

FROG BAYOU BRIDGE

(Clear Creek Bridge)

Arkansas Bridges 2005

Spanning Frog Bayou (Clear Creek) at Old AR 282 (originally Van
Buren-Mountainburg Road)

Plainview

Crawford County

Arkansas

HAER AR-65

AR-65

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD

National Park Service

U.S. Department of the Interior

1849 C Street NW

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HISTORIC AMERICAN ENGINEERING RECORD

FROG BAYOU BRIDGE (Clear Creek Bridge)

HAER No. AR-65

Location: Spanning Frog Bayou (Clear Creek) at Old AR 282 (originally Van Buren-Mountainburg Road), Mountainburg vicinity, Crawford County, Arkansas

UTM: 15.392755.3942183, Mountainburg SW, Arkansas Quad.

AHTD #: M2675

Structural Type: Parker through truss

Construction Date: 1921-22

Designer: Arkansas Highway and Transportation Department

Builder: J.S. Terry Construction Company, Poteau, Oklahoma

Owner: Crawford County, Arkansas

Original Use: Vehicular bridge

Present Use: Bypassed in 1985

Significance: Frog Bayou Bridge was built in accordance with standard plans issued by the Arkansas Highway and Transportation Department and is highly representative of early twentieth century metal truss bridge-building technology.

Project Information: The Arkansas Historic Bridges Recording Project is part of the Historic American Engineering Record (HAER), a long-range program that documents historically significant engineering sites and structures in the United States. HAER is administered by the Heritage Documentation Programs Division of the National Park Service, United States Department of the Interior, Richard O'Connor, Manager. The Arkansas State Highway and Transportation Department sponsored this project.

Lola Bennett, HAER Historian, 2007

Chronology

- 1803 Louisiana Purchase doubles size of the United States
- 1819 Arkansas Territory created from part of Louisiana Purchase
- 1820 Crawford County formed
- 1836 Arkansas becomes 25th state to join the Union
- 1844 Pratt truss patented
- 1846 George Dyer settles near present-day Mountainburg
- 1870 Parker truss patented
- 1873 Arkansas Legislature authorizes counties to build and maintain bridges
- 1892 Mountainburg incorporated
- 1912 Mountainburg population 225¹
- 1913 Arkansas Highway Commission created
- 1914 First automobile trip made over Boston Mountains²
- 1916 Federal Aid Road Act appropriates federal funds for state road construction
- 1917 Arkansas Highway Commission begins issuing standard plans for bridges
- 1922 Frog Bayou Bridge erected
- 1940 Boston Mountains become part of Ozark National Forest
- 1985 Frog Bayou Bridge bypassed
- 1995 Frog Bayou Bridge listed on National Register of Historic Places

¹ *Arkansas State Gazetteer and Business Directory* (Memphis: R.L. Polk & Co., 1912), 425.

² L.A. Deden, "Here's the Tale of How an Auto First Went Over the Boston Mountains," *Van Buren Press-Argus*, 7 December 1928, 1. According to Deden's account, the 43-mile trip over the Boston Mountains to Winslow, made in a 70 horsepower automobile, took eleven hours. Prior to the trip, Deden spent six days on horseback examining the route, asking residents "to help clear the road of rocks and rough places, to cut overlapping branches from trees, etc." At one point during the trip, "the old car made a rush for the old road which was very steep, [but] fortunately was stopped by some large trees that she ran into... With the help of all the men we got her into the road and soon were on our way, rejoicing." The passengers returned to Fort Smith by train, while the car was shipped back and "nearly wrecked," via another route.

Description

Frog Bayou Bridge is a single-span, 150' pin-connected Parker through truss on stone masonry piers and abutments. There is a steel stringer approach at each end, bringing the total length of the bridge to 209'.

The upper chords and inclined end posts are riveted, built-up members, comprised of back-to-back channels connected by a solid plate on top and lacing bars underneath. The lower chords are paired forged eyebars. The upper and lower chords are connected by built-up posts and paired loop-ended tension bars angling up towards the ends. The center panel has paired adjustable tension rods with turnbuckles angling in both directions. The trusses are braced overhead with transverse struts, comprised of angles and lacing, at each panel point. The truss members are secured with a pin at each panel point. Upper and lower lateral sway bracing consists of rods with threaded ends that cross between panel points.

The floor system consists of transverse steel floor beams, longitudinal steel stringers and a transverse wood deck. The floor beams are comprised of plates and angles riveted together and suspended below the lower chord by U-bolt hangers that loop over the pins at each lower chord panel point. There are five lines of steel stringers on top of the floor beams and a wood plank deck on top of the stringers.

History

In 1846, George Dyer settled in the Boston Mountains near the site of present-day Mountainburg. By 1858, when the Butterfield Stage Coach established a stage stop here, the hamlet boasted a grist mill, saw mill, store and hotel.³ After the arrival of the railroad in the 1870s, the village prospered. Mountainburg was officially incorporated on July 29, 1882.

Crawford County laid out a road between Van Buren and Mountainburg sometime prior to 1870, when it appears on Tainter & Merrill's "Map of the State of Arkansas." There was a bridge at, or near, this site by 1919, when "Clear Creek Bridge" appears on a post office location map.⁴ Presumably, that bridge was a wooden structure, although no records have been found to confirm this.

Crawford County began building metal bridges in the 1870s, but did not build them regularly until after 1910, when automobile traffic demanded modern bridges. In 1917, the Arkansas State Highway Department began making standard bridge plans available to counties in accordance with the Federal Aid Road Act. Crawford County availed itself of federal and state aid

³ Eula Hopkins and Wanda M. Gray, *History of Crawford County, Arkansas* (Van Buren, Arkansas: Crawford County Historic Preservation Association, 2001), 83.

⁴ U.S. Post Office Department, "Reports of Site Locations: Mountainburg, Arkansas, 1919."

programs, and erected many bridges in cooperation with the State Highway Department. In 1917, the Arkansas State Highway Commission noted of Crawford County, "*Steel bridges are being built over the streams as rapidly as funds can be secured.*"⁵

On October 27, 1920, the Crawford County Court appropriated \$10,000 for a bridge across Clear Creek in Mountain Township.⁶ Two weeks later, the court appointed bridge commissioners to oversee the bridge's construction. On March 9, 1921, the Crawford County Court awarded a joint \$18,709.50 contract for the erection of two bridges, one over Cedar Creek at Rudy and one over Clear Creek at Mountainburg, to J.S. Terry⁷ of Poteau, Oklahoma.⁸ The bridges were completed in early 1922 and accepted by Crawford County on March 7, 1922.⁹

Design

Civil engineer Thomas Willis Pratt (1812-1875) was born in Boston, where his father, Caleb Pratt, was a noted architect. After obtaining his secondary education in the public schools of Boston, he enrolled at the Rensselaer Academy (now Rensselaer Polytechnic Institute) in Troy, New York, where he studied architecture. After graduation, Pratt worked for the Army Corps of Engineers, building dry docks for the Navy Yards at Charleston, South Carolina, and Norfolk, Virginia. In 1833, Pratt was employed by the Boston & Maine Railroad, where he began designing bridges. The remainder of his career was devoted to engineering and supervising work for railroad lines in the Eastern United States.

During his career, Thomas Pratt patented several inventions, including a steam boiler and a method of ship hull construction. The patent he achieved notoriety for is a roof and bridge truss, patented in 1844. The Pratt truss reversed the configuration of the 1840 Howe truss, putting the shorter web members in compression and the longer web members in tension, which greatly reduced the chances of structural failure through buckling. Developed at a time when the structural action of trusses was just beginning to be understood, the Pratt truss was one of several truss types that heralded the transformation from empirical to scientific bridge design. Over time, the Pratt truss came to be favored for its strength and straightforward design; by the 1870s it was the standard American truss type for moderate railroad and highway spans and continued to be so well into the twentieth century.

Widespread acceptance of standard truss designs encouraged the growth of the iron industry, which led to increasing competition by the 1870s. Engineers began introducing modifications to

⁵ Arkansas State Highway Commission, *3rd Biennial Report*, 1917.

⁶ *Crawford County Court Records*, Book K, 131.

⁷ Poteau, Oklahoma is approximately 30 miles southwest of Van Buren. The J.S. Terry Company is presumably the same "Terry Bridge Company" that unsuccessfully bid on a contract for seven concrete bridges in Washington County in 1922. (*Fayetteville Democrat*, 23 March 1922.)

⁸ *Crawford County Court Records*, Book L, 81.

⁹ *Crawford County Court Records*, Book L, 136.

make stronger, more efficient bridges. One such improvement, in the case of the Pratt truss, was a polygonal upper chord, which increased the depth of the truss at mid-span where the greatest bending moments occur.¹⁰ The primary advantage of the design was a reduction in the dead load of the bridge, which permitted longer spans without substantially increasing the cost. Charles H. Parker (1842-1897), a mechanical engineer with the National Bridge & Iron Works of Boston, received a patent for improvements in the connections of a "curved-chord" Pratt truss in 1870.¹¹ Although Parker did not claim the polygonal upper chord in his patent application, as it had already been in use for several decades, the truss profile shown in his drawing proved to be especially efficient and his name became widely associated with the type. The Parker truss was popular for spans of 40' to 200' well into the twentieth century.¹²

¹⁰ Caleb and Thomas W. Pratt's 1844 patent shows a truss with a curved upper chord, but the inventors did not claim this feature.

¹¹ Charles H. Parker, U.S. Letters Patent No. 100,185, 22 February 1870. Reportedly, only a few bridges were built using Parker's patented claims, but several still survive. See HAER No. MA-99, North Village Bridge; HAER No. MA-102, Lower Rollstone Street Bridge; HAER No. VT-3, Elm Street Bridge; and HAER No. VT-13, Northfield Parker Truss.

¹² Victor C. Darnell, "The National Bridge and Iron Works and the Original Parker Truss," *IA: Journal of the Society for Industrial Archeology* 24, no. 2 (1998): 5-20.

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