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## **Eight hundred years of bridging the Tweed;** in a journey from sea to source

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### *Introduction.*

One of the rarer British road signs is that which suggests to drivers 'Test your Brakes'. These peremptory, but eminently sensible, signs are sometimes to be found at the edge of fords, where road crosses river. Today fords are as rare as they were once common. This is nowhere more true than in crossing the Tweed where danger to life and limb must often have been very real in the past, although according to Sir Walter Scott, not as great as crossing its English tributary, the Till:

Tweed said to Till:  
'What gars [makes] ye rin sae still?'  
Till said to Tweed:  
'Though ye rin wi' speed,  
And I rin slaw,  
Yet where ye droun ae [one] man,  
I droun twa!'

Nowadays bridges offer a safe and convenient alternative to fords, many of which still crossed the Tweed as late as the 19th century, but such is their ubiquity and smoothness of passage that we give little if any thought to them as we speed across. There are of course exceptions; those huge structures that are cast across estuaries and tidal waters and where the experience of crossing is emphasised by the fact that you often have to pay for the privilege.

In Herman Moll's *Pocket companion of ye roads of Scotland*, published in 1718, perhaps surprisingly, only one road crossing of the River Tweed is recorded between the bridges at Berwick and Peebles some 50 miles upstream, and that was the ferry at Kelso. An earlier map shows a ford crossing at Carham. This situation continued until 1755 when Kelso's first stone bridge was built, ten years after the '45 rebellion and the Battle of Culloden.

This date heralded the beginning of Scotland's emergence as a modern industrial nation and an almost continuous period of bridge engineering that continued through the industrial revolution to the present day. Apart from the obvious exceptions such as the Forth and Tay bridges, alluded to above, few of Scotland's bridges enjoy the attention or interest accorded to her castles, stately homes and of course her scenery. But in a country that has provided the world with some of its greatest civil engineers, many of Scotland's bridges are testament to that engineering pedigree and are worth a moment's pause from visitors and natives alike.

The bridges over the 97-mile River Tweed constitute a fascinating, informative and accessible selection of differing types, with some amazing surprises and delightful stories to be gathered on the way. We start our journey at Berwick, where the Tweed spills into the North Sea.

### *Berwick-Paxton and the remarkable Captain Brown.*

In common with almost all the earliest British bridges, those across the Tweed were made of timber, being easier and cheaper to construct than stone arches. They had their shortcomings, not least in that they didn't last longer than a few decades without major refurbishment or replacement. There is a record of a timber bridge at Berwick being swept away by a flood in 1199 and the present Berwick Old Bridge (NT 996527) was built to replace a timber structure destroyed by floating ice in 1608. Work on its replacement started in 1611, the bridge slowly creeping out from the east bank with diminishing spans, the first being 74 feet. And it was very slowly, for it was not until 1624 that the fifteen near semi-circular masonry arches with their chamfered corners were substantially completed, the road width of 17 feet between parapets being something of a wonder at the time. The

bridge's piers are founded on oak piles, 6 feet to 23 feet long, from 823 trees felled for the purpose in the appropriately named Chopwell Forest in Co. Durham and shipped north from Newcastle. Remarkable in its state of preservation, with its pier protections, or 'starlings', still in excellent condition, the Berwick 'Old' Bridge is the oldest intact surviving bridge across the Tweed. It cost nearly £15,000.

Immediately upstream and evocative of another age is the four-arch Royal Tweed Bridge (NT 996528). When it was opened in 1928 it included the longest steel reinforced concrete arch in Great Britain which, at 361 feet, was five times greater than the largest arch of its venerable neighbour. The staging, and 'falseworks' to support the concrete whilst setting, were erected on timber piles driven into the river bed. The whole structure was cast in-situ with concrete from mixing plants set up on both sides of the river by a labour force averaging 170 men. It cost £160,000, less in fact than the distinguished neighbour almost in its shadow, Robert Stephenson's Royal Border Bridge (NT 993434). This bridge, which was opened in 1850 by Queen Victoria, completed the east coast mainline railway from Edinburgh to Newcastle and is still giving excellent service. There are 28 stone arches and the greatest height above the river bed is 126 feet. The American elm piles for its piers were driven between 33 feet and 100 feet into the river bed using Nasmyth's epoch-making steam pile-driver and at the peak of construction nearly 3,000 men and 180 horses were employed. The whole contract amounted to £200,000.

Four miles upstream from Berwick, near Paxton, is another signal engineering achievement, the Union Chain Bridge (NT 934510), erected between 1819 and 1820. It is the oldest surviving suspension bridge in Britain still carrying vehicles (Telford's Menai Suspension Bridge was not completed until 1826) and for five years after its construction was the longest bridge span in the western world carrying carriage traffic. Its builder, Captain Samuel Brown, R.N., utilised new technology and Welsh-made wrought iron bar-chains 15 feet long to achieve a bridge span between points of suspension of 437 feet. The eminent Scottish engineer John Rennie strongly influenced the design of the bridge's masonry support towers. The bridge was opened on the 26th of July 1820 with Captain Brown first testing the integrity of the structure by driving a 'curricle' or light carriage across, and then twelve fully laden wagons. Satisfied, he declared the bridge open only to watch in horror as a crowd, estimated to number around 700, surged onto the bridge. His comments at the time are not recorded, but the bridge held. The bridge is class A listed by Historic Scotland.

There is an interesting footnote to this story for it has often been stated, even in quite recent books, that only six months after this bridge's completion it was blown down in a gale. Where this story gained its currency is not known but it is just not true, the bridge you see today being substantially the same as that opened for use in 1820. However, what you might notice are the single steel cables at each side of the bridge from which are suspended additional wire 'hangers' or supports. These were added in 1902 just *should* the original links fail. So pleased was the commissioning body with his bridge—it had cost £7,700 as compared with an estimated £20,000 for a masonry bridge—that they awarded Captain Brown a 'present' of 1,000 guineas. The Union Bridge was instrumental in widely popularising the concept of the 'suspension' bridge. For the past century it has been in the care of the Tweed Bridges Trust who replaced worn interconnector links between the main chains in 1974.

*Norham-Kelso; masterly bridge creations by Blackmore, Rennie, Smeaton and Slight.*

The next two bridges are also in the capable hands of the Tweed Bridges Trustees. Norham Bridge (NT 891474), is a narrow rather stilted stone bridge of four arches with hollow spandrels, built by Meakin and Dean to the design of Thomas Codrington, between 1885 and 1887, which is still in use. It replaced a much more daring structure and, in its time, one of national significance, a laminated timber truss of two arches, each of 190 feet, built in 1838 to the design of John Blackmore. Six miles upstream and still in the wide part of the river is Coldstream Bridge (NT 848401). This was built between 1762 and 1767, when Scotland's roads were just beginning to improve, and provided a shorter alternative to the east coast post road between Edinburgh and Newcastle. The bridge is a fine example of the work of John Smeaton, F.R.S., fondly remembered amongst engineers as the 'Father' of modern British civil engineering. Although the five main arches are of three different spans they are all of the same radius so that one set of timber centering, which allowed the arch rings or voussoirs to be formed, could be used for all the arches. A weir downstream protects the piers and their 'starling' surrounds from scour. The bridge was built using direct labour by Robert Reid under Smeaton's direction. As well as a plaque describing its construction the bridge bears another which

records that it was across this bridge that the poet Robert Burns first journeyed into England. It is known that at the little toll house here an enterprising tollkeeper offered a marriage service for his customers. The tollhouse itself was built by Reid for a contract sum of £27. Cleverly he designed the tollhouse so the 'under-building' necessary to support it at road level made a convenient two storey house for himself, from which he looked after the bridge for more than two decades. The Trustees were singularly unimpressed at what they saw as a waste of their money, but Smeaton, who thought that they in turn had been rather niggardly in their remuneration to Reid, stepped in to commend the building as a useful and clever method of supporting the wing wall of the bridge, and so honour was satisfied.

By now, if you are still following our course upstream, we are approaching Kelso and it is here in the heart of the Borders that there is to be found one of Rennie's, and Britain's, finest bridges. Built from 1801 to 1804 for the sum of £12,876, it replaced the bridge dating from around 1756 which, built with too shallow foundations, partially collapsed in 1797 because of undermining by scour. Rennie's bridge, with its elegant elliptical arches of 72 foot span is further enhanced by its fine architectural detail. It is worth noting its wide projecting cornice, the perfectly proportioned entablature and columns and the 'V' jointed arches and rusticated 'cutwaters'. The steep rise of the ground at the south end required a high bridge and so Rennie chose a horizontal line of road and parapets to obtain a symmetrical elevation. Such attention to aesthetic detail on a structure with a purely practical purpose is truly remarkable.

Two miles further on near the remains of Roxburgh Castle is the site of an ancient bridge, possibly timber, which records indicate was broken down in 1398 and 1411 during Border wars.

Mertoun Bridge (NT 610321), an attractive red, freestone bridge of five 70 foot low rise arches is unusual in that the designer, James Slight of Edinburgh, while originally planning it to be built entirely of stone, settled initially for the arches to be of laminated wood and timber construction but took the precaution of building the piers and abutments of sufficient dimensions and strength to take stone arches. Slight may have been influenced by Robert Stevenson, C.E.'s laminated timber arch proposed for Dornoch Firth, c. 1830. Work commenced in 1839 and was finished in 1841 with the stone arches being added later, presumably when the timber decayed, two or three decades later—surely an exercise in economics as much as engineering. Details of the wooden arch construction were included in James Newland's *The carpenter and joiner's assistant*, published in 1860.

#### *Dryburgh-Ashiestiel; achievements at Leaderfoot and the rise and fall of the Smiths of Darnick.*

From Mertoun Bridge the Tweed curves round the wooded peninsula of Dryburgh Abbey to flow under a steel cable suspension footbridge of 1911 with a span of about 260 feet and with steel lattice-girder support towers. This bridge replaced a remarkable chain-bar suspension footbridge of similar span completed in September 1818 for the Earl of Buchan—this in the days when the aristocracy built stately bridges as well as stately homes. A drawing of 1820 by Smith, which still survives, together with his authoritative account of the bridge were forwarded to, and included by, Stevenson in his 'Description of bridges of suspension', published in 1821. In turn this bridge had replaced one of chain-rod stay type designed and constructed by John & William Smith of Darnick and completed in August 1817. Unfortunately it collapsed during a January storm in 1818. It is probable that it was this collapse, and a confusion between bridges, that gave rise to the apocryphal story of the 'collapse' of the Union Bridge mentioned earlier. The present bridge was re-decked and repaired by Borders Regional Council in the early 1990s.

It is, however, at Leaderfoot that the development of bridge building over two centuries is most dramatically demonstrated by three tall bridges, all with the common purpose of bridging the Tweed.

The Dygrange Old Bridge, or Fly Boat Bridge—a name that refers to the presence of an earlier ferry (NT 575346)—was built by Alexander Stevens, one of Scotland's finest bridge builders, between 1779 and 1780 with a daring 105 foot centre span and a varying depth arch ring a mere 2 foot 6 inches deep at the crown. The rather garish pointing to be seen on the façades dates from the 1960s and does little to enhance the bridge's otherwise subtle and aesthetic details. The modern road bridge which soars across the water in a single span of 57 metres was built between 1971 and 1973 to the design of Sir Alexander Gibb and Partners and is of twin steel box girder construction with a reinforced concrete deck. Most impressive of all is the creation which strides above both—tall and slender with brick arches and eye-catching rustic-faced red sandstone—the 19 arch Leaderfoot Viaduct which has a maximum height of 130 feet. The most imposing element of the former Berwickshire Railway, it was opened for operations in 1865, and continued in use for passengers till 1948. It is the work of Charles Jopp and Messrs Wylie and Peddie. Recognising that Scotland's

historic heritage is not solely vested in her military past, her castles and palaces, Leaderfoot Viaduct is now in the care of Historic Scotland. It has recently undergone conservation work prior to being made more publicly accessible in 1996 as a major national monument to Scotland's outstanding engineering and industrial past.

Two miles upstream from Leaderfoot is Gattonside suspension footbridge (NT 545347) with its 296 foot leap across the river, an astonishing achievement in 1826 made possible by the use of wrought iron. This bridge is the oldest existing example of the work of the notable Scottish engineering company of Redpath and Brown, who began business as ironmongers in Edinburgh. The towers were built by J. & T. Smith of Darnick, as they had now become, upon whose misfortunes we commented earlier. At the south side of this bridge a small house was built for the collection of 'pontage' or tolls, the fee being one penny per foot passenger. In 1928, over 100 years after they had built the bridge, the firm of Redpath Brown & Co. carried out a full programme of repairs and refurbishment free of charge. In 1991 the bridge was reconditioned and 'modernised' by Borders Regional Council and sadly much of the original handcrafted ironwork was replaced by the present heavy-looking side trusses. However, the towers and original chains were retained, although separated with a modern high tensile steel 'Macalloy' bar cable introduced in between, thus preserving major features of the original bridge. A full-sized cross-section of the bridge with its finely hand-crafted original ironwork has been preserved for posterity by the Institution of Civil Engineers and is on permanent exhibition in the entrance foyer to the Department of Civil & Offshore Engineering, Heriot-Watt University, Riccarton, Edinburgh.

Also at Melrose is the 18th century bridge at Darnlee (NT 490325) about half a mile above which is the hamlet of Bridgend. This name commemorates the fact that here was once the curious medieval bridge which Sir Walter Scott described in *The Monastery*. James Skene's print of 1830 shows the bridge to have had a central tower connected to the spans on either side by draw-bridges, the toll collector controlling passage by raising or lowering the appropriate draw-bridge. In Scott's informant's day a pier base was still visible.

The next bridge of historical interest is near to the confluence of the Tweed and the Etrick Water (NT 488322) about midway between Galashiels and Selkirk. Tweed Bridge is another work of the enterprising Smith brothers who, having carried out work for Sir Walter Scott at Abbotsford, were moved to introduce a romantic element into a bridge founded by Scott himself. This romantic urge is seen in the archstones of alternate pink and yellow sandstone and the raised Tudor shields in the spandrels. Writing in his diary on the occasion of the bridge's foundation on the 11th of April 1831, Scott noted, *'The day was beautiful, the scene was romantic, and the people in good spirits and good humour. Mr Smith gave a proper repast to the workmen and we subscribed sovereigns a-piece to provide for any casualty.'* The Smiths, one might think, would have felt slightly put out at this suggestion of possible 'casualties', but Scott uses the word in its old Scots sense meaning a payment.

At Yair (NT 458326), two miles further on, there is a bridge that is not at all what it might appear to be at first sight. Only nine years ago this bridge, originally built in 1762, was completely rebuilt to the original design but incorporating modern strengthening. Can you tell?

Another two miles upstream is a bridge that, seen from the right angle, is surely an example of poetry in stone—Ashiestiel Bridge (NT 439350). Bridging the Tweed in one single elliptical arch, 131 foot 6 inches wide and 26 foot in height, it is believed to be one of the largest arches ever constructed of rubble stone. Apart from its coping and cornice it contains not one single hewn or dressed stone. Again the builders were J. & T. Smith of Darnick and sadly it was here in 1847 at Ashiestiel Bridge that nemesis was to arrive for the intrepid brothers, it being reported in contemporary accounts that on the temporary timber centering under the arch being removed, the 'keystone shot up into the air and the whole bridge collapsed'. It was to the credit of the Smiths that they undertook to rebuild the bridge at their own expense. Unfortunately the original contract price of £1,200 allowed for the building of one bridge, not two, and it is sad to report that shortly afterwards they 'failed in business'. The bridge today is basically still the original structure but the outer spandrel, walls and parapets have been recently rebuilt. It is class A listed.

*Ashiestiel-Peebles; more Redpath and Brown excellence and later railway achievements.*

As we continue up the narrowing river at Walkerburn (NT 361368) and Innerleithen (NT 333360) the bridges are both relatively unglamorous multi-span iron or steel structures. The four bow-truss spans of Innerleithen Bridge, constructed between 1885 and 1886, replaced a substantial timber truss bridge to the design of James Jardine, erected by the Road Trustees in 1830. The iron or steel bow girder railway viaducts at Haughhead with 6 spans and Horsburgh or Cardrona with 5 spans, either

side of Innerleithen, on a line originally opened in 1866 and 1864 respectively, are worth a quick look. An interesting surprise is in store where the road follows the turn of the river about a mile from Peebles when you come to a small house called Wire Bridge Cottage. Its name is a clue that you are near to what is left of the historic Kingsmeadows wire bridge (NT 268400), a private footbridge for Sir John Hay that had a span of 110 feet, designed and erected by John Stevenson Brown of Redpath and Brown in the summer of 1817. When finished, as proof of its strength, the bridge was completely crowded with people without sustaining any injury. The project was the second wire bridge in Europe the first being at Galashiels, which was completed in November 1816 and lasted until 1838. Kingsmeadows Bridge was modified in 1923 and continued in service until it was destroyed by a large tree carried down the river during a serious flood in 1954. The original abutment can still be seen on the river bank below the cottage and just beyond the shingle beach on the far bank there is the remnant of the other anchor post, rather sparse postscripts to an intriguing piece of our engineering heritage.

We next come to Peebles and Priorsfield footbridge (NT 253403), a typical and picturesque example of a late 19th century small suspension bridge with wire rope cables and a main span of nearly 100 feet. A lenticular plate, with a now rather indistinct inscription, records that the bridge was constructed in 1905; the engineer was R. J. M. Inglis of 'Tantah', Peebles and the contractor was Somervail of Dalmuir. Immediately downstream, when the river is low, the foundations of the multi-span iron-plate bow-girder on the former railway loop, opened in 1866, can still be seen.

#### *Peebles-Manor Water.*

Looking upstream from this bridge you can see what turns out to be a most intriguing structure, Peebles Old Bridge (NT 250403). At first glance it seems a typical turn-of-the-century bridge with its five spans and parapets surmounted with decorative Glasgow cast, cast-iron dolphin lamps but closer inspection reveals the haunches of the original narrow late 15th century bridge that once crossed the river here, all that remains of that one other road bridge that existed between Berwick and Peebles as recorded in Herman Moll's *Pocket companion of ye roads of Scotland* mentioned at the outset. The original bridge, which was only eight feet between parapets, was widened to 20 feet in 1834 by J. & T. Smith and in 1900 the Town Council further doubled the width of the bridge by boldly moving the entire east side downstream. If you go under the bridge you will notice the small indentations in the later masonry, evidence of the 'shears' or tongs that were used to lift and position the stone blocks.

A few hundred yards to the west is Fotheringham Bridge (NT 243405), gifted to his native town by John S. Fotheringham, who had spent most of his life in South Africa, where he ran the biggest bakery business there, becoming Mayor of Johannesburg in 1937. In 1948 he offered up to £5,000 for the erection of the footbridge. It is a tubular steel truss bridge and it was opened in 1953.

Next upstream comes Neidpath Viaduct or The Queen's Bridge. This magnificent viaduct is one of the finest examples of skewed-arch construction in Scotland and is class A listed. Opened in February 1864, it was designed by George Cunningham of Bruce and Cunningham, consulting engineers of Edinburgh, for the Symington, Biggar and Broughton Railway Co., which was taken over by the Caledonian Railway Co. in 1866. The intricate and detailed calculations for determining the dimensions of the free-stone masonry and erecting the viaduct, with its eight skewed arches of 40 feet span and 15 feet width on a curve of 20 chains (1320 feet), were made early in 1863 by Robert Murray of Damdale, Peebles. At the east end of the viaduct the railway entered a 529-yard tunnel. Both viaduct and tunnel furnish an outstanding example of the determination of the Victorian railway engineer in overcoming great physical difficulties to achieve a permanent alignment permitting rapid travel. It is fascinating to contrast its line with that of Telford's proposed horse-traction railway of 1810, which was intended to follow the windings of the valley bottom as it approached Peebles from the west. The line was closed in 1954.

Almost immediately upstream a graceful five span low-rise masonry bridge with segmental arches on slender piers comes into view. Manor Bridge (NT 230395), as it is called, which replaced a ford in 1883, was one of the last major examples of this bridge type in the county. The arch rings are of squared stone, and the spandrels of snecked rubble. The central span of the bridge is 45 feet and is flanked by progressively reducing spans which impart a pleasing symmetry to the whole elevation. This bridge has a connection with David Kidd who made a fortune from the invention of the modern envelope. In 1873 he built 'Glenternie' in the Manor Valley, about two miles south of the bridge. The following year he died, leaving the house to his sisters, the Misses Pringle and Elizabeth Kidd.

These ladies, along with Miss Anderson of 'Hallyards', also north of the bridge, contributed materially to the cost of building the bridge.

*Lyne-Source at Tweed's Well.*

Above Lyne Water the river is becoming noticeably narrower as it is crossed by the unprepossessing pre-war light steel Lyne footbridge (NT 207397). Further west, near the botanic garden at Dawyck, Crownhead Bridge (NT 164356) carries the B712 over the Tweed. Two prestressed concrete spans of 24.5 metres, constructed in 1985-86, replaced a pair of open-spandrel reinforced concrete arches, probably dating from Edwardian times. Two miles further on, where the stream swings south at Drumelzier, is Merlindale Bridge (NT 130340), consisting of two 40 foot span steel trusses, erected in 1931. We have now reached the picturesque upper Tweed valley. From here to the source of the river, near the Devil's Beeftub, there are numerous small span bridges of which one is particularly worthy of the visitors attention. It is a neat whinstone rubble arch at Tweedsmuir known as Carlow's Bridge (NT 097243), built in 1783. Spanning 30 feet it rises from an irregular mossy rock bed in most attractive surroundings to provide a stylish conclusion to our journey.

The notations in brackets by each bridge are the national grid references locating each site. Not all of the sites mentioned are immediately accessible by the public and some do stand on private property so please do exercise the common courtesies if you wish to have a closer look. Similarly, as many of the bridges are still in use, if stopping do park sensibly and have a regard for traffic.

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