Volume 7, Number 1
July 2020

Historic Bridge Bulletin

In This Issue:

The historic North Village Bridge in Webster, Massachusetts. It is a Charles H. Parker patent pony truss bridge built in 1871 by the National Bridge and Iron Works of Boston, Massachusetts. *Photo by Nathan Holth.*

Bynum Bridge: the Old and the New

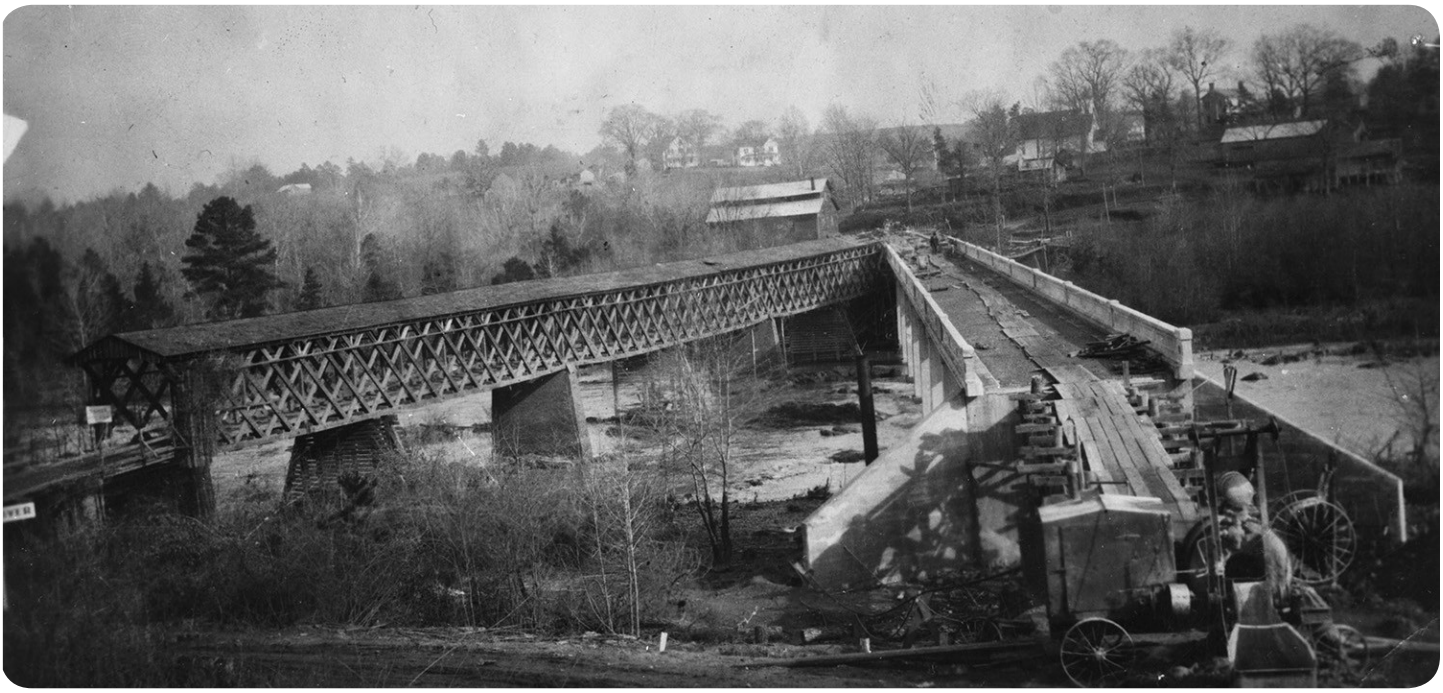
By Diane Swan and Debbie Tunnell

For over 75 years, the historic Bynum Bridge carried cars and people across the Haw River. Everything changed, however, in the late 1990s when the North Carolina Department of Transportation discovered that the bridge was deteriorating and initiated plans to replace it. After a long-heated battle, the bridge was saved, with the NCDOT opting to close it to vehicular traffic and declare it a pedestrian bridge. In 2015, the community was shocked when the Bynum Bridge was characterized as "orphaned and abandoned." Determined to show its value in the community, neighbors used these events to mark the beginning of a new chapter for this treasured Bynum landmark.

The Old

People have been crossing the Haw River near present-day Bynum, North Carolina, for more than 200 years. In the early nineteenth century, travelers used Bynum's Ferry. Then, in 1839, a bridge was built near Bynum to allow easier passage between the county seat of Pittsboro and the college town of Chapel Hill. The area continued to grow, and in the 1860's Luke Bynum built a wooden dam and millrace to provide power for a cotton gin and gristmill on the Haw River. After the Civil War, in 1872, Luther and Carney Bynum added a cotton mill and "Bynum" district was born. Due to heavy rains and flooding which frequently washed out bridges across the Haw, the county commissioners voted on April 8th, 1879, to build a new bridge (higher and with a ramp) at the "Bynum's Factory."

The next forty years brought incredible change as horse drawn carts gave way to automobiles because mass production made car ownership affordable. This transportation revolution spurred North Carolina and the federal government to upgrade roadways. In North Carolina, Governor Locke Craig—the state's first "Good Roads Governor"—embarked on an ambitious campaign to improve the state's roads, assisted by the establishment of the State Highway Commission in 1915. At the national level, the Federal Roads Act of 1916 provided increased funding for roads and bridges and promoted the adoption of standardized road and bridge designs. In 1919, the Good Roads Association, a small band of North Carolina civic leaders, proposed a bill that would develop a network of hard-top roads to connect all the county seats and principal towns. Reinforced concrete bridges, which could be built quickly, became the bridge of choice for local governments with tight budgets. In 1921,



1922 photo looking east on west bank showing new bridge nearing completion. The old bridge to its north.
Photo by Nell Page Atwater. Photo From Wilson Library Special Collections at UNC, Chapel Hill.

Late 19th century photo of covered bridge and grist mill at Bynum, looking west from the East bank. *From Wilson Library Special Collections at UNC, Chapel Hill.*

Bynum Bridge became part of a $50 million bond issue from Governor Cameron Morrison and the state legislature– the first organized statewide road and bridge campaign in North Carolina history. The Bynum Bridge was State Project No. 400, and in March 1922, the Chatham Record reported that the contract to build was awarded to R.M. Walker and Company from Atlanta, Georgia, for $50,000. By June 16th, 1922, this newspaper would report that construction on the Bynum Bridge had started. Construction was completed on May 18th, 1923.

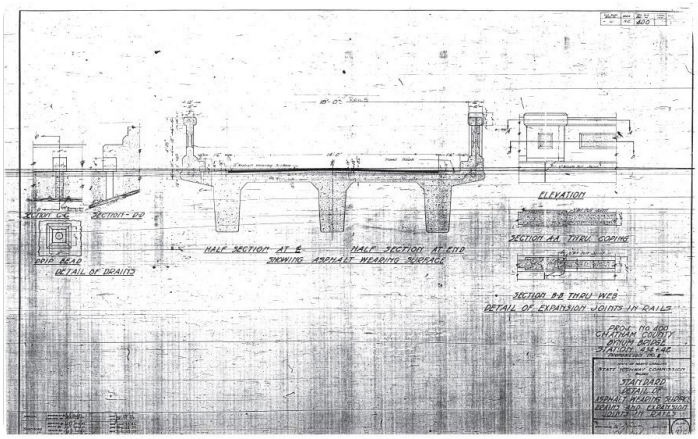
At its completion, Bynum Bridge was considered state of the art engineering. It is the longest first-generation tee beam bridge built before 1924. The first tee beam designs consisted of three longitudinal beams (as Bynum Bridge has), but by the late 1920s the standards were updated for wider roadways, and later examples usually consisted of four or more beams. It is also the longest unaltered reinforced concrete tee beam bridge known to remain in North Carolina. The bridge has nineteen spans of about 43 feet each for a total length of 806.1 feet. Only one tee beam bridge (The White Oak River Bridge, built in 1952 and replaced in 2001) in the state is known to have been longer. The Bynum Bridge is intact and still retains the original piers, beams, deck, and parapets in all spans, making its preservation not only vital to the Bynum community, but also the history of bridge construction in North Carolina.

The New

Since its closing to vehicles in 1999, Bynum Bridge has come to life as a pedestrian destination. With its proximity to the Lower Haw River State Natural Area and the county-owned Bynum Beach Access Area, Bynum Bridge has become a focal point for nature-related activities, special gatherings, and events for people in Bynum, Chatham County, and beyond. Many well-attended public events take place on Bynum Bridge. Several stargazing groups, including the Chapel Hill Astronomical and Observational Society and the Bynum Astronomy Club, have use the bridge as an ideal gathering place to search and enjoy the dark skies. The National Audubon Society reported in their February 2015 "Birders Guide" that of the many bird watching areas in the North Carolina Piedmont, "few are better than the Bynum Bridge area in Chatham County." For a few years, an art show known as Bridgefest was held on the bridge. The Bynum community has been known to celebrate Independence Day with a potluck meal on the bridge. "Pumpkins on the Bridge," sponsored by Bynum Front Porch, is a much beloved annual Halloween event that features hundreds of community carved and candle-lit Jack-O-Lanterns placed on the bridge from dusk until midnight. Bynum Bridge and the community made the cover of Chatham Magazine's "Best of Issue" Oct/Nov 2019. The bridge is a favorite site for photographers, painters, musicians, writers and other artists.

Historic Designation

North Carolina Department of Transportation is the owner of Bynum Bridge (NCDOT Bridge #405). In 1997, NCDOT was looking at replacing Bynum Bridge because of its deteriorating capacity to carry



A sheet from the original plans for the Bynum Bridge, showing the beams under the deck and railing. *Photo from NRHP Nomination Form.*

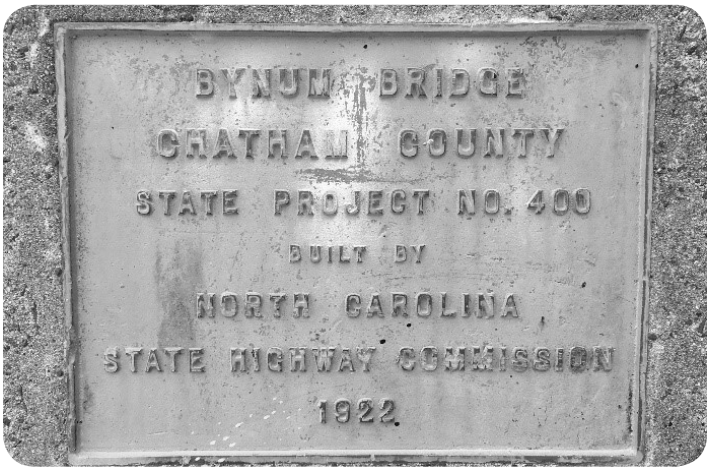
Elevation view of the Bynum Bridge. *Photo from NRHP Nomination Form.*

the increasingly heavy load of traffic. In 1997 it was determined that the Bynum Bridge was eligible for the National Register of Historic Places under Criterion A for its role in the state highway system and Criterion C as a good example of reinforced concrete deck girder bridges built in 1920.

Bynum Bridge was officially listed on the National Register of Historic Places (Chatham County NC #100005196) on April 23, 2020, 23 years to the day from when its survey report first acknowledged its historic significance.

What began as an effort to recognize the importance of the bridge to the community, also established the importance of the Bynum Bridge to the history of the state of North Carolina. Bynum Bridge has been deemed a structure associated with events that have made a significant contribution to the broad patterns of our history and a bridge that embodies a distinctive method of construction that helped make North Carolina "The Good Roads State."

Debbie Tunnell moved less than a mile from Bynum Bridge, with her husband Ken, in 1989. Debbie has an undergraduate degree in Psychology and a Masters degree in Therapeutic Recreation from UNC-CH. Debbie has volunteered with Bynum Front Porch, Carolina Tiger Rescue, Chatham Community Church, Haw River Assembly and Triangle Land Conservancy. Diane Swan is a cabinetmaker/wood artist. She has lived in and near Bynum since 1980, and walks Bynum Bridge often.



Historic Marker Plate on Bynum Bridge. *Photo by Diane Swan, May 2018.*

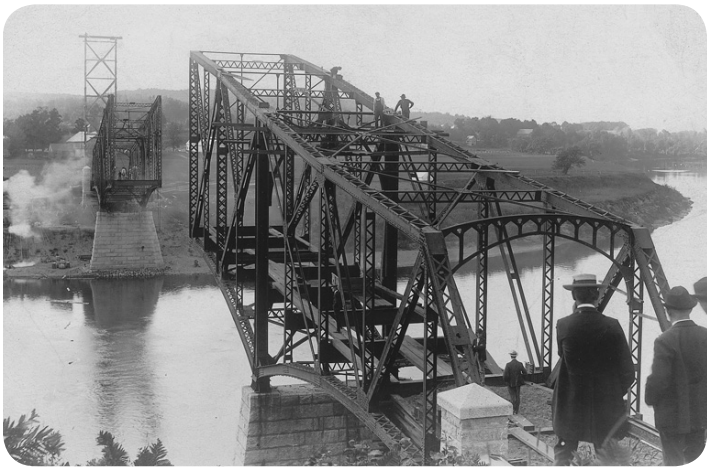
Overview of the deck of the Bynum Bridge. *Photo from NRHP Nomination Form.*

Principles of Aesthetics: The Schell Memorial Bridge

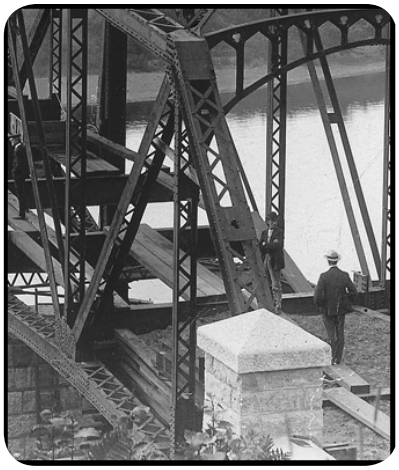
By Vern Mesler

In his book *De Ponitibus*, the civil engineer and bridge designer J. A. L. Waddell (1854 - 1938) complained about the lack of architectural elements and ornamentation in American bridges: *That the metal bridges built in the United States ... are, with rare exceptions, anything but models of excellence in respect to the principles of aesthetics, no engineer is likely to deny.*

In one rare exception, in 1903, a new highway bridge being considered for spanning the Connecticut River at Northfield, Massachusetts, originally designed for utilitarian purposes only, became something more. Upon hearing of the proposed construction, Mr. Francis Robert Schell offered to finance the new bridge as a memorial to his mother and father. It would be known as the Schell Memorial Bridge. First



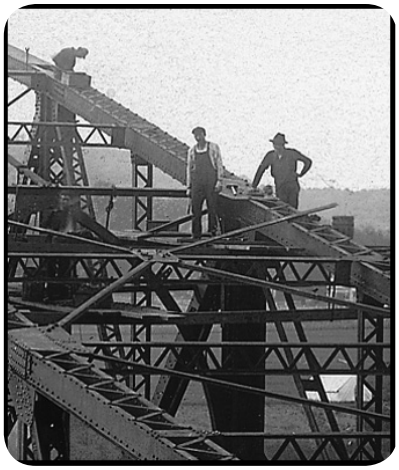
Erection of the Schell Memorial Bridge. *Courtesy of Northfield Mount Hermon Archives.*

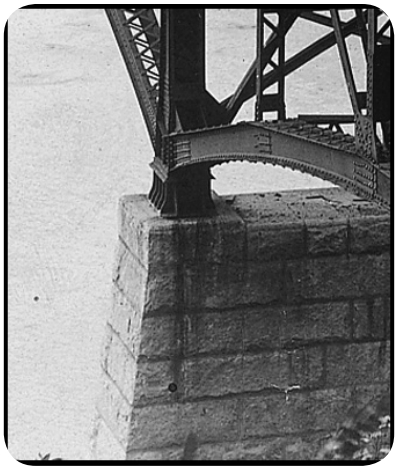


designed with three simple and independent spans, it was decided that a "Baltimore" type through truss would be a more appropriate design for a memorial and would span the entire width of the Connecticut River. The new bridge would be an exception to what Waddell noted in his book: *In regard to the ornamentation of bridges by the adoption of elaborately artistic approaches ... little has yet been done in America, the reason being that any money so expended has evidently no utilitarian purpose, and consequently to the eye of the solely practical man appears to be entirely wasted.*

In today's terminology, the Schell Memorial Bridge is a three span cantilever/continuous Pennsylvania through truss. The bridge was designed by Edward S. Shaw of Boston, Massachusetts, and constructed by the New England Structural Company of East Everett, Massachusetts. The central span is 352 feet in length and the overall length of the bridge is 515 feet. The bridge utilizes an uncommon design that may be unique among surviving bridges today. The bridge is continuous over the piers, but the ends of the bridge from the piers to the abutments function

To learn more about the Schell Memorial Bridge, read a series of articles titled "The Schell Memorial Bridge" published in Volume 50 (No. 25 - 27) of *The Engineering Record* (1904, December 17, December 24, and December 31) that provide technical information about the bridge. These articles provide a rare insight into the design, fabrication, and erection of a significant twentieth century steel bridge for a small New England town. Erecting the Schell Memorial Bridge was done by a cableway system for which "there is no published description of previous use." The authors of the articles above devoted a significant portion with text and diagrams of the erection apparatus. View online at: https://historicbridges.org/massachusetts/schell/article.pdf





as cantilevers. In this unusual design, no dead load is applied to the abutments (functioning as cantilevers). However, bearings at the abutments, which include giant springs that are designed to dynamically adapt to and absorb live load forces, turn the bridge into a continuous truss when under traffic.

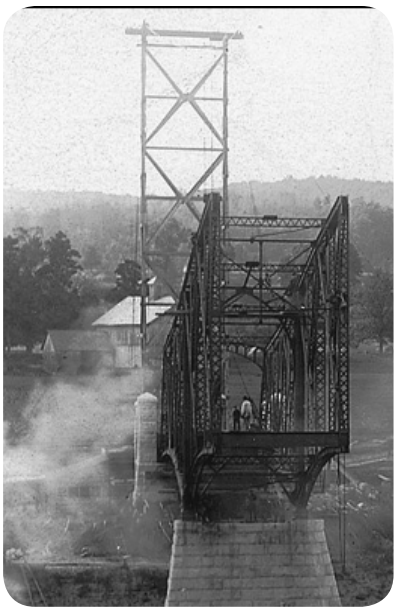
The Schell Memorial Bridge was opened to the public in 1903. On December 17 of the same year, the first powered, heavier-than-air machine took flight at Kitty Hawk, North Carolina. While aviation has advanced, the Schell Memorial Bridge with its exceptional truss design and its artistic approach in ornamentation has been closed since 1985 due to the lack of maintenance which resulted in the bridge being too deteriorated for safe use. While MassDOT devised a plan to rehabilitate, local officials would not take ownership of the bridge, citing a concern about high maintenance costs. In 1987 the decision was made to demolish the bridge. Despite a demolition contract being awarded in 1999, the bridge still stands. However, in 2013 MassDOT proposed replacing the Schell Memorial Bridge with a new bridge that they claim will be similar to the original truss design.

We tend to think of memorials as objects that serve as a focus for the memory or the commemoration of something or someone. As such, memorials are constructed of the finest materials, crafted by skilled craftsmen, and maintained as a gift for future generations and as an influence for architects,

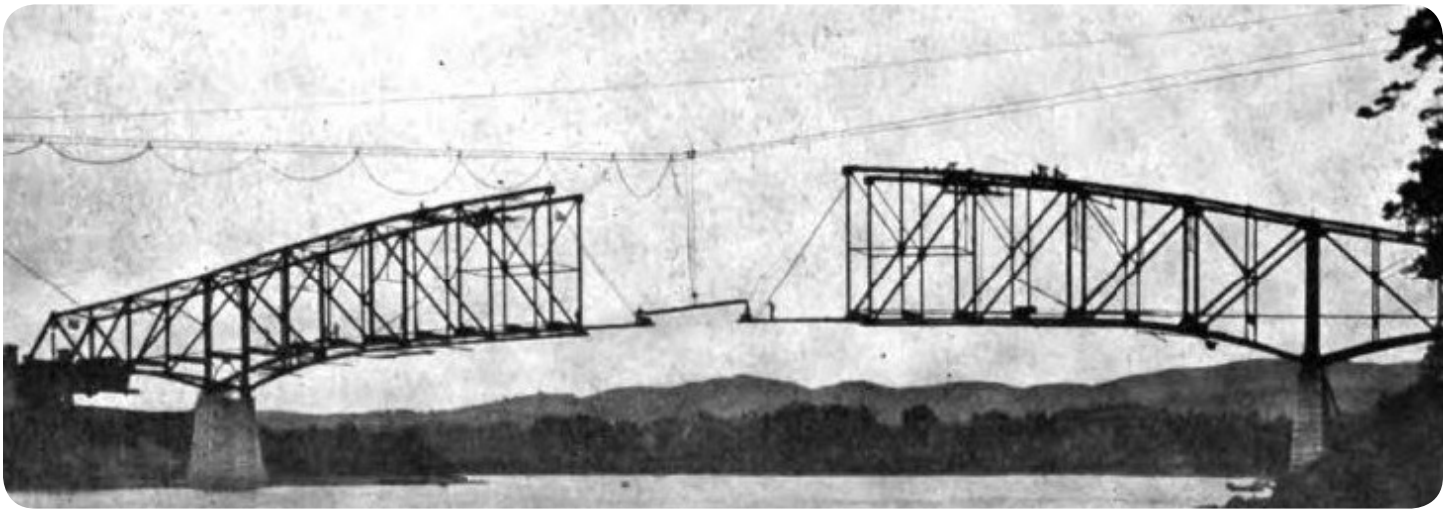
Below are notable components to the Schell Memorial Bridge:

- Templets, Rivet Connections: As the bridge was designed with riveted connections throughout, special care was taken in making the templets in order that the several parts when brought together in the field without the support of falseworks might be connected with satisfactory results.
- Freight-Car Springs: The upper ends of the anchor rods, already referred to, pass through the abutment bearing and ends of the trusses, on which they bear by means of cast-iron washers and spiral steel freight-car springs, through which the anchor rods pass. The bearings were adjusted so as to leave a play of 1/32 to 1/16 in. between the ends of the trusses and the bearings below, and also between the washers on top of the spring and the nuts on the anchor rods.
- Curbs and Wheel Guards: The steel floorbeams carry lines of longleaf hard pine stringers, spaced 2 ½ ft. apart on centers, and butted on the top flanges of the floorbeams, on which they are gained to varying depths to give a crown to the roadway.
- Cast-Posts of Special Design: The railings are formed of four lines of wrought-iron pipe passing through cast-posts of special design, spaced 5 ft. 4 in. on centers and secured to the broad wheel guards on which they rest by lag screw.

engineers, and craftsmen as they search for new and innovative designs. Despite promises to construct a new bridge that is "historically faithful" to the Schell Memorial Bridge, one essential record that will be lost forever is the craftsman's record, not in words but in the bridge itself: quarry-faced granite, longleaf hard pine, chestnut, railway bridge steel, cast iron posts of special design, material wrought by craftsmen and erected by a unique cableway system.



Vern Mesler has thirty-four years experience with welding and steel fabrication. He also has over thirty years experience as an adjunct welding instructor. He has served as project manager for Historic Bridge Park of Calhoun County, Michigan, the first of its kind, and has also worked with a number of truss bridge restoration projects in Michigan and Ohio.



Above: This photo from *The Engineering Record* shows the Schell Memorial Bridge with the erection cableway used to aid in constructing the bridge.

Above: The Schell Bridge as seen in October 2013. *Photo by Nathan Holth.*

Nowland Avenue Bridge

By Historic Bridge Foundation

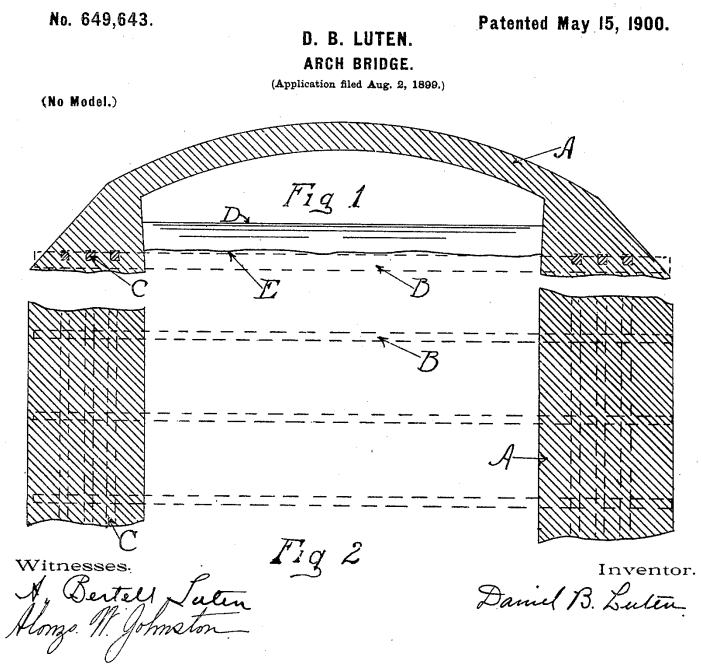
Nowland Avenue is a street in Indianapolis, Indiana, that roughly parallels a waterway named Pogue's Run. As configured today, the portion of this road that remains open to vehicular traffic ends at Brookside Parkway. However, the road once continued east and crossed Pogue's Run twice as the waterway weaves through this area in what is Spades Park. The unusual section of roadway contains two historic bridges of different design. The western bridge is a segmental stone arch built in 1902 that spans 25 feet, has an overall length of 28 feet, and was built by Samuel Robbins to the design of the City of Indianapolis Bridge Department. The eastern bridge is a concrete arch bridge built in 1903 and is the subject of this article.

The eastern bridge is a closed spandrel Luten deck arch bridge that was built in 1902. Designed by famous concrete arch bridge engineer Daniel B. Luten, and built by his National Bridge Co. of Indianapolis, Indiana, this is the oldest known Luten arch bridge in the city, and perhaps beyond. Architecturally, it is noted for its Beaux Arts style, and represents the start of the City Beautiful movement.

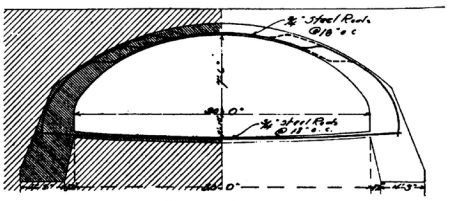
Luten played a major role in popularizing the use of concrete for bridge construction in the early 20th century. He aggressively defended his designs by securing many patents for his various bridge designs. Luten's own National Bridge Company built these patented bridges. Additionally, a number of other companies across the country were licensed to build Luten arch bridges. The Nowland Avenue Bridge was built very early in comparison to when his patents date. Only patent number 649,643 (awarded in 1900) is older than this bridge. In the years after the Nowland Avenue Bridge was built, Luten would secure over 40 patents. Patent 649,643 defends Luten's invention of an arch bridge of "concrete, stone, iron, steel, or brick" that contains an underwater tie between the abutments, designed to relieve some of the strain at the abutments caused by the arch forces. This underwater tie is indeed a unique feature of many of Luten's arch bridges, including the Nowland Avenue Bridge. Patent 649,643 specifically recommends the tie be made of wood because Luten

The Nowland Avenue Bridge as seen today. *Photo by Laurie Klinger.*

A portrait of Daniel B. Luten (1869-1946). He was born in Grand Rapids, Michigan.



The drawing and title page for patent 649,643. "B" in the drawing refers to the underwater tie.



NOWLAND AVENUE BRIDGE, INDIANAPOLIS, INDIANA.

Scale 1 inch equals 16 ft. View on page 70.

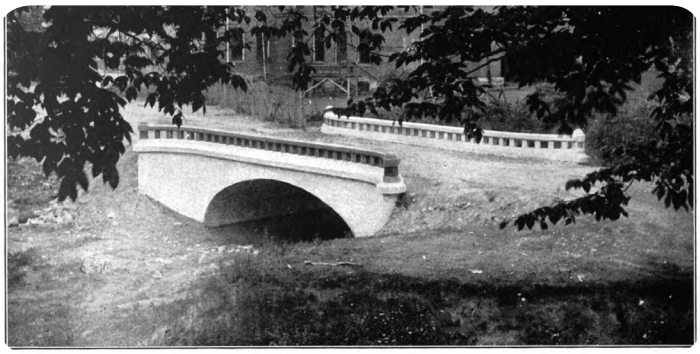
Span 30 ft. Rise 7 ft. 6 inches. Opening 10 ft. 4 inches. Roadway 20 ft. Crown 12 inches. Pavement rods ¾ inch spaced 18 inches in 6 inch concrete pavement. Arch rods ¾ inch spaced 18 inches. Railings monolithic concrete. Designed for 20 ton road roller or 200 lbs. per sq. ft. Completed 1903. Not designed by empirical method.

This drawing showing the configuration of the Nowland Avenue Bridge appeared in a 1908 catalog of the National Bridge Company.

felt that this material would last indefinitely and not deteriorate because it was located underwater. Elsewhere in the patent, it is noted that the material used for the tie could also be made of iron or steel, and indeed on many of his bridges steel rods encased in concrete were often used for the tie.

The Nowland Avenue Bridge is shown in a drawing in a 1908 catalog of the National Bridge Company. In this drawing, the bridge is shown to have one of the underwater ties described in the patent. The ties are shown as being composed of steel rods encased in concrete. Its 30-foot span has a rise of 7.5 inches, and a 20-foot roadway. It was designed to handle a 20-ton truck or 200 pounds per square foot.

The bridge today is in very poor condition and badly in need of restoration. Much of the bridge railing is missing from the bridge. The spandrel wall suffers from severe spalling. There is an ongoing effort to organize the restoration and reuse of this bridge as a non-motorized crossing. In 2017, a group of neighbors established Pathways Over Pogue's (POP) to advocate for completion of Pogue's Run Trail through Spades Park. The proposed trail would utilize the historic Nowland Avenue Bridge.



This photo showing the Nowland Avenue Bridge appeared in a 1908 catalog of the National Bridge Company.

The Joliet Bridge and Iron Company

By Steven A. Walton

The Michigan DOT considers Joliet Bridge and Iron Co. (JBIC) of Illinois, "one of the leading producers of Michigan's metal truss highway bridges in the early twentieth century." Despite this, their origins, methods, factory, and extent of work are all quite obscure.[1] From the home office in Joliet, they had offices across the country—in Minneapolis, Saginaw, Cincinnati, Memphis, Denver, St. Louis, Indianapolis, and Girard, Kansas. Their bridges are known from as far east as Michigan and Ohio, west to California, and in most states along that line and at least one project in Hawai'i. They worked in a great range of bridge styles, from flat plate girder spans of tens of feet to multiple-span crossings, using a diverse array of truss patterns, and became known for their tubular steel piers as well. By and large, it seems that JBIC was a reliable builder of small and medium-sized bridges, and many local commissioners could simply say after they had built one, "We have a fine bridge."[2]

My research on JBIC is attempting to bring together the history of the company and its distribution network and commissions in order to understand bridge firms' bidding and development process in the early twentieth century. Since no company records have (yet) been located that would clarify their manufacturing process, and the diversity of their bridge types, this makes my initial hope for an analysis of the company's engineering strategy impossible. JBIC seems to have made whatever type of bridge someone wanted, and explaining their truss types (i.e., with regard to style or patent issues, etc.) is too large a project at this time.

Origins

Incorporated in March 1896 with $10,000 capital, JBIC either immediately prospered or realized they needed more backing (or both), for within a year they increased their capital stock to $50,000 (something like $1.4 million today).[3] Within five years they were doing so well that they employed 100 men in Joliet and incorporated themselves in both Minnesota and Michigan, the latter with $100,000 in capital.[4] Soon

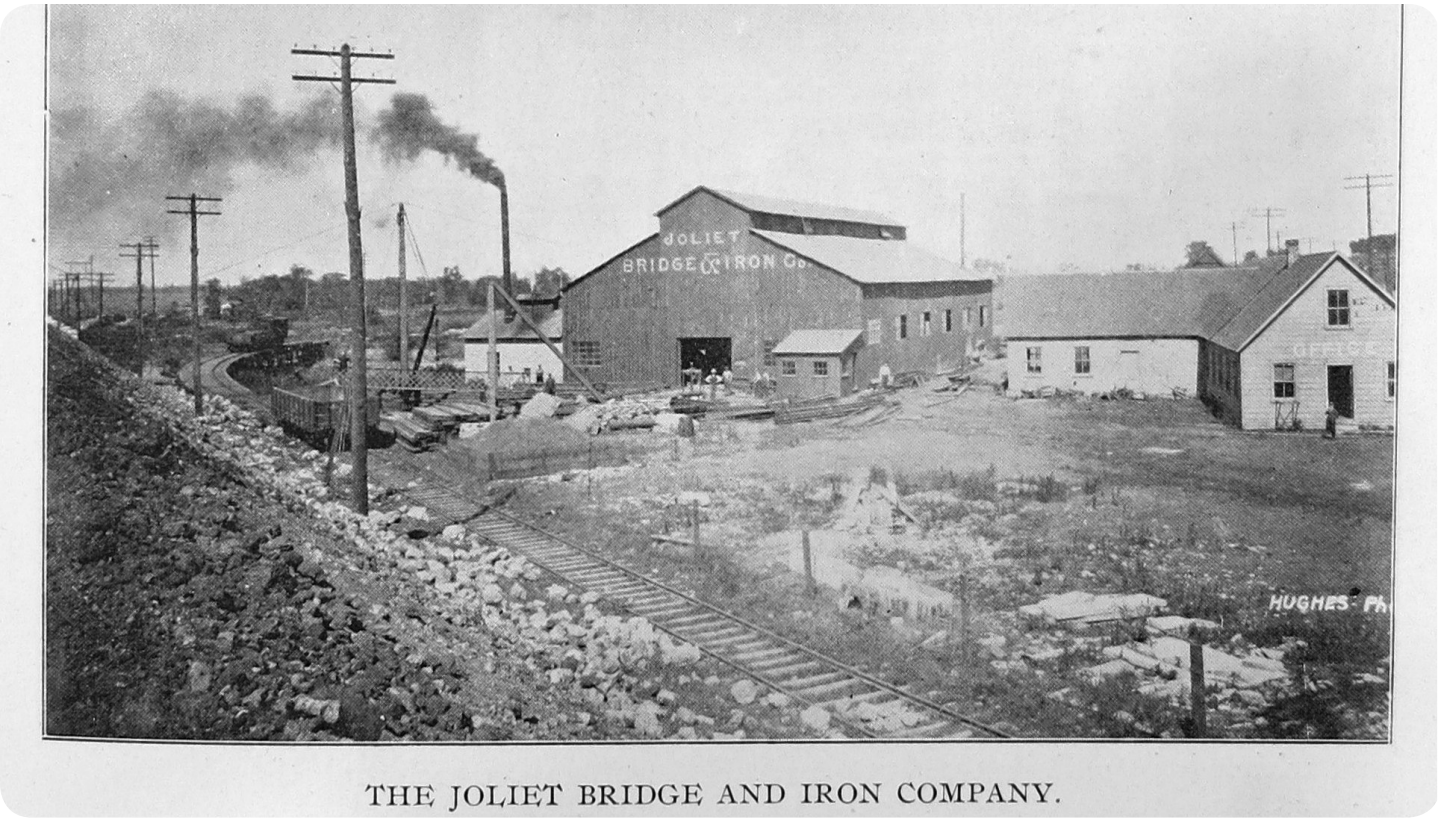


Figure 1.

they had at least a half-dozen and perhaps many more representatives across the Midwest and Great Plains states, all served from a modest factory on the northern edge of Joliet (Figure 1).

Born in 1856 in Scotland, Robert Charles Morrison arrived in America about 1880 as a stonemason. After fourteen years as a bridge builder—mostly in stone it would seem—he became president and treasurer of JBIC in 1896, eventually passing it to his son upon his death in 1913. Indicative of the shift from apprenticeship to university education in bridge engineers, as well as the consolidation of bridge companies in the early twentieth century, Andrew W. Woodman, a civil engineer from MIT (1889) became JBIC president in 1914 and shortly thereafter partnered or merged the firm with the De Pere Manufacturing Company of Wisconsin (incorporated 1917, capitalization $150,000; the exact relationship is unclear) and then also with the United States Crane Company.[5] By 1929, JBIC had ceased to exist, though remnants continued as a consulting bridge engineering firm.

JBIC started bidding for projects in July 1896. The city of Decatur, Illinois, put out a call for three new iron bridges "with substantial structures spanning uncertain streams," and JBIC was one of bidders for the three 40-foot spans with stone abutments. Fourteen firms submitted a total of 18 bids from Ohio, Indiana, Illinois, Wisconsin, and Missouri, but JBIC was awarded the contract even though their bid of $2,758 was near the middle of the offers.[6] Such was the nature of bridgebuilding in the late nineteenth century, with existing roads all across the Midwest being upgraded, as well as the expansion of roads out across the Prairies (the iron building trades were in fact so brisk in the first years of the century that rolling mills could not keep up; there was at one time a year's delay in fulfilling orders to the bridge shops).[7]

Regional Bridge Builder

JBIC erected iron truss bridges across the Midwest and further afield (Figure 2), developing a standard line of bridges. By 1897 they claimed to have already built nearly 200 bridges and were doing about $100,000 work annually.[8] With the great deal of work in the area, JBIC opened an office in Belvidere, near Rockford, Illinois, in 1904 under the charge of James McCabe. Local papers claimed that the firm was "one of the oldest companies in the bridge business and has the largest and best equipped plant for bridge

Figure 2.

building in the state." McCabe started taking out advertisements in the local paper over the next two months, noting that the firm would contract design and manufacture "steel bridges, buildings, etc." and had "in large stock of steel for small bridges always on hand."[9]

Judging from their experience, bridge companies like JBIC in this "catalog bridge" period[10] relied upon a network of agents to respond to city and county RFPs for bridges, and in some cases also took their plans to the municipalities for direct consideration. For example, D.H. Young was an agent for JBIC in the lower Plains states, whose territory included Arkansas and Oklahoma, and in 1902 he had 45 bridges under contract for JBIC across his region. By 1905, he had been responsible for the construction of 40 bridges alone in Allen Co., Kansas.[11] In some cases, the agents even drove the bridge acquisition process for a locality: J.K. Hilton was sent to Clay City, Kentucky, to try to get the city council to purchase a bridge to span the Red River in 1904. It appears that he arrived with plans, specifications, and an approximate cost already developed and left it to the city council to decide where the bridge would actually go. The local paper said, "Talk up the bridge, we must have it," and suggested that three crossing points would be viable and that the council would simply choose the one where it could get enough subscriptions from local businesses to cover (most of) the cost of the bridge.[12]

When JBIC put in a bid on a project, it put in a bid for the structural iron as well as the abutments, though it would typically subcontract the latter out to a local mason. In some cases, the county overseeing the bids would add its own twist on the subcontracting process, as for example when the McHenry Company board of supervisors accepted JBIC's $2,998 bid for a bridge in Marengo, Illinois, but then decided that the 28 cords [3,584 cu. ft.] of stone

Figure 3. Clockwise from above: view up end of southeastern endpost (all four look quite identical); top chords looking west; transition from fluted to flat (clearly there is some major buckling at transition point, but flutes are remarkably uniform); overall view of bridge.

necessary for the abutments "could be furnished cheaper by being purchased at the quarry at Garden Prairie," so they appropriated an extra $252 to have the stone delivered to the bridge site and then let JBIC build the foundations.[13]

Subcontracting in big bridge construction can often bring its own headaches. In the winter of 1899–1900, JBIC build a bridge at Rice, Minnesota, for $10,000. Apparently improper concrete and defective workmanship in the abutments, which were built in the winter, caused the eastern span of the bridge to fall into the river when the ice went out in the spring. The collapse was clearly not catastrophic because JBIC apparently repair the abutment, lifted the bridge back into place, and tendered the bridge for acceptance by the village and the adjacent townships. In the end, municipalities demanded a $700 discount (although for what is unclear since it was repaired at the company's cost), to which the company eventually acquiesced.[14]

A question of fluting or "Lasagna Bridges?"

What originally drew me to study JBIC was the uniform, prominent fluting on the end posts and top chords of their preserved Dehmel Road Bridge in Frankenmuth, Michigan, that made it look to me like a lasagna noodle (Figure 3). A quick search of their other bridges on Bridgehunter.com and HistoricBridges.org showed that numerous of their known bridges had this "feature." At the time, I presumed that the fluting of the top plate between the rivets was intentional, because it was so remarkably uniform (and there are some joints where the rivets have very clearly been blown out by rust). On this and other JBIC bridges, the fluting also seems to start and stop at specific points along the chords.

Although I have been assured that these are all deformations due to pack rust, and that the deformations occur only where the rivet spacing is wider—implying either a threshold of plate tightness/compaction where pack rust can begin at all, or (and) a sudden and somewhat unlikely narrow elastic deformation zone in the steel where plastic deformation can suddenly take place—I have found at least one other contemporaneous case where built-up girders seem to have been intentionally fluted and are not in a situation where pack rust could or did form. A post office in Chula Vista, California, discovered that their internal, coated, structural members were made of fluted beams when they had to have asbestos abatement performed.[15] In this case, it was found difficult to remove the asbestos fireproofing material from the pockets in the flutes, suggesting that the fluting may have been used to be a more receptive surface for the spray-on fireproofing in the first place. This of course does not prove or necessarily imply that JBIC fluted its

A suspension footbridge built by JIBC in 1898 over the Vermillion River in Pontiac, Illinois. *Photo by Nathan Holth.*

chord members during manufacture, but neither does it exclude the possibility that fluted beams were *manufactured*. It would be nice to believe that some bridge manufacturers saw this as an aesthetic selling point for their bridges, rather than our excepted understanding that these are corrosion failures due to under-dimensioned top plates and/or rivets spaced too widely apart. How they would have done it continues to be under investigation.

Regardless, my ongoing study of the history of the JBIC will continue to provide a window on an important but smaller bridge company before the great consolidation across the country before World War One.

Notes

[1] "State Street [Bridge] over Cass River," Michigan Department of Transportation, http://www.michigan.gov/mdot/0,4616,7-151-9623_11154_11188-29149--,00.html.

[2] "County Committee Accepts Bridge," Marengo Republican-News (Marengo, IL), Jan. 24, 1902, 1.

[3] "Licensed to do Business," The Inter Ocean (Chicago), March 25, 1897, 7. In 1906 they again increased their capital stock from $10,000 to $50,000 suggesting a stock buyback in the intervening years; "Corporation Affairs," Pine Bluff Daily Graphic (Pine Bluff, AK), Nov. 22, 1906, 1.

[4] "Joliet Mills Closed," The News (Paterson, NJ), Aug. 16, 1901, 3; The Saint Paul Globe (Saint Paul, MN), May 20, 1900, 12; "New Michigan Corporations," The Inter Ocean (Chicago), Apr. 15, 1901, 6.

[5] American Society of Civil Engineers, Year-book (New York: ASCE, 1907), 127. ASCE, Constitution and List of Members (New York: ASCE, 1914), 120. Herringshaw's City Blue Book of Biography: Chicagoans of 1919 (Chicago: Clark J. Herringshaw, 1919), 384. John William Leonard, Who's Who in Engineering, 1922–1923 (Brooklyn, NY: John W. Leonard Corporation, 1922), 1413. "Firm Raises Capital," Iron County News (Hurley, WI), May 26, 1917, 7.

[6] "Bridge Contracts Let," The Decatur [IL] Herald July 25, 1896, 2; "Bridge Contracts Let," The Evening Bulletin [Decatur, IL], July 25, 1896, 5.

[7] "D.H. Young," The Girard Press (Girard, KS), Feb. 20, 1902, 6.

[8] Joliet Illustrated. Historical Descriptive, and Biographical (Joliet, IL: The Daily Republican, 1897), 99. The 1880–81 Joliet city directory lists him as a stone cutter and mason.

[9] "Will Locate Here," Republican-Northwestern (Belvidere, IL), Jan. 26 1904, 4; ads on Jan. 28, Feb. 13, Mar. 12, Mar. 26. etc.

[10] Martha Carver, Tennessee's Survey Report for Historic Highway Bridges (Nashville: Ambrose Printing Company, 2008), 154.

[11] "D.H. Young," The Girard Press (Girard, KS), Feb. 20, 1902, 6; Iola Daily Register and Evening News (Iola, KS), Apr. 11, 1905, 5.

[12] "Local Brevities," The Clay City Times (Clay City, KY), May 5, 1904, 3; "Council Proceedings," The Clay City Times (Clay City, KY), May 12, 1904, 1.

[13] "Board of Supervisors," The Woodstock Sentinel (Woodstock, IL), Sept. 19, 1901, 9.

[14] "Came to Terms," Little Falls Weekly Transcript (Little Falls, MN), Aug. 31, 1900, 4.

[15] PSBCA Nos. 4085, 4093, & 4282, March 13, 2000, online at http://about.usps.com/who-we-are/judicial/board-contract-appeals-decisions/2000/4085op.htm.

Steven A. Walton is an associate professor of history in the Industrial Heritage and Archaeology program at Michigan Technological University in the UP of Michigan. He is also Executive Secretary of the Society for Industrial Archeology and editor of their journal, IA.

The Main Street Bridge in Eagle River, Michigan. This riveted pony truss was built in 1909 by JIBC. *Photo by Nathan Holth.*