

Humpback Covered Bridge
Covington Vicinity
Alleghany County
Virginia

HAER No. VA-1

HAER
VA,
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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

REDUCED 8" x 10" DRAWINGS

Historic American Engineering Record
National Park Service
Department of the Interior
Washington D.C. 20240

HISTORIC AMERICAN ENGINEERING RECORD

VA-1

HUMBACK COVERED BRIDGE

Date: 1835.

Location: Covington Vic. Alleghany Co. Va.

Built by: original: James River and Kanawha Turnpike Corp.
present: Virginia Dept. of Highways.

Significance: The oldest surviving wooden bridge in Virginia "Old
Humbacks" curved multiple kingpost form is unique to
America.

Historian: Donald C. Jackson

The Humpback Bridge, located adjacent to Virginia Rte. 60 and crossing Dunlops Creek near Covington, was built in 1835 as a part of the Kanawha Turnpike.

[1] It is the oldest covered bridge in Virginia.

Originally three bridges of this design were built across Dunlops Creek, all by a man known as Mr. Venable of Lewisburg and his assistant, Tomas Kincaid.

[2] All three were part of the Kanawha Turnpike, a roadway 208 miles long designed to connect the market centers of eastern Virginia with the rapidly developing frontier. [2] All three were part of the Kanawha Turnpike, a road 208 miles long designed to connect the market centers of eastern Virginia with the rapidly developing frontier. [3] Traversing the rugged Allegheny Mountains, it was the first (and only) transportation link between the James River and the Kanawha River prior to the Civil War. [4] As such, the Humpback Bridge played a vital role in one of America's early highways.

Humpback Bridge was an inventive engineering feat, and now stands as a superb example of fine craftsmanship. The bridge is a multiple king post truss, a structural form dating from the Middle Ages, with curved upper and lower chords. The flooring beams and planks are placed directly on the lower line of the arch instead of being hung below as was the usual practice. [5] Consequently, the roadway follows the line of the arch thus providing the name "Humpback." The total rise of the arch is approximately 3-1/2 feet. The main upright timbers are, on the average, 9 feet apart, 7 inches x 10 inches in size and mortised at the top and bottom. There are no nails in the structure

as most connections are made with locust pins. The timber bracings are tapered, varying from 6 inches wide in their middle to three inches at the ends. Though the roof, floorboards, and portions of the exterior sidewalls have been replaced or repaired since 1835, the framing and abutments are original. [6]

Only one of the three "Humpback" bridges survives today. One was burned during the Civil War and the other destroyed in a 1913 flood. [7] In 1929 U.S. Rte. 60 was constructed, bypassing the sole remaining bridge. Following 25 years of neglect, the bridge was finally restored in 1954 through the efforts of the Covington Business and Professional Woman's Club. Today the bridge is the featured attraction within Humpback Bridge Wayside Park. [8]

FOOTNOTES

[1] Covered Bridges in Virginia (Virginia Department of Highways, Office of Public Relations, n.d.).

[2] Richard S. Allen, Covered Bridges of the Middle Atlantic States, (Brattleboro, VT: The Stephen Greene Press, 1959), p. 83

[3] Howard Newborn, Jr., "The Kanawha Turnpike," Virginia Highway Bulletin (October 1974), p. 14.

[4] Ibid., p. 31.

[5] Allen, Covered Bridges, p. 83.

[6] John Lee Davis. The Daily Review (Clifton Forge, VA, 1 November 1969).

[7] Allen, Covered Bridges, p. 83.

[8] Davis, Daily Review.

ADDENDUM TO:
HUMPBACK COVERED BRIDGE
Humpback Bridge Wayside Park, spanning Dunlap Creek
Covington vicinity
Alleghany County
Virginia

HAER VA-1
VA,3-COV.V,1-

PHOTOGRAPHS

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HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240-0001

HISTORIC AMERICAN ENGINEERING RECORD

HUMPBACK COVERED BRIDGE

This report is an addendum to a 4 page report previously transmitted to the Library of Congress in the early 1970s.

LOCATION: Humpback Bridge Wayside Park, spanning Dunlap Creek,
Covington vicinity, Alleghany County, Virginia
UTM: 17.583879E.4184110N, Callaghan, VA Quadrangle

STRUCTURAL
TYPE: Wood covered bridge, multiple kingpost truss

DATE OF
CONSTRUCTION: 1857 (date changed from original report due to new evidence)

DESIGNER/
BUILDER: Unknown

PRESENT OWNER: Virginia Department of Transportation

PREVIOUS USE: Vehicular bridge

PRESENT USE: Pedestrian bridge

SIGNIFICANCE: The Humpback Covered Bridge was built for the James River & Kanawha Turnpike and is one of the early turnpikes through the Alleghany region of Virginia. It is the oldest bridge in Virginia, and the older of only two surviving examples of a cambered wood covered bridge in the United States.¹

HISTORIAN: Lola Bennett, 2002

PROJECT
INFORMATION: The National Covered Bridges Recording Project is part of the Historic American Engineering Record (HAER), a long-range program to document historically significant engineering and industrial works in the United States. HAER is part of the Historic

¹ The other example of this type is Geer's Mill (Ponn) Bridge (1874) over Raccoon Creek near Wilkesville, Vinton County, Ohio.

American Buildings Survey/Historic American Engineering Record, a division of the National Park Service, U.S. Department of the Interior. The Federal Highway Administration funded the project.

Chronology

- 1784—George Washington tours the Alleghany region and reports to the Virginia Assembly the necessity of constructing a system of canals and turnpikes to open trade and communication with the west.
- 1785—James River Company incorporated.
- 1816—Virginia Board of Public Works established.
- 1820—Virginia General Assembly passes an act making the James River Company a state-operated venture and authorizes construction of a 208-mile road from the mouth of Dunlap Creek to the great falls of the Kanawha River.
- 1824—Three bridges constructed on Dunlap Creek west of Covington, Virginia.
- 1837—Flood destroys all three bridges on Dunlap Creek; they are subsequently rebuilt.
- 1842—Flood destroys all bridges on the turnpike between Covington and Lewisburg; they are subsequently rebuilt.
- 1849—Upper Dunlap Creek Bridge rebuilt.
- 1850—Middle Dunlap Creek Bridge rebuilt.
- 1856—Flood destroys Lower Dunlap Creek Bridge.
- 1857—Present Humpback Covered Bridge built.
- 1929—Humpback Covered Bridge bypassed.
- 1953—Covington Business and Professional Women’s Club raises money for repairs and preservation of Humpback Covered Bridge.
- 1954—Humpback Covered Bridge restored and surrounding land developed as a public park.
- 1969—Humpback Covered Bridge designated a Virginia Historic Landmark and listed on the National Register of Historic Places

Bridge Description

Humpback Covered Bridge is a single-span multiple kingpost truss wooden covered bridge with radically cambered upper and lower chords resting on stone abutments. The total length of the bridge is about 120' along the lower chord, with a clear span of 100'-0" between abutments. The truss is 13'-0" high from the top of the upper chord to the bottom of the lower chord, 15'-0" wide overall, with a roadway width of 13'-0".

The trusses are framed as multiple kingpost trusses. The upper chord is two parallel 8x8" beams, fastened together with threaded rods that pass through the chords at each panel point and are fastened with a plate and nut on either side. The lower chord is two parallel 8x8" beams, fastened together in a similar manner. The upper and lower chords have a positive camber totaling 4' over their 100' distance. The chords are connected by vertical wooden posts (6x10") spaced 9'-0" apart and diagonal members (8x10") between the posts. The upper chord is notched around the posts on either side. The tapered posts pass through the lower chord where they are set into notches and fastened with bolts.

The floor system follows the camber of the lower chord rather than being hung level from it. The rise is about 4' over a distance of 100'.² Wooden floor beams are placed transversely at each panel point and rest on the lower chord, and 5x10" I-beams have been sistered in alongside the floorbeams. The beams rest on the lower chord and the lower lateral bracing (4x4" timbers) is fastened between them. Wooden joists, or stringers, are laid on top of the floor beams and support the wood plank deck. The roadway surface is plank flooring laid transversely.

Upper lateral bracing consists of tie beams seated on top of the upper chord, diagonal cross bracing between the tie beams, and sway braces between the posts and tiebeams. The gable roof has slightly overhanging eaves and is covered with wooden shingles fastened to wooden purlins on top of the rafters. The ridge is cambered parallel with the chords of the trusses.

Clapboard siding (1x7") covers the exterior of the bridge to the eaves. The sheathing is fastened to vertical wooden nailers on the outer face of the truss. The portals are straight, with projecting pediments and squared openings.

The abutments are squared stone with mortared joints. A section of the west abutment has been replaced with concrete. The lower chords of the bridge rest on bedding timbers on top of the abutment facewall. The backwalls above the abutments and behind the bedding timbers serve as retainers for the roadbed. Stone retaining walls extend

² According to the Spring 2002 newsletter of the National Society for the Preservation of Covered Bridges, the much-quoted figure of 8' for the rise of Humpback Covered Bridge is greatly overstated. According to measurements made in 1995 by Mr. James W. White Jr., an engineer with the Virginia Department of Transportation, the rise is 4'-1". The measurement was made at the request of Leola B. Pierce, also an engineer, who was doing research for her book Covered Bridges in Virginia, and was the first to question the inaccurate figure.

approximately 40' back from the backwall at both abutments along inclined approaches to the bridge.

Virginia Covered Bridges

Virginia once had hundreds of wooden covered bridges. Most of these did not survive the Civil War and the floods of the late nineteenth century. According to bridge historian Richard Sanders Allen,

The original flow of pioneer travel followed Virginia's rivers, rather than crossed them. In time, turnpikes were punched through the passes and over the ridge gaps to open up the western counties and carry settlers and commerce toward the promised land of Ohio. As was the case elsewhere in America, Virginian toll roads needed substantial covered wooden bridges, and spots at which they crossed often became the sites of sizeable towns.³

In the mid-1930s Virginia still had at least fifty covered bridges.⁴ Today, there are only eight, and five of these were built between 1912 and 1920. They are primarily located in the valley area west of the Blue Ridge Mountains. The Humpback Covered Bridge is the oldest, and most architecturally distinctive, surviving covered bridge in Virginia.

James River & Kanawha Turnpike

After the Revolutionary War, westward settlement began in earnest. In 1784, Gen. George Washington toured the Alleghany region and reported to the Virginia Assembly that a system of canals and turnpikes to open trade and communication with the west was of prime commercial and political expediency, a concept later reiterated in Thomas Pope's 1811 Treatise on Bridge Architecture:

It is a notorious fact that there is no country of the world which is more in need of good and permanent Bridges than the United States of America. Extended along an immense line of coast on which abound rivers, creeks and swamps, it is impossible that any physical union of the country can really take place until the labours of the architect and mechanic shall have more perfectly done away the inconvenience arising from the intervention of the waters. Nature, ever provident for Man, has, however, afforded us ample means of remedy. Our forests team with the choicest timber; and

³ Richard Sanders Allen, Covered Bridges of the Middle Atlantic States (New York: Bonanza Books, Brattleboro, VT: Stephen Greene Press, 1959), p. 80.

⁴ Andrew R. Howard, Covered Bridges of Virginia, A Guide (Unionville, CT: The Village Press, 1999), p. 5.

our floods can bear it on their capacious bosoms to the requisite points. Public spirit is alone wanting to make us the greatest nation on earth; and there is nothing more essential to the establishment of that greatness than the building of Bridges, the digging of canals, and the making of sound turnpike-roads.⁵

The first initiative in this endeavor, the James River Company, was incorporated in 1785; however, the work of building a system of canals to the west progressed very slowly. On February 5, 1816, the Virginia General Assembly passed an act to establish a “Fund for Internal Improvement,” for the purpose of “rendering navigable, and uniting by canals, the principal rivers, and of more intimately connecting, by public highways, the different parts of this commonwealth.” The act further provided for the establishment of the Virginia Board of Public Works to oversee the projected work.⁶

In 1820, the General Assembly passed an act making the James River Company a state-operated venture and authorized the construction of a 208-mile road from the mouth of Dunlaps Creek to the great falls of the Kanawha River. According to Thomas Dixon, “The Kanawha Road seems to have been viewed as a necessary expedient to take care of business until a canal could be completed, but was not to be considered as a permanent work.”⁷ This turnpike required the construction of no less than forty-eight wooden bridges.⁸

Construction of Humpback Covered Bridge

According to research done in 1985 by Thomas Dixon Jr., the Humpback Covered Bridge was built in 1857—not 1835, as historians once believed. The 1835 date has been published in contemporary sources, engraved on a plaque at the bridge and was cited in the 1970 HAER report. Dixon states in his article, “Humpback Bridge, Last Remnant of the James River and Kanawha Turnpike,” that the two contemporary sources which describe this bridge in detail, Richard Sanders Allen’s Covered Bridges of the Middle Atlantic States and Gay Arritt’s Historical Sketches of the Alleghany Highlands, do not cite “any original documents to substantiate the construction date or any other facts about the bridge’s design or history. It appears that they are based on local oral traditions.”⁹

⁵ Washington Chauncy Ford, ed., The Writings of George Washington, Vol. 10, 1782-1785 (New York and London: G.P. Putnam’s Sons, 1891), pp. 404-414; Thomas Pope, A Treatise on Bridge Architecture (1811), p. 127.

⁶ John S. Salmon, compiler, Board of Public Works Inventory, Records in the Library of Virginia (Richmond: Library of Virginia, 1996), p. 35.

⁷ Thomas W. Dixon Jr., “Humpback Bridge, Last Remnant of the James River and Kanawha Turnpike,” Covered Bridge Topics, Spring 1986.

⁸ Dixon, p. 8.

⁹ Dixon, p. 8.

The turnpike was planned to cross Dunlap Creek three times within about a mile and a half as it began its ascent of Alleghany Mountain. The contract for this section of road between Covington and Gauley was let to John Carruthers. The contract specified that the bridges on Dunlap Creek were “to be composed of three frames quite across the stream, as when erected will form a double bridge twenty-five feet wide with members of good sound oak or pine.” The three bridges were constructed in 1823-24, but almost immediately exhibited problems. When one of them collapsed in 1825, Board of Public Works principal engineer Claudius Crozet stated in his annual report:

In sight of Covington the road ascends a considerable hill, to avoid some difficulties in the valley of Dunlap’s Creek; it soon descends again into the valley, and crosses the creek three times on bridges of considerable length. One of these bridges gave way during last summer, and had to be rebuilt; another showed symptoms of a similar fall, but was propped up in time. This accident was owing to the too considerable bearing given to the longitudinal beams stretched across the stream, which were each compressed to two very long beams touching each other at their ends, without any scarfing, and wholly united by the framing above: the whole being only composed of narrow split pieces, without any horizontal cross-braces, was not capable of resisting any lateral pressure (a circumstance too often neglected in bridges), and the bridge bulged laterally. The new bridge has been better framed, and the string pieces made of stronger dimensions, and overlapped at their junction in the middle of the bridge. Still the span is, I think, too great for a flat bridge.¹⁰

Subsequently, stone piers were erected under all three bridges, and the superstructures were repaired or rebuilt over the next five years. Then, in 1837, a flood destroyed eleven bridges along the turnpike, including the three on Dunlap Creek. Both the abutments and superstructures were rebuilt in a more substantial manner, and the annual report of 1838 stated: “They are finished in a solid and durable style in every respect, and especially in point of masonry, are a great improvement upon the structures which they are destined to replace.”¹¹ Just four years later, however, another massive flood destroyed all the bridges on the turnpike between Covington and Lewisburg. The company’s annual report for 1842 stated:

The road was substantially and handsomely repaired, and the three bridges over Howard’s Creek rebuilt; and thereafter the bridges over Dunlap’s Creek were also rebuilt. Of six bridges rebuilt or restored, three were of

¹⁰ Claudius Crozet, “Report of the Principal Engineer—The Kanawha Road,” Ninth and Tenth Annual Report of the Board of Public Works, Vol. IV, 1826.

¹¹ James River & Kanawha Company, Fourth Annual Report, 1838.

materials recovered; the superstructures as well as the abutments of the other three being entirely new.¹²

While the upper and middle bridges were rebuilt, in 1849 and 1850 respectively, the lower bridge (this site) held for fourteen years, until being swept away by still another flood in the spring of 1856. The 1856 annual report of the James River and Kanawha Company stated:

during the year one of the bridges over Dunlap's Creek gave way, but the preparations are making to have it rebuilt; the place in the meantime fortunately admits the substitution of a ford. ...The bridges on the road from Covington to the mouth of Big Sandy are in good order, with the exception of one over Dunlap's Creek which has been built about 14 years and was swept off last spring. This bridge can be rebuilt at a cost of about \$1,500.¹³

Thus, the present Humpback Covered Bridge was built in 1857, not 1835, as has been previously reported. It subsequently survived the Civil War as well as major floods in 1877 and 1913, during which time the upper and middle Dunlap Creek bridges were lost.

Subsequent History of the Bridge

In 1929, the roadway was realigned and a new steel truss bridge was constructed just north of the covered bridge (subsequently replaced with the present reinforced concrete bridge). While it was still used by local residents for a time, the covered bridge fell into a state of disrepair and the land around it became overgrown with brush. For several years the State Highway Department had discussed the possibility of reconditioning the bridge and establishing a wayside park, and the Covington-Alleghany County Chamber of Commerce was very much in favor of this idea. In 1953, the Highway Department obtained an option on 5 acres of land surrounding the bridge.

Early estimates suggested it would cost \$6,000 to recondition the bridge and grade the grounds for a wayside park. The State Highway Department agreed to match funds if \$3,000 could be raised. The Covington Business and Professional Women's Club organized a fund drive and had the necessary money raised by the end of September 1953. The dedication ceremony for the new Humpback Bridge Wayside Park and reconditioned bridge took place on May 26, 1954.¹⁴

¹² James River & Kanawha Company, *Eighth Annual Report*, 1842.

¹³ James River & Kanawha Company, *Twenty-second Annual Report*, 1856.

¹⁴ Gay Arritt, *Historical Sketches of the Alleghany Highlands* (Covington: Alleghany Historical Society, 1982), p.83.

In 1969 Humpback Covered Bridge was listed on the National Register of Historic Places and was also designated as one of the first historic landmarks in Virginia.

Bridge Design

Dating to the Middle Ages, the kingpost is the oldest and simplest bridge truss design. It is based on the inherently stable form of the triangle, which tends to resist deformation. The kingpost truss is essentially a triangle with a central post, known as the kingpost. The two diagonal timbers are braced on the ends of lower chord and function in compression, transmitting loads from the center of the bridge back to the abutments. The multiple kingpost has one kingpost at the center and many diagonal braces on either side forming “a ‘series of combined triangles’ to create a load-bearing [structure]” that can span greater distances than the simple kingpost.¹⁵ According to a current database printout of the World Guide to Covered Bridges, there are approximately 95 examples of the kingpost truss design remaining in the United States.¹⁶

The Humpback Covered Bridge is an unusual example of a radically cambered multiple kingpost covered bridge, in which the upper chord, lower chord and deck are arched upward from the abutments. Presumably, the camber was added to better resist deflection under loading. According to Robert Fleming Hunter’s 1957 thesis, “The Turnpike Movement in Virginia, 1816-1860,” wooden covered bridges were typically built on turnpikes in Virginia in the ante-bellum period. Many of these bridges were built “on the lattice plan,” and apparently there were numerous unexpected problems with lateral stability and deflection.¹⁷ Although no documentation has been found concerning this, it could possibly account for the design of the bridges on Dunlap Creek being cambered multiple kingpost trusses.

Wooden covered bridges of the humpback, or trussed-arch type, were built in Europe in the eighteenth and nineteenth centuries. Pioneer American bridge builders Timothy Palmer and Lewis Wernwag built bridges of this type in the late eighteenth and early nineteenth centuries. While no documentation has been found to tell us why this design was chosen, or whether other bridges of this configuration were built, records of the James River & Kanawha Company suggest, at least, that several other trussed arches or “humpback” type bridges may have been built along the turnpike in the 1840s and 50s.

¹⁵ Joseph C. Nelson, Spanning Time: Vermont’s Covered Bridges (Shelburne, Vermont: The New England Press, 1997), p.245.

¹⁶ National Society for the Preservation of Covered Bridges, World Guide to Covered Bridges, database printout, April 2002.

¹⁷ Robert Fleming Hunter, “The Turnpike Movement in Virginia, 1816-1860,” (Ph.D. diss., Columbia University, 1957).

Tradition says that at one time, before the Civil War, the three bridges on Dunlap's Creek were all of the trussed arch design, one being burned during the war and another succumbing to the great flood of 1913.¹⁸

Today, the Humpback Covered Bridge at Covington, Virginia is one of only two known surviving examples of this type, the other being the Geer's Mill Bridge, or Ponn Bridge, built in 1874 over Raccoon Creek near Wilkesville, Vinton County, Ohio.

¹⁸ Dixon, p.12.

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