

HAER No. IL-120

HAER
ILL
16-CHIG,
149-

North Inlet Bridge
(Jackson Park 59th Street Bridge)
Spanning the north inlet from Lake Michigan
to the 59th Street Marina, at 5900 South
Lake Shore Drive (US 41)
Chicago
Cook County
Illinois

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Department of the Interior
Denver, Colorado 80225-0287

**HISTORIC AMERICAN ENGINEERING RECORD
NORTH INLET BRIDGE (JACKSON PARK 59TH STREET BRIDGE)**

I. INTRODUCTION

Location: Spanning the north inlet from Lake Michigan to the 59th Street marina, at 5900 South Lake Shore Drive (US 41), Chicago, Illinois

Quad: Jackson Park, ILL - IND
N4145-W8730/7.5

UTM: 3467ISE.451946.462765

Date of Construction: 1895 (repair drawings prepared in 1908, 1947, 1975)

Present Owner: City of Chicago
Department of Transportation
Bureau of Bridges
North Clark
Chicago, Illinois

Present Use: Vehicular, bicycle, and pedestrian bridge to be rehabilitated. Projected date for completion of the rehabilitation of the structurally deficient bridge is Spring 1994. The project is the re-creation of a bridge in the Jackson Park Historic Landscape District and Midway Plaisance placed on the National Register of Historic Places on 12/15/72 and includes: the replacement of deck and sidewalks, steel superstructure, abutments, dockwalls, and stairs; and rebuilding with salvaged repaired masonry and duplicated masonry.

Significance: The North Inlet Bridge, a single span through-girder bridge, was built from the designs of architect D.H. Burnham & Co. and structural engineer C.L. Strobel. Strobel was a pioneer in skyscraper construction and designed many important large bridges over the Mississippi, Missouri and Ohio Rivers. The bridge is a significant part of the permanent improvements to Jackson Park, planned by Frederick Law Olmsted, notable nineteenth century landscape architect, the site of the influential World's Columbian Exposition in 1893.

Historian: Kevin Lee Sarring and Wilbert R. Hasbrouck, FAIA,
Hasbrouck Peterson Zimoch Sirirattumrong
Architects, Engineers, Conservators July, 1993

II. HISTORY

A. Columbian Exposition Bridges and Post Fair Park Improvements

The North Inlet Bridge, although completed several years after the Columbian Exposition, clearly has direct antecedents in the Fair's bridges. The direct antecedent for this Bridge is clear. Photographs of the Columbian Exposition show similar bridges over the north and south canals at the Basin near the Columbian Fountain. Although the distance spanned is larger, requiring three arches instead of one, the similarities to the North Inlet Bridge depicted on D.H. Burnham and Co. undated design drawings are striking. These designs similarities include: the segmental arch radius; block modillions in the cornice, ashlar wall surface treatment, over-all proportions, Elk statuary, and rostral light standards. The only visible dissimilarities are that the Exposition bridges had flat piers instead of rounded turrets, and the statuary and light standards are in different positions.

**North Inlet Bridge
HAER No. IL-120
Page 3**

During the Exposition, bridges of uniform dimensions and designs linked the wide walkways at strategic locations for circulation and artistic vistas. Their engineering was perfunctory, standardized, and straightforward. Many were decorated with actual size animal statuary such as bisons, bears, and elks. There was a temporary bridge at the north inlet, perhaps of wood trusses, lathed and stuccoed as the other Exposition structures were. It created an understated portal by boat from Lake Michigan to the Wooded Isle lagoons. The Bridge linked the North Strand with its variety of foreign pavilions to the Middle Strand the panoramic lakefront esplanade along the Manufacturer's Building, the largest building in the world at the time. The official "Map of the World's Columbian Exposition" issued by the Department of Public Works shows the bridge abutments in plan bedecked with four statues. To the north, at a piazza punctuated with a statue of America, fair goers could have a meal at the Clambake, buy soda water from a kiosk or have a free drink from one of the many Hygeia Fountains, visit the pavilions of England, Spain, New South Wales and Germany, and rent a wicker wheel chair not unlike those in English seaside resorts or at American Atlantic City. To the south a tall metallic lighthouse towered over the life saving station, weather bureau, life boats beached on the inlet, and the Heliograph. Visually, guarding the bridge and inlet mouth, was the gun mounted faux battleship Illinois "moored" along the south jetty.

After the Exposition, there was a great debate as to what should remain in Jackson Park especially since the stucco constructions were relatively impermanent. The issue was settled in January 1894 when vandals incinerated the Casino, Peristyle and Music Hall, the first of several fires. During the summer the remainder of the Count of Honor buildings burned thereby assuring that the site would revert to park use. The esplanade was already being rebuilt for vehicles south of the north inlet. By 1894 "the Lake Shore Drive... has been continued southward from a point about 1,000 feet south of the Fifty-ninth Street inlet for a distance... nearly to the (south) inlet."⁽¹⁾ It might be assumed that the Exposition bridge had already been removed anticipating its permanent replacement as a vital crossover in the lakefront park, a component of the Lake Shore Drive. The stonework and foundation drawings for the bridge, with the South Park Commissioners title block, were completed in March 1895. Two months later the bridge was drawn on a plan by Olmsted, Olmsted and Eliot

Landscape Architects, a firm founded by Frederick Law Olmsted who had a significant role in the Fair planning. The relandscaping plan included detailed grading diagrams, new and remaining Exposition constructions, sidewalks, plantings and reconfigured lagoon shorelines.

In 1895, Exposition bridges were a topic in the Report of South Park Commissioners - one bridge was being modified for a driveway function; a second, known as the Japanese Bridge to the Wooded Isle, was being relocated to permanent foundations and " a Stone and Iron Bridge over the north inlet at the lake shore is under construction." ⁽²⁾

The next year, the Commissioners report stated that the North Inlet Bridge "...was completed early in the season (Spring 1896). It is 132 feet in length and 94 feet 6 inches in width, carrying across it a macadam driveway 60 feet in width, and two concrete walks each 15 feet in width. The abutments, outer arches and balustrades are of dressed Bedford stone. The span over the inlet is 40 feet." ⁽³⁾

The North Inlet Bridge is the first of four other Jackson Park bridges representing post Exposition park improvements.

B. Construction Chronology

The North Inlet Bridge was built over approximately twelve months in a standard sequential installation including the following: foundation and sheet piling, capping, abutment stonework and backfilling, girders and decking, sidewalks and roadbed (cinder, fill, concrete, bituminous surfacing) and stonework balustrades.

There is some evidence to suggest that limestone setting was carried out during the winter months and the limestone laid "frozen" thus accounting for the extensive sheeting deterioration which occurred soon after the bridge was completed.

C. Location

The North Inlet Bridge spans the mouth of the 59th Street marina in Jackson Park. It is included in the "Jackson Park Historic Landscape District" which is listed on the National Register of Historic Places. It is also within the multiple property National Register listing "The Historic Resources of the Chicago Park District" certified on 3/22/90. The bridge is part of Lake Shore Drive, State Route 41. It is just over seven miles south of downtown, southeast of the nearby world famous Museum of Science and Industry, the rebuilt Palace of Fine Arts surviving from the Columbian Exposition.

III. THE BRIDGE

A. Description

The North Inlet Bridge is a fixed, simply supported segmental arch, iron and stone bridge spanning 41'-2". Eight iron girders, seated in limestone abutments, carry the 94'-6" wide dual carriage-way and flanking sidewalks. The girders are back to back riveted angles capped by flat bar plates for the top and bottom flanges, connecting together and to the flat plate web. The girder shape responds to the curve of the arch 5'-5½" deep at the abutments rising to 2'-8½" deep at mid-span. Visually covering the end girders are self supporting limestone arches. The top of the arch, at the key stone, is raised .20" gracefully representing classical optical refinements, similar to entasis on columns. The abutments are regular coursings of limestone blocks whose head joints are butted and tooled flush, while the bed joints are margined, thus accentuating the bridge's horizontally. The walls are battered 8".

There are rounded turrets at the spring of the arch, a block modillion cornice, evidence of the balustrade railings and four rectangular round ended sculpture bases. The concrete foundation is stepped, accommodating the slope of the earth embankments, and rests on 141 deep timber piles. At the waters edge, there is a Wakefield Piling patterned wooden cribbing. Stylistically, the North Inlet Bridge is best described as Italianate.

B. Repairs

There have been three documented repairs of the North Inlet Bridge since its completion in 1896. Most of these repairs have been concerned with the limestone structural reinforcement, and roadway work. The limestone was apparently poor original material quality or laid "frozen" without proper seasoning.

In 1908, the South Park Commissioners report stated:

"The abutments of the north inlet bridge have been surfaced with limestone concrete 6 inches in thickness on the north and south faces; the Bedford stone facing which had cracked and disintegrated to a considerable extent having been cut out to the depth named. The concrete used is of such character that it is difficult to distinguish between the new concrete face and the old Bedford stone on the side faces of the abutments where it has not been removed. The facing was carried from the top of the abutments to a line two feet below low water."

This repair work is indicated on undated drawings prepared c. 1950-52 as an "examination of structure an existing conditions report."

On December 30, 1947 a contract for repairs was made and completed five months later for \$18,431.22. ⁽⁴⁾ Some of these repairs are indicated on a Chicago Park District drawing (45623 file: 11-D55-3) dated November 5, 1947 and pertain to steel crossbraced armatures placed under the existing girder adjacent to the abutment, to provide additional support for the roadbed. The contract award to Harry A. Thompson Inc. was for work in accordance with Specifications No. 47103. ⁽⁵⁾ On January 13, 1948, a Change Order was approved substituting different "H" piles, and pile capping beams furnished by the Park District resulting in a credit to the Park District of \$368.78. ⁽⁶⁾

In 1975 the roadway and sidewalks were rebuilt in reinforced concrete, and truss cross bracing replaced. This work is described on Drawing No. 45687 File No. 11-D55-67 dated 1975. At that time, a report "Engineering Investigation..." by Wiss Janney Elstner and Associates was prepared describing the loading conditions and the accelerating deterioration of the stone and metal.

C. Ownership and Future

The Bridge is owned by the City of Chicago and maintained by the Department of Transportation, Bureau of Bridges. The bridge structure ID Number is: 016-6195. The bridge has severe deterioration of the both masonry and iron structure. By observation on land and from underneath by boat, the masonry suffers from: water entry at open joints contributing to freezethaw surface spalling; salt attack efflorescence; carbon exhaust staining; stone misalignment; vandalism such as graffiti; missing railing balusters; and ad-hoc foundation stabilization by installation of a concrete abutment cap. The iron structure is: shored at the haunches, thru rusted/scaled at the plate girder flanges and abutment pockets; and the roadbed and stair have collapsed on the north east due to lake scour action under the walls. The concrete dockwall is likewise collapsed on the north east, and elsewhere pitted, abraded, and undermined especially on the Lake Michigan side of the Bridge. Because of the magnitude and scale of renovation necessary, it was determined to replicate and rebuild the bridge utilizing some salvaged original masonry in durable condition.

The planned future rehabilitation is the reconstruction of the entire superstructure, repairing and rehabilitating substructure and resurfacing of the approach roadways, increasing the clearance at the water by the uniform raising of bridge, new lighting underneath the structure, new boat traffic stop and go lights, and rehabilitating the east dock walls. The improvement will use approximately 30% original repaired rebuilt limestone, new replica limestone and new ashlar granite up to the expected high water mark as an alternative to limestone. No changes are to be made regarding widening,

drainage or overall design configurations. Missing features will be reproduced based on historical evidence such as the full size drawings for the turned limestone balusters.

IV. BIOGRAPHICAL MATERIAL

A. Daniel Hudson Burnham (1846-1912)

D. H. Burnham & Co. Architects prepared the undated architectural drawings for the North Inlet Bridge (assumed late 1894 or the spring of 1895) for the City of Chicago and South Park Commissioners. The founder and principal owner of the company, Daniel Burnham, was born in Henderson, New York in 1846, and educated at Chicago public schools and private schools in Massachusetts. In Chicago, as a young man, he worked in the office of Loring & Jenney, and thereafter formed a brief partnership with Gustave Laureau. In 1872 he joined the office of Carter, Drake and Wight where he met John Wellborn Root. In 1873 they formed the partnership of Burnham & Root. After Root's untimely death in 1891, Burnham was made the chief of construction for the 1893 World's Columbian Exposition. In 1894, he reorganized his office as D. H. Burnham & Co. with partners: Ernest R. Graham, Edward C. Shankland, Charles Atwood and Burnham's two sons. In 1909 he published, with Edward H. Bennett, The Plan of Chicago which became an inspiration for great public works nation-wide over the next generation, and a cornerstone in the City Beautiful Movement. A year later President Taft appointed Burnham Chairman of the National Commission of Fine Arts, which advised on planning for Washington D.C.. Other municipal improvement plans he carried out were for San Francisco, Cleveland, Detroit and Manila in the Philippines. His firm grew on the success of large commercial projects to become the largest in the United States. Daniel Burnham died of colitis connected with food poisoning and worsening diabetes on June 1, 1912 while in Germany consulting to the Kaiser about German cities planning.

B. Charles Louis Strobel (1852-1936)

Charles Louis Strobel prepared the engineering drawings for the North Inlet Bridge in the spring of 1895. Born in Cincinnati, Ohio on October 6, 1852, he received a civil engineering degree from the Royal Institute of Stuttgart Germany in 1873. From 1874 to 1878, he was with the 300 mile Cincinnati Southern Railway where he became engineer of bridges, in charge of designs for iron bridges and viaducts. His Ohio River Bridge's 519 foot span was the longest truss or girder type bridge up to that time, and his high bridge over the Kentucky River was the first cantilever bridge in the United States. From 1878 to 1885, he was assistant to the president and chief engineer of the Keystone Bridge Company, and consulting engineer to Carnegie, Phipps and Co. Ltd. both in Pittsburgh. Strobel authored the well known Pocket Companion of Useful Information and Tables Appertaining to the Use of Wrought Iron for Engineers, Architects and Builders. In 1885, he came to Chicago and provided the structural engineering for the Rookery Building, the Monadnock Block, the Auditorium and the Woman's Temple. In 1893, he was in private practice, and incorporated the Strobel Steel Construction Company in 1905. Strobel retired in 1926 and when he died in Chicago on April 4, 1936, the Chicago Tribune called him a "leader in the development of steel skeleton construction." He used that system in both his Bridge work and in buildings.

V. FOOTNOTES

1. South Park Commissioners Report 1894.
2. South Park Commissioners Report 1895.
3. South Park Commissioners Report 1896.
4. Chicago Park District Annual Report 1947.
5. Board of Commissioners Journal 1947-48.
6. Board of Commissioners Journal 1947-48.

VI. BIBLIOGRAPHY

A. Books

Bolotin, Norman, and Christine Laing. The Chicago World's Fair of 1893: The World's Columbian Exposition. Washington D.C., 1992.

Burg, David F. Chicago's White City of 1893. Lexington, Kentucky, 1976.

Bolotin, Harman and Christine Laing. The Chicago World's Fair of 1893: The World's Columbian Exposition. Washington D.C., 1992.

Chicago Park District. Journal of Proceedings of the Board of Commissioners. 1947 and 48, 1948 and 1949.

Condit, Carl W. American Building. Chicago: University of Chicago Press, 1968.

Fabos, Julius Gy., Gordon T. Milde, Michael V. Weinmayer. Frederick Law Olmsted, Sr., Founder of Landscape Architecture in America. Amherst, 1968.

Mock, Elizabeth. The Architecture of Bridges. New York, 1940.

Pritchard, Edward R. Illinois of Today and its Progressive Cities. Chicago, 1897.

Randall, Frank A. History of the Development of Building Construction in Chicago. Urbana, Illinois: University of Illinois Press, 1949.

Shumacher and Bowman, Inc. (consulting engineers). Chicago Bridges. City of Chicago: Department of Public Works, 1984.

Tyrrell, Henry Gratten. Artistic Bridge Design: A Systematic Treatise on the Design of Modern Bridges According to Aesthetic Principles. Chicago, 1912.

Withey, Henry F. and Elsie Rathburn. Biographical Dictionary of American Architects (Deceased). 1956.

Whitney, Charles Smith. Bridges: A Study in Their Art, Science and Evolution. New York, 1929.

Works Progress Administration. Historical Register of the Twenty Two Superceeded Park Districts. 1941.

World's Columbian Exposition. Final Report of the Director of Works. Vols. I and IV, scrapbooks. Burnham Library: Art Institute of Chicago, (1894).

B. Periodicals

"The Artistic Side of Bridge Design," Engineering News, XLII (December 21, 1899), 401.

"Story of Chicago Bridges," Midwest Engineer, II (January 1950), 2-9.

Bennett, Edward H. "The Chicago River Bridges," Architectural Record, LII (December 22, 1922), 459-69.

Brown, F.C. "The Relation of the Monumental Bridge to the City Plan," Architectural Review, II (1913): 30-31.

Jackson, Donald C. "Railroads, Truss Bridges and the Rise of the Civil Engineer," Civil Engineering, XLVII (October 1977): 97-101.

_____. "Notes on Recent American Bridges," The Engineer, LXXXIX (June 24, 1910), 651-52.

Tyrrell, Henry G. "American Park Bridges," American Architect and Building News, LXXI (March 30, 1901), 99-101.

_____. "Ornamental Bridges," American Architect and Building News, LXXV (August 24, 1901), 61-64.

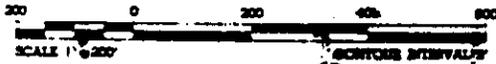
_____. "Bridges in Relation to the City Plan," Architect and Engineer, XXXIV (August 1913), 83-93.

C. Reports

Chicago Park District, annual reports 1947, and 1948.

Report of the South Park Commissioners..., 1896, 1897, and 1909, Chicago.

Wiss Janney Elstner and Associates, "Engineering Investigation of the 59th Street Bridge South Lake Shore Drive for the City of Chicago", (WJE Job No. 74602) July 21, 1975.



COMPILED BY PHOTOGRAMMETRIC METHODS
BY
ABRAMS AERIAL SURVEY CORPORATION
LANSING, MICHIGAN

BRIDGE LOCATION

North Inlet Bridge
HAER No. IL-120
Page 14

