

HARRISON AVENUE BRIDGE

HAER No. PA-498

(South-East Scranton Viaduct)

Pennsylvania Historic Bridges Recording Project - II

Spanning Roaring Brook and Central Scranton Expressway (State Rt. 3022) at
Harrison Ave. (State Rt. 6011)

Scranton

Lackawanna County

Pennsylvania

HAER
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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD

National Park Service

1849 C Street, NW

Washington, DC 20240

HISTORIC AMERICAN ENGINEERING RECORD

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- Location: Spanning Roaring Brook and Central Scranton Expressway (State Rt. 3022) at Harrison Ave. (State Rt. 6011), Scranton, Lackawanna County, Pennsylvania.
- USGS Quadrangle: Scranton, Pennsylvania (7.5-minute series, 1994).
- UTM Coordinates: 18/445510/4583160
- Dates of Construction: 1921-22.
- Designers: A. Burton Cohen (consulting engineer, New York), William A. Schunk (Chief Engineer, Scranton Department of Public Works), and Charles F. Schroeder (Assistant Engineer, Scranton Department of Public Works).
- Builder: Anthracite Bridge Company (Scranton, Pa.).
- Present Owner: Pennsylvania Department of Transportation.
- Present Use: Vehicular bridge.
- Significance: The Harrison Avenue Bridge, a monumental structure spanning Roaring Brook between East and South Scranton, is a symbol of the city's progressive era in the early twentieth century. A citizens' association formed to advocate for this connection between two neighborhoods originally of different economic character. Reinforced concrete engineer A. Burton Cohen, probably hired because of his affiliation with local railroads and the massive Tunkhannock Viaduct, designed the Harrison Avenue Bridge with a combination of filled- and open-spandrel forms. One of two Cohen-designed bridges in Scranton, this structure was listed on the National Register of Historic Places in 1988.
- Historian: Justin M. Spivey, August 1998.
- Project Description: The Pennsylvania Historic Bridges Recording Project - II was co-sponsored during the summer of 1998 by HABS/HAER under the

general direction of E. Blaine Cliver, Chief, the Pennsylvania Department of Transportation, Bureau of Environmental Quality, Wayne W. Kober, Director; and the Pennsylvania Historical and Museum Commission, Brent D. Glass, Executive Director and State Historic Preservation Officer. The fieldwork, measured drawings, historical reports and photographs were prepared under the direction of Eric DeLony, Chief of HAER.

Introduction

The city of Scranton ascends into the hills at the confluence of the Lackawanna River and Roaring Brook in northeastern Pennsylvania. Extraction of natural resources drove the economy of the surrounding region, known as the Wyoming Valley, from the discovery of coal in the last quarter of the eighteenth century into the twentieth. In addition, Scranton's development was impelled by the conversion of locally-mined iron ore into finished metal products throughout the nineteenth century. After the Lackawanna Iron and Coal Company dealt the city's economy a blow by ceasing operations in 1901, civic pride and diverse small industries maintained Scranton's vitality.¹

The Harrison Avenue Bridge is in many ways a product of the city's local industry in the 1920s: designed by a graduate of the International Correspondence Schools headquartered there, William A. Schunk, and built by a Scranton-based construction company, the Anthracite Bridge Company. However, the bridge also represents the city's interface with the outside world. The upstart seat of Pennsylvania's youngest county wanted a monumental structure to maintain its reputation for innovation. Scranton looked to the expertise of New York's A. Burton Cohen, who had designed the world's largest concrete viaduct in neighboring Wyoming County for the Delaware, Lackawanna & Western Railroad (DL&W), to assist with the Harrison Avenue Bridge's design.²

In the years leading up to the bridge's construction, it was referred to by a variety of names, including "Roaring Brook Viaduct," "Connecting Bridge," and "South-East Scranton Viaduct." The last persists in city and historical records, along with its currently accepted name of Harrison Avenue Bridge.

¹ John Beck, *Never Before in History: The Story of Scranton* (Northridge, Calif.: Windsor Publications, 1986), 88.

² David Plowden, *Bridges: The Spans of North America* (New York: W. W. Norton & Co., 1974), 317-8. Plowden notes that the Lackawanna's chief engineer, George J. Ray, took credit for the design of the Tunkhannock Viaduct. See also U.S. Department of the Interior, Historic American Engineering Record (HAER) No. PA-87, "Erie-Lackawanna Railroad, Tunkhannock Viaduct," 1985, Prints and Photographs Division, Library of Congress, Washington, D.C.

City Development

The first European-descended settlers arrived in Pennsylvania's Wyoming Valley from Connecticut in 1762, to occupy land claimed by the Connecticut Susquehanna Company eight years earlier. Five townships (Hanover, Kingston, Pittston, Plymouth, and Wilkes-Barre) were established by 1769 in what Connecticut called Westmoreland County.³ The settlement of competing claims by Pennsylvanians led to the Yankee-Pennamite War that same year.⁴ Following the conflict, a Connecticut settler named Isaac Tripp built a cabin near the city of Scranton's present location. Tripp oversaw the construction of a road to the Delaware River in 1772 and served as a proprietor of Providence township after its formation in 1773.⁵

Roaring Brook's first industry arrived in 1788, when Connecticut settler Phillip Abbott constructed a mill. He sold it to Benjamin Slocum in 1797, whose brother added an iron forge three years later.⁶ The forge was abandoned in the 1830s, but geologist and "coal visionary" William Henry sought to revive iron production in 1840.⁷ After a slow start, iron would become the "genesis of Scranton." Henry's son-in-law Selden Scranton, and Scranton's brother George, both iron manufacturers from New Jersey, invested in Henry's new furnace.⁸ The high cost of transporting finished iron over the mountains prevented their business from turning a profit. In 1846, the New York and Erie Railroad took its famous "gamble" on the Scrantons, awarding them the contract for rail production. After a large investment in rolling equipment, their efforts began to pay off in 1848. Around this time, the town became known as "Scrantonia."⁹ This was shortened to Scranton in 1849; it was incorporated as a borough five years later. The Scrantons' 1847 rolling mill was located on the later site of the Lackawanna and Wyoming Valley (L&WV) Railroad power plant, to the west of Harrison Avenue Bridge.¹⁰

As the other large city in Luzerne County, Scranton was forced to play second fiddle to the county seat at Wilkes-Barre. By 1839, the former had surpassed the latter in population, and Scranton officially entered a request in the legislature for the state to form a new county. This would not be done until 1878, when Lackawanna County was created as Pennsylvania's sixty-

³ Beck, *Never Before in History*, 16.

⁴ H. C. Bradsby, *History of Luzerne County, Pennsylvania* (Chicago: S. B. Nelson & Co., 1893), 629.

⁵ Beck, *Never Before in History*, 16.

⁶ Beck, *Never Before in History*, 24.

⁷ Beck, *Never Before in History*, 31.

⁸ Thomas Murphy, *Jubilee History of Lackawanna County, Pennsylvania* (Topeka: Historical Publishing Co., 1928), 116.

⁹ Beck, *Never Before in History*, 46-8.

¹⁰ Murphy, *Jubilee History*, 119.

seventh and currently last county.¹¹ The following year, Lackawanna Iron and Coal Company donated a plot of land — actually a pond filled with slag — for a county courthouse.¹² The city set about creating its own identity as the new county's seat.

A chapter in Thomas Murphy's *Jubilee History of Lackawanna County* describes Scranton's progressive ambitions. The author evidently connected the Harrison Avenue Bridge with the city's desire for self-improvement; though he does not write about it explicitly, he chose a photograph of the structure to illustrate the chapter.¹³ According to Murphy, "The city began to look itself over" in the 1880s: paving streets, installing sewers, and implementing a building code.¹⁴ It seems that improvements progressed rapidly, for Scranton became one of the first American cities with electric lighting and streetcars in 1886, earning the moniker "The Electric City."¹⁵ In 1901, Scranton rose from third- to second-class city as its population passed the 100,000 mark. (Fellow second-class city Pittsburgh's dominance in the state legislature motivated Scranton's representatives in 1927 to create class 2-A, to which Scranton belonged alone.¹⁶)

By 1921, when construction began on the Harrison Avenue Bridge, the city of Scranton encompassed areas north and south of Roaring Brook valley, and across the Lackawanna River. Separated by geographical barriers with limited crossings, these neighborhoods developed individual identities. Prior to the Harrison Avenue Bridge's construction, the Spruce Street Bridge in central Scranton was the easternmost crossing of Roaring Brook.¹⁷ Upstream from Spruce Street, L&WV tracks ran on the south side of the ravine, and DL&W tracks on the north, making this barrier all the more formidable. On the north side of Roaring Brook, East Scranton's easy access to downtown drew a neighborhood of professionals. Across the valley, working-class residents formed the core of South Scranton's population. The Lackawanna Iron and Coal Company developed South Scranton — once called "Shanty Hill" — for worker housing in the 1850s.¹⁸ Even the South Scranton street grid differed from that on the other side of Roaring Brook. In contrast to the elongated blocks of East Scranton laid out by Joel Amsden in 1850, Lackawanna Iron and Coal Company chose a grid with the longer dimension of its rectangles in

¹¹ Murphy, *Jubilee History*, 86.

¹² Murphy, *Jubilee History*, 74.

¹³ Murphy, *Jubilee History*, 406.

¹⁴ Murphy, *Jubilee History*, 408.

¹⁵ Beck, *Never Before in History*, 73.

¹⁶ Murphy, *Jubilee History*, 407-8.

¹⁷ Volk & Kuels, *Atlas of the City of Scranton and Borough of Dunmore, Pennsylvania* (Philadelphia: Volk & Kuels, 1918).

¹⁸ Murphy, *Jubilee History*, 409.

the perpendicular direction.¹⁹ These economic and geographic differences effectively created separate cities within a city. In a 1920 editorial urging the construction of the Harrison Avenue Bridge, the *Scranton Times* argued that improved infrastructure would unify the city's disparate sections — not just South and East Scranton, but North and West as well.²⁰

Scranton in the early decades of the twentieth century seemed just as progressive as the Electric City of the late nineteenth. Following the closure of Lackawanna Iron and Coal Company in 1901, “company houses in Shanty Hill were torn down or remodeled by new private owners and the section renamed.”²¹ A decade or so later residents of South and East Scranton, realizing a common problem in the long detour through downtown, overcame neighborhood divisions and worked together for a direct connection between their neighborhoods. Attesting to the high level of citizen involvement in Scranton, neighborhood interests formed a “South to East Scranton Bridge Association” to lobby the city for a bridge across Roaring Brook.²² At the opening ceremony, chairman William C. Miller spoke of the zeal with which association members took up the cause:

For about twelve or fifteen years previous to this time there had been considerable talk about the possibility of ... a bridge, but nothing thus far materialized. I decided that the best plan to pursue would be ... an association of citizens ... whose purpose it would primarily and entirely be to talk, teach, preach and work, 'bridge.'²³

Financing the Bridge

As bridge association chair Miller lamented in his speech at the opening, the Harrison Avenue Bridge idea was almost two decades between inception and execution. In June 1916 the Scranton city council approved the concept of a bridge between Harrison and Crown Avenues, but would not fund the estimated \$90,000 construction cost.²⁴ It seems that the structure was conceived as a “reinforced concrete viaduct” from the beginning, probably because of that

¹⁹ Beck, *Never Before in History*, 47.

²⁰ “A Bridge and A Park,” editorial in *Scranton Times*, 1 Apr. 1920, 6.

²¹ Murphy, *Jubilee History*, 409.

²² Coverage of the opening ceremony in the *Scranton Times* erroneously calls the association “East-South Scranton,” putting the more affluent neighborhood first in an inadvertent reminder that Roaring Brook was a class barrier as well as a geographical one.

²³ “Thongs Celebrate Opening of Great Bridge from South Side to East Side,” *Scranton Times*, 21 Sep. 1922.

²⁴ “No Money in Sight to Build a New Bridge,” *Scranton Times*, 29 Jun. 1916. Evidently the Harrison Avenue location was not yet firmly established; “Council Resumes Work After Taking Month Off,” *Scranton Times*, 2 Sep. 1916, mentions a location one block away at Prescott Avenue.

material's emergence as attractive and economical for short to medium spans.²⁵ Even so, the cautious council members, perhaps realizing that an expensive monumental structure was required to span Roaring Brook in that highly visible location, would not increase the city's debt to pay for it. Ten months later, the council was bombarded with petitions for the bridge, no doubt the work of Miller's bridge association.²⁶ This pressure resulted in an ill-fated bond issue of \$90,000 in July 1917, which was scrapped because of the world war.²⁷

In April 1920, the Scranton council considered a bond issue for various infrastructure improvements, and again discussed funding for the bridge.²⁸ Although council members considered dropping the big-ticket bridge in favor of smaller items, the bond ultimately included \$197,000 for the bridge.²⁹ Funds thus appropriated for the Harrison Avenue Bridge, the council proceeded to seek permission from the two railroads operating along Roaring Brook.³⁰

Throughout the process of funding the bridge, the Scranton council seemed to regard its construction as inevitable. Often action was taken before critical obstacles had been cleared. For instance, Cohen had finished designing the bridge in 1920, even before the funds were approved to construct it.³¹ On April 2, before permits had been obtained from state agencies, the city considered seeking bids. The council decided to delay action, however, awaiting approval from the Public Service Commission (PSC) and Waterways Commission.³² L. G. Krause, an engineer from the PSC, visited the site five days later.³³ His approval must have come quickly, because the city was soliciting bids via the *Scranton Times* on April 15. Opening the bids on April 29, the council discovered a wide variation: Scranton's own Anthracite Bridge Company was the lowest bidder at \$184,825.30 and the Curtis Company of New York was highest at \$320,527.50.³⁴ The Anthracite Bridge Company broke ground for the Harrison Avenue Bridge on 1 July 1921.³⁵

²⁵ Plowden, *Bridges*, 297.

²⁶ "Council Listens to Demands for Bridge," *Scranton Times*, 6 Apr. 1917.

²⁷ "Throngs Celebrate."

²⁸ "Will Chop Bond Items at Meeting on Friday," *Scranton Times*, 6 Apr. 1920, 3.

²⁹ City of Scranton, Ordinance Book, 4:300-2 (27 Jul. 1920), City Hall, Scranton, Pa.

³⁰ City of Scranton, Council Minutes 1920-1924, 6 May 1921, 17 Jun. 1921, City Hall, Scranton, Pa.

³¹ City of Scranton, Department of Public Works, 1921 Annual Report, 28-29, Lackawanna County Public Library, Scranton, Pa.

³² "Council Defers Action on Bids for New Bridge," *Scranton Times*, 2 Apr. 1921.

³³ "Public Service Engineer Inspects New Bridge Plans," *Scranton Times*, 7 Apr. 1921, 28.

³⁴ "Big Difference in Bids Made for Construction of Bridge," *Scranton Times*, 30 Apr. 1921, 19.

³⁵ "Roaring Brook Bridge is Under Construction," *Scranton Times*, 2 Jul. 1921.

Constructing the Bridge

An album of photographs kept at the Lackawanna Historical Society tracks the progress of construction.³⁶ Form work for the south abutment was in place by August 10; for the north abutment by September 3. The abutments appear to have been anchored directly into rock outcrops on either side; these ideal foundation conditions may have been the reason for selecting the Harrison Avenue site. Several photographs dated October 21 show truss centering in place under the approach spans and the eastern pair of main arch ribs, and also some temporary structures at the site. A wooden footbridge spans Roaring Brook west of the Harrison Avenue bridge, and towers support a cableway for delivering materials over the ravine. The steel truss centering, supported only at the main arch's skewbacks, avoided the risky and expensive prospect of constructing wooden centering in the deep ravine. An October 26 photograph shows workers placing reinforcement on one of the approach spans.

A photograph taken 3 March 1922 shows the eastern pair of main arch ribs essentially complete, and the truss centering moved to form the western pair. A large pile of what appears to be shale sits at the bridge's northern end; this material may have been removed to form the abutments, waiting to be hauled away or used as spandrel fill. The next photo in the album, dated September 13, shows the bridge essentially complete. Finally, the opening ceremonies a week later were captured on film.

After the bridge was completed, the Department of Public Works' 1922 annual report tallied statistics of its construction. The Harrison Avenue Bridge consumed forty car-loads of cement, one hundred fifty of gravel, and eighty-six of sand. One hundred twenty tons of steel were used for reinforcement, and another 170 for the temporary arch centering. The DL&W's "chief chemist" tested the materials used. Anthracite Bridge Company was paid \$184,825 for the bridge, and an unknown contractor (or perhaps the city itself) filled the approaches for \$3583.54.³⁷

On 20 September 1922, Scrantonians dedicated the Harrison Avenue Bridge with an elaborate three-hour ceremony reflecting its monumental function.³⁸ As a symbol of the connection made by the new bridge, three men, representing South Scranton, East Scranton, and the entire city joined hands at mid-span.

Description

The streets of Amsden's plan for East Scranton running from southwest to northeast are named for U.S. presidents, and those perpendicular for trees. Harrison Avenue parallels Washington eleven blocks away (although he was the twenty-third president), about three-

³⁶ "Harrison Avenue Viaduct," book of photographs, Lackawanna Historical Society, Scranton, Pa.

³⁷ City of Scranton, Department of Public Works, 1923 Annual Report, 36.

³⁸ "Throngs Celebrate."

quarters of the distance from central Scranton to Nay Aug Park.³⁹ The bridge aligns with the East Scranton grid at Harrison, which makes it parallel to, but about two hundred feet southeast of, Crown Avenue in South Scranton. The roadway at the bridge's south end, therefore, travels an S-curve to align with Crown Avenue where it intersects Moosic. A roughly triangular park with a soldiers' and sailors' memorial fills the space between this curving roadway and the original alignment of Crown Avenue. City engineer William A. Schunk, in a Department of Public Works annual report, did "most respectfully recommend" dedicating the anticipated bridge to soldiers and sailors, although his suggestion was never followed.⁴⁰ The park's small bronze statue seems to be a recompense for Schunk's unrealized proposal. Just downstream from the Harrison Avenue bridge, the L&WV route to Wilkes-Barre, locally known as the Laurel Line, crosses Roaring Brook on a low-level trestle. At the trestle's south end, the single track enters a tunnel under Crown Avenue built in 1905.⁴¹

The Harrison Avenue Bridge spans 406'-8", measured between the outermost expansion joints.⁴² From south to north, the spans are a 75'-0" elliptical filled-spandrel arch with 15'-0" rise over the Central Scranton Expressway (State Route 3022), a 201'-8" three-centered four-rib open-spandrel main arch with 46'-3" rise over Roaring Brook, and another arch identical to the first over former DL&W railroad tracks currently owned by the Steamtown National Historic Site. A minimum sixteen feet of vertical clearance is provided over the Expressway, although that roadway sits atop fill added during its construction in 1952. On the north side, the tracks have about twenty-seven feet of clearance. The center arch rises about 125 feet above Roaring Brook.

In Hool's 1916 *Reinforced Concrete Construction*, an entire section by William J. Titus details "The Artistic Design of Concrete Bridges."⁴³ Cohen's good reputation is perhaps justified by comparing his Harrison Avenue Bridge design to the aesthetic guidelines established in the literature. For instance, the minimal use of ornament avoids the temptation to "load down many of our supposedly beautiful city bridges with ginger-bread ornamentation."⁴⁴ The Harrison Avenue Bridge's arrangement of spans is not only pleasing from a symmetry standpoint but also

³⁹ Interestingly, the street representing the fifth president is Quincy Avenue, since Adams had been used already for the second.

⁴⁰ City of Scranton, Department of Public Works, 1921 Annual Report, 29.

⁴¹ James N. J. Henwood and John G. Muncie, *Laurel Line: An Anthracite Region Railway* (Glendale, Calif.: Interurban Press, 1986), 43.

⁴² Most dimensions from Supplementary Bridge Record and City of Scranton, Department of Public Works, 1923 Annual Report; others from measurements made by author.

⁴³ William J. Titus, "Artistic Bridge Design," in George A. Hool, and Frank C. Thiessen, *Reinforced Concrete Construction*, 1st ed. (New York: McGraw-Hill, 1916).

⁴⁴ Titus, "Artistic Bridge Design," 493.

is in harmony with its site, spanning longest where the valley walls are steepest. In agreement with Titus' guidelines for detailing, spring lines and the roadway are marked by copings, there is some variation of surface texture, and abutment walls are kept plain. Cohen's attention to proportion and detail, demonstrated in the Tunkhannock Viaduct of greater fame, is also evident in the Harrison Avenue Bridge.

Construction photographs reveal that the four open-spandrel ribs were formed in pairs. This is reflected in the final appearance of the bridge. Each pair of 2'-10"-wide ribs is separated by 8'-6", while the middle two ribs have 12'-8" clear between them. Vertical walls brace each of the outer ribs to the inner ones, but the inner ribs are only connected through the deck and the filled-spandrel arches. The walls have deep chamfers where they intersect the ribs. All four ribs support square spandrel columns, four on either side of the crown. A slightly projecting band marks the base of each column, but the columns blend smoothly into the spandrel arches above. Interior columns were formed with rougher lumber, as shown by the noticeable striated pattern on their surface. This same striated finish is found inside the filled-arch barrels, probably since it would not be visible to passengers in trains passing beneath. As if in keeping with Titus' aesthetic rules, the arch ring's shape is apparent on the spandrel wall.⁴⁵ This is because of a slight color difference, whether intentional or not. The original coved cornice, located just below the parapet on all three spans, was removed when the railings were replaced.

From south to north, the 30'-0"-wide roadway descends a slight grade, flanked by a sidewalks 5'-0" wide and a 1'-3"-wide railing on either side. In its annual report following the bridge's completion, the Department of Public Works describes "a sidewalk on each side six feet four inches in the clear, which cantilevers two feet six inches beyond the face of the parapet wall and the spandrel arches."⁴⁶ These cantilevers were cut back during a 1972 rehabilitation, reducing the sidewalks' width. Four intermediate expansion joints control longitudinal movement of the deck, dividing it into three separate segments supported on the spandrel columns and one supported by the filled-spandrel arches at either end. The expansion joints are located at the crown of the spandrel arches adjacent to the main arch's crown, and also at the crown of the spandrel arches adjacent to the pier. According to the Department of Public Works' description, "provision was made in the design for a street car track" by depressing the middle of the 10"-thick roadway in the main arch span. However, no track was ever installed across the bridge.⁴⁷ The floor slab was originally waterproofed with asphalt-soaked cloth and covered with earth fill, but this arrangement later proved detrimental.

The main span over Roaring Brook is framed by 20'-0" by 60'-0" piers with stepped bases. The portions of the piers directly beneath the bridge are smooth-faced, and marked by a

⁴⁵ Cf. Titus, "Artistic Bridge Design," 509.

⁴⁶ City of Scranton, Department of Public Works, 1923 Annual Report, 35.

⁴⁷ Cf. Thomas F. Flanagan, *Scranton Railway Company*, Pennsylvania Traction Series (West Chester, Pa.: Traction Publications, 1979).

projecting coping at the spring line of the closed-spandrel arches. Half-octagonal engaged columns on either side of the piers sport horizontal grooves similar to those on the piers of Cohen's Tunkhannock Viaduct. While the Tunkhannock's grooves were used to disguise pouring breaks in its slip-formed piers, construction photographs show that the Harrison Avenue Bridge's piers were formed all at once. The grooves, therefore, serve the purely ornamental function of varying surface texture. The engaged columns were originally capped by stocky concrete pylons extending above the railing. According to the Department of Public Works, the "ornamental lighting pylons" towered 26'-0" above the deck.⁴⁸ At their base, the piers are pierced by a 13'-0"-wide opening. Just below the spring line of the filled-spandrel arches, an arch across this opening supports a wall against the filled-spandrel side of the pier.

Wing walls step aside from the abutment, then curve away to a maximum separation of 60'-0". The wing walls are undecorated except for a coved cornice and coping just below the concrete parapet wall. Although the parapets have been replaced on the main span, segments of original railing remain atop the wing walls.

Engineers and Contractors

Identical 36"-square bronze plaques at the northwest and southeast ends of the bridge's railing list the mayors, directors of public works, and city council for 1921 and 1922. The plaque's last four lines list Schunk as chief engineer, Schroeder as assistant engineer, Cohen as consulting engineer, and Anthracite Bridge Company as contractor. Despite Schunk's top billing, he credits Cohen with the actual design of the bridge in a Department of Public Works annual report: "The bridge was designed by Mr. A. Burton Cohen, of New York City, a very capable and experienced reinforced concrete engineer, who also acted in a consulting capacity during its construction."⁴⁹

During this time, both Schunk and his assistant were living in East Scranton, near the bridge's north end.⁵⁰ William A. Schunk was a native Scrantonian, born in 1876. Starting as "office boy" at the factory where his father worked, he climbed up through the city engineer's office and into the professional neighborhood in the heights above Saint Thomas College (now Scranton University). His father, Jacob, was born and educated in Germany, and worked for thirty years as a machinist in Dickson Locomotive Works. Certainly Jacob was responsible for young William's employment in Dickson's drafting room. Schunk rose from office boy to draftsman, attending Scranton's public schools and later earning consecutive degrees in mechanical and civil engineering from the International Correspondence Schools. He left the

⁴⁸ City of Scranton, Department of Public Works, 1923 Annual Report, 35.

⁴⁹ City of Scranton, Department of Public Works, 1923 Annual Report, 34.

⁵⁰ R. L. Polk, *Scranton Directory* (Scranton, Pa.: R. L. Polk & Co., 1923). The Anthracite Bridge Company paid for a half-page advertisement in the 1923 directory.

locomotive works in 1896 to become a surveyor with the city engineer's office, and thirteen years later he became its chief engineer.⁵¹

Charles F. Schroeder, whose residence at 1522 Linden Street was close enough that he could observe construction on the bridge without leaving the house, was Schunk's assistant.⁵² The son of a German immigrant mason, he was born in 1879 and grew up in nearby Hawley.⁵³ He must have been surrounded by talk about construction throughout his youth. Conrad Schroeder, a prominent Scranton contractor and Charles' uncle, built many of Scranton's public buildings, including the Lackawanna County Courthouse, Scranton City Hall, and a replacement for the high school which Charles attended.⁵⁴ He entered Scranton Business College in 1896 and thereafter began a career with the city engineer's office. In 1925, shortly after the completion of the Harrison Avenue Bridge, Schroeder himself became the city engineer.⁵⁵ As a life-long Scrantonian with German roots, Schroeder was truly following in his predecessor's footsteps.

Riding on the success of his 1915 Tunkhannock Viaduct for the DL&W, A. Burton Cohen was hired to design at least two new bridges in Scranton. Evidently, the city found some prestige in hiring an engineer from New York, as Cohen's name rarely appears in newspapers or council minutes without the appellation "of New York City." The Lackawanna Avenue Bridge over the Lackawanna River, the city's other Cohen-designed bridge, is also marked by four concrete pylons extending above the piers at either end of its main span.⁵⁶ These pylons remain in place, and are considerably more slender than those originally on the Harrison Avenue Bridge. In addition to these two monumental structures, Cohen also designed a concrete deck replacement for the 1894 Phoenix Bridge Company truss over Roaring Brook at Spruce Street.⁵⁷ Other than the hundreds of reinforced concrete structures associated with his name, little information about Cohen's career is available from civil engineering overviews, biographical dictionaries, or histories of the DL&W. More in-depth research is needed to explore the life of this prolific engineer.

⁵¹ Frederick L. Hitchcock, *History of Scranton and Its People* (New York: Lewis Historical Publishing Co., 1914), 672-3.

⁵² R. L. Polk, *Scranton Directory*.

⁵³ Murphy, *Jubilee History*, 657.

⁵⁴ Hitchcock, *History of Scranton*.

⁵⁵ Murphy, *Jubilee History*, 657.

⁵⁶ "The Answer Man," *Scrantonian*, 30 Mar. 1969, identifies this bridge as Cohen's work.

⁵⁷ A. Burton Cohen, "Repairs to Spruce Street Bridge, Scranton, Pennsylvania," *Journal of the American Concrete Institute* 18, No. 3 (Nov. 1946): 241-8. An unusual spiral reinforcement configuration, called the "Alpha System," was used in the replacement deck.

Boyd A. Musser founded the Anthracite Bridge Company in 1914, and presided over the firm for twenty-one years.⁵⁸ "Bridge Company" is perhaps a misnomer because the company's work included a large proportion of buildings. David Brandt, brother of the company's late last president, remembers Anthracite's international steel fabrication work, from coal breakers in Lima, Peru, to an aircraft hangar in Casablanca. The firm's domestic work included power plants for the Tennessee Valley Authority, but also concrete bridges closer to home in Carbondale.⁵⁹ Although Anthracite's drawing files, including plans for schools, hospitals, and bridges, were recently donated to the Lackawanna Historical Society, the Harrison Avenue Bridge is not among them.⁶⁰ Images of the South-East Scranton Viaduct, evidently Anthracite's proudest accomplishment, were used to advertise the company even sixty years later.⁶¹ The company was sold in 1984 by J. Edward Brandt, whose father had succeeded Musser as president.⁶² After seventy years of operation, the shops at 310 South Genet Street were closed shortly thereafter.

Subsequent Alterations

Signs of trouble on the Harrison Avenue Bridge were first noticed in 1937, after Schunk had been promoted to director of public works. On March 12 of that year, after receiving reports of cracking on the bridge, the city council asked Schunk to report on its condition.⁶³ Although some cracking is normal in ordinary (not prestressed) concrete structures, the council's attention to the matter seems to indicate a greater problem. Schroeder, then chief engineer, quoted an estimate of \$1500 for repairs to several city bridges on 8 October 1937.⁶⁴ However, the issue remained silent for several years.

The Harrison Avenue Bridge received its first overhaul in 1946, when the state resurfaced Harrison Avenue (then called Legislative Route 5) between Front Street and Roselyn Street.⁶⁵ Above the center arch, highway workers stripped the roadway down to the structural slab, removing the existing wearing surface, base, and earth and cinder fill. A new concrete base replaced the fill in the depressed trackway, and covered the roadway to a 5 1/2" crown in the

⁵⁸ Tom Clark, "Old Line Local Firm Does Fine Business," *Scranton Times*, 9 Jul. 1967, B-8.

⁵⁹ David Brandt, telephone conversation with the author, 20 Jul. 1998.

⁶⁰ Anthracite Bridge Company collection, Lackawanna Historical Society, Scranton, Pa.

⁶¹ See advertisements for Anthracite Bridge Company in the *Scranton Times*, Mar. 1982.

⁶² Clark, "Old Line Local Firm," B-8.

⁶³ City of Scranton, Council Minutes 1934-1938, 12 Mar. 1937, City Hall, Scranton, Pa.

⁶⁴ City of Scranton, Council Minutes 1934-1938, 8 Oct. 1937.

⁶⁵ Pennsylvania Department of Highways, "Plans for Construction and Resurfacing, Route No. 5 Section No. 15 in Lackawanna County," aperture card files, PennDOT District 4-0, Dunmore, Pa.

middle. Portions of the existing 9"-thick concrete base above the closed-spandrel arches were replaced, and the entire roadway was covered with a 2 1/2"-thick asphalt wearing surface. Evidently the removal of permeable fill was intended to slow water penetration and corrosion of reinforcement within the concrete. However, the bridge continued to decay internally.

The Central Scranton Expressway, a short collector-distributor spur of Interstate 81, was constructed in 1964.⁶⁶ Using the L&WV right-of-way abandoned in 1952, the Expressway entered downtown over a new prestressed concrete Spruce Street bridge built by the Anthracite Bridge Company.⁶⁷ Fortunately the Harrison Avenue Bridge's south filled-spandrel arch provided sufficient clearance for the new limited-access highway. A steel retaining wall holds back fill added to widen the roadbed, keeping it from sliding against the Harrison Avenue Bridge's south pier.

Ironically, the major renovation of the Harrison Avenue Bridge in 1972 and 1973, which undoubtedly prolonged its life, also removed the bridge's original railings. A "routine repair job" in October 1971 uncovered hidden defects such as internal voids and corroded reinforcement. One contractor even suspected that "the bridge appears to have fewer reinforcing rods than it should." This led to a complete overhaul, improving drainage and replacing the deck, sidewalks, railings, and expansion joints. M. J. Spott and Company was awarded the repair contract for \$418,909.⁶⁸ The structure spent its fiftieth anniversary under construction, the most visible result of which was the removal of the four pylons atop its central piers. Today the piers terminate in caps just above their original cornice line, about mid-height of the modern concrete railing. As a consequence of this alteration, the top of the structure appears unfinished.

Conclusion

The Harrison Avenue Bridge is a symbol of Scranton's progressive era in the early twentieth century. Its completion connected two neighborhoods separated by economic status and by the Roaring Brook ravine, increasing the interaction between their residents. The bridge also symbolizes Scranton's desire for a monumental structure, confirming its recovery from employment losses in the early twentieth century. Hiring nationally known concrete engineer A. Burton Cohen from New York, the seat of Pennsylvania's youngest county sought to continue its reputation for innovation and progress. The result is a structure in harmony with the rugged Roaring Brook valley which once separated East and South Scranton.

⁶⁶ Henwood and Muncie, *Laurel Line*, 186.

⁶⁷ Flanagan, *Scranton Railway Company*, 31.

⁶⁸ "Distressing News for Motorists — Harrison Span 'Out' Until '73," *Scrantonian*, 9 Jul. 1972.

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