

# HISTORIC STRUCTURES

significant structures of the past

## B&O Railroad Bridge at Harpers Ferry – 1836

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The Baltimore & Ohio Railroad broke ground in Baltimore, Maryland on July 4, 1827 and planned on running from Baltimore to the Ohio River along the Potomac River to Cumberland, Maryland. After delays at Point of Rocks due to a right of way conflict with the Chesapeake and Ohio (C&O) Canal, it arrived at Sandy Point, across the river from Harpers Ferry, on December 1, 1834. The *Virginia Free Press* reported, *Monday last, will be remembered by the citizens of Harpers Ferry as an important one in its history. On that day, at half past 2 o'clock, P. M. a locomotive came thundering up to the bridge, drawing after it a train of cars carrying nearly a hundred passengers... the hand of man has cut a pathway through the cliffs that had been considered impregnable; and he has constructed causeways to bear him in safety, where he and his steel had trembled at the dashing billows.*

A four span wooden bridge built in 1829 by Lewis Wernwag as a toll bridge for James and Catherine Wager crossed the river at the time. Wernwag also built a wooden three arch deck bridge across the Monocacy (Monogouay)

River in 1831 for the B&O. It was the first wooden bridge to carry railroad traffic in the United States. The *Frederick Herald* reported of this bridge,

*We here present our readers with a description of the splendid bridge or viaduct, over the Monocacy, constructed by Lewis Wernwag, Esq. whose reputation as a scientific bridge-builder no one will question. The bridges constructed by him in various parts of the country have long been celebrated for their beauty, strength and scientific adaptation to the difficulties encountered – but we regard that which we are now about to describe as his 'chef d'oeuvre' which will long remain a monument of his genius, and the discrimination of the directors in assigning its erection to his judgment and experience.*

In addition to many bridges across the Susquehanna River, etc., he built the Colossus Bridge across the Schuylkill River (STRUCTURE, June 2014). The C&O Canal arrived at Harpers Ferry in 1833 and the Frederick-Harpers Ferry Turnpike arrived in 1832. As a part of the right of way settlement between the B&O and C&O, the canal was given the right to extend its line along the easterly bank of the river, forcing the B&O to cross the river and reach Cumberland along or westerly of the west bank of the river. Construction was underway on the Winchester and Potomac (W&P) Railroad with Moncure Robinson as Chief Engineer. It connected Winchester, Virginia with Harpers Ferry to the north. Construction on the C&O was proceeding

up the left bank of the Potomac past Harpers Ferry towards Cumberland. A bridge, strong enough to carry a railroad, was badly needed by the B&O to pick up traffic from the W&P and continue its route westerly to Cumberland and thence to the Ohio River.

In the summer of 1834, Benjamin Latrobe (the son of Benjamin Latrobe, an early architect/engineer in the United States) of the B&O, along with Robinson, began looking into using Wager's bridge. Since the entrance to the bridge from the east required a 90-degree left hand turn, which a railroad could not navigate, they decided it wasn't feasible. The B&O decided,

*...to construct a substantial viaduct across the Potomac, on the prolonged trace of the Winchester road and capable of permitting the passage of locomotive engines, with their usual trains, to which the present bridge is wholly incompetent. Contracts for this purpose have already been entered into, and it is expected that the viaduct will be completed nearly in the ensuing summer. The piers, six in number, with their abutments will be of undressed masonry, and the superstructure of wood. Its entire length including the portion crossing the Chesapeake and Ohio Canal will be 830 feet.*

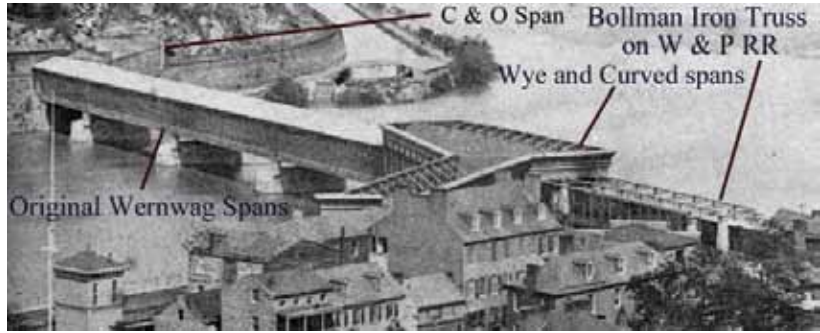
Philip Thomas, the President of the B&O, along with John Bruce, President of the W&P, determined the cost of a new bridge on this alignment "would be \$85,000, not all that much more than the cost of paying Wager to use his bridge; \$15,000 for the privilege of laying a track over it (on which he planned to levy tolls) and building a depot on his land, and \$25-30,000 for reconditioning the structure..." Even with their own bridge, it had to be on Wager's land and they had to recognize Wager's right to carry toll passengers, carriages, etc. across the river on it. It wasn't until July 15, 1835 that a contract was prepared which met all of the Wager's demands.

At the time, they did not know how they would be leaving Harper's Ferry to the west, so they went straight across the river and tied into the projected line of the W&P tracks with W&P to build the westerly abutment and the B&O to build the rest of the bridge. Jonathan Knight, Chief Engineer of the B&O, reported to the Board,

*The plan of a viaduct to be erected across the Chesapeake and the Ohio Canal and the Potomac river at Harper's Ferry, has been designed chiefly by my late assistant, B. H. Latrobe. The mason work of this structure which is (besides other uses) to form a connection between the Baltimore and Ohio and the Winchester and Potomac Railroads, has already been contracted for and it is intended likewise to contract for the superstructure of, which is to be of wood, as soon as practicable; in order the entire viaduct may be finished in the shortest time possible.*

In Latrobe's diary, he recorded his first meeting with Wernwag at Harpers Ferry, who was then 66 years old. They had been out looking at the bridge site when "a fierce southeast wind, bearing rain, blew through the Potomac passes like a hurricane and chased the surveyors from the river the next day." Latrobe spent most of the day with Wernwag in his shop, "Examining his models and amusing and edifying myself with his conversation... Wernwag is certainly a most uncommon man. His conceptions of complicated machinery are exceedingly clear and ingenious. He is a thorough-bred German in his dialect and manners and knew my father 35 years ago."

Wernwag and Latrobe arrived at a bridge style, something like the famous Schaffhausen Bridge across the Rhine River in Switzerland built by Grubenmann in 1757, that Latrobe would design and Wernwag would build. The B&O, based upon the agreement with the Wagers, designed the bridge to serve the railroad, carriages, pedestrians, livestock, and a towpath for the Shenandoah Canal. The towpath was to be added on the downstream side to accommodate canal boats transferring from the Shenandoah River into the C&O Canal. The C&O canal would build an inlet lock to lift this traffic from the Potomac to the canal just east of lock #33. After Latrobe



Bridge with Wye Span and Bollman Truss on W&P line, lower right.

finished his design in mid to late 1835, he left the B&O for a short time to work on the Baltimore and Port Deposit Railroad.

Work began on the bridge in the fall of 1835. The *Virginia Free Press* wrote, "A grand piece of workmanship is about to commence at Harpers Ferry. Proposals are to be received in a few days for the mason work of the bridge, which is to be constructed across the Potomac. It is to rest on seven substantial piers and two abutments – the whole to be erected by the Baltimore and Ohio Railroad Company, except the abutment on this side, which is to be raised by the Virginia Company. This structure, when completed will be regarded with peculiar interest. It will make the two great works of Internal Improvement, and

connect with bands of iron, two independent sister states. The Baltimore Railroad Company may address those States in the language of Virgil, "Conubio iungam stabili" (I will join together in steady union)."

Caspar Wever, Knight's assistant in charge of all masonry, after receiving bids, awarded the masonry contract to Charles Wilson and Wernwag was given the superstructure work, probably without any competitive bidding as no announcement was published in the *Virginia Free Press*. On March 31, 1836, the opening of W&P was celebrated along its entire length. With the completion of railroads on both sides of the river, the pressure was on to finish the connecting bridge. Wernwag did not start his work

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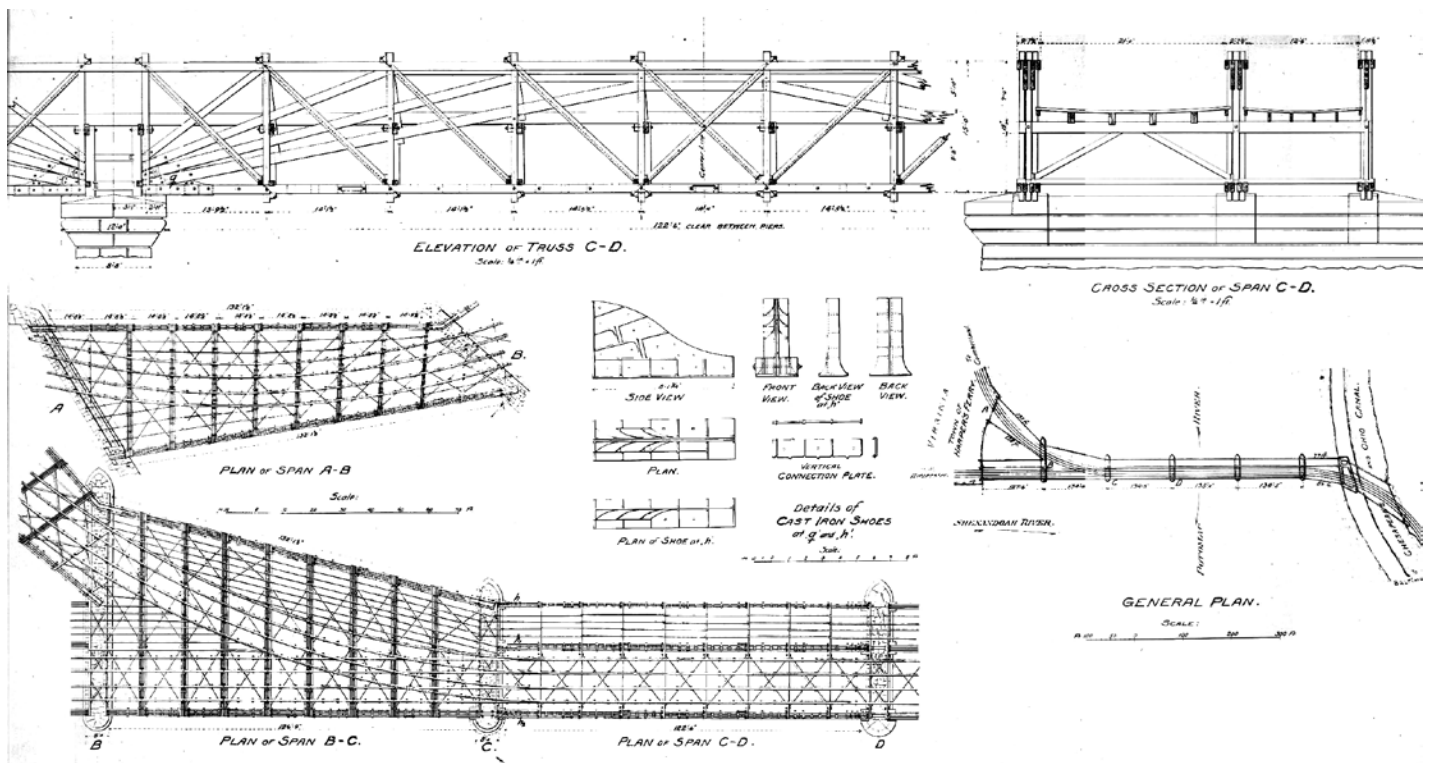
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Wye Span and original Wernwag/Latrobe truss, top left.

until late summer 1836. After he had his first span up, Latrobe, now back with the B&O, visited the site and wrote in his journal, "it is a beautiful combination of timbers, but the lumber of which it is built is rough stuff." Latrobe next visited the site in January 1837 after the bridge was completed, but not covered. Upon inspecting the bridge, he determined that the foundations were inferior and suggested wrapping the heads of the masonry piers with iron bands, as well as other remedial work.

The *Virginia Free Press* reported in early 1837, "We learn that the bridge of the Potomac at Harpers Ferry, for the purpose of uniting the Baltimore and Ohio Railroad with the branch to Winchester, Va. is so far completed that locomotives and their trains have passed over it." Much work, however, was still required to make the bridge safe and stable. During the repair, no heavy locomotives were allowed on the bridge. There were no problems with the foundations on the span over the C&O Canal, so it was roofed and covered in 1837 while repairs to the river piers were made. Latrobe's report to the Board in 1838 noted,

*The wooden superstructure of the bridge has justified the confidence entertained, in the excellence of its principle of construction, the only weakness which it has exhibited, being shown by three of the timbers supporting a part of the flooring, which cracked*

*during the passage of one of the trains. The recurrence of such a fracture, caused by an accidental imperfection in one of the timbers which failed, will be effectually prevented by the proposed immediate introduction of an additional timber between each of those upon which the floor and tracks depend for their support.*

The total cost of the bridge is not known, but it was surely in excess of the \$85,000 estimated earlier by Thomas. It is known that the company spent \$23,450.60 on the repairs in 1837 and another \$5,596.34 later in the year.

In 1839, after the passage of an Act by the Virginia Legislature permitting the line to cross over the Potomac and run through the state to Cumberland, the B&O had to determine its route through the state. The options were to run about six miles southwesterly on the W&P lines and then northwesterly across Virginia to Cumberland or, after crossing the bridge, run through the Arsenal (Armory) grounds along the westerly side of the Potomac for some distance and then run inland through Martinsburg to Cumberland. The latter route was chosen, but this required a branch to be built into the existing bridge to provide the change in direction of the main line to the north and west. Latrobe solved this problem by designing a two span addition to the bridge that branched off at the second pier from Harpers Ferry. What was called Pier A was

extended 38 feet upstream to accommodate the necessary curvature for the track. The two new spans were called the "WYE span" and the "curved span" and they had a variable width to permit the track to be curved as required. It was at the WYE spans that the rail traffic had to cross over the carriage traffic lanes that followed the W&P line, since they were on the northerly side of the bridge. Gatekeepers were placed to stop all carriage and wagon traffic when a train was passing over the bridge. The remainder of the bridge was not covered until the WYE and curved spans were completed. Latrobe spent a large sum of money in the covering and portal on the Harpers Ferry approach to give the bridge what he thought was a necessary amenity for the community.

There is no evidence that Wernwag was involved in building the WYE or curved spans, even though he did not die until August 1843. Maybe it is just as well that he was not involved, as the bridge failed twice, once in September 1844 and again in March 1845. The failures were due to decay combined with the fact that the very long floor beams overloaded the trusses.

On June 15, 1861, General Joseph Johnson, CSA, upon evacuating Harpers Ferry early in the Civil War, burned the bridge. After the war, all spans were rebuilt with Bollman iron truss spans which survived until the 1890s. ■