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Thomas Telford

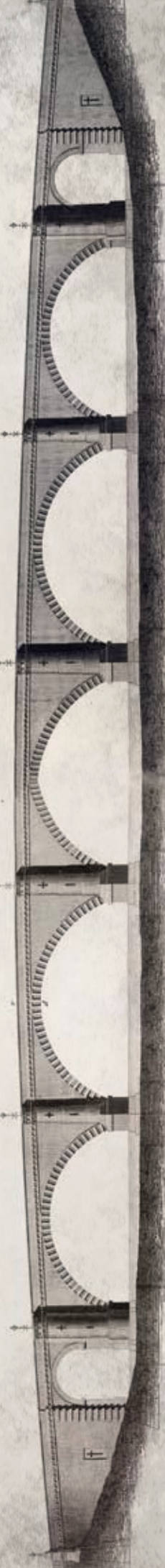
Telford's Bridge at Dunkeld

2007 is the 250th anniversary of the birth of Thomas Telford, one of the greatest civil engineers of the 19th century. He was born the son of a shepherd at Westerkirk, near Langholm, Dumfriesshire on 9th August 1757. At the age of 14, Telford was apprenticed as a stonemason and worked at this trade in Edinburgh. By 1782, he was involved in large building projects in London and Portsmouth, and working with architects such as Sir William Chambers and Robert Adam. Architects of the King's Works, he amassed a great practical knowledge of materials and building design. At the age of 36, he was appointed engineer for the Ellesmere Canal, construction of which included the Pontcysyllte Aqueduct, the most dramatic cast iron structure of its time.

Telford's work in Scotland stemmed from the government's determination to improve the economy of the Highlands by providing a better road network and infrastructure. In the period 1802 to 1823, Telford was responsible for building hundreds of miles of roads and around a thousand bridges of which the Dunkeld Bridge is a most magnificent example. He engineered the Caledonian Canal and improved many harbours including Dundee and Aberdeen. Between 1823 and 1830, Telford managed the construction of thirty-two 'parliamentary churches' and associated manse in the Highlands and Islands: two churches and manses were built in Perthshire at this time, one at Kinloch Rannoch and one at Innerwick, Glen Lyon.



A Brief History



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Bridging the Tay at Dunkeld

The medieval bridge begun by Alexander Myn in 1510 had collapsed by the early 17th century and for two hundred years crossings were made by two ferries - the Inver Ferry upstream of the Cathedral and the East Ferry downstream of Little Dunkeld Church.

These ferry crossings were inconvenient and perilous as Lord Cockburn, a circuit judge, commented in his autobiography 'Circuit Journeys',

"Those who are born to modern travelling can scarcely be made to understand how the previous age got on... there was no bridge over the Tay at Dunkeld... nothing but wretched peerless ferries let to poor cottars who rowed or hauled or pushed a crazy boat across or, more commonly, got their wives to do it",

and in 1766 six people drowned in a bad accident at the East Ferry when a ferry boat laden with thirteen passengers and four horses capsized.

Recognising the poor state of the roads and lack of bridges in Scotland, the government instructed Telford to carry out a survey for improving communications. In 1802 he reported that a bridge could be built at Dunkeld on a straight reach of the river a little way above the East Ferry at a cost of £15,000 (nearly £1m in today's prices). The 4th Duke of Atholl agreed to give up his interest in the ferries and meet half the cost on the understanding his investment could be recovered by tolls. An Act of Parliament to construct the bridge was passed in 1803, with the factor of the Atholl Estates, Thomas Palliser, managing the project on behalf of the Duke.



4th Duke of Atholl, from the collection of Blair Castle, Perthshire

This leaflet has been produced to celebrate the 250th anniversary of Thomas Telford's birth and the 200th anniversary of the opening of the Dunkeld Bridge. Sincere thanks go to Christopher Ford, Chairman of the Dunkeld and Birnam Historical Society for his substantial input into the leaflet's text.

Perth and Kinross Heritage Trust is a registered Scottish charity that aims to promote, protect and enhance the historic environment of Perth and Kinross. For further information on the Trust, please see our website: www.pkht.org.uk



Dunkeld Bridge by C J Greenwood, 1843, reproduced by permission of Perth Museum and Art Gallery, Perth & Kinross Council

Further reading

Dunkeld, Telford's Finest Highland Bridge by Christopher R Ford, 2004, Perth and Kinross Libraries
Thomas Telford by L T C Rolt, (new edition) 2007, Alan Sutton

Constructing the Bridge

The bridge at Dunkeld is an A-listed building and was described as Telford's 'finest Highland bridge' by Poet Laureate Robert Southey, writing soon after its completion. It spans the River Tay, the most powerful river in Britain with a huge mountainous catchment area to the north and west of Dunkeld. Water levels can rise dramatically and the design of the bridge took this into account.

Initial plans were for the bridge to cross the Tay further to the east, where the river narrows and bends to south however, apparently on the insistence of the Duke of Atholl, the design was moved westwards to align with Atholl Street, one of the two main streets in Dunkeld. Bridge Street was constructed and a new dramatic entrance to Dunkeld created. The bridge is built in a 'gothick baronial' style with mock turreted towers with blind arrow slits between each arch. This style of building was popular in early 19th century Perthshire and other

notable gothick baronial buildings include St Paul's Church in Perth and Taymouth Castle, Kenmore.

In length, the bridge measures 685ft (over 200m) with seven spans – a central one of 90ft (27.4m), two of 84ft (25m), two of 74ft (22.5m) and two land spans of 20ft (6m). The spandrels (between the arches) are not filled with rubble stone but with internal longitudinal walls to take the thrust of the arches without over loading the external spandrel walls. This arrangement was a feature of Telford's designs and has contributed to the durability of the bridge.

Construction of the bridge began in the spring of 1803, at first supervised by Patrick Brown and then John Simpson under Telford's direction. The first tasks were to prepare materials and construct the wooden service bridge. The sandstone for the arches was quarried at Gellyburn on the Murthly Estate, some 10km to the south east of Dunkeld and the stone for the rubblework was sourced in local

quarries to the west of Birnam. The foundations of the bridge are not piled but are laid on rafts of larch cut from the neighbouring Polney Wood.

On the 24th June 1805, a ceremony was held to inaugurate the construction the stone bridge. Sir George Stewart, laird of the Murthly Estate laid the foundation stone in the Duke of Atholl's absence and, after the workmen had all received and downed a dram, construction began. Over 250 workmen (masons, carpenters, smiths, quarrymen and labourers) were employed during the construction of the bridge.

The contemporary watercolour below by George Heriot shows the construction of the bridge. Despite adverse weather conditions with high water levels often flooding foundations, the bridge was opened to the public in October 1808 and finally approved by Telford as complete in November 1809.



Construction of bridge by Heriot, reproduced with kind permission from a private collection

Tolls and Toll Trouble

The tollhouse situated on the Birnam side of the bridge is not the original designed by Telford and is thought to date from 1834. Telford's toll houses usually have a toll collection window built into the house whereas tolls or the pontage on Dunkeld Bridge were collected from a wooden booth. The Duke let the right to collect tolls to a toll keeper for an annual rent.

The 1803 Act regarding the construction of the bridge set out the pontage. Tolls charged for a crossing ranged from one halfpenny for a person on foot through to twopence for an unladen horse, fourpence when drawing a cart to eightpence for a carriage. Sheep and pigs were sixpence per score and cattle one shilling and eightpence per score. For comparison, during the 19th century the average daily wage was between one and two shillings. The revenue per year in the early 19th century was some £750 rising to over £2,000 by 1863.

The original estimate for the construction of the bridge was £15,000 but the actual cost, including land purchase and approach roads, totalled £34,000 of which the government contributed £7,000 leaving the Duke to recover £27,000 from tolls. The Duke had raised the money for the bridge through loans and bonds and with the interest added to what had been borrowed, the debt far outstripped what could be raised from tolls.

When the decision to build the bridge was taken, it was predicted that the

bridge would be toll-free within a few years of its completion. Disgruntled with the continued tolls, the public protested - resulting in riots at the bridge and various court cases. One colourful character involved in the agitation to remove the toll was Alexander Robertson (a landowner who lived on the southern side of the river), locally known as Dundonnachie. The Duke of Atholl was accused of using the money gathered through the tolls to build his new mansion house at Dunkeld. This grand house, to the west of the Cathedral was never completed and was demolished in the 1840s, after the death of the 4th Duke in the 1830s. Tolls were paid until the bridge was taken over by the County Roads Authority in 1879.

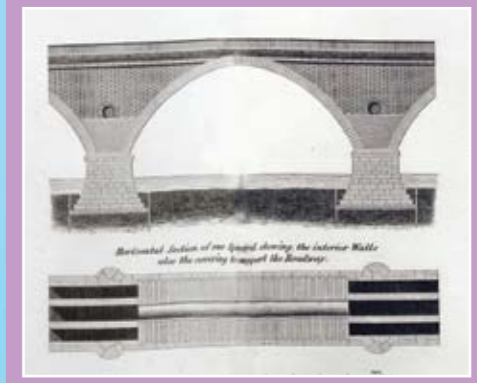
"At fair Dunkeld, where Tays four waters roll, a mighty Duke lives by a Bawbee toll" (Dundee Advertiser)



View of the bridge from the Cathedral, from the A K Bell Library Local Studies Section

Sinking the Foundations

Initial ground investigation revealed loose sand and gravels to a great depth below the river bed with no sign of solid rock. Telford's usual construction method was to drive timber piles into solid rock for the foundations of the bridge piers, but at this site such construction was impractical. To solve this problem, the foundations of the bridge piers were constructed on rafts of spruce and larch timber at depth of 5ft (1.5m) below the river bed (8ft or 2.4m below the normal water level). To allow the laying of the foundations, timber piles would have been driven into the riverbed and were then lined with planks and sealed with clay to create a cofferdam from which water would be pumped.



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