EURITT BRIDGE
(Grand River Bridge)
Iowa Bridges Recording Project
Spanning Grand River
Leon Vicinity
Decatur County
Iowa

HAER No. IA-49

BLACK & WHITE PHOTOGRAPHS

WRITTEN HISTORICAL & DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
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EURITT BRIDGE
(Grand River Bridge)

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Location:	Spanning Grand River at unnamed county road; 5.7 miles west of Leon; Decatur County, Iowa UTM: 15.426030.4508030 USGS: Lamoni North, Iowa quadrangle (7.5 minute series, 1981)
Date of Construction:	c.1882
Fabricator:	Phoenix Iron Company, Philadelphia, Pennsylvania
Designer/Contractor:	Daniel and Webster, Garden Grove, Iowa
Present Owner:	Decatur County, Iowa
Present Use:	Roadway bridge
Significance:	Pin-connected Pratt trusses were used for almost all of Iowa's wagon trusses in the late 19th century. The Grand River Bridge is distinguished among the surviving Pratts by its well-preserved condition and odd approach span. With an inclined end post on one end and an upright post on the other, this unique span is a pony truss/truss leg hybrid, the only one of its kind in Iowa and exceedingly rare elsewhere.
Historian:	Leslie Pitner, August 1995
Project Information:	This document was prepared as a part of the Iowa Historic Bridges Recording Project performed during the summer of 1995 by the Historic American Engineering Record (HAER). The project was sponsored by the Iowa Department of Transportation (IDOT). Preliminary research was performed by Clayton B. Fraser of Fraserdesign, Loveland, Colorado.

INTRODUCTION

The Euritt bridge carries a gravel-surfaced road across the Grand River west of Leon in central Decatur County. The structure consists of a pinned Pratt through truss over the main channel of the river, approached on the east by a peculiarly configured pony truss/truss leg hybrid span, for a total span of 235'. This unique approach span distinguishes this bridge among the early iron trusses in Iowa. Built around 1880 by a local bridge contractor, Daniel and Webster, it is an excellent example of a unique local variation on an established truss type.[1]

BACKGROUND

Iowa is graced by over a hundred rivers and streams. While these waterways supported its transformation from frontier to one of the world's foremost agricultural producers, they also created the need for thousands of bridges, both large and small. By the late nineteenth century, Iowa was well into its economic development. The population had tripled from 1850 to 1860, doubled again by 1870, and continued to grow until the turn of the century.[2] With the influx of settlers from the eastern areas of the United States and from Europe, the amount of cultivated land grew to 36 million acres by 1880.[3] As the railroads began to arrive in the 1860s and 70s, the infrastructure was set to move Iowa's produce to outside markets. This growth also created the continual need for new and improved roadways to move crops and livestock to local railroad depots.

The need for new bridges is documented in the endless petitions for bridges presented to the County Boards of Supervisors who were the primary form of local government in Iowa. It fell to each county to provide its own infrastructure of roads and bridges. Rather than plan for the provision of such roads, the boards responded to citizens' requests for new roads and bridges. Bridge petitions were presented to the board, which would then take the requests under consideration depending on the state of the county Bridge Fund, the size and cost of the bridge, and whether the bridge could be built by county labor or would require an outside bridge contractor. The type of bridges built

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[1]Auditor's Bridge Register, Lincoln Township, held at Decatur County Courthouse, Leon, Iowa.

[2]Leland L. Sage, A History of Iowa, (Ames, Iowa: The Iowa State University Press, 1974), 92.

[3]Joseph Frazier Wall, Iowa: A Bicentennial History, (New York: W.W. Norton & Company, Inc., 1978), 127.

in any given county depended on county finances and the preferences of the board which served. Some counties built relationships with the large Midwest bridge building companies, such as the Wrought Iron Bridge Company, Canton, Ohio, or King Iron Bridge Company, Cleveland, Ohio. Others put out all contracts for bid, or established annual contracts with one company.

The bridge building and fabrication industry in the United States also grew exponentially in the second half of the nineteenth century. As knowledge of engineering increased, bridge building went from empirical carpenter-built bridges to scientifically designed and calculated truss bridges. The advent of widely available wrought iron accelerated the move away from timber and combination wood and iron bridges to all iron truss bridges. The iron trusses created a business opportunity to design and market these iron bridges to local officials. To fill this need, large national and regional companies were created, such as King Iron, which was building about 250 bridges a year in the 1880s and 90s. Opportunities also abounded, however, for smaller, local businesses to succeed.

DANIEL AND WEBSTER

Daniel and Webster was a local bridge contracting firm based in Garden Grove, Decatur County. They used their position as a local contractor to bid on yearly contracts to provide all the bridges in the county. As early as 1879, Daniel and Webster had such contracts with Decatur County. This practice continued through the mid-1880s.[4] T.B. Daniel had been trained as a carpenter and originally was a house builder. He moved to Garden Grove in 1867 and became one of town's most prominent citizens.[5] No records are left about Webster or his role in the partnership. Daniel and Webster appear to have mostly constructed smaller timber bridges, but had the ability to provide larger iron truss bridges.

The Euritt Bridge is configured with a Pratt through truss main span and the pony truss/truss leg approach span. In Iowa, pony truss approach spans were often added to a main span in order to

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[4]Decatur County Board of Supervisors Minutes, January 16, 1879 (Book 1, p. 467), January 7, 1880 (1, p. 548), January 3, 1881 (2, p. 3), January 11, 1883 (2, p. 198), January 19, 1883 (2, p. 271).

[5]Biographical and Historical Record of Ringgold and Decatur Counties, Iowa, (Chicago: The Lewis Publishing Company, 1887), 692-3, 780.

reduce the length of the spans and the cost of the bridge. The main span is a 126′ seven-panel wrought-iron Pratt through truss with a 13′ roadway. It is 18′ high, with the upper chord and inclined end posts built up of two channels with cover plate and lacing. The lower chord is two forged rectangular eyebars. The verticals are two channels with lacing and the diagonals and counter braces are paired, iron-rod eyebars in the middle three panels and paired, forged eyebars in the end panels.

The 60′ four-panel pony truss consists of similar members, but with upright end posts at the approach end and inclined end posts where the trusses meet. The approach end is configured as a truss leg bridge with the "leg" functioning both as endpost and support. By this, the cost of erection is reduced slightly because of the combined sub- and super-structure.[6] This truss leg type is uncommon, and by the end of the nineteenth century, was considered inferior structurally.[7] The panels are configured as a Pratt, with vertical compression members and diagonal tension members. The wrought-iron components were rolled by the Phoenix Iron Company of Philadelphia, one of the largest iron mills in the United States. A 30′ wood stringer approach on the west and another 16′ approach on the east complete the bridge. A combination of stone masonry, timber pile bents, and concrete filled steel cylinder piers form the substructure. The truss leg/inclined end post combination on the pony truss makes this bridge unique in Iowa, an arrangement which must have been designed by Daniel and Webster.

THE DEVELOPMENT OF THE PRATT TRUSS

Pin-connected Pratt configurations were used for almost all of Iowa's wagon trusses of the late 19th century, executed first in wrought or cast iron, and, after the early 1890s, in steel. Thousands of such pinned Pratts were erected throughout the state for crossings both large and small, and numerous examples remain in place today.

Thomas Pratt was the designer of one of the first trusses based on scientific analysis in America. Born in 1812, he studied engineering at Rensselaer Polytechnic Institute in Troy, New York. After graduation, he was hired by the United States Army Engineers to work on the construction of dry docks. After a few

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[6]Fraserdesign, "Bedstead Trusses," Iowa Historic Bridge Inventory, vol. 1, prepared for the Iowa Department of Transportation, 1993, 121-2.

[7]Milo S. Ketchum, The Design of Highway Bridges, (New York: McGraw-Hill Book Company, 1912), 6.

years, he began work as a bridge engineer for the railroad.[8] Pratt received a patent with his father Caleb Pratt on a truss in 1844. It was designed to have parallel chords, with the verticals, upper chord, and end posts in compression, and the bottom chord and diagonals in tension. The parallel chords and equal panel lengths allowed for standardized lengths for the vertical, diagonals and chord members, making the truss efficient to construct and manufacture.[9] The Pratt truss was the most widely used truss in Iowa during the boom of bridge building which took place in the last decades of the nineteenth century.

DECATUR COUNTY

Decatur County lies in the row of counties bordering Missouri. It was first settled in 1840 as people began move north from Missouri. It is an area of rolling prairie, well timbered with several rivers and streams.[10] The hilliest areas are given over to pasture and hay crops. The yields per acre for crops are lower than other areas of the state.[11] The county was organized into townships in 1850, with Burrell Township, where the Euritt Bridge is located, as one of the original four. Burrell Township was quite rural, and the bridge is named for one of the original settlers of the area, J.R. Euritt. The county grew rapidly from 1853 to 1857, with another burst in population from 1868 to 1875.[12] The railroad was established in the county in 1871, which provided the transport for the iron members for the bridge.

The Grand River Bridge is distinguished among the surviving Pratts for its early erection date and well-preserved condition. The bridge is further set apart by its oddly configured approach span. This unique span, with its pony truss/truss leg configuration, is the only one of its kind in Iowa and extremely rare elsewhere. The Grand River Bridge is technologically significant both for its representation of prevailing bridge construction trends in the late nineteenth century and a local variation in its approach truss.

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[8]Carl W. Condit, American Building Art: The Nineteenth Century, New York: Oxford University Press, 1960, 109-10.

[9]Condit, 111.

[10]J.M. Howell and Heman C. Smith, History of Decatur County, Iowa and its People, (Chicago: The S.J. Clarke Publishing Company, 1915), 2, 4.

[11]Sage, 15.

[12]Biographical and Historical Record, 714-5.

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ADDENDUM TO
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This appendix is an addendum to a 6-page report previously transmitted to the Library of Congress.

APPENDIX: ADDITIONAL REFERENCES

Interested readers may consult the Historical Overview of Iowa Bridges, HAER No. IA-88: "This historical overview of bridges in Iowa was prepared as part of Iowa Historic Bridges Recording Project - I and II, conducted during the summers of 1995 and 1996 by the Historic American Engineering Record (HAER). The purpose of the overview was to provide a unified historical context for the bridges involved in the recording projects."