

OVER BRIDGE, GLOUCESTER

Immediately to the West of Gloucester, the River Severn divides into two channels which rejoin some two miles downstream enclosing meadowland known as Alney Island. Until 1966, when the new Severn Bridge was built, the bridges over these two channels and the causeway linking them, were the lowest bridging point over the Severn connecting the South of England with Wales. It is not known when the first bridges were built, but certainly the route was used by the Romans. It is thought that the land levels have changed over the centuries, and that at one time Alney Island was a tidal swamp and the river channels much shallower. There may have been a ford originally, but it is of interest to note that in the pre-Reformation period, the monks of the Abbey of Gloucester used to walk to the village of Over, where the Abbey owned property and a vineyard on the site of the present hospital. This walk was taken regularly for exercise, and it is reasonable to assume that there were bridges in use at that time over both channels of the Severn.

The first documentary evidence of a bridge at Over is by Leland who wrote that he saw a bridge of eight arches under construction in 1535. The causeway then followed its present route to Westgate Bridge and so into Gloucester. There has been some dispute over the actual number of arches in this bridge as contemporary drawings show fewer than eight; however when the present railway bridge was rebuilt in 1951 the bases of piers for eight arches were found. The carriageway of this bridge was only 13 feet wide between the parapets, and the span was 137 feet.

In 1813, John Wheeler, who was probably a surveyor, wrote to the magistrates to notify them that the bridge was in a dilapidated condition and that one arch was falling. Five years later he reported that ice from a thaw had further damaged the bridge which was now dangerous. In the 19th century important bridges were the responsibility of the magistrates, and were paid for from a parish levy known as Bridge Money. All decisions were made at the Quarter Sessions.

£10 was spent in 1821 in replacing several stones in the piers. Eleven years after the first report that the bridge was dangerous, the County Surveyor, John Collingwood, examined it and confirmed that "carriages may not pass over safely". He ordered the immediate repair at a cost of £76 for the piers, stonework and parapet, and £12. 15. 0. for the roadway. In October 1824, the magistrates appointed a committee "to examine the state of Over Bridge", under the chairmanship of Sir Berkeley Guise. Nine months later, the committee reported back to the Quarter Sessions and presented three plans for a new bridge. One of these was by a man named Carpenter, but there is no record of the engineers who produced the other two. None of these satisfied the magistrates and it was decided to ask Thomas Telford to submit plans for erecting a bridge at Over. In January, 1826 he submitted two designs, one of cast iron for £24,000, and one of stone for £40,000. The latter was approved, and

advertisements for tenders were placed in The Times and The Courier. Both papers insisted on payment in advance, The Times requiring one and a half guineas, and The Courier one guinea! Three tenders were received -

Taylor of Soho, civil engineer	£45,761
John Cargill of Pontypool	£39,250
Hugh McIntosh	£37,350

John Cargill's tender was accepted, although it was not the lowest, and it is perhaps pertinent to point out that his referees were Thomas Telford and a Mr. Fletcher who was an engineer at that time working on the Gloucester and Berkeley canal for Telford. When John Cargill started on Over bridge, Fletcher was the engineer in charge for the first nine months, after which he went to the Ionian Isles in a professional capacity, and was replaced by John Hall. Fletcher's reports to the magistrates contained far more details than did his successor's, so that the early stages of the construction of the bridge can be more fully described than the later ones.

The design of the bridge was for a single elliptical arch, similar to the bridge at Neuilly which Telford admired. The new bridge was to be 150 feet wide, 13 feet wider than the old one, to accommodate the additional flood water created by the enclosure of the land in the upper reaches, and the embankment of the river channel. The rise of the arch was to be 35 feet, with the carriageway 17 feet, and the footpaths 4 feet each. In order that the flow of the river should be unobstructed this bridge was to cross the river at right angles, a little way upstream of the old one, so creating the present bend in the road as the causeway meets the bridge.

Stone for the abutments and all inside building was brought downstream from Highley and Alveley in Shropshire. A quarry was opened in the Forest of Dean for the stone for the outside works. This stone may have been transported up the Severn from Lydney, for there was already a quay at Over. River transport was common and continued throughout the period of the construction of the new bridge, which added yet another hazard to that of the Bore and seasonal flooding for the contractors to contend with.

In July 1826, work was started and coffer dams were built. Soil investigation on the East bank revealed that the strata were as follows from the surface downwards:-

1. Subsoil	5 feet.
2. Loam	11 feet.
3. Soft blue silt	12 feet.
4. Peat moss	5 feet.
5. Strong, coarse indurated gravel	3 feet.
6. Gravel on coarse sand	8 feet.
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The foundations for the main pier were laid upon the indurated gravel 33 feet below the surface. On the West side the ground was firmer and gravel was reached at 27 feet. On both sides, upon the gravel, rubble was laid, and then 37 memel logs which were made of thick brushwood lashed together with chains to form continuous logs. In this case each log was about 40 feet long. These were then infilled with masonry rubble on which beech planks were laid. This constituted the foundations for the two main piers.

The September tides damaged the dam but it was soon repaired according to Fletcher's quarterly report, in which he noted that the following tradesmen were employed at that time.

14 Masons	5 Millwrights	25 Diggers
12 Carpenters	6 Blacksmiths	

By January 1827, the Eastern abutment, which did not have such extensive foundations, was up to the level of the springing of the arch. In March, the Western abutments and also the two for the arch over the mill stream adjacent to the West bank of the river at Over were under construction. The timber framing for the great arch was started and there was sufficient timber upon the ground to complete it.

At this time, it was realised that soil was needed for the embankments and would most readily be obtained from the nearby Vineyard Hill. Enquiries revealed that this land still belonged to the Church, and permission was eventually given by the Bishop of Gloucester for the abstraction of soil, provided that the land was reinstated to his satisfaction.

By October 1827, Telford considered that the work was sufficiently advanced for him to be paid £1,000. He was to be paid a further £1,000 when the bridge was completed, so getting 5% of the estimate. He was not pleased to be informed by the clerk to the magistrates that he would have to wait until there was a full Quarter Session in January 1828, three months later, when the magistrates would consider paying him if the money were available! The records of the Sessions for that month reveal that he was in fact paid, and that at that time £28,000 had been spent on the bridge.

Mr. Cargill, the contractor, was paid in quarterly instalments, when he reported briefly on progress. In April 1829, Telford inspected the water walls and was satisfied with the progress made. In June of that year he produced the following statement of the contractor's claim.

1. Bridge and approaches	£39,250.	0.	0.
2. 3 collateral embankments	2,622.	10.	0.
3. Water wing walls	1,094.	1.	4.
4. Sundry drains	115.	3.	10.
5. Covering embankments with soil	122.	8.	10.
6. Sloping banks of Vineyard Hill	62.	10.	0.
7. Gate into Wm. Guises land	2.	15.	0.
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	£43,269.	9.	0.
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The bridge was nearing completion when it was found necessary to add wing walls to the abutments at an additional cost of £900 - £1,000. On Cargill's final bill, he reported that the embankment had slipped and sunk, thus throwing over the retaining walls and breaking a part of both ends of the arch across the mill stream. These were all rebuilt, and the arches were extended and supported by strong buttresses. His final bill brought the contractor's cost to £43,526. Sir Berkeley Guise was paid £273. 6. 0. for land in Over belonging to him which was used for the West side of the bridge and the new roadway. The Bishop of Gloucester was dissatisfied with the restoration of Vineyard Hill and the magistrates were required to pay £93. 16. 6. in compensation for the damage.

In July 1829, the new Over Bridge was completed and Telford pronounced himself satisfied. When the centering support of the wooden framework was removed the crown sank 2" and then a further 8". Telford was undismayed, quoting the bridge at Neuilly as having sunk first 13" and then 10" more over a span of 128 ft. When asked a year after the completion of the bridge to examine 'sundry openings which require to be stopped and is daily sinking' he complied, and wrote that he considered the opening up to be normal and the workmanship perfect! The openings in the joints were immaterial in such a large structure and should be filled in. The slipping of the embankments could easily be remedied.

On request, he again examined cracks in April 1831, and in this report he wrote that he confidently affirmed there was no cause to suspect the bridge's stability. The magistrates must have been reassured, for in October of that year he was paid the balance of his fee. In 1832 further repairs were executed under Telford's direction costing £500, of which Telford paid £250 and the County £250.

It is not clear when the new bridge was first used by traffic, for the old bridge was still in existence throughout this period. In April 1834, the magistrates decided to stop up the roads to the old bridge and sell the bridge itself. In July, Thomas Armstrong won the contract with a tender of £230. The centre piers and arches were to be down by 10.10.1834 and the remainder to be finished by 1.1.1835. No gunpowder was to be used. On 27.2.1836 Armstrong was told to remove the materials and buildings immediately, or action at law would be taken. This letter had the desired effect for the remains of the 1535 bridge were finally removed in 1836.

In his autobiography Telford gave his account of the building of Over Bridge. When repairs became necessary immediately after the removal of the wooden framework and the bridge continued to sink, he realised there must be some fault in the structure. The wing walls had not been given piling and platforms, which meant that they sank and pulled away. The greater movement was on the Eastern side and was entirely due to his own parsimony in not providing adequate foundations.

Successive County Surveyors have continued to fill in the cracks with various materials. In 1907 a scaffold was placed beneath the bridge and a straight edge revealed a reverse curve of $\frac{3}{4}$ ". Open joints of $2\frac{1}{2}$ " were

found. It was suggested that an extensive propping-up operation would make the bridge stable, and that the wing walls should be underpinned with concrete and brick. When a shaft was dug for this operation water rushed in and caused even greater movement of the bridge itself. Sir John Fowler of the Forth Bridge was consulted, and his advice was to fill in the shaft and leave the bridge alone, as it was most important not to upset the balance. This advice was taken, and was obviously well-founded, for the bridge carries today an enormous volume and weight of traffic such as Telford could never have imagined, but which completely vindicates his confidence in the stability of Over Bridge.

J. C. FROST

Sources

All Telford's designs and working drawings were given to the Institute of Civil Engineers. Over Bridge itself can be seen any day, but the elliptical design can only be appreciated from the river, or possibly the Maismore road. In Gloucester Folk Museum is a water colour painting showing Telford's bridge, with the 1535 bridge seen through the arch.

Glos. Records Office, Q/AB 3 (Over Bridge correspondence)
Q/SO 14-16

L.E.W.O. Fullbrook-Leggatt, Over Bridge

L. Richardson, The River Severn (1964)

R. Phillips, Over Bridge, a Monograph (1908)