A BRIDGE NOT SO FAR

In the rush to cross our bridges we seldom stop to consider just what it is we are crossing. Roland Paxton bridges some of the gaps.

One of the rarer of British road signs is that which suggests to drivers 'Test Your Brakes'. These peremptory (but eminently sensible) signs are to be found at the edge of fords, where river runs across road. Today fords are as rare as they were once common and, along with the simple river ferry or casually overthrown tree to keep crossing feet dry, must rank at the lower end of river crossing technology.

Today however, such is the ubiquity of bridges, we give little if any thought to them as we cross. We cross our bridges and forget them. 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 to do so. But what about those you cross which, so much part of the landscape, are over and done-with in a few seconds?

BRIDGING THE AGES

In Herman Moll's 'Pocket Companion of Ye Roads of Scotland' published in 1718, only one road crossing of the River Tweed is recorded between those at Berwick and Peebles, and that was the ferry at Kelso. This situation continued until 1755 when Kelso's first stone bridge was built. Some historical perspective is perhaps added when one considers that this was but ten years after the '45 rebellion and the Battle of Culloden.

But this date heralded the beginning of 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 her castles, stately homes and of course her scenery. But in a country that has provided the world with some of its greatest civil and structural 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 River Tweed make an interesting, informative and accessible selection and with some amazing suprises and delightful stories to be gathered on the way. We start our journey and come across our first bridge at Berwick and at the very mouth of the river where it spills into the North Sea.

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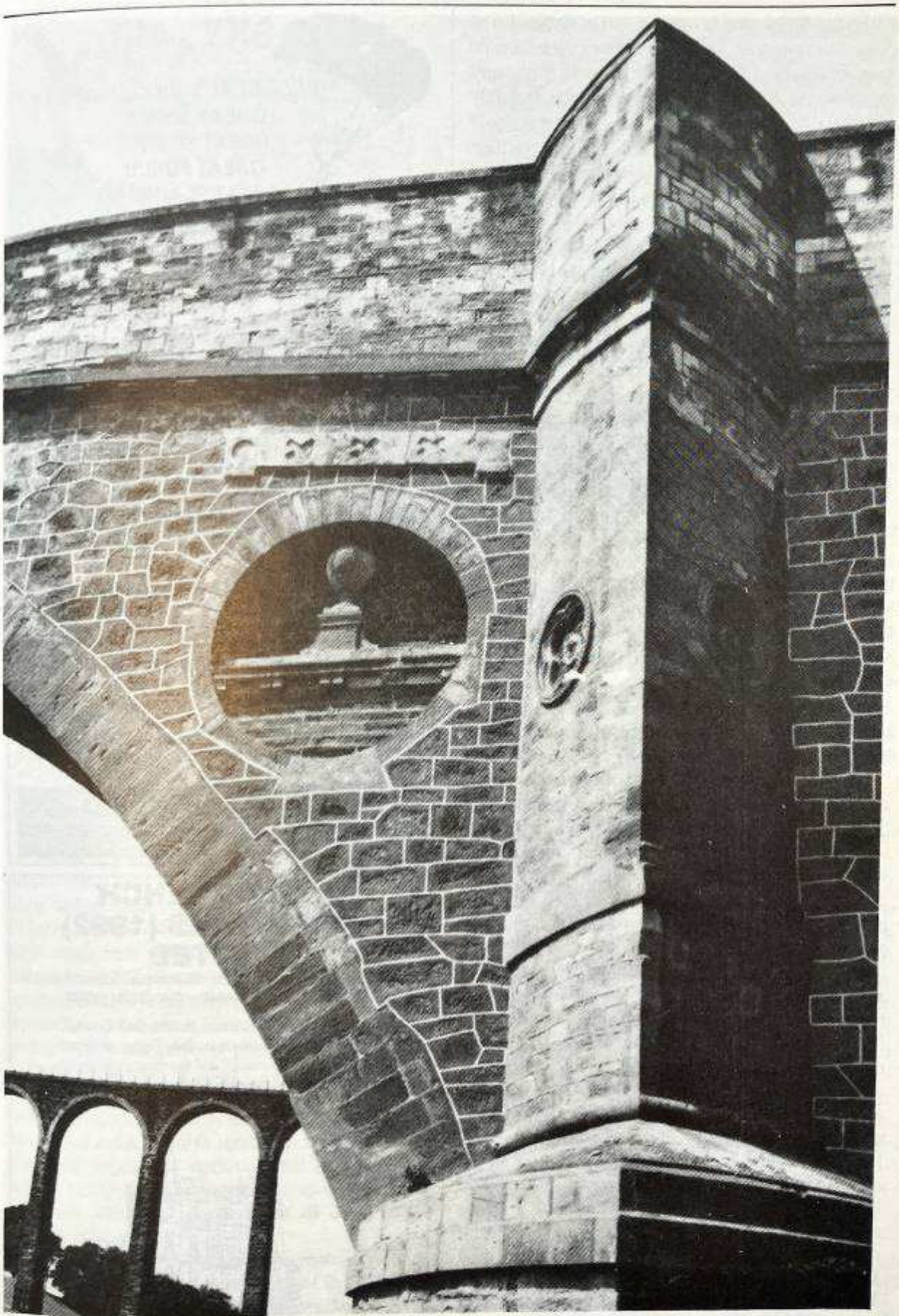
ONCE WOOD

In common with almost all early bridges those across the Tweed were of timber construction. They had their shortcomings, not least that they didn't last. There is a record of one at Berwick on Tweed 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 the replacement started in 1611, the bridge slowly creeping out from the east bank. And it was very slowly, for it was not until 1624 that the 15, near-sequential, masonry arches with their chamfered corners were substantially completed, the road width of 17ft between parapets being something of a wonder at the time. The bridge's piers are founded on oak piles 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.

Immediately upstream and evocative of another age is the Royal Tweed Bridge (NT996528) which, when it was opened in 1928, was the longest steel reinforced arch in Great Britain and at 361ft, five times greater than the largest arch of its 300 year old neighbour. The staging and 'falseworks' to support the concrete whilst setting were erected on timber piles driven into the river bed and the whole structure cast in-situ from mixing plants set up on both sides of the river. Almost in its shadow is Robert Stevenson's Royal Border Bridge (NT993434) opened in 1850 to complete the east coast mainline railway from Edinburgh to Newcastle. There are 28 stone arches and the greatest height above the river bed is 126ft. The piles for the piers were driven using Nasmyth's steam hammer and at the peak of construction nearly 3000 men and 180 horses were employed. The whole contract amounted to £200,000.

CAPTAIN BROWN R.N.

But 4 miles upstream from Berwick is another signal engineering achievement, the Union Chain Bridge (NT 934510), see illustration page 38, erected between 1819-20. It is the oldest (Telford's Menai suspension bridge was built in 1826) surviving suspension bridge in Britain still carrying vehicles and for five years after its construction was the longest bridge span in the western world carrying carriage traffic. Its builder, Capt. Samuel Brown R.N., utilised wrought iron bar-chains 15ft long



The buttress and 'cutwater' of Alexander Steven's Drygrange Old Bridge over the river Tweed presents an almost fortress-like face to the weather. Built between 1779-80 the bridge, which has a centre span of 105ft, is a mere 2ft 6ins deep at the crown. The rather garish pointing seen is here is of recent origin. In the background are a few of the Leaderfoot Viaduct's 19 soaring arches. The bridges are but two of those to be discovered on the Tweed.

to achieve a bridge span between points of suspension of 437ft. The eminent Scottish engineer John Rennie strongly influenced the design of the bridge's masonry support towers. The bridge was opened on the 26th July 1820 with Captain Brown first testing the integrity of the structure by driving a 'curricule' or light carriage across. Satisfied, he upped the odds by driving across 12 fully laden wagons. Further satisfied, he declared the bridge open only to watch in horror as a crowd, estimated by contemporary observers to number around 700, surged through the toll gates onto the bridge. His comments at the time are not recorded, but the bridge held.

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 and it is just not true, the bridge you see today being, in all but small details of maintainance, the same as that opened for use in 1820. However what you might notice are the single cables at each side of the bridge from which fall additional wire 'hangers' or supports. These are there just *should* the old original links fail. In a manner of speaking the belts to the braces. So pleased were the commissioning body, The Tweed River Bridges Trust, with his bridge – it had cost £7,700 as opposed to an estimated £20,000 for a masonry bridge – that they awarded Captain Brown a 'present' of 1000 guineas. The Union Bridge was to be instrumental in widely popularising the concept of the 'suspension' bridge.

The Tweed River Bridge Trustees were a busy body and it was they who commissioned Norham Bridge (NT891474), a narrow stone bridge of four arches built between 1855-57. It replaced a much more daring structure and, in its time, one of national significance, a laminated timber truss of two arches, each of 190ft, built in 1838. Six miles upstream and still in the wide part of the river is Coldstream Bridge (NT848401), illustrated opposite. This was built between 1762-67 and provided a shorter alternative to the east coast post road between Edin-burgh and Newcastle. The bridge is a fine example of the work of John Smeaton FRS 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 (to allow the arch 'rings' to be firmed) could be used for all the arches. The bridge was built by direct labour by Robert Reid under Smeaton's direction. As well as a plaque describing its construction the bridge bears another. It records that it was across this bridge that the poet Robert Burns started off on his first journey to England. Although not consequent upon Robert Burns having crossed over, it is recorded that here at the little toll-house an enterprising tollkeeper offered a marriage service for his customers. The toll-house itself was built by Reid for a contract sum of £27. Cleverly he designed

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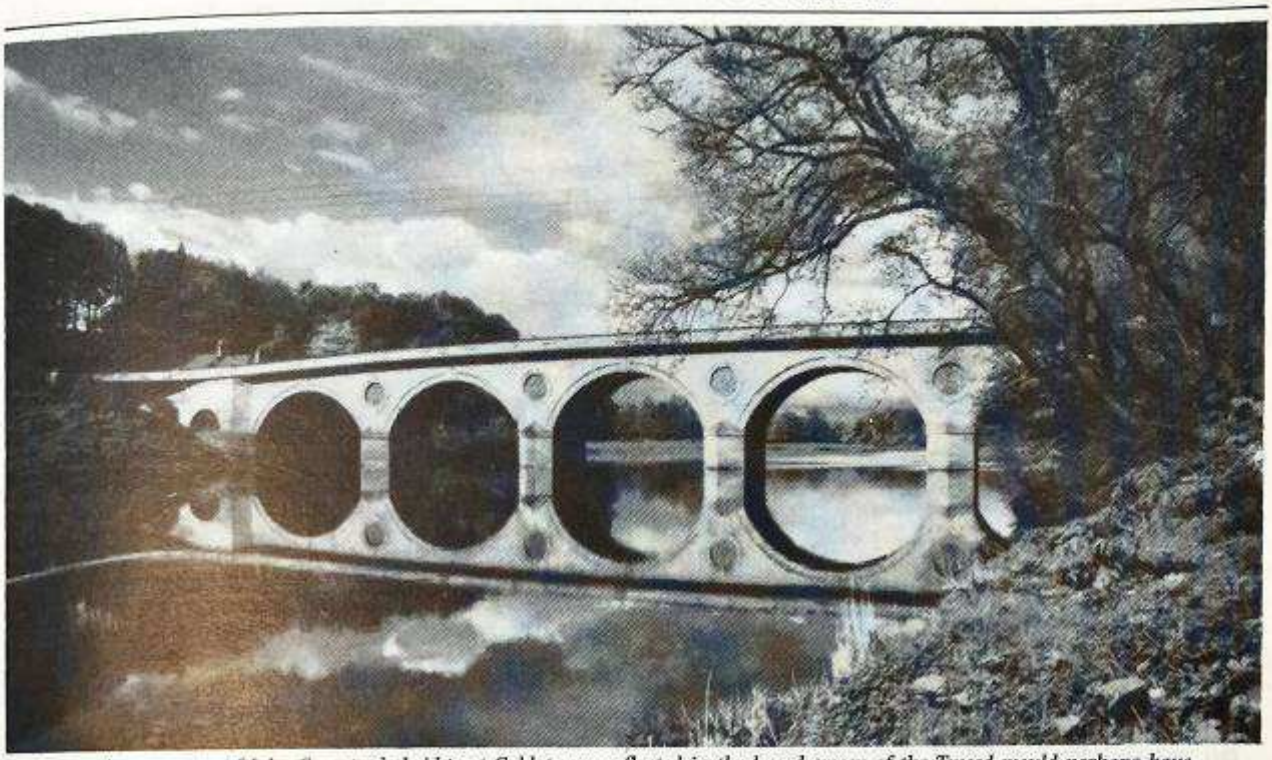

The gentle symmetry of John Smeaton's bridge at Coldstream reflected in the broad sweep of the Tweed would perhaps have appealed to Robert Burns as he crossed here on his first visit to England. Just visible behind the wing of the bridge on the far bank is the roof of the toll house where the enterprising toll-keeper offered a marriage service.

the tollhouse so the 'under-building' necessary to support it at road level made a convenient two storey house for himself. 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 following our course upstream, we are approaching Kelso and it is here in the heart of the Borders that is to be found one of Rennie's, and Britain's, finest bridges. Built between 1801-04 for the sum of £12,876, it replaced the bridge dating from around 1755 which, built with too shallow foundations, finally collapsed in 1795. Rennie's bridge, as well as being a paradigm example of engineering, is enhanced by its fine architectural detail and 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 made the more remarkable when one considers that all the detail is rendered in stone.

Mertoun Bridge (NT 610321), see photograph page 37, an attractive red, free-stone bridge of five 70ft low rise arches is unusual in that the designer, James Slight of Edinburgh, while originally designing 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 later take stone arches. The initial work was commenced in 1839 and finished in 1841 with the stone arches being added later – surely an exercise in economics as much as engineering. Incidentally details of the wooden arch construction were included in James Newland's "The Carpenter and Joiner's Assistant" published in 1860.

THE RISE AND FALLS OF J & T SMITH

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 260ft 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. In turn this bridge had replaced an earlier one of chain-rod constructed by J & T Smith of Darnick who claimed it to be the first of its kind in Britain. The claim might well have been correct but one suspects that Messrs Smith & Co would rather they had kept their corporate mouth closed, as the bridge, while truly the first of its type was, six months later, also to become the first of its type to collapse – during a January storm in 1818. It has been suggested that it was this collapse, and a confusion between bridges, that gave rise to the

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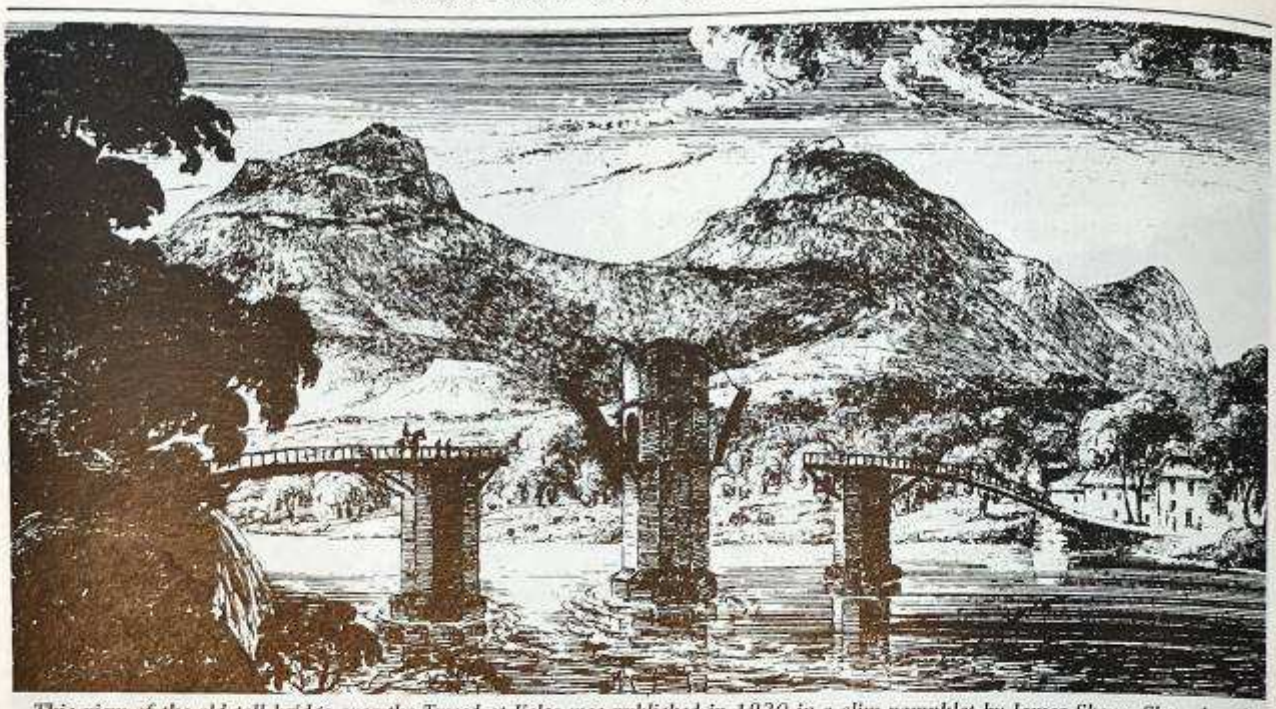

This view of the old toll bridge over the Tweed at Kelso was published in 1830 in a slim pamphlet by James Skene. Skene based the reconstruction on the memories "of an aged inhabitant, who retained a perfect recollection of the appearance and position of this singular bridge".

apocryphal story of the 'collapse' of the Union Bridge mentioned earlier.

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

The Drygrange Old Bridge, or Fly Boat Bridge – a name that refers to the presence of an earlier ferry (NT 575346) – was built by Alexander Stevens between 1779-80 with a daring 105ft centre span and an arch ring a mere 2ft 6ins deep at the crown. See illustration on page 33. The rather garish pointing to be seen on the facades dates from the 1960's and does little to enhance the bridge's otherwise subtly detailed aesthetics. The modern road bridge also to be seen here was built between 1971-73 and is of steel box-girder construction with concrete deck. But most impressive of all is that which strides above both, tall and slender, the 19 arch Leaderfoot Viaduct which has a maximum height of 130ft. The most imposing element of the former Berwickshire Railway it was opened for operations in 1865. Recognising that Scotland's historic heritage is not solely vested in her military past, her castles and palaces, the Leaderfoot Viaduct is now in the care of Historic Scotland and undergoing conservation work prior to becoming a major national monument to Scotland's outstanding engineering and industrial past.

Two miles down-stream from Leaderfoot is Gattonside suspension footbridge (NT545347) with its 296ft span across the river. This bridge is the oldest existing example of the work of the Scottish engineering company of Redpath Brown and was erected in 1826 in an altogether more successful bridgebuilding exercise by J & T Smith of Darnick upon whose misfortunes we com-

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mented earlier. At the south side of this bridge there was small house built for the collection of 'pontage' or tolls, the fee being 1d 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. Currently the bridge is being reconditioned and 'modernised' by Borders Regional Council and sadly much of the original handcrafted ironwork will soon be gone.

Also at Melrose is the 18th century bridge at Darnlee (NT488322) about half a mile above which is the hamlet of Bridgend, the name commemorating the fact that here was once the curious medieval bridge which Sir Walter Scott described in 'The Monastery'. James Skene's print of 1830 (illustrated opposite) 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 drawbridge – No pay toll tax? No cross bridge. In Scott's day the pier bases were still visible.

The next bridge of historical interest is near to the confluence of the Tweed and the Ettrick Water (NT 488322) and 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 to this bridge which was indeed founded by Scott himself. This romantic urge is seen in the arch-stones of alternate pink and yellow sandstone and the raised Tudor shields in the spandrels. Writing in his diary on the occasion of the bridges opening on the 11th 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 Smith's, one feels, might have felt slightly put out at this suggestion of possible 'casualties'.

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

But a few miles downstream from Yair 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, 131ft 6ins wide and 26ft in height, it was supposed in its day to be the largest arch ever to be constructed of rubble stone. Apart from its coping and cornice it contains not one single hewn or dressed stone. Again the builders in 1847 were J & T Smith of Darnick and sadly it was here at Ashiestiel bridge that nemesis was to arrive for the intrepid brothers it being reported in contemporary

Mertoun Bridge was designed by James Slight of Edinburgh and was originally built with wooden arches between the stone piers and abutments. The graceful stone arches seen in this photograph were added later.

accounts that on the temporary wooden supporting 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".

WIRE STEEL AND STONE

As we continue up the narrowing river the spans become smaller and at Walkerburn and Innerleithen the bridges are both relatively unglamourous multi-span steel-bow structures. But there are interesting surprises still in store for where the road follows the turn of the river about a mile from Peebles you come to a small cottage called Wire Bridge Cottage and a clue that you are near to what is left of the historic Kingsmeadow wire bridge (NT 268400), a footbridge that had a span of 110ft, designed and erected by JS Brown of Redpath Brown in the summer of 1817 (the Battle of Waterloo took place in 1815) and the first of its kind in Europe. It was modified in 1923 but 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 remains of the other anchor post, rather sparse postscripts to an intriguing piece of our engineering heritage.

Close now to the end of this journey of discovery we come in sight of Peebles and the Priorsfield suspension footbridge (NT 253403), a typical example of a late 19th century small suspension bridge with wire rope cables. From this bridge and upstream you can see what appears to be a rather uninteresting structure, Peebles Old Bridge (NT250403). At first glance it seems a typical turn-of-the-century bridge with its five spans and parapets surmounted with decorative Glasgow cast, cast-

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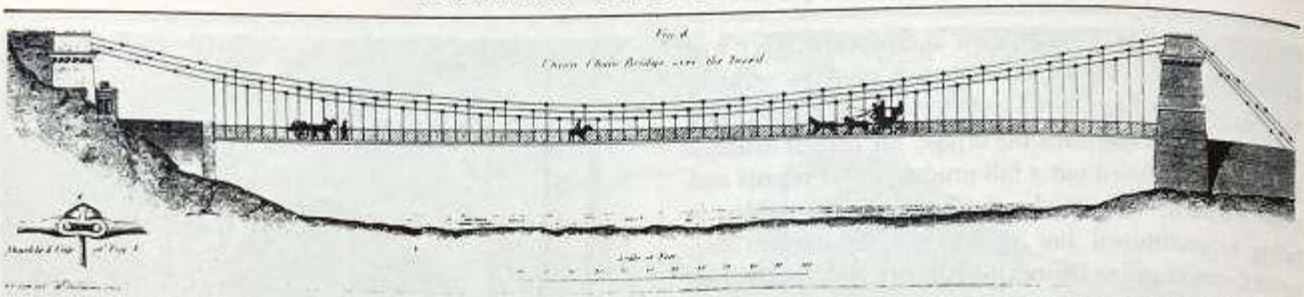

Designed by Captain Samuel Brown R.N. the Union Chain Bridge, 4 miles upstream from Berwick-on-Tweed is the oldest surviving suspension bridge in Britain still carrying vehicles. For the five years prior to Telford's Menai Bridge (1826) it was the longest bridge span in the western world.

iron dolphin lamps but closer inspection reveals the haunches of the original narrow 15th century bridge that once crossed the river here, all that remains of that one other 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 was widened in 1834 and in 1900 the then 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.

This of course is the story of just some of the bridges across one Scottish river but surely demonstrates the truth in the adage that we should perhaps not cross our bridges before we come to them, but stop first and discover what stories thay have to tell us of our past. ●

Roland Paxton is a Fellow of the Institution of Civil Engineers and Chairman of its Panel for Historical Engineering Works. An Honorary Senior Research Fellow of Heriot-Watt University, his keen interest and hobby is the history of civil engineering and promoting this fascinating interest to a wider public. He was editor of the very popular book, '100 Years of The Forth Bridge' (ISBN 07277 1600 X) published to mark the Centenary (1990) of the rail bridge and written by engineers for the enjoyment of the general public.

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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