HENSZEY'S WROUGHT-IRON ARCH BRIDGE
(Allemaengel Road Bridge)
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(Billig Bridge)
(Ontelaunee Creek Bridge)
Kings Road, Spanning Ontelaunee Creek
Wanamakers
Lehigh County
Pennsylvania

HAER No. PA-209

PHOTOGRAPHS

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Historic American Engineering Record
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Joseph E.B. Elliott, photographer, Summer 1991

PA-209-1	OVERALL PERSPECTIVE VIEW OF BRIDGE LOOKING NORTHWEST AT SOUTH-SIDE TRUSS
PA-209-2	VIEW LOOKING WEST ACROSS DECK FROM EAST END
PA-209-3	PERSPECTIVE VIEW LOOKING NORTHWEST FROM EAST END
PA-209-4	PERSPECTIVE VIEW LOOKING NORTHEAST FROM WEST END
PA-209-5	OVERALL VIEW LOOKING NORTH
PA-209-6	DETAIL VIEW OF PANEL ON SOUTH-SIDE TRUSS, EAST END OF BRIDGE, LOOKING NORTH
PA-209-7	DETAIL VIEW OF EAST END WING WALL AND PIPE RAILING
PA-209-8	VIEW OF EAST ABUTMENT LOOKING NORTH
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PA-209-10	DETAIL VIEW OF SOUTH-SIDE TRUSS LOOKING NORTHWEST
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PA-209-14	DETAIL VIEW OF LOWER CHORD CONNECTIONS AND SAG RODS FROM BELOW THE DECK
PA-209-15	GENERAL VIEW UNDERNEATH DECK SHOWING KING POST, TIE RODS AND STRINGER I-BEAMS

Note: The following views (PA-209-16 through PA-209-21) were produced in 1988, photographer unknown.

PA-209-16 VIEW LOOKING EAST ACROSS DECK FROM WEST END

PA-209-17 DETAIL VIEW OF PANEL ON NORTH SIDE OF BRIDGE

PA-209-18 DETAIL VIEW OF PANEL WITH DOUBLED TENSION RODS

PA-209-19 GENERAL VIEW OF SOUTH FACE LOOKING NORTH

PA-209-20 VIEW OF UNDERSIDE SHOWING LOWER CHORD, NORTHEAST

PA-209-21 PERSPECTIVE VIEW OF NORTH SIDE OF BRIDGE

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All color xerographic copies were made from a duplicate color transparency. J.E. Elliott, photographer, Summer 1991.

PA-209-22 (CT) VIEW OF BRIDGE FROM MID-SPAN TO ABUTMENT

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HENSZEY'S WROUGHT-IRON ARCH BRIDGE
(Mosser's Bridge)
(Ontelaunee Creek Bridge)
(Allemaengel Road Bridge)
(Billig Bridge)

HAER NO. PA-209

LOCATION:	Spanning Ontelaunee Creek on Legislative Route 39112, Lynnport Vicinity, Lehigh County, Pennsylvania. UTM: 18.428460.4500580 Quad: New Tripoli, Pennsylvania
DATE OF CONSTRUCTION:	1869-70; one span relocated to present site in 1900
PRESENT OWNER:	Commonwealth of Pennsylvania, Pennsylvania Department of Transportation, Harrisburg, Pennsylvania
PRESENT USE:	Not in service; closed 1987
SIGNIFICANCE:	Mosser's Bridge is one of two bowstring arch-truss bridges remaining on state-owned highways and roads in Pennsylvania. It is distinguished by a variety of unusual features, including top chords fashioned from two Phoenix sections, a system of camber rods below the bottom chord which serve to deepen each truss and thereby limit deflection, and camber rods beneath each floor beam which reduce the lateral movement of the top chords under live loads. This single span was originally erected in 1869 as part of a two-span bowstring arch-truss which carried Main Street over Trout Creek in Slatington, Lehigh County, Pennsylvania. The ironwork was supplied by the Continental Bridge Company of Philadelphia, and erected under the supervision of local bridge contractor Daniel Beidelman. In 1900, this span was relocated to its present site by the Penn Bridge Company of Beaver Falls, Pennsylvania, where it served the transportation needs of the rural agricultural community in the Ontelaunee Creek valley.

PROJECT INFORMATION:

MOSSER'S Bridge was recorded in July 1988 by Berger Burkavage, Inc., of Clarks Summit, Pennsylvania, for the Pennsylvania Department of Transportation, Harrisburg. The project team consisted of Martha H. Bowers, Architectural Historian; Rob Tucher, Photographer; and Ingrid Wuebber, Research Historian.

Additional documentation (photographs, measured drawings, and history) was completed by the Historic American Engineering Record, National Park Service, as part of the Cast- and Wrought-Iron Bridge Recording Project sponsored by the Institute for the History of Technology and Industrial Archeology, West Virginia University, Morgantown, West Virginia. Additional historical information, appearing as an appendix to the Berger-Burkavage report, was completed by William Chamberlin.

DESCRIPTION

The subject of this documentation is a single-span bridge which carries Legislative Route (L.R.) 39112 over Ontelaunee Creek in Lynn Township, Lehigh County, Pennsylvania. Lynn Township occupies the extreme western portion of Lehigh County, and is bounded by portions of Schuylkill County to the north and Berks County to the west. The area is predominantly rural, characterized by dispersed farmsteads and small villages, the nearest of which is Wanamakers, located on State Route (S.R.) 143 less than one mile from the bridge. L.R. 39112 is a gravel road which extends east off Route 143 and, for most of its approximately 5-mile length, follows a northeasterly course along the south bank of Ontelaunee Creek. Route 143, lying above the north bank, is the principal route through this area from U.S. 22/78 to Lynnport and New Tripoli. Along the North bank of Ontelaunee Creek is Township Road 746, which extends south from Wanamakers and ends at L.R. 39112 just before the latter crosses the creek. The only buildings in the immediate vicinity of Mosser's Bridge are a nineteenth-century stone farmhouse and several agricultural outbuildings, formerly part of the Mosser farm from which the bridge derived its original name. These are situated on the east side of the creek, at the point where L.R. 39112 makes a sharp curve to the north off the east end of the bridge. The banks of Ontelaunee Creek are heavily wooded.

Mosser's Bridge is a single-span pony bowstring arch-truss. It has a 90 degree skew and is seated on coursed rubble ashlar abutments. The approaches are formed by stone wing walls which rise to the level of the roadway and are fitted with pipe railings. The bridge is 92'4" long (end shoe to end shoe) with each truss subdivided into eight panels. Each of the panels is 10'2" long, the remainder 12'0" wide. The span carries a wood plank deck with a 15' clear roadway between 4" x 4" timber wheel guards. The top chords are fashioned from two 7 15/16" x 5/16" cast Phoenix sections, between which is riveted a stem plate 11 1/4" x 5/16". Stiffening bars, 2" wide and 5/16" thick, are inserted horizontally through the stem plate at regular intervals and are riveted to the outer flanges of the Phoenix sections.

The bottom chords consist of pairs of flat bars 4 3/4" x 1/2" with turnbuckles, on which rest the I-beam floor beams which carry I-beam stringers on which the flooring is laid. The vertical posts of each truss consist of pairs of T-bars 3" x 2 1/2" x 1/2" which by means of flanges at the bottom are riveted to the upper flange of each floor beam. The T-bars are joined to the top chord by means of plates riveted perpendicular to each side of the stem plate; in order to allow the stem of the T-bar to be riveted to the plate, a small section of the "head" of each

T is cut away. Within each panel are flat vertical members, 2" x 5/16", placed approximately 2 feet apart. At the top, they are riveted to alternate sides of the stem plate; the bottom ends are inserted between the parallel bars of the lower chord and riveted in place.

To the lower flanges at the outer ends of each floor beam are riveted vertical plates, or shoes, of cast iron (the largest of which is approximately 2' wide and 1' 10" deep), through which the bottom chord passes. The web of each plate provides the bottom anchorage for diagonal rods with turnbuckles, which at the top are flattened and riveted to the stem plate of the top chord. The lower edge of each vertical plate features two niches of saddles, into which fit parallel camber rods of 1 3/4" diameter, with turnbuckles. Each pair of camber rods is bolted, at the outer ends, to an anchor plate seated behind each end shoe of the trusses. The inner ends of each pair of rods are bolted to 4-foot-long connecting plates, which in turn are bolted to either side of the bottom chord at the center of each truss. Between each pair of camber rods is a third rod of similar diameter. Each of these "third" rods extends only across the outer three panels of each truss; each rod is bolted at the inner end to the vertical plate at L3, and at the outer ends flattened and inserted between the bars of the bottom chord between L0 and L1, near the end shoe, where it is riveted in place.

There are two types of bottom bracing. Beneath each floor beam, except that at L4, is a pair of 7/8" camber rods with eyes at the outer ends, through which a pin is inserted to hold them against a plate riveted to the top of the floor beam between the legs of the vertical posts. Beneath the center of each floor beam is bolted. Between each pair of floor beams, lateral bracing consists of four 3/4" rods which come together at the center at a circular cast-iron ring into which each is bolted. Each rod extends from the ring diagonally to the outer ends of a floor beam, where it is hooked in an "eye" riveted to the beam web.

In a bowstring arch-truss, the deck is suspended form the top chord, thereby placing all verticals in tension. The bottom chord is also in tension, as a result of the horizontal thrust exerted by the arched top chord. When a load passes over the bridge, the load is conveyed to the vertical posts. As the posts are placed in greater tension, the segment of top chord between the two posts is placed in compression. The flat verticals between posts of Mosser's Bridge thus appear to have been installed in order to counteract the tendency of a given arched segment of the top chord to buckle upward under the force of the added compression. this problem would be less likely to occur if the arch was formed from straight segments, or, perhaps, if the

arch was fully tubular, with four, rather than only two, Phoenix sections. (The Phoenix column was patented in 1862 by Samuel J. Reeves and manufactured through the remainder of the century by the Phoenix Bridge Company of Phoenixville, Pennsylvania. It consisted of four cast members, riveted together to form a cylindrical column, and was normally used as a compression member. Although the Phoenix Bridge Company is most closely associated with the use of the column, it was also purchased for use by other bridge companies in patented designs of their own making.)

The trusses of Mosser's Bridge are rather shallow; i.e., the ratio between the maximum truss depth (approximately 8 feet) and the overall length (92 feet) is only about 1:11. Due to the arch configuration, the outer ends of the trusses are considerably shallower, a condition which increases deflection and vibration under live loads. Placement of the camber rods below the bottom chord has the effect of deepening the truss (by increasing the ratio of span to truss depth at the quarter points). This essentially forms inverted king posts which help to limit deflection of the truss when a load is on the outer ends of the bridge. This configuration is repeated below the floor beams, which, with their 9-inch webs, are relatively shallow for their 21-foot length. Placement of the camber rods below each beam, again in a king-post configuration, would counteract the tendency of the floor beams to sag at the center, thus reducing the lateral movement of the upper chords under live load.

Mosser's Bridge is one of two pony bowstring arch-trusses recorded in an inventory of state-owned highway bridges conducted in 1982-1985 by the Pennsylvania Department of Transportation and the Pennsylvania Historical and Museum Commission (Commonwealth of Pennsylvania 1986:98). The first patent for a bowstring arch-truss was acquired by Squire Whipple in 1840 (Comp and Jackson 1977). Subsequently, the type achieved wide popularity for small vehicular crossings due to its relative "efficiency." Efficiency in this instance was associated with the goal of obtaining a comparatively strong structure with a relatively small amount of material (and thus lesser cost). However, bridge engineers were perpetually confronted with the problem of building a structure that was not only light and strong, but also sufficiently rigid. From the mid-nineteenth century on, many patents were issued for bowstring truss designs, and even more applications made, as engineers of varying training, experience, and competence attempted to develop bowstring trusses that would perform as required and at the same time be competitive in price (see, for example, Simmons 1985). In this regard, Mosser's Bridge may be interpreted as a highly individualized, "vernacular" example of bowstring archtruss design.

The trusses of Mosser's Bridge originally constituted one span of two-span structure built in 1869 over Trout Creek in Slatington, Pennsylvania. When one of the spans was moved to Ontelaunee Creek in 1900, it is possible that the wooden deck would have been replaced with new material, but is unlikely that the trusses themselves would have required alteration to accommodate the span's new location. New abutments, of course, were constructed at Ontelaunee Creek in order to support the span over the stream. See the next section of this report for further information.

HISTORY OF MOSSER'S BRIDGE

Mosser's Bridge was originally erected in 1869 over Trout Creek in Slatington, in extreme northeast Lehigh County. The area of Slatington was initially settled in the 1730s, when Nicholas Kern, a German immigrant, acquired 500 acres along Trout Creek and the Lehigh River. Kern established a gristmill and a sawmill on Trout Creek, but he and his descendants remained almost the only permanent inhabitants of the area through the remainder of the century. In 1844, however, extensive deposits of slate were discovered by Owen Jones, William Roberts, and Nelson Labar on and near the Kern holdings. The Tunnel Quarry was opened in 1845, to extract slate for roofing shingles. In 1847, Jones and Robert McDowell opened a school-slate factory under the name Owen Jones and Company. Within four years, a town was laid out, called Waverly, and the area soon emerged as the largest supplier of slate in the state, producing roofing slate, school slates, blackboards, structural slate, and sink tops. In 1856, the Lehigh Valley Railroad was opened along the Lehigh River to the growing industrial village, by then known as "Liberty." By 1860 the community had a population of 500, and in 1864 it was incorporated as Slatington Borough. By 1869 the population had quadrupled, bringing the number to 2,000 (Mathews and Hungerford 1884:556-559; Slatington Centennial Association 1964).

The first bridge on Main Street over Trout Creek was a stone structure which had been erected in 1826. In March 1869, the Lehigh County Commissioners decided to look into the issue of its replacement (Lehigh County Commissioners' Minutes [hereinafter cited as "LCCM"] March 1, 1869). This issue appears to have been raised as a result of the decision of the Lehigh Valley Railroad to construct a "Slatedale" branch along the south bank of Trout Creek to the main line, to service the area's slate quarries and industries (Mathews and Hungerford 1884:561, 565)

In October 1869, the County Commissioners reviewed four bids for a new bridge from one Daniel Beidelman, described as a "bridge contractor." Each of Beidelman's proposals was for a bridge of two spans, each 91 feet long, the costs of which varied according

to the type of lumber to be used in the flooring. The Commissioners selected the fourth proposal, which called for "seven Phoenixville iron floor beams in each span, 9" x 3", with white oak flooring, " the total cost to be $6163 (LCCM October 18, 1869). The ironwork for the two spans was supplied, for $1500, by the Continental Bridge Company of Philadelphia, which around that time was marketing "wrought iron arch bridges,: the arches of which were specifically described as being formed form "Phoenix column iron" (Order No. 1781, "on account of Slatington Bridge," in LCCM March 21, 1870; Darnell 1984:61). In April 1870, the Commissioners appointed a team of "viewers" to inspect the bridge and report on whether it had been constructed according to contract (LCCM April 20, 1870). As no further mention of the bridge occurs in the Commissioners' Minutes, it may be assumed that the structure did indeed meet the terms under which it had been built. The new Main Street bridge, a two-span pony bowstring arch-truss, was erected on high stone piers and abutments sufficiently high for the railroad line, which formally opened in 1870, to pass beneath (Mathews and Hungerford 1884:561, 565; Slatington Centennial Association 1964). An 1899 photograph (included in this documentation as photo PA- -113) shows all of the west span (over the rail line) and a small part of the east span (over Trout Creek). An interesting feature of the west span, as shown on the photograph, was the stone pier which supported the center of the span. Whether this unusual feature was part of the original construction, or was installed later to correct a perceived deficiency, is unknown.

The arch-truss bridge served as intended for three decades. In 1900, however, viewers on behalf of the Lehigh County commissioners recommended replacement of the structure, which apparently suffered from "weakened beams caused by smoking engines" passing beneath the west span (a situation which might have earlier led to erection of the pier to support the center of the span) (Slatington Centennial Association 1964; LCCM July 23, 1900). Although the Borough of Slatington could not mount the cost of a replacement on its own, it was aided by the Allentown and Slatington Street Railway Company, which offered to pay one-third of the full cost of a new bridge in exchange for permission to run its line across it. This course of action was approved by the Commissioners on July 23, 1900 (LCCM July 23, 1900).

An invitation for bids for a new Main Street bridge was issued on August 9, 1900. Potential bidders were invited to submit "their own designs with complete specifications" (LCCM August 9, 1900). Although the bids were opened, as advertised, on August 21, no contract was awarded. Four bidders had submitted plans and estimates: the Groton Bridge Company of Groton, New York, one

plan for $32,100; the Penn Bridge Company of Beaver Falls, Pennsylvania, one plan for $30,800; George Shoemaker (no location given), one plan and two estimates (for $15,000 and $30,000); and Nelson and Buchanan of Chambersburg, Pennsylvania, no fewer than six different plans and quotes ranging from $22,490 to $26,491 (LCCM August 21, 1900).

One week later, the County Commissioners advertised for bids one again, this time providing their own estimates ($17,000 for superstructure, $10,000 for substructure) for a span 212 feet long, 40 feet wide, with a railroad track (with a stone floor). On September 3, the second round of bids was opened. Bidders this time were the King Bridge Company of Cleveland, Ohio (with 3 estimates), Penn Bridge Company (2 estimates), Groton Bridge Company (2 estimates), Oswego Bridge Company of Oswego, New York (1 estimate), and Nelson and Buchanan (4 estimates). Of these, the bids of the King and Groton companies were the lowest and that of Oswego by far the highest (LCCM August 27, 1900; LCCM September 3, 1900).

During this same period of 1900, the Lehigh County Commissioners had been planning the erection of a new bridge over Ontelaunee Creek near William Mosser's farm, in rural Lynn Township (LCCM april 10, 1900). Lynn Township, on the opposite end of the county from Slatington, was a predominantly rural agricultural area which had been set off from adjacent Heidelberg Township in 1753 (Mathews and Hungerford 1884:297). The Ontelaunee Creek valley extended east-west across the northern portion of the township, between the Blue Mountains and Shockary Ridge. The principal route through the valley (now Route 143) lay north of the creek, roughly following its course. This road was one of three extensions of the King's Highway, or public road, which had been established in the eighteenth century to enable area farmers to transport their produce to Philadelphia via Kempton (Roberts et al. 1914:821). In the early decades of the nineteenth century, several villages grew up along the road: New Tripoli, Lynnport, Jacksonville, and Steinsville (Mathews and Hungerford 1884:307, 311-313). Early industry in the township was associated with agriculture--for example, gristmills, sawmills, and small wool carding and stocking mills. Slate deposits began to be exploited in the township in the 1840's, leading to the establishment of several mantel factories (Mathews and Hungerford 1884:311, 313). The Berks and Lehigh Railroad was built through the valley in 1874, increasing the ability of farmers and local manufacturers to market their produce and products (Mathews and Hungerford 1884:311).

The area south of Ontelaunee Creek was occupied primarily by farmers, whose farmsteads were dispersed along the north flank of

shockary Ridge. A network of small roads developed, including one following the south bank of Ontelaunee Creek (corresponding to Legislative Route 39112 today), from which other roads extended south to Kistler Valley on the other side of Shockary Ridge (see Davis 1874). Since the main road, railroad, and commercial centers lay north of Ontelaunee Creek, it was inevitable that many crossings of the creek would be established over time. By 1874, no fewer than 10 roads crossed the creek between the township line (beginning with the crossing at Mosser's farm) east to New Tripoli (Davis 1874). Although each crossing, individually, was likely to service only very limited, local traffic, together these crossings formed an important element in the rural transportation system, a fact which their rural "constituents" were likely to bring to the attention of the County Commissioners on a regular basis. The importance of these crossings extended through the nineteenth and into the twentieth century: between 1892 and 1918, the county arranged for the erection of new bridges at five locations over Ontelaunee Creek ("County and Inter-County Bridges, January 1, 1933," manuscript Bridge Records, Lehigh County Historical Society). Thus, the decision of the County Commissioners to erect a new bridge on Ontelaunee Creek at Mosser's farm was a representative response to the needs and wishes of the Ontelaunee Valley agricultural community.

On August 27, 1900, the same day bids for Slatington's Main Street bridge were resolicited, the Commissioners opened proposals submitted for masonry and for ironwork at Mosser's on Ontelaunee Creek. The stone masonry contract went to Jacob Sechler of Lynn Township, the lower of two bidders; however, none of the quotes from five firms (King Bridge Co.; the Wrought Iron Bridge Co. of Canton, Ohio; Massilon Bridge Co. of Philadelphia; or Harry Cooper [location unspecified]) were chosen (LCCM August 27, 1900). The following day, the County Engineer, George T. Oplinger, provided the Commissioners with an estimate for Mosser's Bridge over Ontelaunee Creek: $1000 for masonry and $2200 for a superstructure (LCCM August 29, 1900).

With the latter figure in mind, the Commissioners reviewed the second round of bids for Slatington's Main Street bridge. The Penn Bridge Company's lower bid was for $15,995, $1720 higher than the lowest figure, $14,275, which had been submitted by the King Bridge Company however, the Penn Bridge Company's offer also included a proposal to remove and relocate one of the existing Main Street arch-truss spans "anywhere in the County" the Commissioners might wish, for an additional charge of only $325. Unable to resist the offer, the County Commissioners awarded the Main Street bridge contract to the Penn Bridge Company (LCCM September 3, 1900; LCCM September 4, 1900).

The separate contract, for relocation of one of the arch-truss spans to Ontelaunee Creek opposite Mosser's farm, was signed on September 7, 1900 (Agreement, Penn Bridge Co., Mosser's Bridge, dated September 7, 1900, in Bridge Records, Lehigh County Historical Society). The abutments and wingwalls were completed by Jacob Sechler, of Lynn Township, to plans and specifications developed by County Engineer George Oplinger ("Plans and Specifications for Mosser's Bridge, Lynn, Masonry Work," Bridge Records, Lehigh County Historical Society) (see copy of plan included in this documentation as photograph PA- 114).

Neither the plans nor specifications given to Sechler included construction of a pier to support the center of the relocated arch-truss. By 1914, however, a pier had been erected beneath the center f the span, replicating the earlier attempt, when the bridge was still at Slatington, to support the trusses from below (Roberts et al. 1914:820). This feature was remarked upon in 1932, soon after the bridge had been brought under the jurisdiction of the State Department of Transportation. To the consternation of engineer H.C. Roeder, the bridge was "in dangerous condition due to some-one building up supports under [the] bottom chord at [the] middle of the span and consequently reversing all the stresses in the top chord and web members." Specifically cited were the "hangar rods from top to bottom chord" (presumable the flat vertical members) which were bent from "taking compression instead of tension" as a result of being propped up from below. Roeder's plan to repair the damage included removal of the center pier, and letting "traffic try and straighten [the bent members] out over the winter., If they do not straighten out by next summer, they will be re-riveted," a course of action which did, in the end, appear ("Wanamakers Bridge Over Ontelaunee Creek," manuscript dated 7/832-1935, in Bridge Records, Lehigh County Historical Society). The span remained in service until 1986, although its original state posting of five tons was reduced to four in 1968 (Commonwealth of Pennsylvania, Department of Highways, Iron-Steel or Timber Bridge Record, on file at District 2-0, Pennsylvania Department of Transportation, Clearfield).

APPENDIX

Material provided by William Chamberlin:

Joseph G. Henszey first appears in the Philadelphia directories in 1849 where he is listed as a hardware merchant.[1] In the business as Moore Henszey & Company, he succeeded in this pursuit until the Civil Warm, when the company lost the southern trade that had constituted most of its business.[2] Possibly influenced by the success of a Boston bridgebuilder, Thomas W. Moseley, who had recently opened an office in Philadelphia[3] to exploit the post-Civil War market for iron bridges in that area, Henszey applied for, and on June 22, 1869 was issued, a patent[4] for what he would advertize as "Henszey's Patent Wrought Iron Arch Bridge."[5]

The Henszey patent, which dealt only with details of the upper and lower chords and the means of connecting them to one another, included:

1) An upper chord composed of two side-by-side Phoenix column segments[6] sandwiching a stem plate between one pare of the flanges; and

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[1]McElroy's Philadelphia City Directory. E.C. and J. Biddle & Co., Philadelphia, PA, 1849.

[2]Manuscript ledgers, Pennsylvania, v. 136, p. 579. R.G. Dunn Collection, Baker Library, Harvard University.

[3]Moseley's first Philadelphia directory listing is in 1868 (Gopsill's Philadelphia City Directory for 1868-1869. James Gopsill, Philadelphia, 1872) for the Moseley Iron Bridge Company at 147 South 4th.

[4]Letters Patent No. 91,745, dated June 22, 1869. United States Patent Office.

[5]Poor's Manual.

[6]The Phoenix column was patented in 1862 by Samuel J. Reeves and manufactured through the remainder of the century by the Phoenix Iron Company of nearby Phoenixville, PA. It consisted of four to eight flanged rolled segments rivetted together to form cylindrical columns of various diameters. Although the Phoenix Bridge Works is most closely associated with the column, it was purchased by other bridge companies for use in designs of their own making.

2) Strap hangers riveted to the stem plate at the top and between the parallel bars that formed the lower chord at the bottom.

While these features agree completely with corresponding details of the bridge at Wanamakers, the patent is silent on other distinguishing features of that bridge, such as: the camber rods and their cast iron saddles, bearing shoe details, trussing of the floor beams, lateral bracing of the trusses, and whether the upper chord was to be arched or parallel to the lower.

Henszey's claim was for a "light and simple, but rigid upper chord." As an alternative to the use of Phoenix columns, he included the option of constructing the upper chord from a pair of flanged plates arranged, rivetted directly between the upper chord segments.

BIBLIOGRAPHY AND REFERENCES CITED

Comp, T. Allan, and Donald C. Jackson
1977 Bridge Truss Types: A Guide to Dating and Identifying. American Association for State and Local History Technical Leaflet 95, in History News, Vol. 32, No. 5.

Darnell, Victor C.
1984 Directory of American Bridge Building Companies, 1840-1900. Society for Industrial Archaeology, Occasional Publication No. 4, Washington, D.C.

Davis, F.A.
1874 New Illustrated Atlas of Lehigh County, Pennsylvania. Reading Publishing Company, Reading Publishing Company, Reading, Pennsylvania.

Lehigh County, Pennsylvania
1869 Minutes of the Commissioner's Office. Curated at the Lehigh County Historical Society, Allentown, Pennsylvania.

1870 Minutes of the Commissioners' Office. Curated at the Lehigh County Historical Society, Allentown, Pennsylvania.

1900 Minutes of the Commissioners' office. Curated at the Lehigh County Historical Society, Allentown, Pennsylvania.

n.d. Bridge Records. Manuscript items curated at the Lehigh County Historical Society, Allentown, Pennsylvania.

Mathews, Alfred, and Austin N. Hungerford
1884 History of the Counties of Lehigh and Carbon, in the Commonwealth of Pennsylvania. Everts & Richards, Philadelphia.

Northampton County Historical and Genealogical Society and the Lehigh County Historical Society
1982 The Lehigh Valley: An Illustrated History. Windsor Publications, Inc., Woodland Hills, California.

Pennsylvania, Commonwealth of
1986 Historic Highway Bridges in Pennsylvania. Issued by the Pennsylvania Historical and Museum Commission and the Pennsylvania Department of Transportation, Harrisburg.

Pictorial Souvenir, Scenes of Slatington and Vicinity.

1936 The News Publishing Company, Printers, Slatington, Pennsylvania.

Roberts, Charles Rhoads, Rev. John Baer Stoudt, Rev. Thos. H. Krick, and Wm. J. Dietrich
1914 History of Lehigh County, Pennsylvania. Lehigh Valley Publishing Company, Ltd., Allentown, Pennsylvania.

Simmons, David A.
1985 "The Risk of Innovation: Ohio Bridge Patents in the 19th Century," in Proceedings of the First Historic Bridge Conference, Department of Civil Engineering, Ohio State University, and the Historic Preservation Division, Ohio Historical Society, Columbus, Ohio.

Statington Centennial Association
1964 Slatington, Pennsylvania, Centennial, 1864-1964, Official Program. Northern Lehigh Junior Chamber of Commerce.

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Photographs PA-209-1 through PA-209-22 were previously transmitted to the Library of Congress in 2000.

Photographer: Rob Tucher

PA-209-23 CONTEXTUAL VIEW FROM EAST SIDE OF ONTELAUNEE CREEK, LOOKING SOUTHWEST.

PA-209-24 VIEW OF ARCH-TRUSSES FROM UPSTREAM SIDE, LOOKING SOUTH/SOUTHWEST.

PA-209-25 DECK VIEW FROM EAST END, LOOKING WEST.

PA-209-26 DECK VIEW FROM WEST END, LOOKING EAST. MOSSER FARMHOUSE AT CENTER LEFT.

PA-209-27 DETAIL OF TOP CHORD AND CONNECTIONS AT U3, DOWNSTREAM SIDE.

PA-209-28 EAST HALF OF ARCH TRUSS ON DOWNSTREAM SIDE, VIEW TO NORTHEAST.

PA-209-29 DETAIL OF BOTTOM CHORD, VERTICAL PLATE AND CAMBER RODS AT L2, UPSTREAM SIDE.

PA-209-30 DETAIL OF WEST ABUTMENT AND END SHOE, UPSTREAM SIDE; OUTER END CONNECTIONS OF BOTTOM LATERAL BRACING AND FLOOR BEAM CAMBER RODS SHOWN AT UPPER RIGHT.

PA-209-31 FLOOR BEAM AND STRINGER SYSTEM, VIEW LOOKING EAST.

PA-209-32 DETAIL VIEW OF FLOOR BEAM AND STRINGER SYSTEM; INNER END CONNECTION OF BOTTOM LATERAL BRACING AT UPPER LEFT; FLOOR BEAM CAMBER RODS AND CAMBER SHOE AT L3, AT RIGHT. VIEW LOOKING NORTH.