colossal viaducts on the South Durham and Lancashire Union Railway, namely, the Tees Viaduct, 732 feet long; the Deepdale or Cat Castle Viaduct, 740 feet in length; and the Beelah Viaduct, 1,000 feet long.

The contract is already let for reconstructing the Tees Viaduct, to the Motherwell Bridge Company, Limited, having secured the work, and the undertaking will be commenced in the early summer.

While the viaducts between Barnard Castle and Kirkby Stephen are quite capable of carrying present-day railway loads, the North-Eastern Railway Company, as a precautionary measure, have withdrawn from service over this route their specially-designed, heavy, eight-wheeled coupled locomotives, built for mineral haulage from the South-West Durham coalfield to the iron and other manufacturing centres of North Lancashire and Cumberland.

Meanwhile the mineral trains will be drawn by six-wheeled coupled engines. A day or two ago, acting on the instructions of the company's engineers, holes to the depth of about seventeen foot were dug in the neighbourhood of the Beelah Viaduct by way of testing accurately the stratification, and boring operations, it is understood, will later be carried cut. The Deepdale Viaduct has also been examined as to rock foundation. “



1925

“It took 21 tons of paint to repaint Deepdale viaduct, and 31 tons for Beelah. Ten men were on the job for three months.”

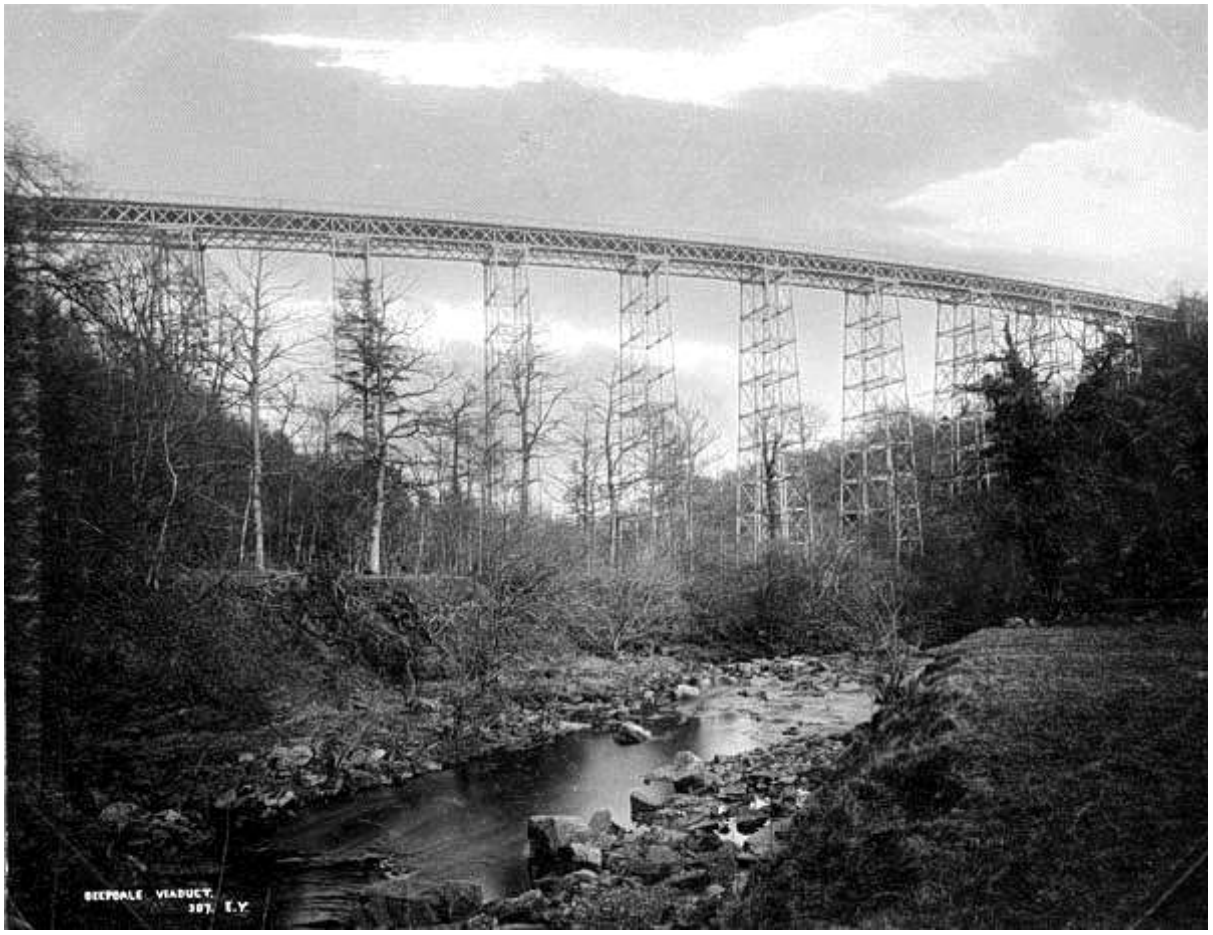
10/06/1931
“Barnard Castle in the past earned a reputation in producing big throwers of the cricket ball, and the writer can recall some half dozen examples above the average.
William Lawson, a former leading figure in the educational world who was trained by the late Mr J. J. Bailey, when a young man used to emulates his athletic feats by throwing a stone over the Deepdale Viaduct, a height of 160 feet.”

1962
The line was closed in 1962 and the viaduct was dismantled a year later - a process captured by a foresighted local photographer.

More photographs of the viaduct and stations on the line can be found at-

http://www.cumbria-railways.co.uk/john-birkbeck-photos.html

http://www.forgottenrelics.co.uk/bridges/gallery/deepdale.html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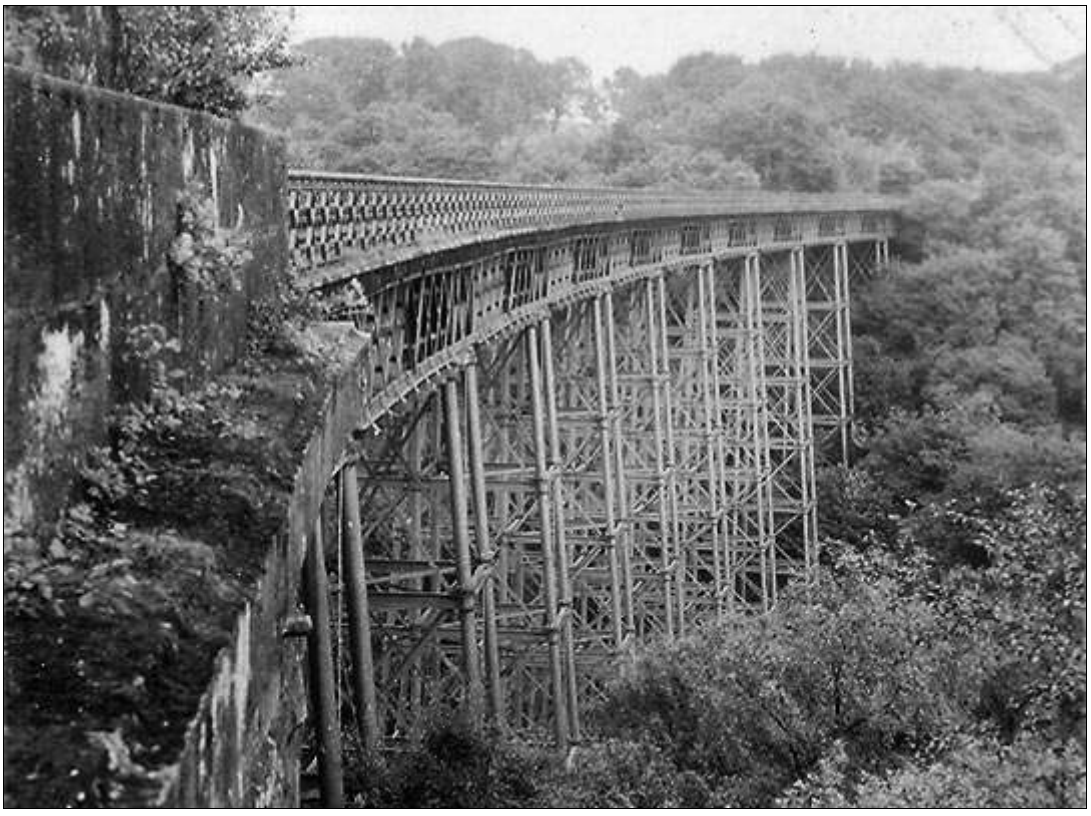

Parts of the viaduct can still be seen. These are some modern photographs, from public footpaths.

**The south abutments.**

**The stone foundations of the piers on the north bank.**

**The abutments on the north (Lartington) side.**

**The north side foundations, viewed from the beck.**