

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

FOR NPS USE ONLY

RECEIVED

DATE ENTERED

SP 70

NATIONAL REGISTER OF HISTORIC PLACES
INVENTORY -- NOMINATION FORMSEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS**1 NAME**

HISTORIC

Monroe Street Bridge
AND/OR COMMON**2 LOCATION**

STREET & NUMBER

Monroe Street between Ide Avenue and Riverfalls Blvd. NOT FOR PUBLICATION

CITY TOWN

Spokane

VICINITY OF

CONGRESSIONAL DISTRICT

#5

Thomas Foley

STATE

CODE

COUNTY

CODE

Washington

Spokane

3 CLASSIFICATION

CATEGORY

☐ DISTRICT☐ BUILDING(S)☒ STRUCTURE☐ SITE☐ OBJECT

OWNERSHIP

☒ PUBLIC☐ PRIVATE☐ BOTH

PUBLIC ACQUISITION

☐ IN PROCESS☐ BEING CONSIDERED

STATUS

☒ OCCUPIED☐ UNOCCUPIED☐ WORK IN PROGRESS

ACCESSIBLE

☐ YES RESTRICTED☒ YES UNRESTRICTED☐ NO

PRESENT USE

☐ AGRICULTURE☐ COMMERCIAL☐ EDUCATIONAL☐ ENTERTAINMENT☐ GOVERNMENT☐ INDUSTRIAL☐ MILITARY☐ MUSEUM☐ PARK☐ PRIVATE RESIDENCE☐ RELIGIOUS☐ SCIENTIFIC☒ TRANSPORTATION☐ OTHER**4 OWNER OF PROPERTY**

NAME

City of Spokane

STREET & NUMBER

W 221 Wall

CITY TOWN

Spokane

STATE

Washington

5 LOCATION OF LEGAL DESCRIPTION

COURTHOUSE

REGISTRY OF DEEDS, ETC

Spokane County Court House

STREET & NUMBER

W1116 Broadway

CITY TOWN

Spokane

STATE

Washington

6 REPRESENTATION IN EXISTING SURVEYS

TITLE

None

DATE

☐ FEDERAL ☐ STATE ☐ COUNTY ☐ LOCALDEPOSITORY FOR
SURVEY RECORDS

CITY TOWN

STATE

DESCRIPTION

CONDITION

☒ EXCELLENT
☐ GOOD
☐ FAIR

☐ DETERIORATED
☐ RUINS
☐ UNEXPOSED

CHECK ONE

☐ UNALTERED
☒ ALTERED

CHECK ONE

☒ ORIGINAL SITE
☐ MOVED DATE _____

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

The Monroe Street Bridge is one of over 100 Spokane spans; however, its size, location, and beautifully balanced design have given it a unique position in the city's life. Located on the edge of the central business district, it links the civic, financial, and commercial heart of Spokane on the south, to the county offices and commercial districts on the north bank.

As the largest concrete arch bridge in the United States, third largest in the world, at its completion in 1911, the structure was frequently described in news and engineering magazines.

"The . . . bridge crosses the Spokane River at the lower end of the falls, where the drop in a series of cataracts is 136 feet with a length of 1300 feet. The downtown streets on both sides of the river are not more than 10 feet above high water at the crest of the falls, but within four blocks it drops to a gorge 140 feet in depth and 1500 feet width at the top." ¹

"The total length of the concrete structure is 784 feet and if the wooden approach on the south end is included, the bridge measures over all 965 feet. The center arch is one of the largest monolithic concrete arches in the world. This single span measures 281 feet in length, 71 feet in width, 136 feet in height to the top of the handrail, and weighs with the bridge deck 26,920,000 pounds." ²

"The main arch over the river, . . . has a span of 281 feet and a rise of intrados of 114 feet. This arch is of the twin rib type, the ribs being placed 36 feet c. to c. The ribs are 16 feet wide by 6 feet 9 inches deep at the crown, and flare toward haunches of 19 feet 9 inches and a depth of 18.5 feet." ³

The bridge consists of: ". . . a middle segmental span of 281 feet, two 120 foot semi-circular spans, (and a retaining wall 93 feet in length with a maximum height of 53 feet.) The main arches are not reinforced, but others are either of concrete reinforced with rods and wire mesh or of structural steel encased in concrete." ⁴

"The south abutment, which forms the most unusual feature of the design is 140 feet in height. It was made necessary by the fact that there is no natural supporting ground on that side of the river. On account of this peculiar condition the springing line of the 120 foot arch is about 65 feet above the rock foundation to provide an abutment to carry the sloped line of stress from the first named line to the rock. Thus each of the four arch ribs is carried separately down to the base of the abutment in such shape that the center line from the thrust will always keep within the middle third. All arches are analyzed on the elastic theory." ⁵

"At the thinnest place, the very crown, this concrete arch (main span) is six feet and nine inches in thickness. At its base, where the arch leaves the pier, it is 18 feet thick.

In the smaller spans, the 120 foot arches, the concrete at the crown is three feet and three inches thick and is 11 feet at the base." ⁶

The super structure is supported in the main arch by five arches in each spandrel. The 120 foot arches have dual supporting arches in their spandrels. A series of eight arches,

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diminishing in size on the north approach, was matched by five arches on the south in 1915 when the massive land fill of the south gorge permitted removal of the original wooden approach. Because the fill has continued to settle, a 20 foot section remains wood, covered with asphalt, with a boardwalk for pedestrians. This section is periodically replaced.

"The new structure carries a double track electric car line and a highway and has two nine foot cantilevered sidewalks The chief decorative feature of the bridge are the arches over the sidewalks, above each of the main piers. These arches are of concrete with seats inside and openings on the road way. On the road way side is a concrete buffalo skull with a similar skull on the opposite side. The north and south sides of the arches are decorated with ornamental bracket lamps The railing is designed with a chain effect." 7

The bridge was constructed with an arch span falsework suspended by cables from the old existing steel bridge. As the falsework was completed, the steel was removed from the outdated structure. On July 21, 1910, a gale force wind demolished the falsework arch. Recentering the bridge was greatly complicated without the support of the steel bridge. Falsework was re-erected by the use of timber bents supported on four steel trusses. Anchorages and toggles on the pier of the main span allowed erection of steel trusses as cantilevers. The massive steel falsework for the bridge roadbed was cantilevered and cross beamed. When the concrete was poured for the roadbed the steel falsework was retained to provide an extremely stout roadbed. Other portions of falsework steel were used for other Spokane bridges as was the steel from the demolished steel bridge.

The eight arches of the north approach are no longer open. In 1914 a railway embankment filled in the east side of the arches. The eastern side of the approach is five sections longer than the western railing and a stair descent from the first section leads to a vista park above the catch pool of the falls. A major alteration in the appearance of the river bank in recent years is a city project to convert much of the river bank below Ide Avenue to a river front park. In conjunction with this plan, gondola cable cars over the falls were retained after Spokane's Expo 74, and descend from the south bank over the lower falls to a point below the bridge on the north bank.

The original creosoted wood paving over the heavily reinforced road bed has long since been removed. The electric car line tracks were removed in 1934. Another alteration was the removal of the bracket lamps on the covered arches. Vandalism had cost the city \$100 per month for replacement until the lamps were removed in 1925. Other features of the superstructure remain as planned. Each of the four covered arches include plaques concerning the bridge; those on the north cover the history of the bridge and river while those on the south include the names of the engineers, architects, and city commissioners. The buffalo skulls are unchanged by the years. Their massive size is generally assumed to be exaggerated; in fact, they are modeled on an actual buffalo skull.

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3

The bridge is in excellent condition for weight bearing capacity. Its initial design for street cars has provided a strength more than equal to the present four lane traffic. The only serious structural damage to the bridge in its history occurred when a direct collision removed three rail sections over the 120 foot south arch. Replacement was possible by constructing a mold from another portion of the railing.

Majestic size and location provide the Monroe Street Bridge with a unique place in the memory of Spokanites. Its impressive view of the falls and its great height above the river create one of the most spectacular structures in the Northwest. With the modernization of Monroe Street to a four lane arterial, the Bridge is as an active location as it has been since 1889, with the first structure. The Monroe Street Bridge is no longer the largest bridge in the city but it is the most unforgettable.

8 SIGNIFICANCE

PERIOD		AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW			
<input type="checkbox"/> PREHISTORIC	<input type="checkbox"/> ARCHEOLOGY-PREHISTORIC	<input type="checkbox"/> COMMUNITY PLANNING	<input type="checkbox"/> LANDSCAPE ARCHITECTURE	<input type="checkbox"/> RELIGION	
<input type="checkbox"/> 1400 1499	<input type="checkbox"/> ARCHEOLOGY-HISTORIC	<input type="checkbox"/> CONSERVATION	<input type="checkbox"/> LAW	<input type="checkbox"/> SCIENCE	
<input type="checkbox"/> 1500 1599	<input type="checkbox"/> AGRICULTURE	<input type="checkbox"/> ECONOMICS	<input type="checkbox"/> LITERATURE	<input type="checkbox"/> SCULPTURE	
<input type="checkbox"/> 1600 1699	<input checked="" type="checkbox"/> ARCHITECTURE	<input type="checkbox"/> EDUCATION	<input type="checkbox"/> MILITARY	<input type="checkbox"/> SOCIAL/HUMANITARIAN	
<input type="checkbox"/> 1700 1799	<input type="checkbox"/> ART	<input checked="" type="checkbox"/> ENGINEERING	<input type="checkbox"/> MUSIC	<input type="checkbox"/> THEATER	
<input type="checkbox"/> 1800 1899	<input type="checkbox"/> COMMERCE	<input type="checkbox"/> EXPLORATION/SETTLEMENT	<input type="checkbox"/> PHILOSOPHY	<input checked="" type="checkbox"/> TRANSPORTATION	
<input checked="" type="checkbox"/> 1900-	<input type="checkbox"/> COMMUNICATIONS	<input type="checkbox"/> INDUSTRY	<input type="checkbox"/> POLITICS/GOVERNMENT	<input type="checkbox"/> OTHER (SPECIFY)	
		<input type="checkbox"/> INVENTION			

SPECIFIC DATES

BUILDER/ARCHITECT

STATEMENT OF SIGNIFICANCE

Spokane is a city of bridges, but its most magnificent span is the 64 year old Monroe Street Bridge. It was a landmark not only for its sheer size but also for the innovative techniques used in solving engineering problems. It remains an active part of Spokane traffic routing and a central vista point.

The site of the Monroe Street Bridge has been a historic one for Spokane and the present bridge followed two earlier structures on the same location. The first wooden bridge over the river was erected in 1889 but was damaged by fire. For a few years, Spokaneites had to travel east to cross the river at one of the bridges above the falls. In 1891 a new steel bridge was placed over the river. Designed for street car traffic, among the first passengers across the span was the noted Sarah Bernhardt who was appearing in the city. When a partial collapse of the steel structure frightened Spokane, a new bridge was decided upon for the site. Having constructed a pioneering concrete bridge, the Washington Street bridge in 1907, the city decided to build a reinforced concrete structure across the river. Originally planned for only a 200 foot arch with three smaller arches, the city evidently decided to put itself on the map by designing one of the three largest bridges in the world. By early 1909, design plans were modified for a larger structure.

Few bridges approached the great mass of the Monroe Street Bridge in 1911.

"A new reinforced concrete bridge across the Tiber, at Rome, Italy, has a concrete arch with a span of 328 feet, and Auckland, New Zealand, has a concrete arch with a span of 320 feet. The nearest approach in length to the span of the Monroe Street Bridge in America is the Rocky River bridge at Cleveland, with a span of 280 feet, while next to this comes the Walnut Lane bridge in Philadelphia with a span of 233 feet." 1

Shortly after completion, the size of the Monroe Street Bridge was surpassed by four feet. Resemblance found in the Rocky River bridge resulted in a law suit filed January 1912 for infringement of copyright. However, the differences in design were apparent. The Cleveland bridge had only four arches in each spandrel of the main arch compared to five in the Monroe Street Bridge.

Designer of the bridge, city engineer J. C. Ralston, was assisted by Morton McCarthy, J. F. Greene and P. F. Kennedy. The group was also responsible for the design of the 1100 foot long Latah Creek Bridge. McCarthy, as an engineer for Reconstruction Finance from 1932 to 1957, was also designer of the ill-fated Tacoma Narrows Bridge, a cable-suspension span which collapsed dramatically in 1940, and approved the plans for the San Francisco-Oakland Bay Bridge. J. F. Greene designed the five mile long Robert Street bridge in New Orleans. The superstructure was designed by the firm of Cutter & Malmgren. K. K. Cutter, one of the two architects in Spokane elected as a fellow of the American

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Institute of Architects, was also the designer of many Spokane and Northwest homes, as well as others throughout the United States. His best known Spokane buildings are the Glover House (National Register), Grace Campbell House (National Register), and the Davenport Hotel (National Register).

Two major problems faced the engineers during design. The first problem was centering the bridge and Ralston thought it to be solved, by using the old steel bridge to support the falsework. A freak storm of near tornado force hit the city at 2 PM July 21, 1910 and ended that hope. Temperature dropped from 90° at 1:45 to 56° at 2:00, with a wind force of 42 mph; the falsework was lifted clear from the south support without breaking the guy wires. Flying debris knocked a six foot hole in the Washington Water Power substation on the south bank. Amazingly, none of the workmen, thrown from the bridge to the rapids and rocks below, were killed. By three o'clock the same afternoon, the temperature had risen to 80° leaving the city and the rising bridge in shambles.

Work was completed in centering the bridge by using steel trusses for support. The cost of the storm was an additional \$40,000 in expenses and months of delay. Nonetheless, construction time was only 1 year 11 months. Total cost of the bridge was \$500,000, half of which was paid in wages. The city saved a good deal in cost by reusing the steel from the trusses and old bridge for other structures and by using the modern equipment purchased for the bridge on other projects.

A second major engineering problem for Engineer Ralston was the deep gorge on the south bank of the river. The city had planned to have piers sunk through a land fill to rock, the fill to be retained by a wall springing from the base of the bridge. Unfortunately, the planned location of the supporting pier required an extremely deep excavation to reach solid ground. Deciding the city could not afford an additional \$100,000 in cost for a fourth arch, Ralston developed a wooden approach for the first 150 feet of the south end of the bridge. The fill was to be used to support the smaller arches until solid ground could be reached nearer the bank. The filling of the gorge was continued for the next three and one-half years with use of all excavation material from new buildings, cinders from businesses, and any non-deteriorating waste material. In 1914, the city completed matching the concrete south end, except the final 20 feet which continues to settle, requiring replacement every three years of roadbed and boardwalks.

Internationally praised for its mass and innovative engineering, the bridge has retained regional renown for its beauty, vista and size. One unfortunate aspect of this fame is a high suicide rate over the years since 1911. A more pleasant aspect of its fame is the recent interest in improving the view of the bridge from above and below the falls, as well as the vista from the bridge, by removing the obstructions surrounding the area. Plans include a riverside park on the bank of the river. The city has purchased the bank north of the river between Post and Monroe Streets.

disappears - 100' and destroyed for north end.

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Situated to channel much of the business district traffic, the Monroe Street Bridge has played an integral role in the city's life. Used as a lovers lane by the first decade's patrons, the romantic aspects of the bridge's appearance are today more appreciated by the tourists and photographers than by the myriad of drivers using its four lanes. A city blessed with bridges of virtually every description from pedestrian "skyways" and suspension bridges, to smoothly designed modern railway trestles and freeway spans, the Monroe Street Bridge remains Spokane's most spectacular and best known bridge.

9 MAJOR BIBLIOGRAPHICAL REFERENCES

See continuation sheet.

10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY 1.5

UTM REFERENCES

A

1	1	4	6	8	0	7	5	5	0	0
ZONE			EASTING				NORTHING			

B

ZONE			EASTING				NORTHING			

C

ZONE			EASTING				NORTHING			

D

ZONE			EASTING				NORTHING			

VERBAL BOUNDARY DESCRIPTION

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE	CODE	COUNTY	CODE
-------	------	--------	------

STATE	CODE	COUNTY	CODE
-------	------	--------	------

11 FORM PREPARED BY

NAME / TITLE

Patsy M. Garrett/Historic Preservation Specialist

November 1, 1975

ORGANIZATION

DATE

Office of Archaeology and Historic Preservation

STREET & NUMBER

TELEPHONE

W2316 First Avenue

CITY OR TOWN

STATE

Spokane

Washington

12 STATE HISTORIC PRESERVATION OFFICER CERTIFICATION

THE EVALUATED SIGNIFICANCE OF THIS PROPERTY WITHIN THE STATE IS

NATIONAL

STATE X

LOCAL

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665) I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

STATE HISTORIC PRESERVATION OFFICER SIGNATURE

Aubrey M. Skolnik

TITLE State Historic Preservation Officer

DATE March 4, 1976

FOR NPS USE ONLY

I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

DATE

DIRECTOR, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION

ATTEST

DATE

KEEPER OF THE NATIONAL REGISTER

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES
INVENTORY -- NOMINATION FORM

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BIBLIOGRAPHY

"The Centering for the 281' Concrete Arch Monroe Street Bridge, Spokane, Washington", Engineering/Contracting, XXXV (April 1911), 444-46.

ENGINEERING NEWS (September 1909)

Kennedy, P. F., "Centering for the Monroe Street Bridge", Engineering Record, LXIII (April 1911), 484.

Literary Digest, XLV (August 31, 1912), 335.

"A Municipally Built Concrete Bridge, American City, VI (January 1912), p420-1. Scientific American, LXXIII, (March 1912), 335.

Spokane Daily Chronicle.

Spokane Spokesman-Review.

FOOTNOTES: DESCRIPTION

¹ American City, p. 421.

² Ibid., p. 420.

³ Kennedy, p. 479.

⁴ American City, p. 421.

⁵ Ibid.

⁶ Spokesman-Review, (November 12, 1911), VII, 1:7.

⁷ American City, p. 421

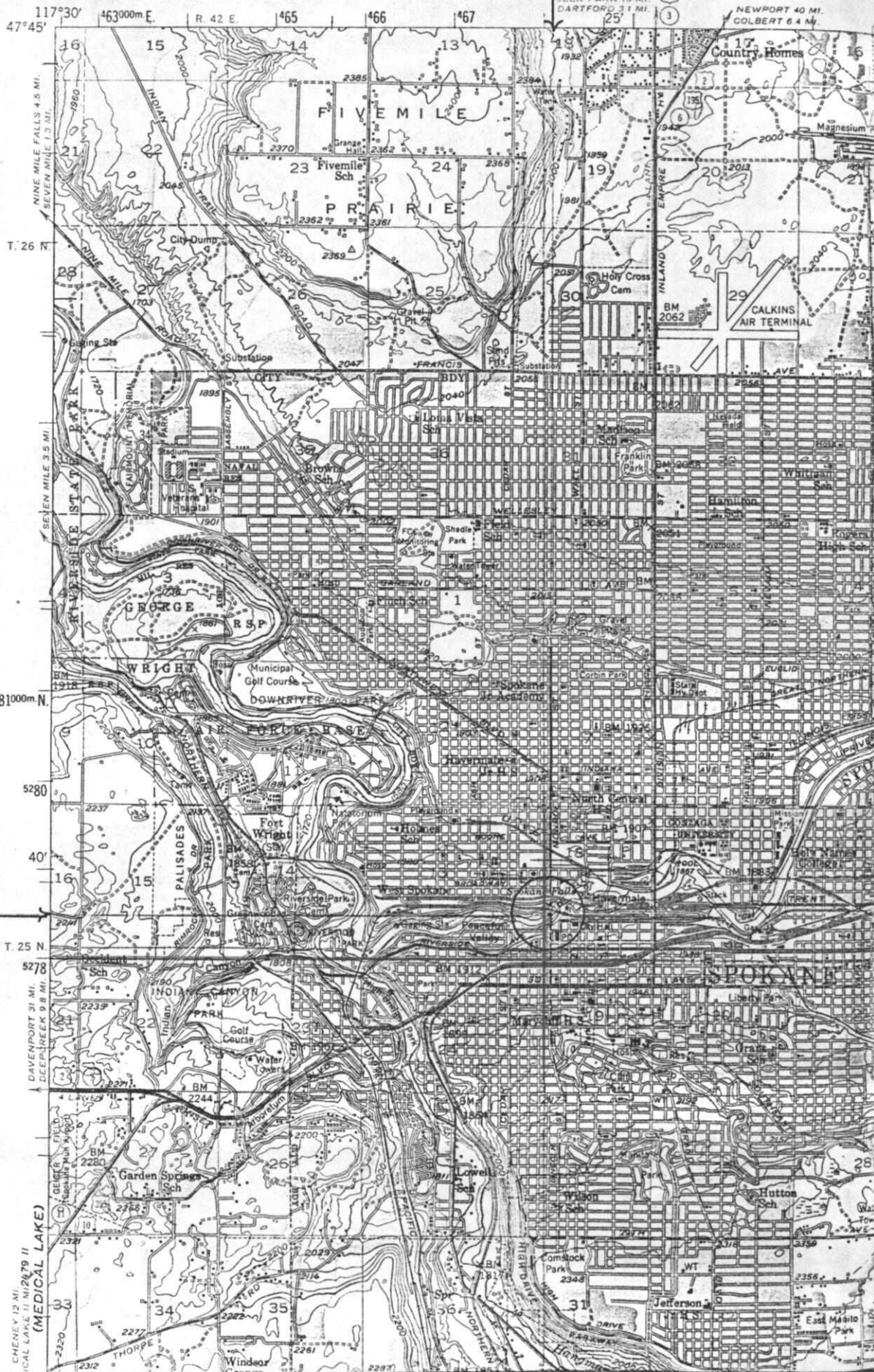
FOOTNOTES: SIGNIFICANCE

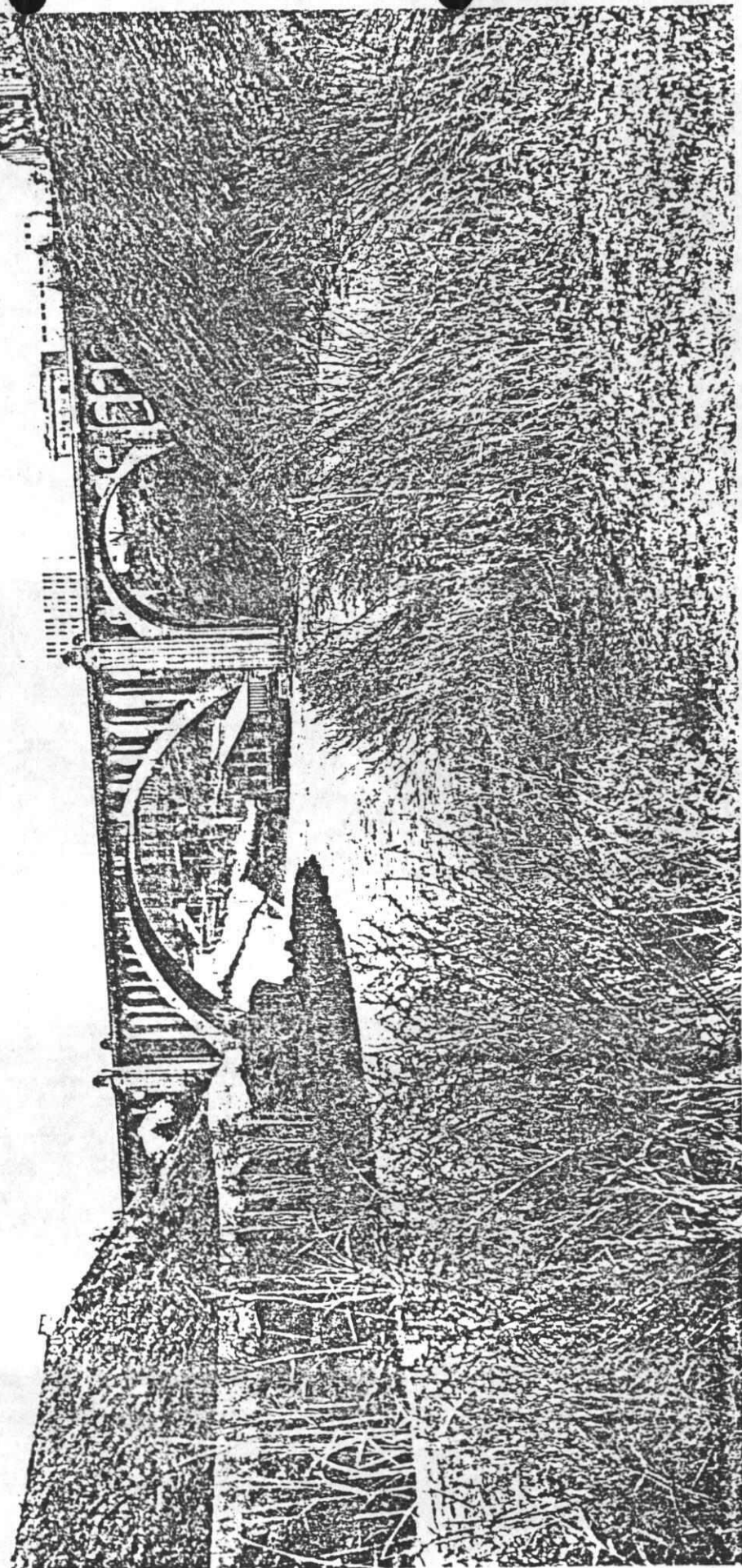
¹ American City, p. 421

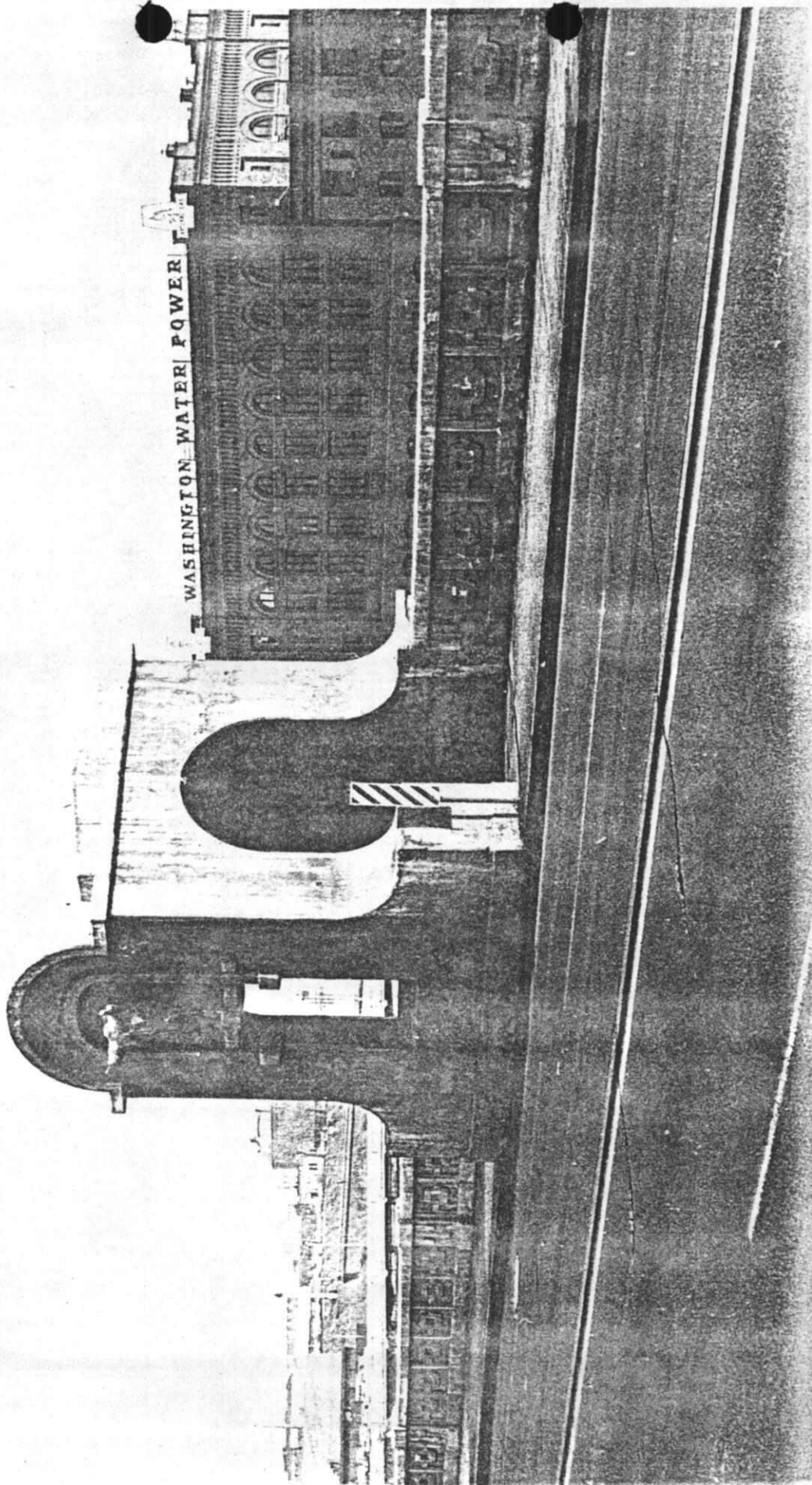
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24791

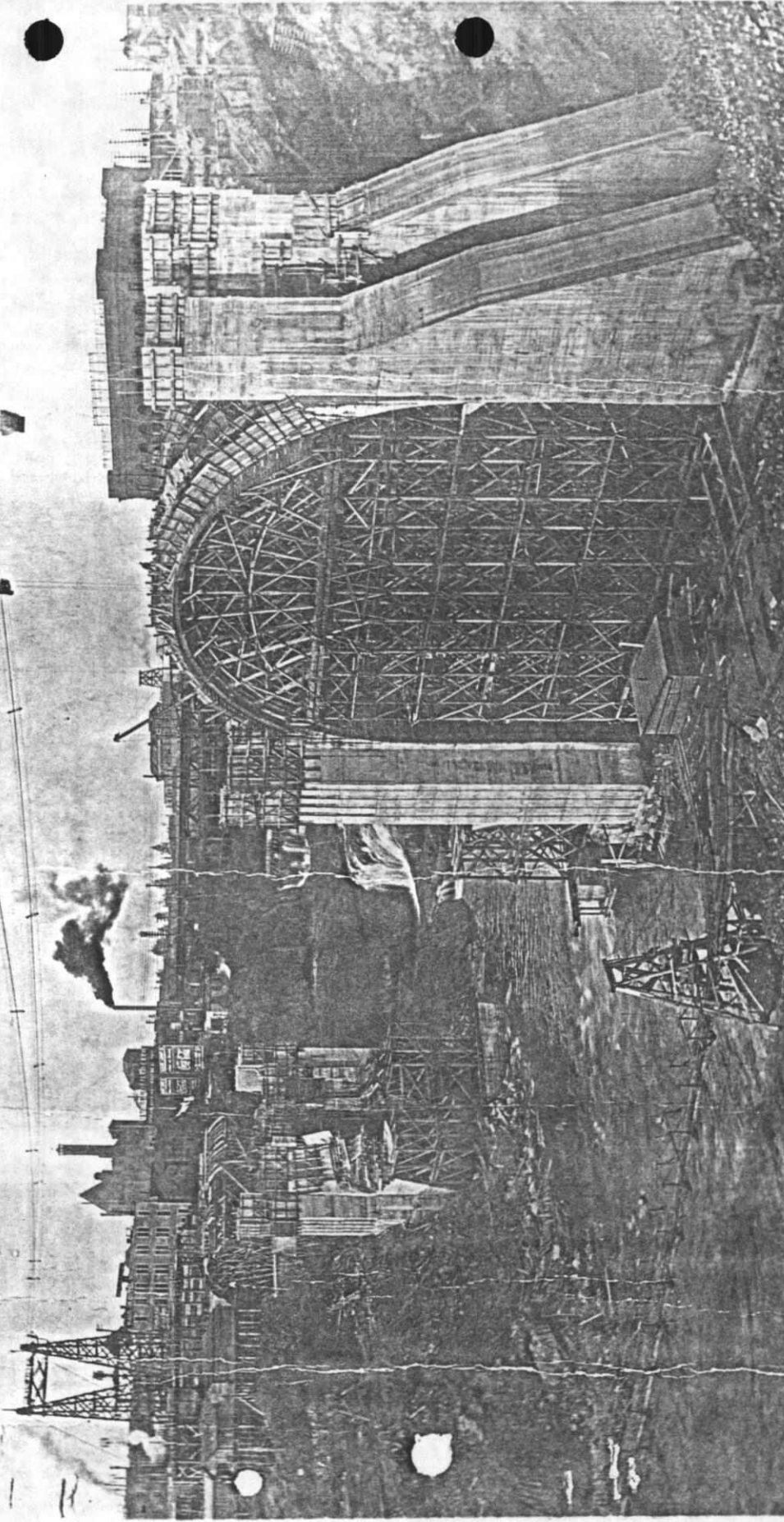
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

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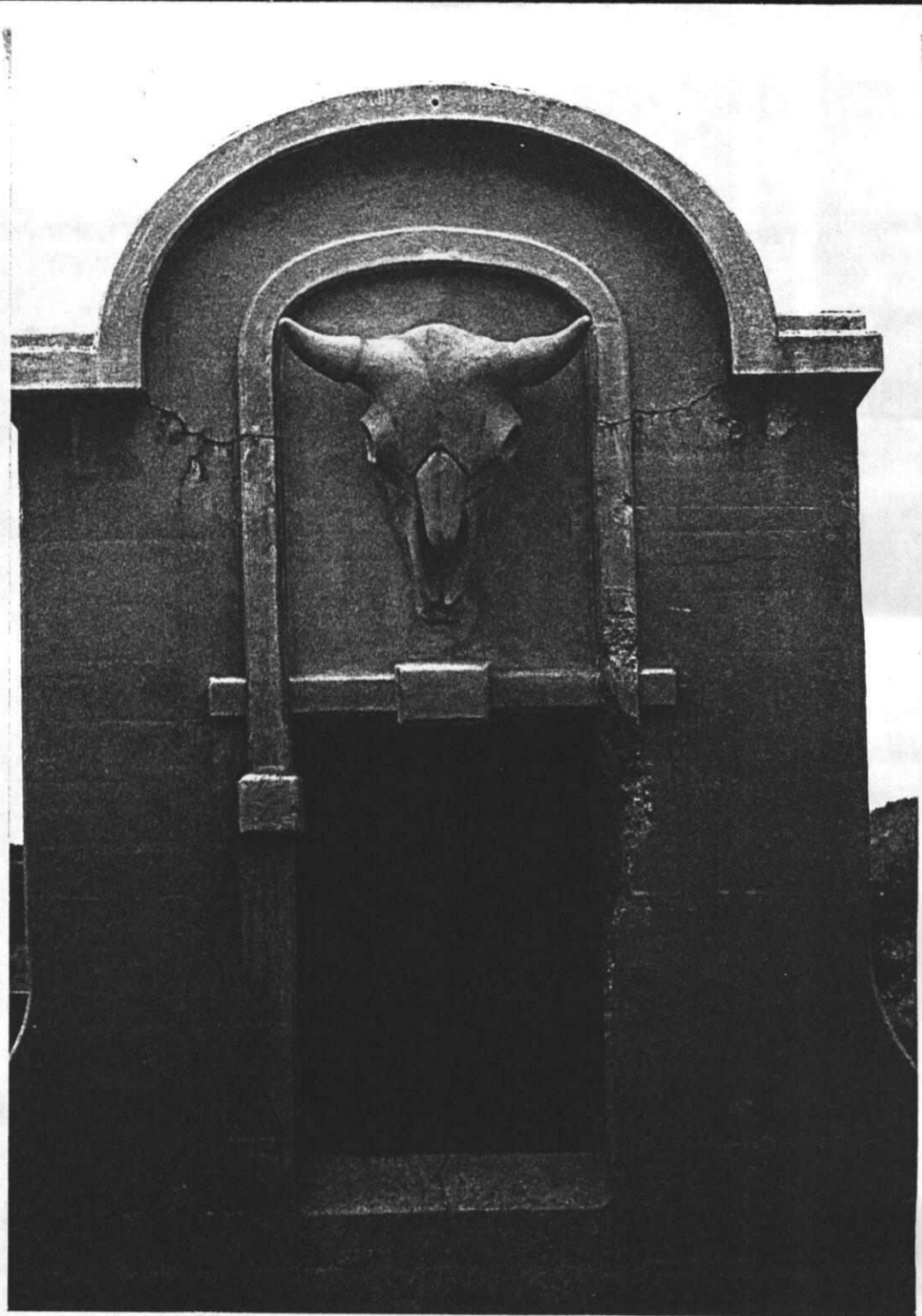


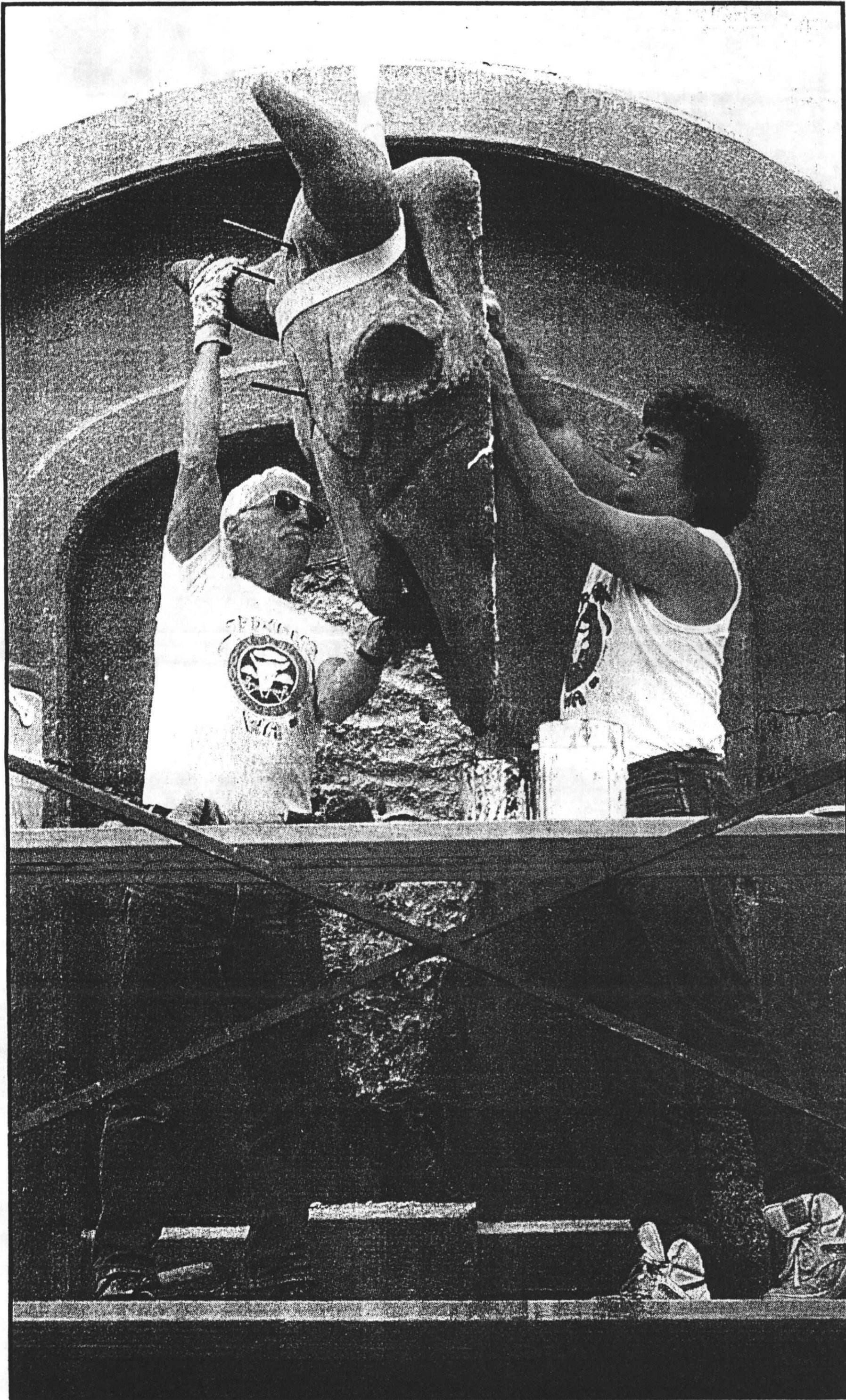




MONTPELIER STREET BRIDGE
OCT. 26, 1910.

W. B. REED, PHOTOGRAPHER



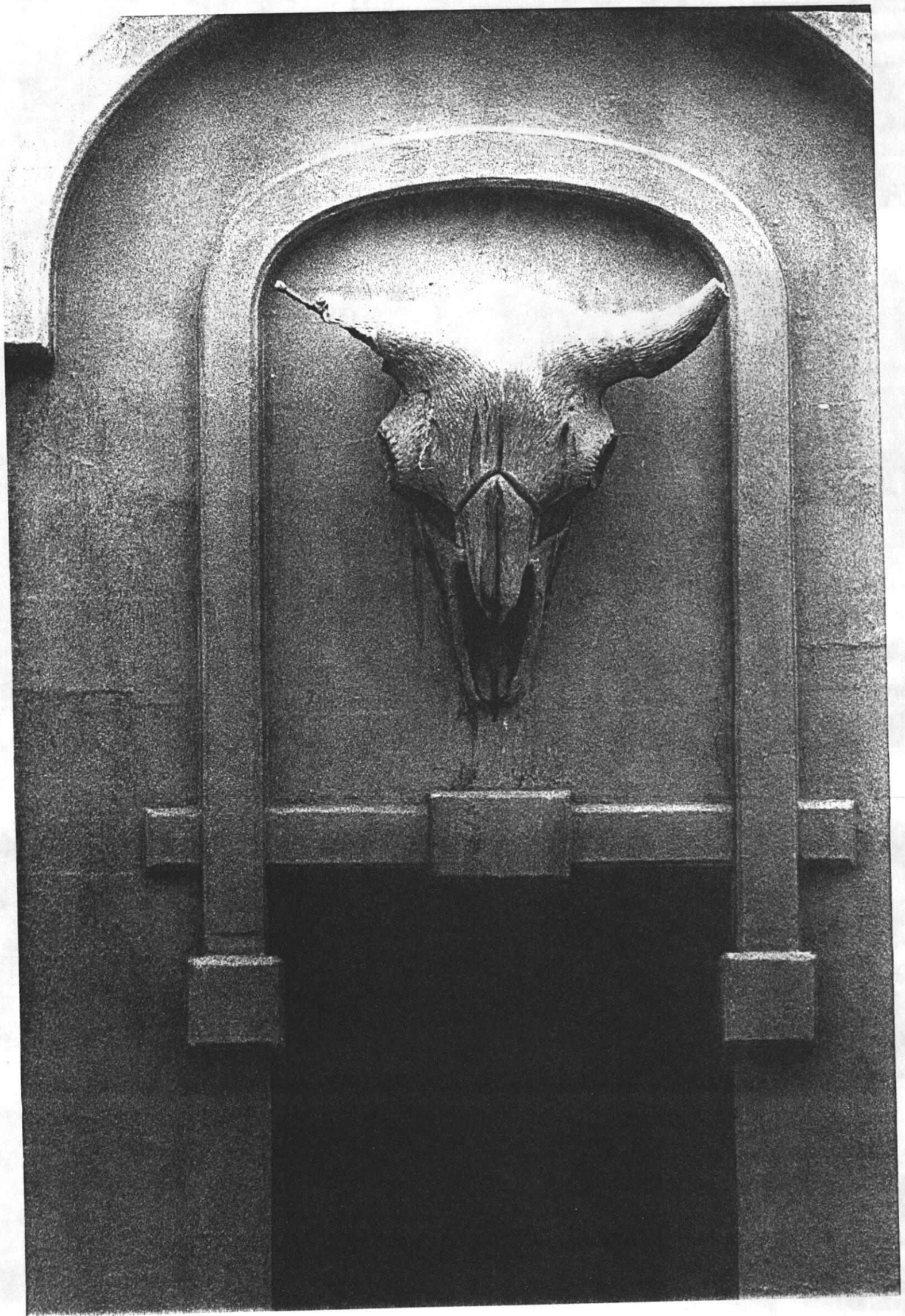


Staff photo by Shawn Jacobson

HEAD'S UP. City employee Jack Fruit helps sculptor Don Rodgers prepare a new buffalo skull for attachment to the Monroe Street Bridge Tuesday afternoon. A truck struck the original skull. Rodgers made a mold from another of the bridge's skulls last year.







1. SITE I.D. NO										HAER INVENTORY										Historic American Engineering Record Department of the Interior, Washington, D.C. 20240																			
2. INDUSTRIAL CLASSIFICATION Bridges, Trestles, and Aqueducts										3. PRIORITY 1										4. DANGER OF DEMOLITION? (SPECIFY THREAT) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> UNKNOWN																			
ARCH: concrete										5. DATE 1909-11										6. GOVT SOURCE OF THREAT OWNER ADMIN																			
City Designation Number: 371001001										7. OWNER/ADMIN City of Spokane										9. OWNER'S ADDRESS West 221 Wall Street Spokane, Washington																			
8. NAME(S) OF STRUCTURE Monroe Street Bridge										10. STATE WA COUNTY 063 Spokane										CITY/VICINITY Spokane																			
11. SITE ADDRESS (STREET & NO) Crossing: Spokane River Monroe Street between Ide Avenue and Riverfalls Blvd. S.T.R.: 18 25N 43E										12. EXISTING SURVEYS <input checked="" type="checkbox"/> NR <input type="checkbox"/> NHL <input type="checkbox"/> HABS <input type="checkbox"/> HAER-I <input type="checkbox"/> HAER <input type="checkbox"/> NPS <input type="checkbox"/> CLB <input type="checkbox"/> CONF <input type="checkbox"/> STATE <input type="checkbox"/> COUNTY <input type="checkbox"/> LOCAL <input type="checkbox"/> OTHER										13. SPECIAL FEATURES (DESCRIBE BELOW) <input type="checkbox"/> INTERIOR INTACT <input type="checkbox"/> EXTERIOR INTACT <input type="checkbox"/> ENVIRONS INTACT																			
14. UTM ZONE EASTING NORTHING SIGN 11 468010 5278050										SCALE <input type="checkbox"/> 1:24 <input type="checkbox"/> 1:62.5 <input type="checkbox"/> OTHER										QUAD NAME Spokane, Washington																			
15. CONDITION 70 <input type="checkbox"/> EXCELLENT 71 <input type="checkbox"/> GOOD 72 <input type="checkbox"/> FAIR 73 <input type="checkbox"/> DETERIORATED 74 <input type="checkbox"/> RUINS 75 <input type="checkbox"/> UNEXPOSED 76 <input type="checkbox"/> ALTERED 82 <input type="checkbox"/> DESTROYED 85 <input type="checkbox"/> DEMOLISHED										16. INVENTORIED BY Lisa Soderberg										AFFILIATION HAER/Washington State Bridge Inventory																			
17. DESCRIPTION AND BACKGROUND HISTORY, INCLUDING CONSTRUCTION DATE(S), HISTORICAL DATE(S), PHYSICAL DIMENSIONS, MATERIALS, EXTANT EQUIPMENT, AND IMPORTANT BUILDERS, ENGINEERS, ETC. When the Monroe Street Bridge was completed in 1911, its monolithic arch superceded the concrete arch over the Rocky River in Cleveland by a single foot; for a brief period the Spokane bridge acquired the title of being the largest concrete arch in the United States. The multiple spanned concrete structure crossed the Spokane River at the lower end of the falls where the water rushes through a 140 foot gorge, linking the city's financial center on the south bank to the commercial and industrial districts on the north bank; the importance of this link had been recognized since 1889 when the first timber structure was constructed at this location. The concrete bridge replaced a steel cantilever truss constructed in 1891 which had become too light to carry the increasing loads of street car traffic. The new bridge was designed to support a 40 foot roadway which would carry a double-track electric car line, in addition to a highway, and two 9 foot sidewalks cantilevered from the deck. Originally, a 791 foot concrete										DATE June 1980										(CONT OVER)																			
18. ORIGINAL USE vehicular										PRESENT USE vehicular										ADAPTIVE USE																			
19. REFERENCES—HISTORICAL REFERENCES, PERSONAL CONTACTS, AND/OR OTHER City Department of Engineering files. Patsy Garrett, National Register nomination, Spokane. "The Monroe Street Bridge," Engineering News, 62, 2 September 1909, pp. 241-243. Carl Condit, American Building Art, 2 Vols., (New York, 1961), 2:198.										20. URBAN AREA 50,000 POP. OR MORE? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO										21. NPS REGION NW										22. PUBLIC ACCESSIBILITY <input type="checkbox"/> YES, LIMITED <input checked="" type="checkbox"/> YES, UNLIMITED <input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN									
23. EDITOR INDEXER										24. LOCATED IN AN HISTORIC DISTRICT? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO										NAME																			
DISTRICT I.D. NO										66										(CONT OVER)																			

[illegible]

Monroe Street Bridge

Description (continued)

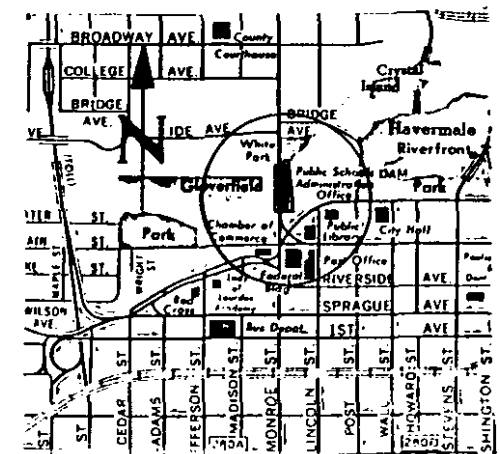
diagonal crossed bracing, while horizontal struts, 13.75 feet long of concrete reinforced with rods, connected the inner ribs to the outer ribs. It is of note that the 120 foot arch is a semi-circular arch in contrast to the more flattened middle arch. The semi-circular form exerts a thrust at the abutment with a minimum horizontal component, which would be an important consideration in light of the conditions of the south bank. Because of the exceptional height of the fill to be deposited at the south bank, it was deemed economical to design an open abutment in order that the earth might flow through and balance itself as much as possible.

The erection and centering of the arches was exacerbated by a freak storm. The bridge was first constructed with an arch span falsework suspended by cables from the existing steel cantilever truss. As the arch falsework was completed, the corresponding steel truss support was removed. On July 21, 1921, a gale force wind demolished the falsework arch. In order to re-erect the arch, it would be necessary to replace that portion of the old steel bridge which had already been removed and had been condemned as unsafe. Consequently the arch falsework was re-erected by four new 192 foot trusses which were supported on timber bents. The trusses were subsequently reused at two different locations within the city. The storm caused an additional \$40,000 in expenses and months of delay. Nonetheless, construction time was only 1 year 11 months. Total cost of the bridge was \$500,000.

The city engineer, J.C. Ralston, was assisted in the supervision of the construction of the bridge by Morton McCartney, and by assistant engineers, J.F. Greene and P.F. Kennedy. The renowned engineering firm of Waddell and Harrington prepared the steel design. The steel reinforcement was purchased from the American Iron and Steel Manufacturing Company of Bethlehem. The architectural features of the bridge which included ornamental bracket lamps and four arched enclosures decorated with buffalo skulls, were designed by the firm Cutter and Malmgren.

The Monroe Street Bridge was one of two concrete arches of monumental proportions constructed in the City of Spokane during the early 20th century. It was similar in design to other long span unreinforced concrete structures constructed at the same time. In fact, its resemblance to the Rocky River Bridge in Cleveland resulted in a lawsuit filed for infringement of copyright. However, both the Monroe Street Bridge and the Rocky River Bridge were very similar to the Walnut Lane Bridge of Philadelphia which was constructed in 1906-8, and became an important forerunner in the design of long-span fixed arches. The great size of the massive arched ribs of all three structures revealed the limits of unreinforced concrete in long span structures. However, like the Walnut Lane Bridge, the open spandrels and the flattened ribs of the Monroe Street's central arch pointed towards the future in concrete arch design.

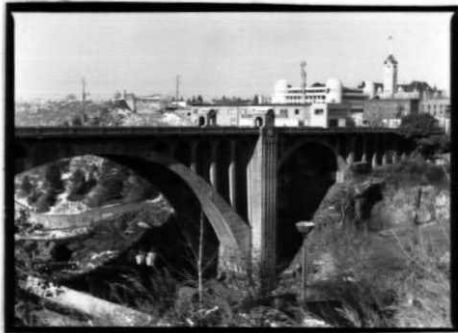
25. Photos and Sketch Map of Location



MONROE STREET BRIDGE

SP0070

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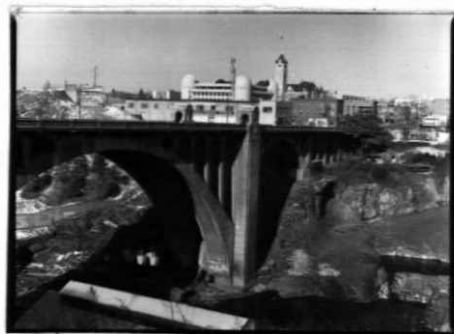
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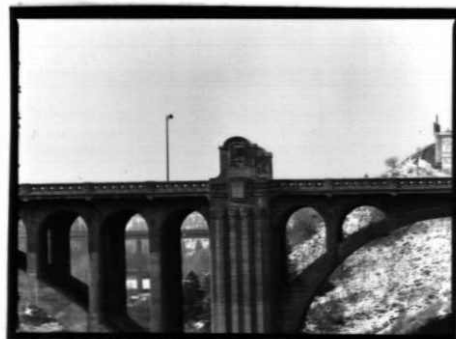
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