

Duluth's Aerial Bridge

And the Canal It Crosses

TONY DIERCKINS

PREVIEW PDF

Duluth's Aerial Bridge and the Canal It Crosses

contains 50 brief stories illustrated with more than 125 historic
and modern photographs, sketches, diagrams, and maps

This **Low Resolution Uncorrected Preview PDF** is not for publication or distribution

Duluth's Aerial Bridge



And the Canal It Crosses:
UNCORRECTED PREVIEW EDITION

TONY DIERCKINS

ZENITH CITY PRESS



DULUTH, MINNESOTA



Zenith City Press
Duluth, Minnesota
www.zenithcity.com

Duluth's aerial bridge...and the canal it crosses

Copyright © 2022 by Tony Dierckins

All rights reserved. No part of this book may be reproduced or transmitted in any form by any means without written permission from the publisher.

Text, Design, Maps, & Bridge Diagrams by Tony Dierckins
Copyedit by Scott Pearson

This book's contents have been adapted, updated, and condensed from
Crossing the Canal: An Illustrated History of Duluth's Aerial Bridge
by Tony Dierckins (Zenith City Press, 2008, out of print)

Modern photos on pages ii, 23, 24, 45, 75, 81, 82, 87, 89, 93, and
the front and back cover by Dennis O'Hara, northernimages.com

Uncaptioned historic images from the Zenith City Press archives (ZCP)

Historic images courtesy of

Ryan Beamer, former aerial bridge supervisor (RB);

David Campbell, current aerial bridge supervisor (DC)

Duluth News Tribune (DNT); Duluth Shipping News (DSN);

Great Lake Design (GLD); James J. Hill Library (JJHL);

Larry Lyons, son of former aerial bridge supervisor Richard Lyons (LL);

Lake Superior Maritime Collection, UWS Jim Dan Hill Library (LSMC);

Minnesota Historical Society (MHS); University of Minnesota Duluth

Martin Library Special Collections & Archives (UMDMLSCA)

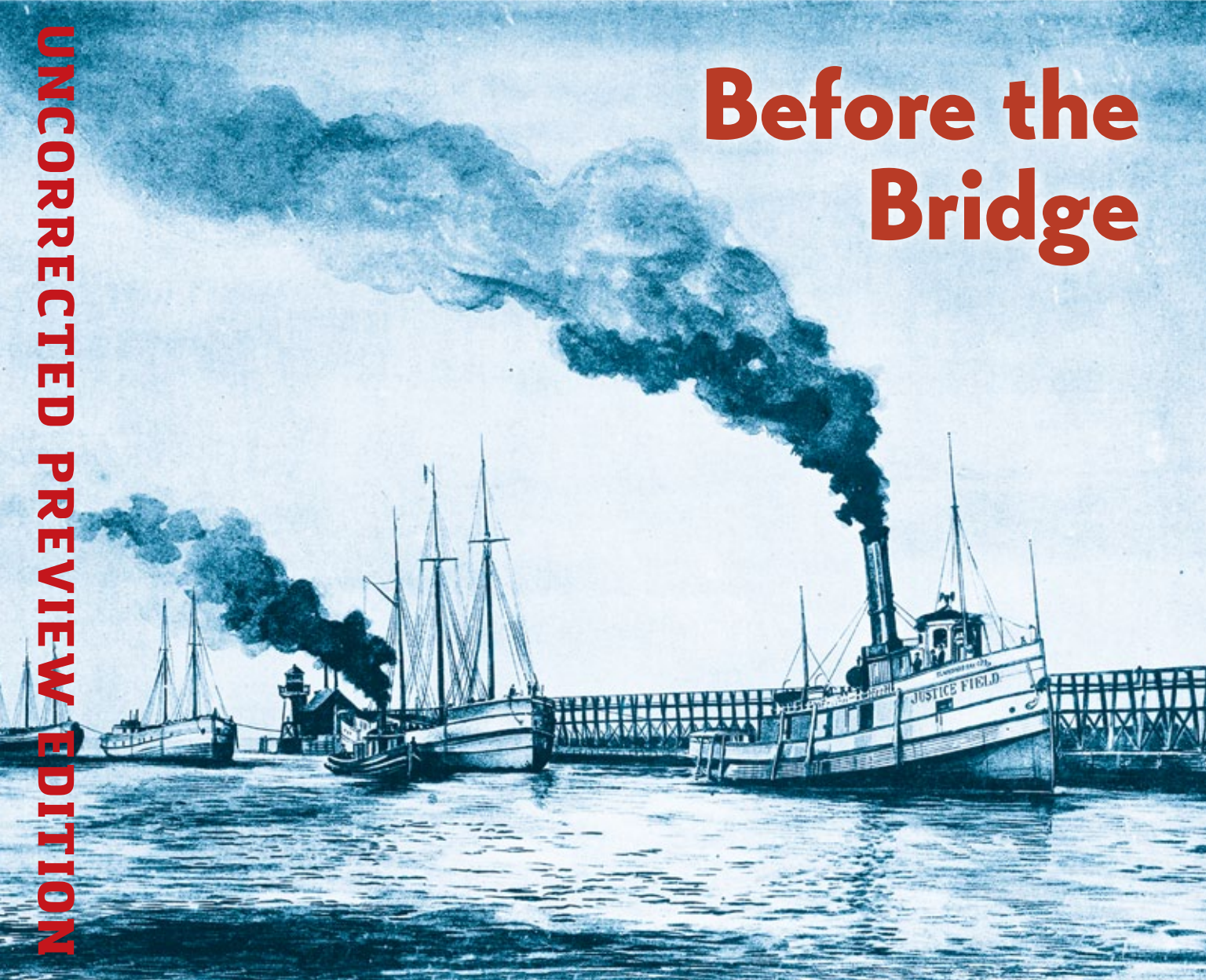
First Printing, 2022 • ISBN: 978-1-887317-52-8

Library of Congress Control Number: 2022??????

Printed in Duluth, Minnesota, USA by J. S. Print Group

UNCORRECTED PREVIEW EDITION

Before the Bridge





This detail from artist Francis Lee Jaques's 1922 painting "Daniel Greysolon Sieur du Lhut at the Head of the Lakes, 1679" depicts the city of Duluth's namesake and his French companions and Huron guides landing on Minnesota Point at Onigamiinsing in 1679.

[IMAGE: MINNESOTA HISTORICAL SOCIETY]

Before the Canal

Duluth's aerial bridge has been an iconic symbol of the Zenith City of the Unsalted Seas since it first began operating in April 1905. But Duluth would have no such bridge if it didn't also have a canal to cross—and it wouldn't have needed to dig a canal at all if Minnesota Point weren't lying between Lake Superior and the St. Louis River.

Along with Wisconsin Point, Minnesota Point forms the world's largest natural baymouth bar. Over the eons, silt carried by the St. Louis and Nemadji rivers collided with sand stirred up by the lake's clockwise rotation, eventually creating the sandbars. This same process had also produced Rice's and Conner's points, which together formed the very western shore of the lake before the formation of Minnesota and Wisconsin points. Together, the four points created a natural harbor known today as Superior Bay. An opening between Minnesota and Wisconsin points where the St. Louis and Nemadji waters converged—now called the Superior Entry—provided access from the lake to the harbor.

That spot—the convergence of the St. Louis River and Lake Superior—has been home to humans for nearly 15,000 years, first to Paleo-Indians, then the Eastern-Archaic societies and on to the Woodland, mound-building cultures. By 1600 the area was populated by the Dakota, Assiniboine, and Cree, and soon thereafter those groups were forced north and west by the Ojibwe, who had migrated from today's New Brunswick following a prophecy and had developed a fur-trading partnership with the French along the way. To avoid a fourteen-mile paddle to circumvent Minnesota Point to access the bay's northern portion, Native Americans canoeing along the lake's northern shore developed a trail to haul their canoes across Minnesota point roughly a half mile from where it connects with the mainland. The Ojibwe called it Onigamiinsing or "Little Portage." More recently that



word has been interpreted as “Place of the Little Portage,” the Ojibwe name for the land now occupied by the city of Duluth.

The fur trade essentially died in the late 1830s, devastating the Ojibwe economy and leaving them vulnerable to federal land grabs in their desperation to survive. Consequently, a series of treaties in the 1840s and 1850s placed the land surrounding Lake Superior into the hands of the United States. In 1854

Euro-Americans—who called the westernmost Lake Superior region the Head of the Lakes—established the Village of Superior between the Nemadji River and Conner’s Point along the shore of Superior Bay behind Minnesota Point.

In 1856 Euro-Americans established nearly a dozen towns in what is now Duluth, each hoping to become a great commercial shipping center, initially shipping tons of copper expected to



Duluth's outer harbor ca. 1871 showing the LS&M Railroad freight depot and warehouse, Elevator A, and the breakwater. [IMAGE: ZCP]

be found along Lake Superior's north shore. One town centered on the northern base of Minnesota Point. Its founders named it Duluth after a seventeenth-century French soldier named Daniel Greysolon Sieur du Lhut, who, along with his party of French companions and Huron guides, purportedly crossed Onigamiinsing in September, 1679. When they platted the town that summer, town founders named the path of Onigamiinsing "Portage Street." The following year four other adjacent towns joined Duluth and officially incorporated as the Town of Duluth. The community roughly covered today's downtown and Minnesota Point down to Thirty-eighth Street South.

Early Euro-American residents expected a railroad and population boom to follow. Sidney Luce, later Duluth's third mayor, built a warehouse and wharf at the very northwest corner of Lake Superior in anticipation of railroad construction, and Robert Jefferson constructed a modest hotel in which he expected to house, in part, traveling capitalists overseeing their investments. But prospectors found very little copper along the shore, and in the fall of 1857 the country's economy took a blow when the Panic of 1857 set off a nationwide economic depression. With no way to make money, most of the Euro-American population fled within months. The population of the Minnesota

towns dropped from 1,560 in 1857 to 406 in 1860, and more left in 1861 when the Civil War began. During the 1860s, the economy essentially worked on the barter system, and more Ojibwe lived in Duluth than did EuroAmericans, especially in the summer when Minnesota Point was said to be lined with temporary Ojibwe camps.

When EuroAmericans began returning following the end of the war, talk of a railroad resumed. The Lake Superior & Mississippi Railroad was planned to run from St. Paul to the Head of the Lakes, terminating at either Superior or Duluth, and connect with the Northern Pacific Railroad at today's Carlton, Minnesota. The NP would run all the way to Washington's Puget Sound. By 1868 Philadelphia financier Jay Cooke had become heavily invested in both railroads. Cooke announced he had selected Duluth as the LS&M's northern terminus in early 1869, setting off a construction and population boom. Cooke sent several agents to Duluth to finance the construction of the city's early infrastructure, and the railroad recruited immigrants from northern Europe to help build the railroad. Its tracks terminated at Fourth Avenue West, adjacent to Luce's warehouse. The LS&M built a freight depot and warehouse at the spot, and within a year a giant grain elevator had been constructed at the

foot of Fourth Avenue West and the Union Depot passenger station stood along the tracks near Sixth Avenue West. In early 1870 the city began building Citizen's Dock, which jutted into the lake from Minnesota Point at today's Morse Street. In August, 1870, the LS&M began daily freight and passenger trains between St. Paul and Duluth.

Six months earlier Duluth had officially become a city, annexing the towns of Endion, Portland, and Rice's Point at the same time. Its population had gone from fewer than 200 people in early 1869 to 3,131 in April, 1870. Sixty percent of the community was made up of northern European immigrants, many of whom refused to work with the Ojibwe because—based on their readings of false newspaper accounts and exploitative novels—they considered all Native Americans savages. Consequently, the construction of the railroad essentially displaced most of the Ojibwe who had, until recently, lived in relative harmony with their Euro-American neighbors. No Ojibway were recorded living in Duluth in the 1870 census.

The new city's developing railroad infrastructure proved problematic in other ways as well. Built at the very northwest corner of Lake Superior, the outer harbor's waters were often too turbulent for a large vessels to dock safely. So the city built a protective breakwater that extended into the lake from the foot

of Fourth Avenue East next to Elevator A. But the breakwater proved ineffective. Most Duluthians recognized that the safest place for a commercial harbor was between Minnesota and Rice's points. In fact, the LS&M had already constructed a line along the western side of Rice's Point and at its southern terminus built DeCosta's Dock, named for the railroad's chief engineer, to serve vessels entering Duluth from the Superior Entry. But if ships entered Superior Bay through the entry, they'd sail right past the Village of Superior and have to navigate several more miles to reach Duluth. When a railroad inevitably reached Superior, commercial vessels would likely find it easier, and perhaps even cheaper, to do business in Superior rather than Duluth.

So the new city's original officials dusted off an idea first entertained in the 1850s: Dig a ship canal through Minnesota Point not far from the sandbar's base to bypass the Superior Entry. So in the summer of 1870, the alderman of Duluth's

Common Council (the equivalent to today's City Council) voted to construct a ship canal and also dredge Superior Bay to create the inner harbor. To finance the work, the city accepted a loan of \$50,000 from Jay Cooke via the LS&M in the form of one hundred \$500 bonds. They chose to cut the canal along Portage Street, the ancient path of Onigamiinsing.



Number 90 of 100 \$500 bonds issued in 1870 to finance the digging a ship canal through Minnesota Point along the ancient path of Onigamiinsing. [IMAGE: LSMC]

Cutting the Canal

When Jay Cooke was deciding in which city to terminate his railroad at the Head of the Lakes, Superiorites had campaigned aggressively to get the LS&M to come to their city—at one time even suggesting that Cooke drop the word “Lake” from the railroad’s name. In 1867 Superior’s backers sent a letter to LS&M president William Banning “circulating rumors that it is not possible to find room on the North Shore either on the lake or bays, to build a railroad, lay out and build a town, or do any kind of commercial business.” When Cooke chose Duluth over Superior, many Superiorites felt that the Philadelphia financier had snubbed their town.

Cooke’s railroads and his other projects indeed brought prosperity to Duluth. But slighted Superior still had one great advantage over the Minnesota city: the Superior Entry kept the majority of region’s fledgling industries on the Wisconsin side of the bay. A canal in Duluth would change everything—and Superior would do all it could to stop its construction.

The Duluth Common Council determined the canal through Minnesota Point along Onigamminsing/Portage Street would be 150 feet wide and 16 feet deep and protected by piers on each side stretching 18 feet into the lake. The council hired W. W. Williams & Co., who sent a fleet of steam-powered dredging barges to Duluth to both cut the canal and deepen the natural harbor. That summer Cooke’s Northern Pacific Railroad began constructing docks, wharves, and a rail line on the swampy land between Minnesota Point and Rice’s Point north of the canal site, creating a massive commercial district.

Major John Upham took the controls of the steam dredger *Ishpeming*, whose shovel took its first bite out of Minnesota Point on September 5, 1870. The dredger chewed up sand and gravel until mid-November, when the ground had frozen. The *Ishpeming*

returned to work on April 24, 1871, digging continuously during daylight hours until Saturday, April 29. By then she had cut a swath thirty feet wide and eight feet deep to within a few feet of the lake side when, as the *Duluth Minnesotian* reported, her shovel struck a vein of impenetrably frozen gravel. A group of “determined” men quickly assembled and with “shovels and picks and drills and powder (two kegs)” they scooped, smashed, bored, and blasted through the rock, allowing the *Ishpeming* to continue her work. At 1 P.M. that day the first cut was complete, connecting the lake and river within Duluth’s borders—or, in the words of the often-verbose Dr. Foster, “the union of the waters became forthwith an accomplished fact.”

Foster’s paper reported that the waters of the Bay, a few inches higher and a few degrees warmer than the lake’s waters, cut and thawed through the ditch. The next morning, Sunday, April 30, a channel five feet deep and twenty wide flowed with a six-mile-an-hour current from the bayside into the lake. That afternoon the small steamer ferry-tug *Frank C. Fero*, piloted by Captain George W. Sherwood, became the first vessel to navigate the canal. The *Ishpeming* returned to work the next day, and kept cutting throughout the summer, making the canal deeper and wider to accommodate large commercial vessels.

Foster didn’t report the news of the completion of the canal’s initial cut until May 6. Seth Wilbur Payne’s *Morning Call* scooped him as the first newspaper to report the completion of the canal, at the same time bemoaning the lack of pomp and circumstance surrounding the event: “An event occurred yesterday of greater importance than would have been the commencement of the [Northern Pacific] docks. We refer to the opening of the canal across Minnesota Point. Why did not our capitalists and real estate criers not show their love for Duluth by some appropriate



The dredging tug *Ishpeming* cutting the Duluth Ship Canal in 1870 with the developing new city of Duluth in the background. [IMAGE: LSMC]

public demonstration?” Payne was right about the importance of the canal: Once the canal and NP facilities were complete, the only thing barring the way of Duluth’s future as the premier city at the Head of the Lakes was its neighbor across the bay—and

Superior’s citizens were not happy about the canal. On April 24, 1871, village attorneys filed for an injunction against Duluth and the dredging company to “be enjoined and restrained from constructing said canal,” setting off a seven-year legal battle.

Duluth Ship Canal Creation Myths

Over the years the events surrounding the digging of the Duluth Ship Canal evolved into an extraordinarily tall tale that many still believe. Several versions of the legend exist, and most go something like this:

In January 1871 Superiorites uncovered Duluth's plot to dig a canal (in the legends, the digging had not yet begun), which would reduce shipping traffic to Superior. Superior's leaders filed for an injunction to stop the dredging, which the courts granted in April. A telegram received on Friday, April 28, warned Duluthians that a government-dispatched courier was in route to deliver the injunction. So the call went out for every able-bodied

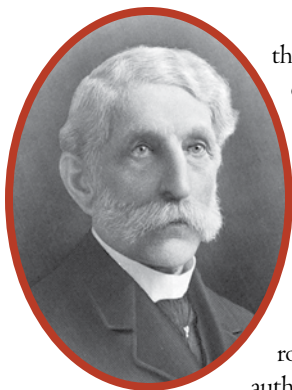
man, woman, and child in town "who could handle a spade or shovel, or beg, borrow, or steal a bucket or a bushel basket" to converge on the canal site where they "dug, scratched, and burrowed 'till it was finished." By the break of dawn Monday, they had cleared a canal. The courier arrived at the exact moment the tug *Frank C. Fero* passed through the canal. Recognizing the hand-dug ditch as a navigable waterway, the courier decided then and there that the injunction had been rendered invalid and immediately tore up the document, ending the whole affair.

Some versions have the *Ishpeming* cutting the entire canal in two days. Many claim the courier arrived on horseback while others say he took the train. In perhaps the tallest version of the tale, recorded by the *Duluth Evening Herald* in 1929, the canal was created with one perfectly executed explosion: "Leading Duluthians of the time...led by [William] Sargent...formed the 'Dynamite Club.' Under the cover of darkness...bankers, clerks, professional men and laborers worked frantically with pick and shovel.... As daylight approached and they realized they would not finish the task, leaders called for dynamite.... When the debris settled the dynamiters were rewarded by the water rushing through the ditch thus created." This story, which notes that the blast also destroyed every window within several miles of the canal, fails to consider that William Sargent was only eleven years old in 1871, hardly the person city leaders would look to organize and lead such a dangerous task.

So how did these tales take root? Like all good myths, they contain some truth: A little hand digging and a couple kegs of blasting powder were used to break up a stubborn patch of frozen gravel on April 29 (see page 6). An injunction was filed, but it did not arrive until nearly a week after the *Ishpeming* had finished its initial cut. The lawsuits dragged on until 1877, but



A June 2, 1945, *Minneapolis Sunday Tribune Magazine* cover story helped spread the myths of the canal's creation [IMAGE: UMDMLSCA]



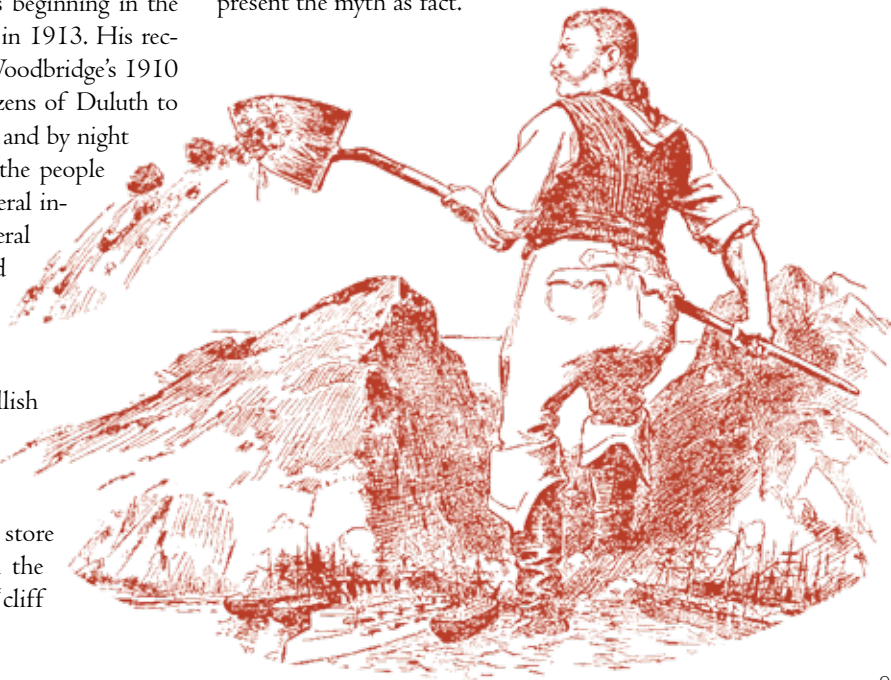
they never once interfered with the canal's construction nor operation.

Like other legends, the canal myth likely began as elaborations of true events told repeatedly, becoming canonical after they were set into type. The first version of the story found in print—including the “dug, scratched, and burrowed” passage—comes from British author James H. Bridge's 1888 book

Uncle Sam at Home. Bridge's source may well have been early Duluth resident Roger Munger (pictured above ca. 1900). Munger told versions of the legend to newspaper reporters beginning in the 1890s, and they were reprinted when he died in 1913. His recollection appeared in his son-in-law Dwight Woodbridge's 1910 history of Duluth: “I was engaged by the citizens of Duluth to dig the channel. We began work on a Saturday and by night Superior knew what we were about. At once the people over there began to scurry around to get a federal injunction restraining us. I hired a gang of several hundred men . . . and we worked all that day and far into the night. . . . When the Superior people came over Monday morning there was the channel open and they couldn't do anything.”

Other versions of the tale further embellish the drama. Some include mention of Superiorites arriving in rowboats to heckle the men digging away at the point. At least one historian wrote that a Superior hardware store advertised the sale of surplus muskets from the Civil War to arm Superiorites against those “cliff dwellers” across the bay.

Perhaps the stories perpetuate because people can't resist telling them, facts be damned. As one of Duluth's first city aldermen, Munger himself helped hire the *Ishpeming* and knew full well his account was a fib. Author Bridge was fourteen years old in 1870 and did not live in the United States, let alone Duluth. Jerome Cooley, who moved to Duluth in 1873, recorded his version in a 1922 book of his “recollections.” Otto Wieland, born in 1871, told his tale to the Works Project Administration in 1942. The *Minneapolis Tribune Sunday Magazine* featured its account, based primarily on the 1929 William Sargent story, in 1945. Duluth teacher Dora Mary MacDonald retold it in her 1949 book *This Is Duluth*, researched in part by her elementary school students. Even today several websites present the myth as fact.



The Legal Battle Over the Ship Canal

The very day the *Ishpeming* had resumed dredging, April 24, 1871, the U.S. Attorney General's office filed for an injunction against the city of the Duluth and W. W. Williams & Co. It claimed that unless the dredging ended or a dike was built between Minnesota Point and Rice's Point, the current of the St. Louis River would be diverted; the silt carried by the river would deposit at Superior Entry, rendering navigation through the entry impossible. The suit asked that the defendants "be enjoined and restrained from constructing said canal."

Supreme Court Justice Samuel Freeman Miller allowed the canal construction to continue on the condition that Duluth build the dike, and that if the dike is constructed to the government's specifications, the injunction "may be modified or dissolved." The injunction was served on June 13, 1871. Pleading a lack of finances, Duluth city attorney James Egan convinced the U.S. attorney general to not only dissolve the injunction, but for the federal government to issue the city a \$100,000 bond to build the dike. Meanwhile, Cooke's Northern Pacific Railroad began constructing more harbor infrastructure. By winter it was building docks on Rice's Point and along the shoreline inside the bay and had also arranged with the city to help pay to complete the canal and widen it to 250 feet. The NP would also help construct the dike to satisfy the injunction's dissolution.

The dike proved a problem from the start, for both Duluth and Superior. The structure, designed with no gates, blocked shipping traffic between the towns. Feeling the barrier would be temporary, Duluth took construction shortcuts that essentially rendered the dike useless. Wisconsinites were divided: Its governor warned that Duluth must build a better dike or fill in its canal while Superiorites wanted the dike gone so they could conduct business in Duluth. In 1872 Wisconsin's new gover-

nor, Cadwallader Washburn, called on the federal government to either close the canal, replace the dike with another located closer to the canal that would provide greater access to the bay, or rebuild the damaged dike to include gates.

By April a ten-foot wide rock-and-timber dike stretched 4,490 feet from Rice's Point toward Minnesota Point. A rail line sat atop the dike, not for passage but to carry material to fill the cribs and secure the dike. The work was dangerous. The *Minnesotian* reported that one laborer had been severely injured when another accidentally struck him with an axe, and another had been thrown to the tracks from one of the gravel train's dump cars, where "eleven cars passed over him, killing him instantly." The paper blamed the death on "the men or jealous rivals who made that unnecessary Dyke [sic] a necessity."

Saboteurs also tried to stop the dike. On May 4, 1872, the *Minnesotian* reported an unsuccessful attempt by "sacrilegious scamps" to blow a hole in the dike. The newspaper taunted the attackers: "Children! Babes! When you come again with your powder in tin tubes, with your water-proof fuse inserted at the middle, bury it deep in the centre [sic] of the Dyke [sic] and then stand on top and touch it off..."

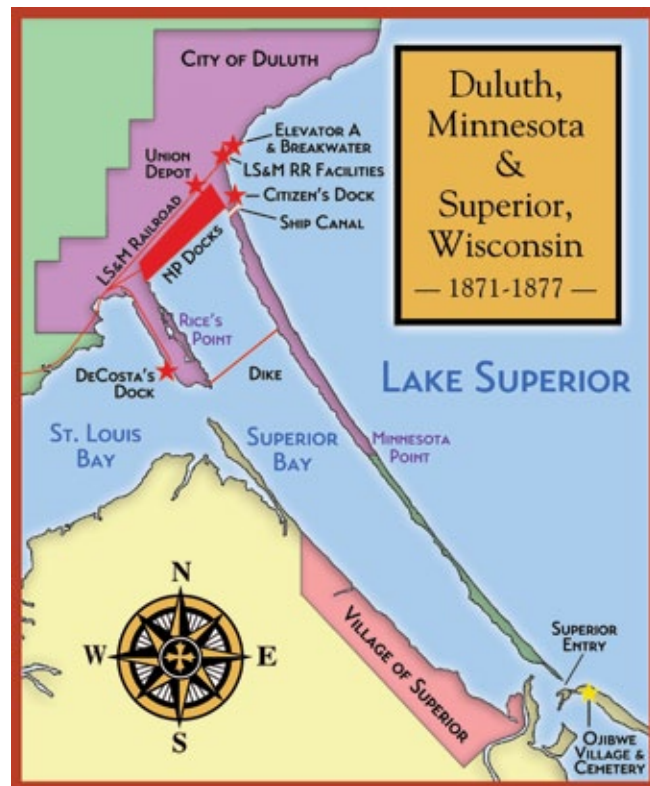
Despite these incidents, work continued until June of that year, but it was never completed. Further, the bay's depth varied greatly, and the dike began settling in deeper waters. After a July storm, the receding waters created a current the dike couldn't handle, and it broke near Minnesota Point. Knowing that their Wisconsin neighbors would take their failed injunction to a higher court, Duluth decided to invest no more time or labor—or money—into the dike.

That's when the NP stepped in to end the dike debacle. The railroad said that if Wisconsin would abandon its efforts to

force Duluth to build a dike, the NP would extend its rail line from Rice's Point to Conner's Point in Superior and run it along the shoreline to the mouth of the Nemadji River and to connect the railroad to future wharves and docks. Northern Pacific would even build a bridge between the points and a grain elevator in Superior. The railroad's intention was to "place Duluth and Superior on equal footing as to leave the commercial world to elect for itself where to do business without any discrimination in favor of either place, delivering passengers and freight both at Superior and Duluth." Both sides agreed to the resolution. It looked like the towns had found a way to come together. The St. Louis River had already demonstrated that it was folly to try to keep them apart.

In the fall of 1873 Jay Cooke himself ran out of money, setting off the Panic of 1873, an economic depression that would last nearly a decade. Almost all industry in Duluth came to a screeching halt. Still, thanks to the railroad infrastructure, in 1874 290 commercial ships arrived at Duluth, while not a single vessel passed through the Superior Entry, giving Superiorites good reason to feel that the lack of rail cost them commerce. In the wake of the panic, the NP didn't have the money to keep its promise to Superior. In December 1874, Superior and the state of Wisconsin filed complaints against Duluth and the NP demanding that they fill in the canal to "restore the current of [the St. Louis] river to its accustomed and natural channel." Duluth would argue that federal funds had been used to improve the canal and build its wooden piers—why would the government order the destruction of infrastructure it had paid for? But extensions and other issues delayed the lawsuit for several years.

The U.S. Supreme Court finally heard the complaint in October 1877. Unexpectedly, Wisconsin dismissed the NP as a defendant. Then Associate Justice S. F. Miller—whose 1871 decision called for the dike's construction—surprised everyone with



his decision: He couldn't care less about the St. Louis River's current. He considered the very points of contention Wisconsin and Duluth had argued over for seven years "immaterial." All that mattered to him was that the federal government had not only approved of the canal's construction, but by virtue of its financial investments in it had also "taken possession and control of the work" on it. And just like that, the legal battle ended—and the federal government had taken ownership of the canal.

Canal Ferry Service

Once the Duluth Ship Canal was cut, the land on Minnesota Point south of the canal essentially became an Island. Cutting off access to the mainland changed everything. Crossing the canal proved to be a major inconvenience: Everything residents needed to survive—food, clothing, building materials—now had to be delivered by boat. The first mention of a ferry system appeared in the *Duluth Minnesotian* on April 18, 1872: “It has been nearly concluded to project slips 20 by 60 feet into Lake Avenue on each side of the Canal and run a scow-boat ferry by a copper wire rope to be dropped to the bottom of the Canal whenever vessels need to pass in or out. Two men will work it, and the cost will not be great.” A week later, the *Minnesotian* announced the ferry system’s establishment: “Arrangements have been perfected by the city with S. L. Secrest and Thos. Brunette to maintain a ferry at the canal during the summer. They propose to run small boats for passengers and scows for teams. The

former will run from 6 A.M. to 11 P.M. and the latter from 6 A.M. to 8 P.M. The contract price is \$14 a day.”

The “rowboat and scow” ferry service remained in operation until 1897, when steam ferries—including the *May Flower*, *Estelle*, and *E. T. Carrington*—took over the job. Residents accessed the ferry from city-owned docks located bayside north of the canal at Buchanan Street and south of the canal at the Osborne Dock. No one expected as much of the ferrymen as did those living south of the canal. Perhaps it was an effort to illustrate the need for a bridge, perhaps it was legitimate criticism, but whatever the case, Park Pointers never failed to inform city officials about poor ferry service quality.

In February 1901, residents of Minnesota Point including Mayor Trevanion Hugo complained about an incident in which a physician, Dr. Phalen, could not get return ferry service at 2:30 A.M. after visiting a critically ill woman south of the canal.



A rowboat ferry crosses the canal in the 1880s. [IMAGE: UMDMLSCA]



The steam ferry *Estelle* ca. 1901. [IMAGE: LSMC]

After many attempts, neither Dr. Phalen nor the patient's husband could alert the ferrymen, who claimed they had been wide awake all night long. Regulations called for ferrymen to take special care of physicians and were to be ready at fifteen-minute intervals after 1 A.M. when they knew a doctor was south of the canal. The ferrymen had violated the terms of their contract, which had been awarded to C. H. Burnham in January and included \$23 a day for the use of his tug *May Flower*. The Common Council resolved to re-advertise for bids on the ferry contract. The owner of the ferry *Estelle* won the contract, and Pointers gave the tug a reprieve the following spring, petitioning the Common Council to keep the *Estelle* rather than turn to a proposed combination ferry and fire tug. They were concerned that service would be shut off whenever the tug was called to a fire.

In 1903 Pointers penned another petition, this time asking for a much larger and "more suitable" ferry, claiming it would be "criminal negligence to continue the present service." Despite her owner's claim that repairs would put her in "first-class condition"—and offering to do the job for \$27 a day—the *Estelle* lost out to the *E. T. Carrington* at \$30 a day. By 1905, the *Annie L. Smith* had replaced the *Carrington* and was operating the day the ferry bridge began operations. Regular ferry operations ended when the aerial bridge began regular operation in April 1905. At least one person was going to miss the ferry service, as young woman among the ferry's final passengers told a *Duluth Evening Herald* reporter that "I don't know whether I will go across the bridge. There is more poetry in crossing in a boat. 'Rocked in the cradle of the deep,' don't you know."

After that day, the *Ellen D.* was put in service whenever the bridge was being serviced—including when the aerial bridge underwent conversion in 1930. The *Estelle* was dismantled in 1906, and the *Carrington* sank fifteen miles from Duluth the next year.

TEMPORARY CANAL BRIDGES

Besides the ferry service, beginning in the winter of 1872, a succession of temporary bridges were used to cross the canal in the late winter, between commercial shipping seasons.

The *Duluth Minnesotian* made the first historic record of a bridge over the Duluth Ship Canal with the simple statement, "The bridge over the ship canal on Minnesota Point remains undisturbed." At the time this simply meant that shipping traffic on Lake Superior had yet to open, so the bridge—a temporary structure that was put up in the winter when the shipping season ended and came down when it began again in spring—was still up if anyone wanted to use it. On April 27 the newspaper explained that gale-force winds on the 25th had forced huge cakes of ice into the canal. The bridge was low enough, to cause a collision: "Two immense cakes, coming with all the force of the wind, and a strong current against the centre [sic] bent of the bridge, knocked it out; when the structure fell, it went out to sea along with the ice."

In 1874 Duluthians spent \$962 building a temporary suspension bridge "of rough wooden towers with cables and a six-foot-wide platform," but workers didn't complete it until February, two months before it had to be removed for the shipping season. When in place, the bridge (shown below in an 1874 sketch by Duluthian Charles Johnson) could barely handle a breeze and often "swayed dangerously" in the wind. It tossed so badly during storms that residents passed back and forth on "hands and knees." From the 1870s to 1895 the temporary bridge was constructed and deconstructed every year—if nature didn't take care of it as it did in 1872.



The Village of Park Point, 1881–1889

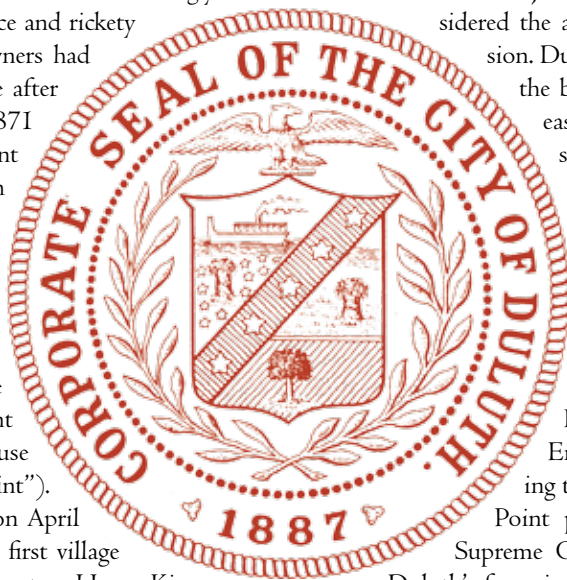
Duluth struggled following the Panic of 1873. By the time the canal lawsuits were settled in 1877 the city was in deep financial trouble. That year its leaders chose to reorganize Duluth as a village so the municipality could reissue its bonds and work itself out of debt. By then those living south of the ship canal, often referred to as “Park Point,” had become increasingly irked by the city’s erratic ferry service and rickety temporary bridges. Further, landowners had seen their property values nose-dive after the canal was cut. Each year since 1871 they had lobbied for a permanent bridge over the canal, but Duluth didn’t have the money to build one. In 1881 the Pointers decided they had had enough of Duluth.

That February Senator John D. Howard introduced a bill in the state legislature to incorporate the independent Village of Park Point (the bill had to be resubmitted because a typo called the village “Bark Point”). It passed on March 7, 1881, and on April 2 Park Point residents elected their first village officials: President R. H. Palmer; trustees Henry Kichli, James S. Pierce, and Captain F. T. Gouin; treasurer Zar D. Scott; recorder J. M. U. Thompson; and justice of peace D. E. Holston. The *Duluth Weekly Tribune* reported that “the total number of votes polled was 16, and the election passed off as quietly as a maple syrup social.”

Meanwhile, Duluth began booming in the early 1880s, thanks a great deal to its shipping canal and safe inner harbor.

The grain trade, lumber and coal industries, and brownstone quarries in Fond du Lac contributed to both a population and construction boom. In 1887 the Village of Duluth paid off its debts, became a city once again, and began looking to expand its borders, in part by annexing Park Point. Many of Park Point’s residents didn’t rejoin Duluth willingly—some, in fact, considered the annexation attempt an act of aggression. Duluth’s industrialists wanted to develop the bay side of the point as they had the eastern shore of Rice’s Point, building a system of wharves and warehouses that would serve factories along Minnesota Point. Most Park Point residents opposed the idea.

So the Pointers took the matter to court, calling the annexation unconstitutional. They argued in part that the mouth of the St. Louis River had shifted from the Superior Entry to the Duluth Ship Canal, moving the state line and thereby making Park Point part of Wisconsin. The Minnesota Supreme Court disagreed, settling the case in Duluth’s favor in January 1890. Historian Walter Van Brunt, Duluth’s first city clerk, suggests Pointers weren’t satisfied until a deal was struck addressing the reason the community left Duluth in the first place: “Finally, being promised a bridge, rather informally and not truly officially perhaps, [the Pointers] surrendered.” Park Point re-joined the city, but the canal kept the community an island unto itself, as it took Duluth fifteen years to make good on its “promise.”



Wilhelm Boeing's Claim on the Canal

Eighteen years after the Duluth Ship Canal was dug, German immigrant and Michigan lumberman and financier Wilhelm Boeing claimed ownership of the land occupied by the canal. Following the Panic of 1857, Boeing had purchased fourteen lots on either side of Portage Street, which had been dug up beginning in 1870 to create the canal. Boeing wanted his land back or, better yet, financial reparation for what had been done to it.

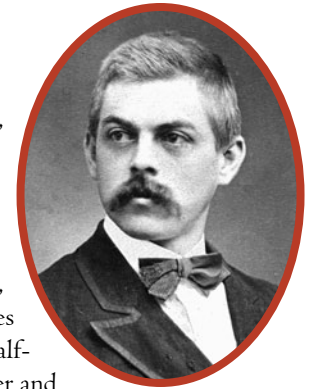
On September 27, 1889, Boeing posted the following notice in Duluth newspapers: "To all boat and vessel owners—You are hereby notified that on and after the fifteenth day of October, 1889, the right of passing through the canal connecting the waters of Lake Superior and the bay of Duluth will be denied by me to all boats and vessels. A rope will be stretched across the canal on my property, which lies in and upon either side of said canal, and the owner or master of any boat or vessel breaking the same will be promptly proceeded against in the courts." The notice was also printed as a circular and issued to captains of vessels passing through the Saulte Ste. Marie locks that were heading to Duluth.

Boeing then told the *Duluth Evening Herald* that the posting was "not intended to work hardship to any interests of Duluth, but simply to establish what rights I possess." His goal was to prod the city into purchasing the property. Duluth Common Council President John J. Costello told the *Herald* that Duluth had considered paying a reasonable sum, but Boeing's asking price of \$100,000 was "preposterous." Besides, Costello argued, the canal was already eighteen years old—why hadn't Boeing made his claim earlier? And since the federal government took over ownership of the canal in the 1870s, how could Boeing sue Duluth for property it didn't own?

Boeing left Duluth in September, leaving his friend Marshal Alworth to handle the matter. On October 14 Boeing telegraphed Alworth, telling him to "String the rope." The next day Alworth hired Frank Jacobs, James Jones, and ferryman Charles Winters. At 12:15 A.M. they tied a half-inch rope to a piling on the north pier and brought it across the canal on the ferry, and then tied it off on another piling on the south pier. Police Officer Frank Horgan promptly cut the rope. When Horgan went home after his shift, Alworth's men put the rope back up. When the steamer *Winslow* passed through the canal later that day, her captain yelled "to hell with you and your old clothesline" and steamed through, the ship itself cutting the rope. Alworth's men promptly restored the rope, only to watch the tug *Spirit* break it a short time later.

The next time Alworth's men tried to block the canal, they spiked eighteen feet of chain to the canal's wooden piers hoping that its weight would lower the rope out of reach of any boat master's knife. But they failed to properly connect the rope and chain. The next morning a *Herald* reporter retrieved the chain, and Police Chief Patrick Doran arrived and instructed officers to "arrest anyone attempting to put a rope across the canal."

Boeing died from influenza in 1890, just months after the posting, and there is no evidence that Duluth ever compensated him for the property he had lost. But even without the \$100,000 he demanded, Boeing had plenty of money. Most of his vast wealth went to his son William, who would eventually move to the Pacific Northwest and start building airplanes. Today Bill Boeing's company is a leader in commercial aviation.



1890s Ideas for Crossing the Canal

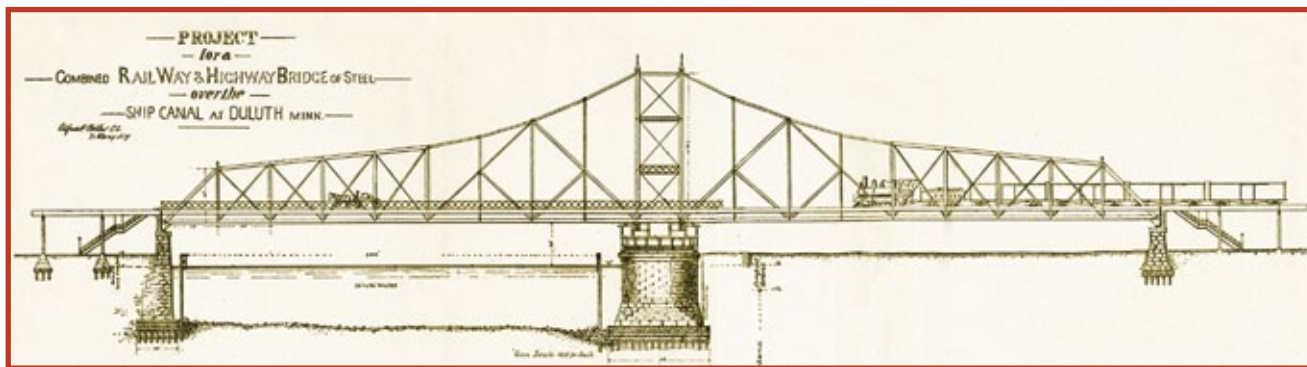
Once Park Point agreed to rejoin Duluth, the city finally went to work on the question of how best to bridge the canal. At the behest of the Common Council, the Duluth Board of Public Works hired Alfred Pancoast Boller, a nationally recognized consulting engineer, to produce the first plan to span the canal with a professionally designed bridge. One of Boller's biggest challenges would be satisfying federal engineers: Since the canal and the land adjacent to it was owned by the federal government, no bridge could be built without federal approval. And the government would approve no bridge that could potentially block commercial shipping traffic through the canal.

For his 1890 proposal, Boller designed a 475-foot swing bridge mounted on a massive masonry pier rising out of the canal tight against the canal's south pier; nearly half the bridge would actually hang over Minnesota Point when in use. To allow ship traffic to pass, the bridge would pivot on a great turntable at its center—using fifty-eight twenty-inch steel ball bearings—so that when it was moved to allow a ship to pass, the entire bridge

would rest along the south pier wall. The bridge would take fifteen seconds to unlock and another ninety seconds to swing out of the way or back into place. He also designed the bridge's deck to carry both railroad and wagon traffic and included sidewalks.

Nothing ever became of Boller's plan. At an estimated cost of \$400,000 (about \$12.5 million in 2022), Duluth simply didn't have the money to build it. Besides the federal government, local business owners and captains of industry opposed any sort of mechanical bridge, as any such structure could potentially fail, blocking the canal and preventing ships from accessing Duluth's harbor. Boller later designed the Interstate Bridge (1897–1960), a swing-arm bridge connecting Duluth and Superior between Rice's and Conner's Points; a remnant of it remains.

In an attempt to avoid the potential problems a bridge might create, Duluth turned its attention to a new idea: A tunnel. The city hired Chicago civil engineer William Sooy Smith to come up with a plan, which he delivered on January 27, 1891. The Smith tunnel would carry St. Croix Avenue (today's Canal Park Drive)



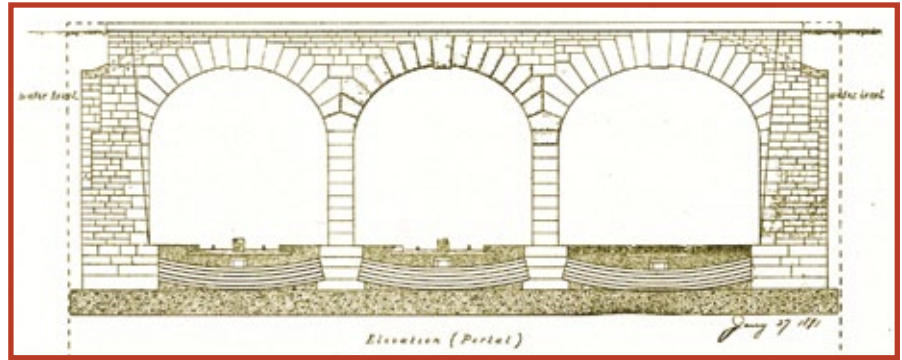
Alfred Pancoast Boller's 1890 plans for a swing-arm bridge over the Duluth Ship Canal. [IMAGE: JJHL]

along the eastern shore of Minnesota Point underground and below the canal, emerging south of the waterway. Towers on either side of the canal would take pedestrians down a stairway to the walkway. But its pricetag was nearly four times that of Boller's bridge, so the idea was scrapped.

Next, the city held a contest for a bridge design. In October 1891 Duluth's Board of Public Works advertise da competition for plans to bridge the canal. The designs had to carry passage for rail, wagons, and pedestrians (the first automobile wouldn't arrive in Duluth until 1900) and work in a way that did not impede canal traffic. The best plan would receive a \$1,000 prize. At the end of December the competition was announced in *Engineering News*. Twenty engineers from across the country submitted designs. Two plans called for a swing arm similar to Boller's earlier design. Several, including a submission by Smith, were for sliding bridges in which either one entire expanse or two smaller expanses (one on either side of the canal) would slide back along rails to clear the shipping lane. Two designs involved cantilevering the bridge so it could be tipped up and out of the way

The Milwaukee firm of Arentz & Sangdahl took home the cash for their bi-level, single sliding draw bridge design. The bridge's railway floor would hang above the roadway for wagon and foot traffic; to make way for a passing ship it would slide straight back 316 feet from the canal along rails. A 116-horsepower electric engine would move the bridge with steel ropes.

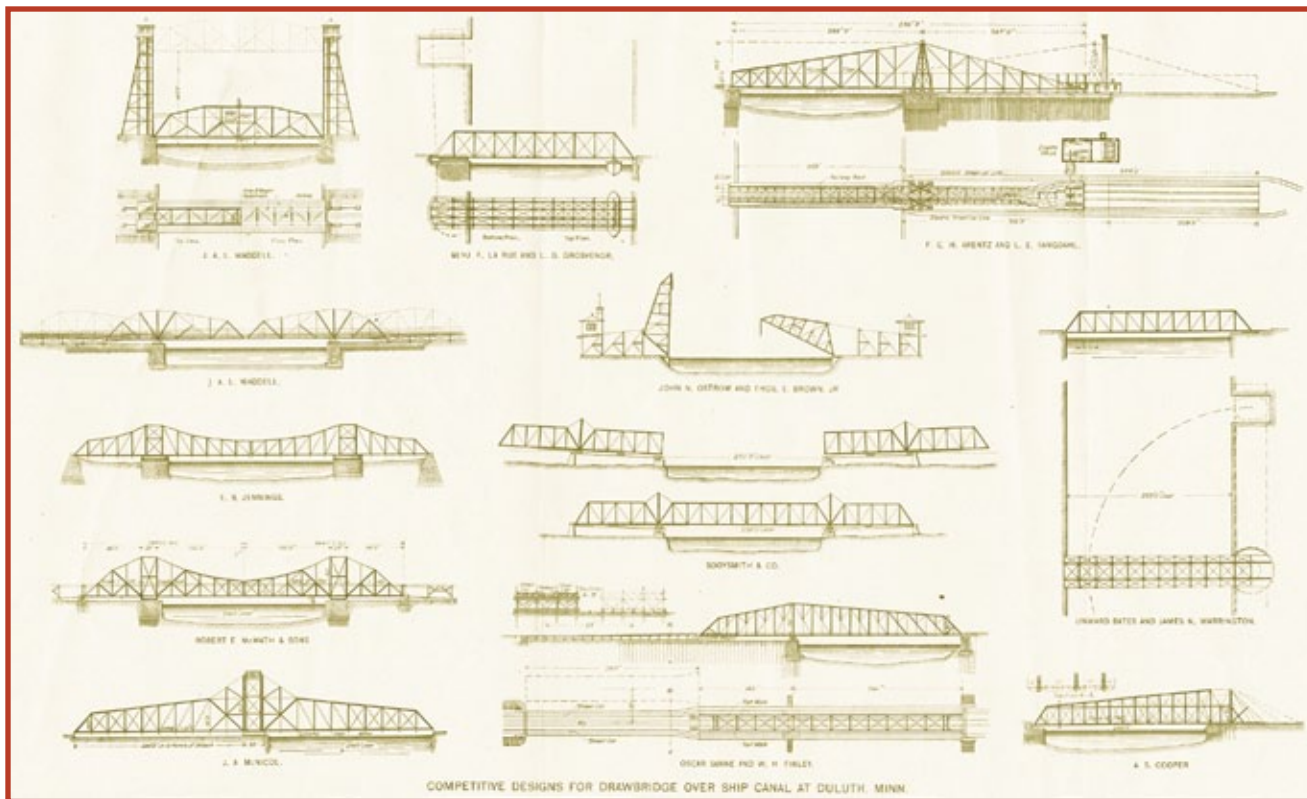
Despite winning the contest, Arentz & Sangdahl's design was passed over for a cheaper bridge that would "take care of the business for several years, or until such a time as the city felt



William Sooy Smith's 1891 plans for a tunnel beneath the Duluth Ship Canal. [IMAGE: JJHL]

it was able to tunnel the canal." The city chose a plan by John Alexander Low Waddell for a new kind of bridge: A vertical lift bridge whose roadway span could be lifted to allow shipping traffic full use of the canal. The board called the plan "the best adapted to the locality and the most suitable and economic structure as regards both construction and operation."

As a Duluth committee presented Waddell's plans to the U.S. Secretary of War, who had jurisdiction over the canal, news broke that the Lake Carrier's Association, the Cleveland Vessel Owner's Association, and others involved in the Great Lakes commercial shipping industry were leading a protest against the construction of any bridge over the canal. The groups argued that access to Minnesota Point would have no effect on the local economy as only two hundred people called the land spit home, and its property was not needed for dock space. Further, one of Lake Superior's fierce storms would certainly wash out the bridge. If a bridge were rendered inoperable during a storm, ships would not be able to pass through the canal to the safe inner harbor. They offered three alternatives: Continue the ferry service, build a tunnel, or connect Minnesota Point to Rice's Point using a trestle bridge with a center draw.



COMPETITIVE DESIGNS FOR DRAWBRIDGE OVER SHIP CANAL AT DULUTH, MINN.

Submissions to Duluth's 1892 canal bridge design contest. [IMAGE: JJHL]

The War Department heard the complaint in Detroit in March of 1892. Duluth's representatives argued that the city intended to make the bay side of Minnesota Point a contributing portion of the port. Multiple slips jutting into the bay from the Point could create "twenty-two linear miles of dock frontage." Further, a bridge would bring rail service to those docks, increasing Duluth's potential for economic development. They argued that the bridge would serve the estimated 10,000

people each day and denied it would obstruct navigation. Despite the city's efforts, the War Department would not approve the bridge. Waddell took his plans to Chicago, where they were used to build the world's first lift bridge in 1893 (see page 60).

Duluth was back to one alternative: A very expensive tunnel. The Board of Public Works' 1892 report on the matter expressed the town's frustration, concluding that, "The day when we will have access to Minnesota Point is probably a long way off."

Rebuilding the Canal & Piers, 1896-1902

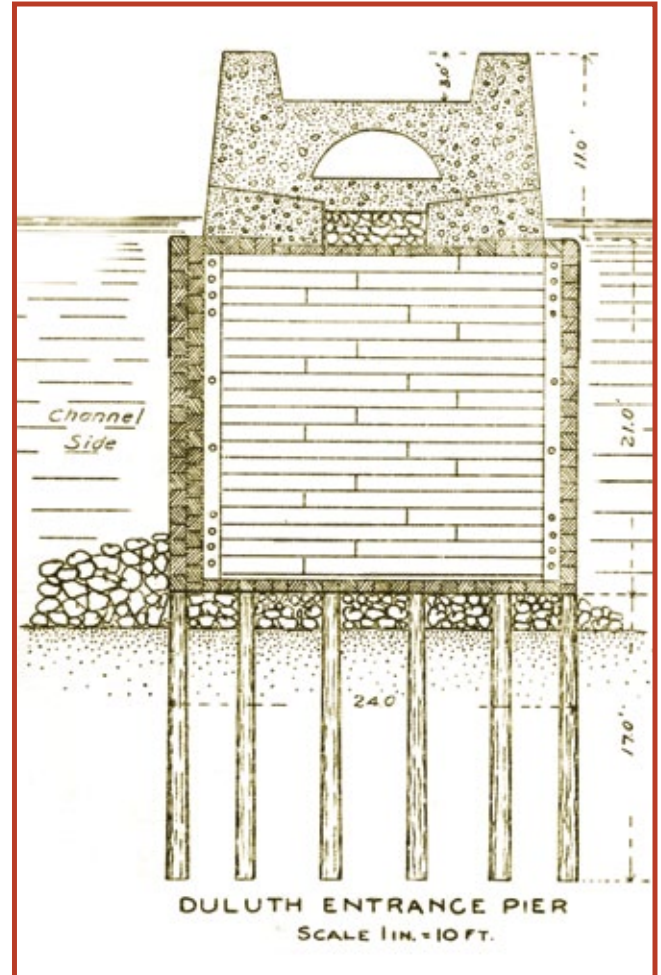
While Duluth officials had been stymied in its efforts to bridge the canal, the city was actually fortunate it did not build a bridge prior to 1898, when the canal was widened: Thereafter, any bridge would have been too short to span the canal, and a tunnel would have been in the way of new piers.

By the early 1890s, Duluth's canal and harbor needed major improvements: The old fourteen-foot deep channel wasn't up to par, not since the locks at Sault Ste. Marie (or "The Soo") on the other end of the lake were enlarged back in 1881. And the iron ore industry had finally arrived in Duluth by way of mines on the Merritt brothers' newly opened Mesaba Iron Range, creating more shipping traffic through Duluth. But the canal's and the harbor's shallow depth prevented bigger ships from carrying larger, more profitable loads.

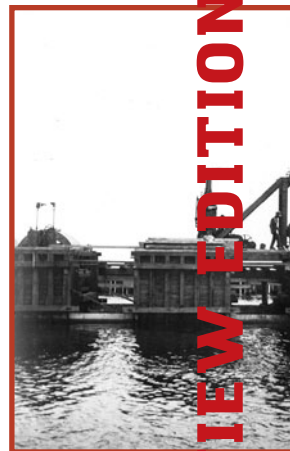
So in 1893 Duluth's Captain Alexander McDougall—inventor of the Whaleback Steamer, which revolutionized the Great Lakes shipping industry—went to work organizing the Duluth-



The canal's crooked wooden south pier in 1896. [IMAGE: LSMC]



Plans for the new piers of the Duluth Ship Canal. [IMAGE: LSMC]

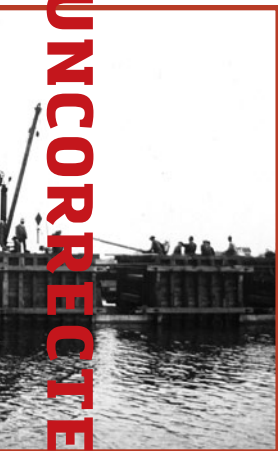


Superior Harbor Improvement Committee, whose first task would be to petition Congress for funds. In 1896 Congress “appropriated \$3 million . . . to make Duluth-Superior harbor the most modern in America.” The project called for twenty-foot channels throughout the bay, a connecting channel between the Duluth Bay and the Superior Bay, and an “immense anchorage basin” behind Park Point. Both the Superior Entry and the Duluth Ship Canal would receive new concrete piers. The appropriation also brought Duluth and Superior together: On June 3, 1896, the same act of Congress that appropriated the funds declared that “the harbors of Duluth and Superior [are] united.” The two separate towns—once bitter rivals—had come together; in 1910 the two cities became known collectively as the Twin Ports.

Plans drawn up in 1896 called for a major renovation of the canal. It would be widened to 300 feet and stretched 400 feet to a total length of 1,600 feet. Substantial concrete structures would replace the rickety, crooked wooden piers that lined the canal. The work would take almost a thousand men and seven years to complete.

The steam dredge *Old Hickory* set to work making the canal deeper and wider: It had to cut another one hundred foot swath out of Minnesota Point, dig a trench twenty-four feet deep where cribbing would be set atop wooden pilings to support the new piers, and clear the rest of the canal to a depth of twenty feet. To widen the canal, dredging would take place south of the south pier; the old wooden pier would remain in place until the new one was completed. While engaged in this digging, *Old Hickory* hit a submerged obstacle: the wreck of the two-hundred-foot, three-masted sailing schooner *Guido Pfister*, which had stranded on the point adjacent to the canal in 1885; it was then abandoned and sunk. Engineers used dynamite to extract the wreckage.

As the *Old Hickory* dredged the canal deeper and wider, contractors began driving more than 5,100 wooden pilings, made of fifty-foot Norway pines, into the lake bottom every four feet; these pilings were later cut to a uniform level at twenty-four feet below the waterline. Workers then set cribbing on top of the pilings. Each crib, assembled at various places around the



L to R: The process of building the concrete piers of the Duluth Ship Canal and a few of the thousands of men who helped built them between 1896 and 1902. [IMAGES: LSMC]

harbor, measured twenty-four feet wide, one hundred feet long, and twenty-two feet tall. Constructed of twelve-inch square pine beams, each crib featured a one-inch band of iron across the top to prevent ice from damaging the wood. Contractors assembled sixteen cribs for each pier. Each was towed into place, aligned, and sunk onto the pilings with the weight of stones. Once properly aligned, the pier had a solid foundation one foot below the waterline. Engineers then sank nine thousand tons of rip-rap stone along the base of the new piers to prevent erosion.

Steam derricks placed concrete footing blocks atop the crib-bing. After the footings were aligned, huge monolith concrete blocks—which would form the canal's deck and parapet walls—were set atop them. Unlike the footings, these blocks, which measured ten by eighteen feet and weighed fourteen thousand pounds each, were molded and cast on site by “large gangs of men working around the clock.” These men, mostly Swedish and Finnish immigrants, received two dollars a day for their efforts. Thousands of tons of concrete were used to make the 334 monoliths used in the piers, 1,200 barrels of Portland cement

for the South Pier alone. A center channel along the bottom of each monolith was left with a half-circle opening. When set in place, this opening formed a tunnel. A pulley-and-cable driven rail system was installed so that lighthouse keepers could reach their posts during treacherous conditions that would make walking atop the piers highly dangerous. Unfortunately, during storms the tunnel itself became half filled with water; it was little used for decades and later filled in as a safety measure. (With the old wooden pier, lighthouse keepers reached the South Pier Light by walking over a trestle walkway, so the keeper could reach the light even when the pier was submerged by large waves.)

Work began on the South Pier in 1898 and was completed in 1900. New South Breakwater and Rear Range Lights sat atop the South Pier by September of 1901. In 1902 workers finished the North Pier. Not once did the reconstruction of the canal interrupt shipping. The new century was still young, and Duluth had a brand new canal that would serve it far into the foreseeable future. But on the other side, Park Pointers still had no safe, reliable means of crossing the canal.

South Breakwater Light & Foghorn

In 1872, the U. S. Corps of Engineers advertised for proposals to build a navigational beacon on the outer end of the Duluth Ship Canal's south pier. Contractors built a wooden pyramidal tower and capped it with an octagonal cast-iron lantern housing a fifth order Fresnel Lens. The light, which cast a red beacon visible 12.5 miles away, was lit for the first time on June 2, 1874. In 1877 the light was upgraded with a fixed red fourth order Fresnel lens.

The western tip of Lake Superior was notorious for its extremely thick fog. In 1880 engineers installed an automated fog bell inside the light's wooden tower, but it proved inadequate. Five years later it was replaced with twin steam-powered fog whistles housed in a small structure near the light. Duluth experienced one of the foggiest seasons on record in 1895, and the fog-signal whistle screamed for over one thousand hours, gobbling up forty-five tons of coal in the effort. The whistles not

only sent a warning to mariners on the lake, they also bounced off Duluth's rocky hillside, creating a cacophony most residents couldn't bear. To remedy the problem, the signal's horns were relocated to the roof and covered with a parabolic reflector. The reflector directed sound away from the city and nearly doubled the signal's reach. The fog signal would be upgraded several times over the years.

Building new concrete piers in 1900 meant tearing down their shaky old wooden counterparts—and everything on top of them. In June 1900 contractors began constructing the new lighthouse, a single-story Romanesque Revival-influence building forty-five feet long and twenty-two feet wide made of buff-colored Cream City brick. Capped with a red roof and featuring Roman arch windows, the structure contained a new fog signal outfitted with a steel parabolic reflector to keep the hillside quiet—yet like its predecessor the signal came to be both loved

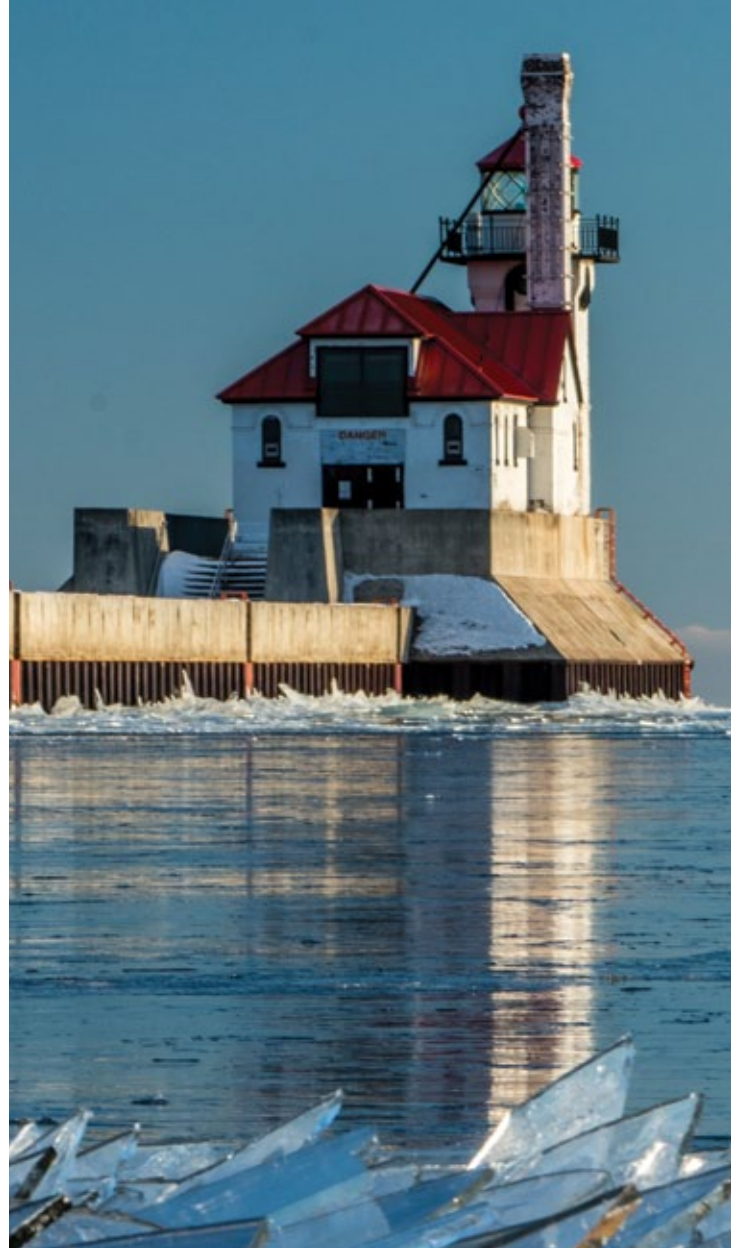


The original South Breakwater Light and keeper's house. Note the raised walkway, built to help keeper's reach the light during storms. [IMAGES: LSMC]

and despised by Duluthians. A tower sprouted thirty-five feet in the air from its east end; here workers installed a gallery deck and the old tower's lens inside a new circular cast-iron lantern that gave it a range of twelve miles. On September 1, 1901, the new light guided mariners to the canal for the first time.

When the ship canal's North Pier Light was constructed in 1910 it originally cast a white beam. Later both lights were changed to be navigationally appropriate: the south pier was fitted with a green light, and the north with a red. In 1915 the fog signal's steam-powered twin whistles installed in 1901 were replaced by locomotive whistles, which in turn were replaced in 1923 by electrically powered twin Type F diaphone horns whose deep "Bee-Oh" tone could be heard for twenty miles. Almost immediately Duluthians complained. The horn was much too loud and rattled windows, disrupted conversation, and woke the sleeping. In 1968 the Coast Guard installed a much quieter single-tone horn. While some Duluthians rejoiced, others dearly missed the old horn's deep toot and felt the City had lost part of its identity. They called the new signal a "peanut whistle."

A nonprofit organization called TOOT (ReTurn Our Old Tone) worked to bring the deep-voiced signal back. They purchased another antique diaphone, renovated it, and installed it in the south breakwater light. TOOT maintained the horn using city funds and fired up the signal in June 1995. For the next ten years city councilors were besieged by letters both for and against the horn. Further, TOOT's failure to both keep the horn operating and communicate with the city caused friction. In 2005 the city took over operation, but that fall the Coast Guard asked Duluth to stop using the horn as it interfered with fog detection equipment and confused mariners. On September 26, 2006, members of TOOT dismantled the horn. The Coast Guard's peanut whistle still blows in foggy conditions: While most ships have radar and GPS navigation, many smaller craft do not.





Rear Range Light

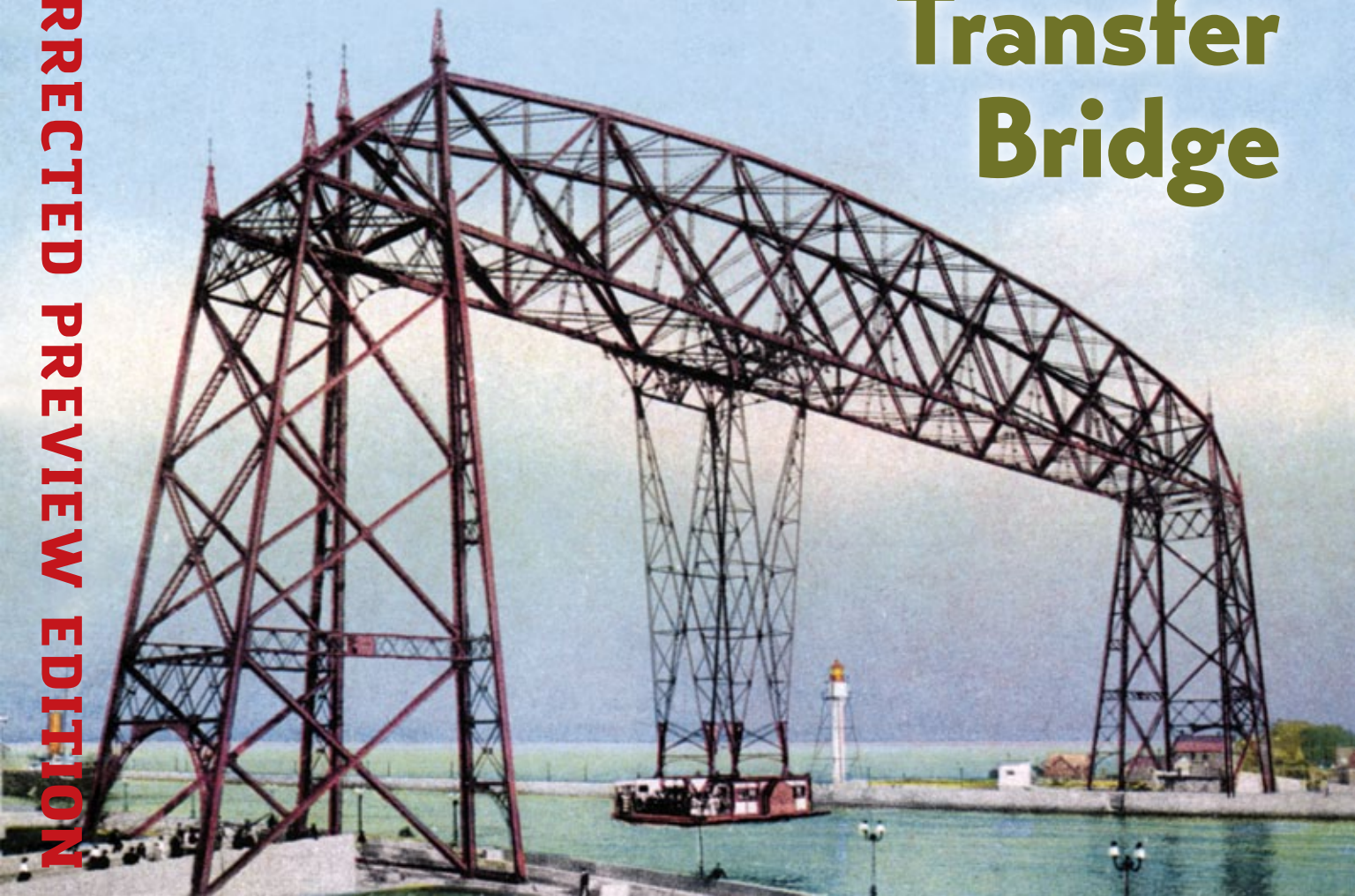
While the South Breakwater Light helped mariners find the canal, another light was needed to provide a focal point by which to guide them through its entrance. In 1880 the Lighthouse Board approved another light at the south pier's western (or inner) end. The light would stand taller than the South Breakwater Light; when used together, the two lights helped navigators establish range and find the center of the canal.

Construction on the wooden pyramid that held the light began in March 1889, and the beacon was shining by September. Like its counterpart on the eastern end of the pier, the inner light boasted a red fourth order Fresnel lens, flashing a signal every six seconds. It wasn't foolproof: Just sixteen days after the light commenced flashing, the steamer *India* collided with the pier at the base of the light itself, damaging the foundation.

As with the old South Breakwater Light, the first Rear Range Light came down during the pier's reconstruction. Engineers replaced the wooden pyramid with a seventy-foot-tall steel tower eight feet in diameter. Built in 1902, the tower is supported by four tube-like legs bolstered with struts and tension rods. The gallery at its top holds an octagonal cast-iron lantern that houses the lens. Workers painted the watch room black and the rest of the tower bright white, providing a striking visual contrast that allowed mariners to use it as a navigation device even in daylight. Engineers also relocated the light, placing it roughly in the middle of the pier instead of at its westernmost end.

In 1995 the old Fresnel lens retired to the Lake Superior Maritime Visitor Center; a new acrylic optic light took its place. And the tower has a slightly different look than when first lit: At some point painters reversed the black-and-white scheme. In 2008 the Coast Guard sold the Rear Range Light to Duluthians Steve Sola and Matt Kampf.

The Aerial Transfer Bridge



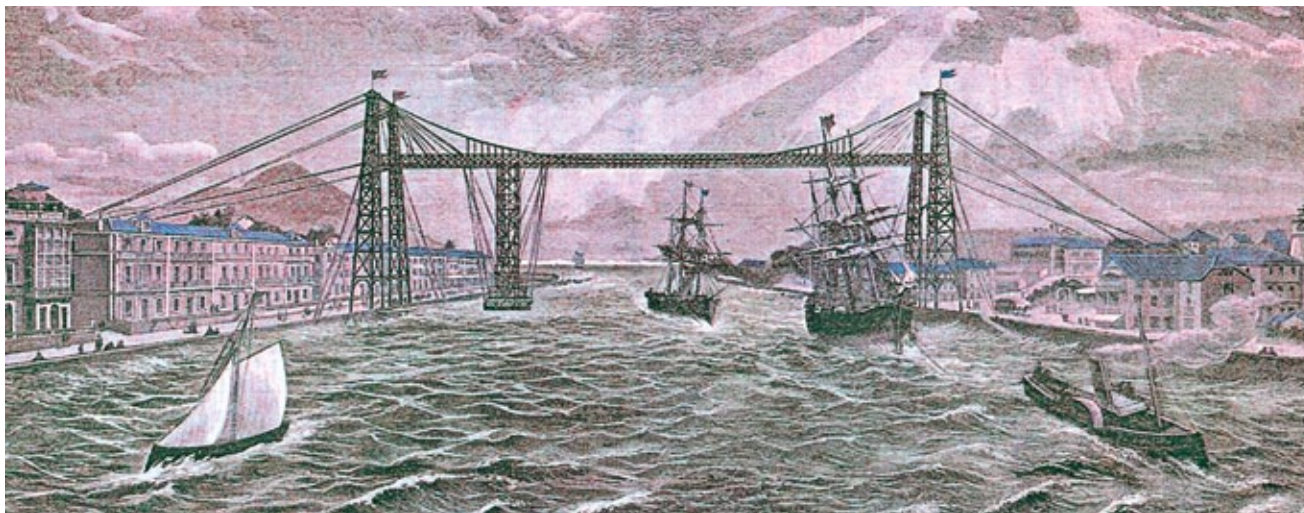
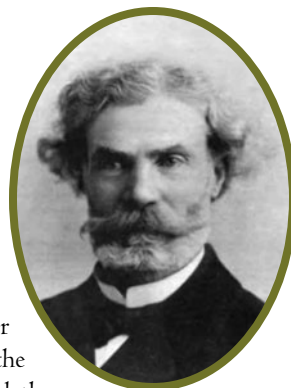
The First Aerial Transporter Bridge

In 1887 France's Ferdinand Arnodin (pictured), the son of a bridge inspector, received the first patent for an aerial transporter bridge, often called a "transfer bridge" or "ferry bridge." Three years later he and Spain's M. Alberto Palacio, a disciple of Paris tower designer Gustav Eiffel, together received a patent for a similar bridge for the "means of transporting goods."

The bridge essentially worked like this: A suspension bridge sat atop two steel towers built on piers placed along opposite banks of a waterway. A gondola car was suspended from the top span with cables attached to pulleys that ran along the structure's bottom rail, which was high enough to allow marine traffic to pass beneath it. A submerged chain, connected to piers along either bank, was looped over a drum on the gondola car. An electric streetcar motor turned the drum, which in turn moved

the cables, and so the gondola car essentially pulled itself back and forth above the water. The cable simply lay along the bottom of the canal when not in use, but while the ferry car was in operation it would naturally be pulled out of the water in front of the car and the slack of the cable would sink back down behind the car and out of the way of shipping traffic as it crossed the river.

Palacio adapted his and Arnodin's patent for Spain's Vizcaya Bridge, which connects the towns of Portugalete and Las Arenas at the mouth of the Nervion River. With Arnodin's help, the 147-foot-high bridge spans 525 feet was completed in 1893



A color lithograph of Spain's Vizcaya Bridge, the first aerial transporter bridge, aka "transfer bridge" or "ferry bridge." [IMAGE: PUBLIC DOMAIN]



A postcard of the Rouen Bridge ca. 1900. [IMAGE: ZCP]

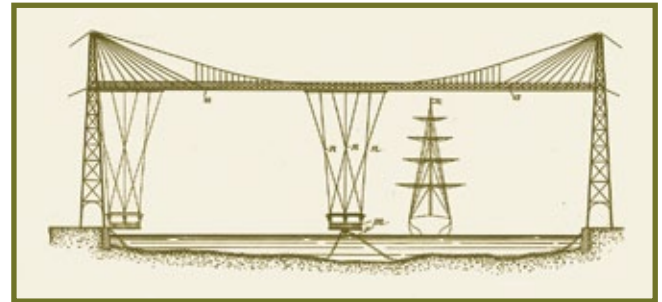
and was the first of its kind in the world, carrying goods, wagon traffic, and people from a suspended gondola. Palacio's bridge is regarded as "one of the outstanding architectural iron constructions of the Industrial Revolution." After nearly 130 years of service, The span still crosses the Nervion River every eight minutes during the day and hourly at night, carrying up to six cars and dozens of passengers on the ninety-second trip. Officials estimate the 4 million people and half a million cars use it every year.

But it was Arnodin's 1899 transfer bridge spanning the River Seine in Rouen, France, that inspired a Duluth engineer's idea to span the city's ship canal. The bridge's towers stood 220 feet above the piers along the banks of the Seine. It stretched 469 feet across the river, and its span rested 164 feet above the water. The ferry car, forty-two feet long and thirty-three feet wide, sat twenty-three feet above the water. It had two cabins, one with windows, the other without: First class and second class (first class cost ten centimes and second class five). The bridge crossed the river in just fifty-five seconds and served the city until 1940, when French Army engineers destroyed the bridge in a futile attempt to slow the advancing German army.



A postcard of the Rouen Bridge's gondola car ca. 1900. [IMAGE: ZCP]

When Duluth's aerial bridge went into service in 1905, transfer bridges were also in use in Newport, Wales (also an Arnodin design); Bizerte, Tunisia; and over the River Loire in Nantes, France. Since then two dozen transporter bridges have been built in eight countries including Spain, France, Germany, England, Czechia, Tunisia, the Netherlands, Argentina, and Brazil. Thirteen of them—including the Duluth bridge—still stand. Arnodin is thought to have designed at least nine of them, three of which remain in operation.



Palacio's and Arnodin's 1890 patent drawing. [IMAGE: ZCP]

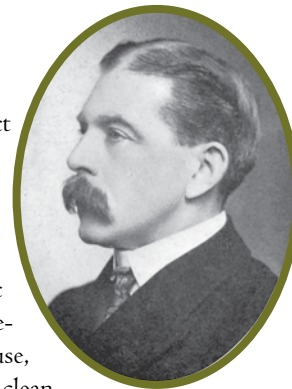


Engineers Behind the Bridge

After reading about Ferdinand Arnodin's aerial transfer bridge in Rouen, France, Duluth City Engineer Thomas McGilvray at once recognized the potential of a similar bridge over the Duluth Ship Canal. In 1899, the same year the French bridge was completed, McGilvray sat down at his drawing table and began adapting Arnodin's plans for the Duluth Ship Canal. City officials loved it.

Born in 1863 in Aberdeen, Scotland, McGilvray attended private schools and earned an engineering degree at the University of Edinburgh. In 1884 McGilvray emigrated to North America, where he began his career as a surveyor for the Canadian Pacific Railroad in Calgary, which eventually lead to a job with the St. Paul & Duluth Railroad. Working for the StP&D, McGilvray laid the foundation of the 1892 Duluth Union Depot and designed the street layout for Smithville and portions of West Duluth owned by the railroad.

McGilvray moved to Duluth in 1890, employed with the firm of Patton & Frank, which was owned in part by former city engineer William B. Patton. When Patton again became Duluth's City Engineer in 1893, McGilvray began a private practice. In 1897 McGilvray replaced Patton as Duluth's City Engineer. The move came not because McGilvray was necessarily a better engineer than Patton, but that he was a Democrat. At the time, Duluth's mayor appointed most city officials, and from 1890 to 1908 whenever a Democrat was in office, McGilvray held the job; when a Republican became mayor, Patton took over as city engineer. During this time the pair also joined forces, creating the Duluth Engineering Company.



Patton took over the bridge project in 1900 when Republican Trevanion Hugo became mayor. Born in Philadelphia in 1860, Patton was living in Duluth by 1885. Prior to his work on the bridge, his most public engineering accomplishment was designing the Lakewood Pump House, which still provides Duluth with its clean drinking water. Patton was also a noted Mason, one of four charter members of the King Solomon Temple of England; the other three were former presidents Teddy Roosevelt and William Howard Taft and General Thomas J. Shryock, one-time treasurer of Maryland. Patton had served as the grand master of the Minnesota Grand Lodge, and at his death in 1923 he was considered "one of the leading Masons in the world."

McGilvray lived to see the bridge converted and again served as city engineer from 1933 to 1941, living in retirement until his death in 1957. A year before McGilvray died, a *Duluth Herald* reporter asked the old engineer about both his transfer bridge and "that up-and-down gadget" that replaced it. "It's been a good bridge," he told the reporter, "But some day it will have to go. Every bridge runs itself out of business." He was referring to the fact that bridges eventually become obsolete due to changes in use: Either the bridge is no longer required or can no longer handle the loads, whether it be increased traffic or increased weight. "I knew that when I built the aerial bridge," he said. "So I can't say I'm sorry to see it reaching the end of its usefulness. I'm pleased that it served as long as it has but you can't allow sentiment to stand in the way of progress." The newspaper's headline was a bit dramatic: "Says Its Builder: City's Famed Bridge Doomed."



Aerial Bridge Designer “CAP” Turner

Before Duluth city engineer Thomas McGilvray presented his idea for an aerial transporter bridge to Duluth city officials, he needed to know if such a bridge would work in Duluth’s cold climate. And McGilvray was a road engineer, not a bridge engineer. Fortunately, in

1899 bridge engineer Claude Allen Porter was working in Minneapolis at the time. Turner, born in Rhode Island in 1869, graduated from Lehigh University’s School of Engineering in Bethlehem, Pennsylvania, in 1890. After working for several companies in the eastern U.S., Turner moved to Minneapolis in 1897 to take a job with the American Bridge Company (ABC).

McGilvray reached out to Porter, asking whether he thought the idea would work. Porter replied yes—with some alterations. Duluth’s canal was often windy and its waters icy in the winter. Porter’s idea was to not build a suspension bridge, but rather a stiff-girder bridge that held up to wind. Its gondola car would not be suspended by cables, which would allow the car to swerve in the wind, but also by stiff steel girders. Finally, there would be no submerged chain, which could easily ice over and interfere with ship-

ping traffic. Instead Turner would devise an overhead “traveling pulley.” Porter’s design would make the Duluth bridge unique: The first transfer bridge built in the western hemisphere and the first stiff-girder transfer bridge ever constructed.

In 1901, while working on Duluth’s aerial bridge, Turner formed his own firm after ABC became a subsidiary of United States Steel. During his career Porter received over thirty patents for using reinforced concrete, including “mushroom cap” columns, first used in St. Paul’s 1911 Lindeke-Warner Building. His other notable designs include the Mendota Bridge between Fort Snelling and Mendota Minnesota (once the longest continuous concrete-arch bridge on the planet), the 2,730-foot Arcola High Bridge (aka the “Soo Line High Bridge”) spanning the St. Croix River north of Stillwater, Minnesota, and the the Liberty Memorial Bridge between Bismarck and Mandan, North Dakota.



This drawing of Cap Turner’s plans appeared in *Engineer News* magazine in 1901.[IMAGE: JJHL]

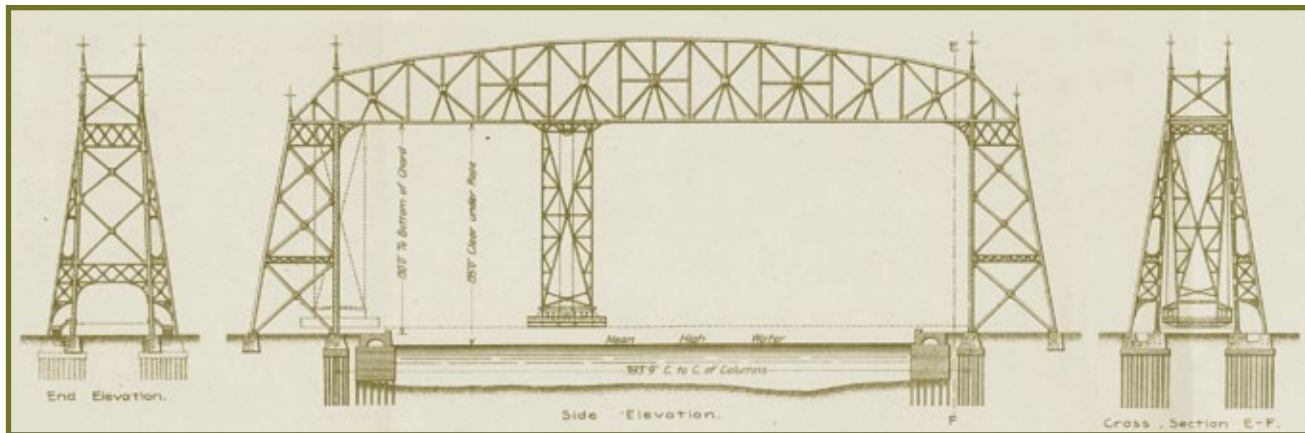
The Struggle to Construct Duluth's Aerial Bridge

After endless rejections, the city gave up on its dream of a bridge that would allow railroads access to Minnesota Point, so a canal bridge no longer needed railroad tracks or contiguous access. Thomas McGilvray's idea for a transfer bridge was less expensive than any previously proposed, likely \$100,000. But a great deal had to be done before workers hammered a single rivet. The plan required the approval of the Lake Carriers Association and permission from Congress and the Secretary of War to build a bridge on and over government property. The city also had to find a contractor to build the bridge and come up with the financing to construct, maintain, and operate it.

In late 1900 the city established the Canal Bridge Commission to move things forward. The group enjoyed early success when the Lake Carrier's Association gave its approval in January, 1901. In February the Commission placed ads in the *Engineering Record* requesting construction bids by March 25. Meanwhile,

city attorney Oscar Mitchell prepared a draft bill for Congress that would grant permission for Duluth to build the bridge. Mitchell sent the draft to Secretary of War Elihu Root, who explained that since the canal was wholly within the state of Minnesota, if state law allowed the bridge, the federal government could then pass legislation permitting the bridge. In March Duluth put just such a bill before the state legislature. It passed.

The city received just one bid, from the Minneapolis branch of the American Bridge Company (ABC). Their price, \$140,000, was \$40,000 more than the City had expected. Still, it was a sum the city's engineers considered reasonable. Still, the city resolved to enter a contract with ABC, contingent on both Patton's the federal government's approval. Claude Allen Porter "CAP" Turner, who had created ABC's submitted plans for the bridge based on McGilvray's sketches, was put in charge of the project.

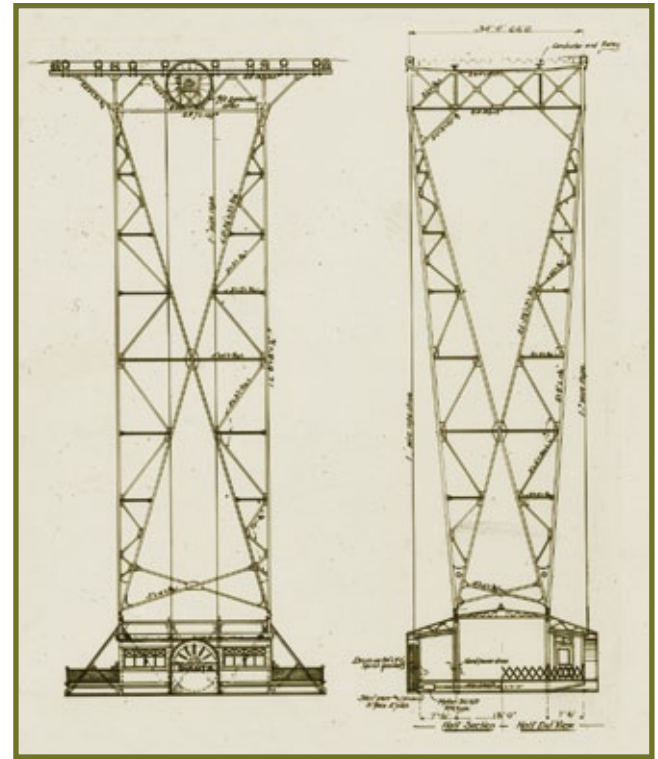


This drawing of CAP Turner's plans appeared in *Engineering Record* in 1901 along with a request for bids. [IMAGE: JJHL]

In early September Acting Secretary of War G. L. Gillespie granted a permit to Duluth to build the bridge and occupy government property during construction, but first a bill before Congress to allow the city to permanently occupy the bridge site must pass in the next session or the license would be revoked. Better news: The bill's passage looked clear—Duluth could begin building by February 1902. Mayor Hugo jumped into action, asking ABC to begin building straight away. But the firm's new parent company, United States Steel, wouldn't allow the contract's installment payment plan. So the directors of ABC created the Duluth Canal Bridge Company (DCBC). Essentially a shadow company, DCBC would handle financing through the sale of bonds and subcontract the structural construction to ABC. A new contract with DCBC called for the bridge to be complete by April 1, 1902, barring any unforeseen delays; if delayed, the DCBC had until May 1, 1903, to finish.

Congress approved the revocable license in early February and by the end of the month the bridge's foundations were in place. But DCBC declared it could not secure the steel it needed until March, 1903, two months before the deadline. The rest of the year tensions rose between the company and the city. Ultimately the city decided to wait until DCBC ultimately defaulted on the contract in May 1903 and move forward thereafter. And so they did, advertising for fresh bids shortly after the deadline.

Eager to have the bridge built according to his plans, Turner left ABC to create his own firm. he then began courting every bridge-building outfit he knew of until finally convincing the Modern Steel Structural Co. (MSS) of Waukesha, Wisconsin, to submit the one and only bid the city received that was based on Turner's plans. Due to some legal wrangling caused by the DCBC's previous contract, the city was forced to reopen bids, although it had already decided to contract with MSS. The financing agreement outlined the terms: Duluth would spend



CAP Turner's plans for the bridge's gondola car and steel hanger, also published in *Engineering Record* in 1901. [IMAGE: JJHL]

\$100,000 for the bridge, paying for it in annual instalments; with interest, the bridge—expected to operate for twenty-five years—would ultimately cost the city \$140,000. Turner then sold his plans to MSS in a deal that kept him on the project as a consultant. Still, by the end of 1903, the city had foundations, but no bridge. The “Ferry Bridge” portion of Patton's 1903 annual report begins, “This much desired project has passed through another year of vexatious delay.”

Building the Duluth Aerial Transfer Bridge

The contract with Modern Structural Steel (MSS) took time to negotiate, but the company was eager to get to it, working without a contract and urging approval of the tower plans by March 11 so it could immediately start building them. In April McGilvray again replaced Patton as Duluth's city engineer: New Mayor Marcus Cullum was a Democrat. So the man who brought the ferry bridge idea to Duluth would oversee the project to its completion.

Meanwhile, W. H. Hoyt, an engineer with the Duluth, Missabe and Northern Railway (DM&N), inspected and approved the steel for the towers and, later, the roller bearings. He expressed concern over the roller bearings' housing, seeing no protection from "blocking up with sand in the summer and snow and ice in the winter." These "roller nests" and the bearings they held were the key to the bridge's smooth operation, and time would prove that protecting them from the elements wouldn't be their only problem.

The contract between Duluth and MSS was finally signed July 20. Two days later the first carload of steel arrived at the piers. Testing laboratories had found the metal work excellent, with all parts "fitting

perfectly, without reaming or drifting." On August 1, workers had the leg of one of the towers in position. By October work was well underway and progressing smoothly. Both towers stood in place by mid November, but workers had to wait for the shipping season to end before putting up the wooden supports needed to bolster the towers as the truss was built piece-by-piece to connect them.

By early 1905, with the supports in place, the truss was beginning to take shape with metal work reaching from both towers toward the center. In February the bridge was near completion, and later that month McGilvray invited two hundred people to witness the ferry car's first crossing. He included local dignitaries to take the ferry's first ride, including Mayor Cullum, Common Council President (and future mayor) Roland D. Haven, several aldermen and police officials, engineer Patton, and nearly two dozen prominent businessmen and civic leaders. At 4:30 p.m. on February 23, 1905, the group entered the gondola car at the south tower and prepared to cross. The bridge was not yet fully complete—some of the false wooden work still stood



In 1905 Thomas McGilvray published a pamphlet titled *Duluth Aerial Ferry Bridge*. It included a series of photos by Major Charles L. Potter of the U.S. Corps of Engineers—the man in charge of the canal. The seven photos on pages 32–35 showing the progression of the bridge's construction come from that booklet. [IMAGES: DPL]

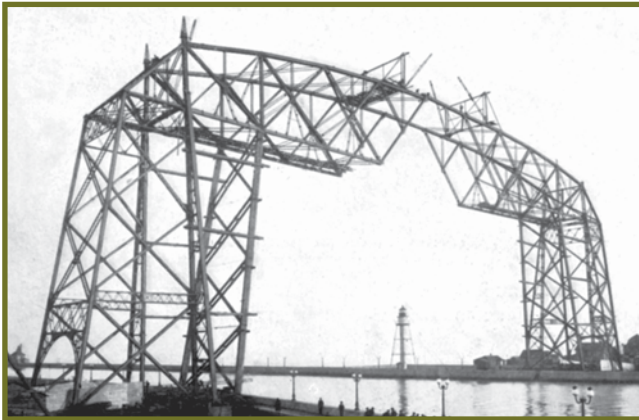
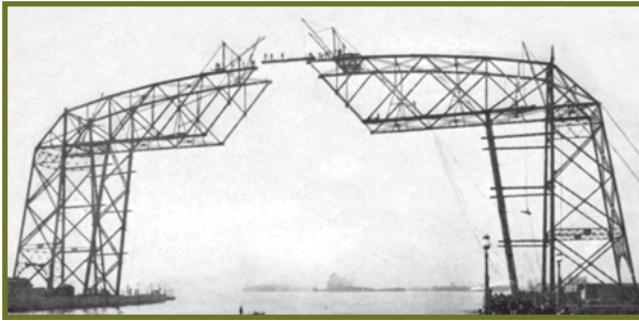
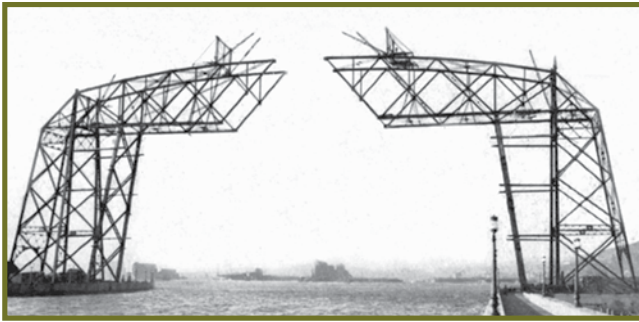
against the south tower where it had once been needed to support the bridge before the main truss was complete. The newspaper fancied that the ferry car would “glide gracefully out over the canal and the hopes which the residents of Park Point have held for years will be realized.”

To ensure safety, men were posted on top of the bridge so they could identify any problems with the trucks in time to warn of an impending accident. McGilvray himself controlled the car, which began rolling without so much as a hiccup. Riders felt “only a slight vibration” while the car moved northward. As the gondola reached the north end of the canal with “a gentle motion, an almost imperceptible contact against the air cushion in the approach, it stopped and locked automatically.” The entire trip lasted one minute and fifteen seconds, but it had been over fifteen years in the making. The ferry car then returned to the other side without any passengers disembarking to complete their trip across the canal.

The first woman crossed the canal via the bridge on March 5. Anna Borth of 716 South Lake Avenue (about a block south of the canal) had watched the bridge’s construction and was determined to be the first person to cross, not including its operators. She asked workers a for a ride, and they obliged her, telling the newspaper that, “she was alone in the car and thoroughly enjoyed the little thrill of being part of so tremendous and important an enterprise.” The paper declared that, since the ferry’s inaugural run didn’t deliver anyone across the canal, Borth was not just the first woman to cross the canal in the ferry car, but technically the first person, aside from its builders, to cross via the aerial bridge.

On March 4 the last of the wooden supports came down: outside of “a number of small jobs, which are unimportant, but which require time for their completion,” the bridge was ready. Those tasks included covering the structure with two coats of olive green paint,





The photo above appeared in the *Duluth News Tribune* in 1905 and shows the team from Modern Steel Structural, who built Duluth's Aerial Transfer Bridge: (from left) Electrician Charles Adrian; structural steel workers F. Schmidt, E. Foucoult, B. Keenan, H. Larson, J. Shrod, and E. Knight; and engineer Gus Rakowsky. t. [IMAGES: ZCP]

a project that began on March 20. The ferry car also required many other finishing touches, but these would not stand in the way of the bridge's opening "on or before All Fool's Day," as the paper reported,

As a final safety measure, MSS decided to see if the bridge could carry the load C. A. P. Turner had specified. On Friday, March 24, after several test runs with just people aboard, workmen loaded the ferry car with sixty-five tons of steel rails, reels of phone wire, cable, a steam boiler, and heavy timber, "greater than any load that the bridge is likely to be called on to carry, at least until street cars are taken across." Even under all that weight, the bridge operated smoothly. MSS prepared to open the bridge to the public the following Monday.

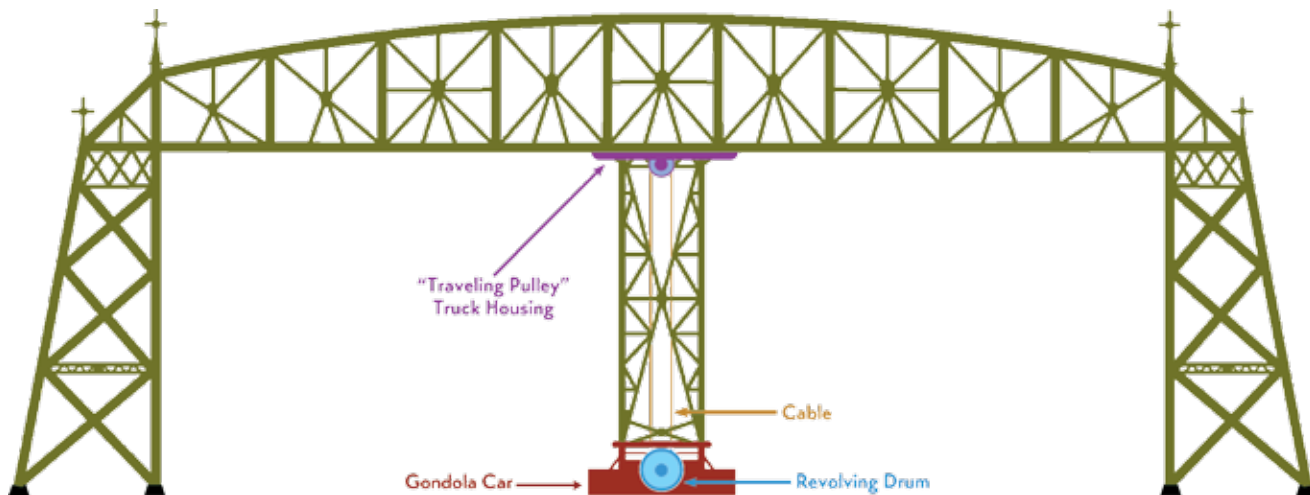
How Duluth's Aerial Transfer Bridge Operated

Duluth city Engineer William Patton's annual report for 1903, published in early 1904, describes the Duluth Aerial Transfer Bridge's physical details:

"The plans, as approved, are for a stiff riveted girder of 393 ft. 9 in. span, supported on steel towers resting on pile and concrete foundations, with the bottom chord of the bridge 135 ft. above high water. The ferry car is suspended by stiff, riveted hangers from trucks running on tracks placed within the bottom chords of the trusses. The car is proportioned to carry a loaded streetcar of 21 tons, and the remainder of the floor loaded with 110 pounds per square foot."

The ferry car itself was fifty feet long and over thirty feet wide, with a seventeen-foot-wide center roadway and seven-foot-wide walkways on either side. The middle thirty feet of

each walk was enclosed to form a cabin. Cables powered by one of two fifty-horse-power electric streetcar motors (the other was a back-up) installed beneath the gondola would drive the ferry car at four miles an hour, crossing in about one minute and ten seconds. The motors turned a drum on the side of the car; cables wound around the drum and up to a traveling pulley—a truck holding many sets of wheels—that rode along the truss. The revolving drum set the car in motion. Like a streetcar, operators used a removable handle at the "front" of the gondola to set the car in motion; for the return trip, the handle was moved to the other end of the car, now moving in the opposite direction. If the electric motors failed for any reason, operators could use a hand gear to move the car safely to shore and out of the way of oncoming vessels. When at rest, the ferry car hung over dry land, allowing ships to pass freely.



The Aerial Transfer Bridge Goes to Work

Five thousand people showed up at the canal on Sunday, March 26, 1905, hoping to ride the new bridge. Instead, they found disappointment: Modern Structural Steel officials did not want to open the bridge because of the potential crowd size as any minor problems in the operation might cause “unfavorable comment” and perhaps even raise fears among “many by whom the new bridge is viewed with distrust.” A good thing, it turned out: That day the power cables feeding the electric motors broke.

Shortly before 6 P.M. on Monday, March 27, with forty people aboard and Gus Rakowsky of MSS at the controls, “the ferry car commenced regular trips,” making runs every five or ten minutes. The next day a *Duluth News Tribune* headline screamed “Aerial Car Crosses in Teeth of Howling Gale,” reporting that the bridge operated “without a hitch” despite gale-force winds. Early trips contained an average of twenty to thirty passengers, but by the end of the evening people were crossing in twos or threes. Winds picked up, and by 9 P.M. it had “the force of a hurricane” as it “shrieked through the trusses,” and in the squall the canal was “a most disagreeable and dismal place.”

The reporter then joined Rakowsky for a trip across in the thick of the storm, the car operating so smoothly its start was “hardly perceptible.” Nearly halfway across the canal the ferry’s nearly silent operation was shattered by the sound of broken glass: the wind had broken two windows on the windward side. Once the ferry reached the other side, Rakowsky nailed the empty window frames back in place. Rakowsky later reminded the reporter that “Duluth is the only place that can boast of such an [sic] equipment.”

Two days later Charles L. Major Potter of the Corps of Engineers provided the city with a list of regulations for operating the bridge—since it stood on federal property under the Corps’

jurisdiction, it was up to the Corps to say when it could and could not operate. Safety was obviously a major concern, and ship traffic would always have the right of way (see page 40).

While the bridge operated smoothly in the teeth of a gale during its first day, the second day found the car taking rather bumpy rides, but the MSS team had the bridge running by the following Sunday. April saw more delays as the bridge underwent more finishing touches. The car closed to passenger service for several days as workers stretched a phone cable across the bridge to provide service to Park Point and finished painting the car, according to the paper, in a “very handsome red birch finish.” By May 1 the aerial bridge was operating flawlessly.

April 7 also saw what was likely the first boat to pass beneath the bridge entering the canal from the lakeward side. The *Bon Ami*, a 108-foot wooden steamer, had set out for Port Wing and Herbster, fishing towns along the Wisconsin South Shore of Lake Superior. The ice forced her back to Duluth, and she entered the harbor’s safety through the canal, and therefore under the bridge. Not until April 20 did the *E. N. Saunders* come in off the lake to become the first vessel to navigate from Sault Ste. Marie to Duluth and enter through the canal and under the bridge.

On April 8, a bright, sunny Sunday—and the first weekend day the bridge was open to the public—the city wanted to find out if the bridge could operate to capacity, by one estimate fifty thousand people a day. The car had been averaging about two hundred people a trip during busy weekday hours, the paper said, adding that “five hundred people on a trip is no crowd for that car.” One trip at 3:30 P.M. that Sunday carried 814 passengers—an estimated fifty-five tons of human cargo. The engineers counted 32,595 people boarding the car in one twelve hour and twenty minute span. So many people ventured across the canal



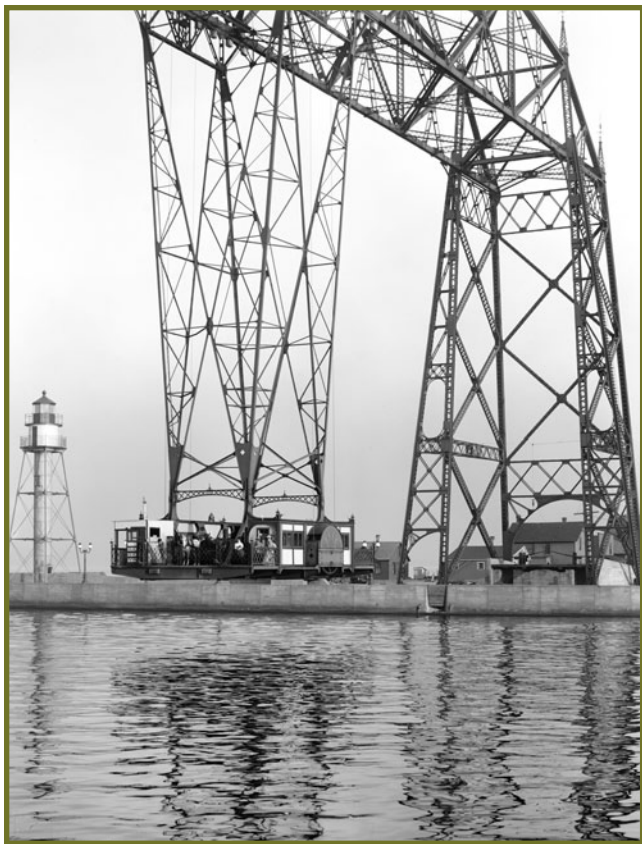
The Duluth Aerial Transfer Bridge photographed April 5, 1905, photographer unknown. [IMAGE: UMDMLSCA]

that day that during its peak period, between 3 and 4 p.m., South Lake Avenue was clogged with people from the canal north to Superior Street—half on their way to the bridge, half on their way back. So many people rode the ferry bridge that day the paper reported that, “the deck flooring was worn smooth.”

That record-setting day also saw the first automobile to cross the canal—which, subsequently, also became the first car

to drive on Park Point. The car, an electric Studebaker-Stanhope, was owned and driven by Edward J. Filiatrault. On his return trip Filiatrault handed the bridge operator his calling card so his accomplishment would be remembered. It also may have been a sales gimmick: Filiatrault owned Duluth’s first car dealership.

The newspaper also mentioned that “baby cabs were sprinkled among all the loads throughout the day, many of them



The bridge and Rear Range Light photographed in 1905. [IMAGE: LSMC]

being in the care of mothers who had no hesitancy in boarding the ferry with the little ones.” In fact, only once did anyone balk at crossing, when two young women waiting to board “quailed when they saw the singular car approach” and turned back toward South Lake Avenue. Still, crowd estimators guessed that children made up a third of those who crossed the bridge that day—and

that perhaps twenty-five percent of Duluth’s population crossed the canal that day.

Like the two frightened young ladies, not everyone thought of the bridge as an improvement. At least one man, describing the bridge in a postcard bearing its image, implied that he missed the adventure of crossing in a boat, writing of the bridge: “Quicker and safer, but not nearly as much fun as crossing on the old ferry.”

A handful of local boys thought the bridge was much more fun. On April 28 the *Duluth News Tribune* reported that “half a dozen boys of various ages” dodged the bridge operator, climbed on the girders below decks of the ferry car and rode the ferry clinging by their fingers just thirteen feet above the water. Alone at the controls, Adrian could do nothing to stop them. If they had lost their grip, the boys would certainly have drowned in the canal’s currents.

On May 5, 1905, the City officially took possession of the bridge, placing it under the jurisdiction of the Board of Public Works. In June workers installed lightning arrestors—the spires that rise from the corners of the bridge’s towers. But soon after the City took possession, the bridge stopped operating smoothly. Several of the wheels inside the truck had broken. Inspectors discovered that the truck system that the girders holding the ferry car rode on had been engineered too rigidly. MSS was called back and made repeated attempts to remodel the old truck system. But it was still not operating properly in October, when Mayor Cul-lum wrote the Common Council that “it cannot be said . . . that their six months’ trial has been entirely successful.” He urged the Council to “consider these matters in their financial settlement with the Bridge Company” and, if the City Attorney advised, delay final payment to the company until they fully resolved the issue. As the year ended, MSS was still hard at work on the problem.

Ferry Bridge Operators

Including original Bridge Superintendent (aka “Bridge Boss”) Leonard Green, only seven men operated and maintained the aerial transfer bridge once it became the city’s property: Thomas White, John Hicken, William Maynard, James Murray, Urban Nehring, and Frank Lampert. The work wasn’t just turning levers and gliding across the canal: Maintenance was dangerous. The traveling pulley had to be greased frequently, and the questionable means of reaching the bridge’s top span were described by the *Duluth Evening Herald* on April 7, 1905, when the team from Modern Steel Structural was still operating the bridge.

Under the banner headline “nerve wracking feat by bridge-men,” the newspaper described how the workers gained access to the upper truss, which needed some additional riveting work, by using the bridge’s cables as an elevator. They did not want to climb ladders while weighed down by heavy leather bags full of hot rivets. Instead the men, with bags of tools and rivets slung over their necks, climbed onto the roof of the ferry car and, just as the bridge operator set the gondola in motion, grabbed onto the cable, which “snatched them aloft at a terrible speed.” Fifteen seconds later they came to the tricky part: getting off while the cable kept moving. They only had a fraction of a second to release from the cable and swing themselves onto the truss or they would be dragged through the pulley and either crushed or thrown 135 feet into the canal below. That method of conveyance was “not likely to become popular with the traveling public,” the reporter joked. At the company’s request, the names of the daredevil bridge workers were withheld lest they encourage such “fool-hardiness.”

Right: Bridge superintendant Leonard Green (left) and bridge operator John Hicken atop the aerial transfer bridge, date unknown. [IMAGE: GLD]



FERRY BRIDGE REGULATIONS

LIGHTS: The car shall carry at night two red lights, in a vertical line, one over the other, not less than six feet apart, and located over the center of the car, at a height such that the lower light will be twenty-six feet above the water, and of such character as to be as visible all around the horizon for a distance of at least one mile.

GONG OR BELL: There shall be maintained on the car a loud sounding gong or bell, under control of the operator, such as can be heard distinctly at the distance of half a mile. A stroke of one gong shall be given one-half minute before starting from either side of the canal, and two strokes just before starting. When the car is in motion during thick weather, three strokes will be given as frequently as every fifteen seconds. At any time the car should come to a stop over the channel from failure of the motor or other cause, the gong shall be sounded continuously until the car shall be clear of the waterway. In case the signal lights for any reason be extinguished, the operator will use the gong signals prescribed for thick weather, until they are again relighted.

RIGHT OF WAY: The car shall be run so as to give clear channel to vessels and shall always keep out of their way. No special signals shall be required of vessels on account of this aerial ferry, but it is advised that when approaching the ferry in thick weather the whistle be sounded more frequently than one minute apart...so that the car operator can more correctly locate the vessel. Vessels are not expected to turn out for the car except in case the car shall be detained over the channel by accident. The car shall not start on a trip across the channel when an approaching vessel, which is moving at a moderate speed is within 500 feet of the car's course. In case the vessel is believed by the operator to have a speed of eight miles an hour, or greater, this distance should be increased to 600 feet or more, so as to make ample allowance for safety. On the other hand in case of a tug towing a raft at the usual very slow speed, the interval may be less than 500 feet. The car shall in no case attempt to pass between two vessels of a tow.

Bridge Superintendent Leonard Green began working the bridge in 1908, the year his job was created (the city engineer previously handled the superintendent's duties). He saw the transfer bridge through the rest of of its life, then stewarded the aerial lift bridge during its first fourteen years. A lifelong Duluthian, Green had served as a sailor on the Great Lake for years, working his way from fireman to marine engineer. He crewed on several tugs in the Duluth-Superior Harbor, various fishing boats operated by the A. Booth Fisheries including the *Corona* and the *Bon Ami*, the first vessel to pass under the Duluth Aerial Transfer Bridge from the lakeward side in 1905. Before coming aboard the bridge, Green worked as a stationary engineer for Duluth's Spalding Hotel.

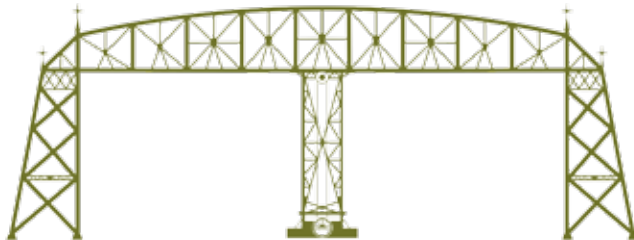
Thomas White started as an operator in 1905 and was working on the bridge when he died in 1918. On December 19, White—substituting for vacationing bridge superintendent Green—climbed to the top of the bridge to perform maintenance, mostly oiling the trucks and pulleys. No one witnessed how the accident occurred, but as the ferry car left the South Pier and headed across, White was somehow pulled into a pulley, which crushed his chest. Some passengers waiting to board heard White scream, but the sound of the ferry in motion prevented the operator from immediately hearing his cries. It took a firefighter and two bridge operators quite some time to free White from the bridgeworks and lower him down by ropes, and he died just minutes after reaching the hospital. White was fifty-seven years old and had lived in Duluth for over forty years. His funeral was held at his home at 1008 South Lake Avenue on Park Point, four blocks south of the canal.

John Hicken also started on the bridge in 1905. In 1928 a newspaper article celebrating Hicken's career estimated that he had traveled 120,000 miles—300 feet at a time—and had taken on 25 million passengers before 1923. But Hicken wasn't

worried about stats. “What’s a couple million people between friends,” he joked with the reporter. He was looking forward to working on the lift bridge except for one thing: His work day would now lack the companionship of his passengers. Unfortunately, he didn’t live to see the conversion completed, dying of pneumonia in 1928, just a year before the transfer bridge was converted to a lift bridge.

William Maynard worked the bridge from 1916 to 1918, then returned in 1932 to operate the lift bridge for another thirteen years. James Murray began as an operator in 1924; when the span converted to lifting he worked as “Special Police” for the bridge. Urban Nehring joined the crew just a year before the conversion and stayed on until 1942.

Frank Lampert, who lived two houses south of the bridge on Park Point, began as operator in 1924. Unofficial records show that he retired in 1944, but newspaper articles indicate he took over as interim bridge superintendent upon Leonard Green’s death in 1944 and stayed on until Al Hass took the helm in 1946 (Learn more about other aerial bridge superintendents on pages 67–69). In 2005 eighty-six-year-old Howard Boyton of Park Point told a reporter that when Lampert controlled the old ferry car, he also acted as an arbitrary gatekeeper: “Lampert would stop you, and if he knew you didn’t belong uptown, you didn’t get there. You didn’t get to go. You stayed right there. That was the end of your trip.”



Three transfer bridge operators including John Hicken (seated, right) atop the bridge, date unknown. [IMAGE: GLD]

The Corps of Engineers Building & Canal Park

After work widening the Duluth Ship Canal and constructing its concrete piers was finished in 1902, the federal government dropped an idea to move the Lake Superior headquarters of the U.S. Army Corps of Engineers from Duluth to Michigan's Upper Peninsula. Instead it chose to build a new headquarters building—the first dedicated Corps of Engineers building in the nation—alongside the new North Pier.

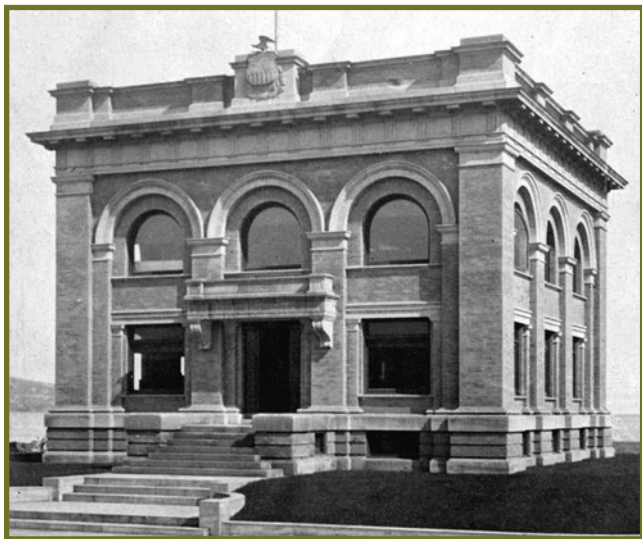
Construction of the building was delayed until after the aerial bridge was operating. Duluth architects Wallace Wellbanks and William T. Bray designed a square, two-story Neoclassical office building faced with tan-colored pressed brick and trimmed in light Bedford limestone. Its windows are set within Roman arches, heavy corbels support a stone awning over the main entrance

portico, and the roof is topped by a large cornice, which has since been painted red, as has a cartouche showing an eagle landing on an American-flag shield. The building's north and south façades each originally carried three window bays, and in 1943 two more bays were added, extending the building eastward.

One room in the basement was dedicated as a laboratory for testing concrete, which played a key role in most marine engineering projects of the day. Besides the test lab and offices, the structure included facilities for draftsmen, a photo studio, a dark room, and a blueprint room. Today the building is the headquarters of the U.S. Army Corps of Engineers Detroit District.

The federal government also decided to landscape the green space it owned alongside both of the canal's piers, which it officially named Canal Park. What most people think of as Canal Park today, the northern portion of Minnesota Point between Interstate 35 and the canal, is technically the Canal Park Business District. In the 1870s and '80s the area was called “No Man's Land” due to its erratic development. When its western half later filled with warehouses and factories surrounded by saloons, it was called “Uptown.” The eastern half contained much of what was called “Finn Town” St. Croix Avenue (today's Canal Park Drive), filled with modest homes and boarding houses where Finnish immigrants lived just north of their Orthodox Jewish neighbors. Meanwhile, the St. Croix Alley filled up with bordellos creating the city's Tenderloin, known as the St. Croix District.

In 1938 the city purchased a 1.89-acre lot just north of Canal Park, the sight of a former tenement house built a parking lot on it, and also named it “Canal Park” (since 2017 it has sometimes been called the Lighthouse Lot). Outside of the canal and bridge, the area between the canal and downtown has only been a true tourist destination since roughly the late 1970s.



The 1905 Corps of Engineers Building ca. 1907. [IMAGE: LSMC]



D. D. Gaillard's Wave Level Tiles

David D. Gaillard, the first man in charge of Duluth's 1905 Corps of Engineers Building and, therefore, the Duluth Ship Canal, had tile water-level indicators installed along the south pier so he could study wave motion from his office window. The mosaics were quite colorful and decorative, featuring American Eagles and the Corps of Engineers' logo. Gaillard's study resulted in his book *Wave Action*, still considered a seminal work on the subject. In 1986 the canal piers underwent an overhaul; concrete was repaired, and the tiles were removed and placed in storage.

Gaillard was sent to Duluth before the aerial bridge was built. He corresponded with bridge designer CAP Turner, suggesting

that the bridge would have a more stunning appearance if its towers were extended well beyond the height of the top span. Eager to please the Corps of Engineers, Turner redrew his 1901 sketch of the bridge to include Gaillard's towers. But the towers were not included in the final design, likely because they would increase cost and did not contribute to the bridge's operations.

After leaving Duluth in 1903 Gaillard rose to the rank of Lieutenant Colonel while working on the Panama Canal. Sadly, he died in 1913, two years before the Panama Canal opened, of mosquito-borne encephalitis. President Woodrow Wilson renamed a portion of the canal known as the "Celubra Cut" to the "Gaillard Cut" and posthumously raised Gaillard's rank to full colonel. In 1916 by the U.S. Army Corps of Engineers built the *Col. D. D. Gaillard*, a 116-foot long dredger later responsible for most of the work widening the St. Lawrence Seaway.



Gaillard's wave-level indicator tiles on the canal's south pier, photographed in 1985 by Grandmaison Studios. [IMAGE: LoC]



CAP Turner's drawing of the transfer bridge with Gaillard's suggested ornamental towers. [IMAGE: JJHL]

The Mataafa Storm of 1905

Eight months after Duluth's aerial bridge began operating, Lake Superior saw one of its worst storms on record. Vessels navigating the lake on Tuesday, November 28, 1905—two days before Thanksgiving—found themselves battling hurricane-force winds. That day and the next, twenty-nine ships were wrecked or suffered damage, seventeen were stranded, and at least one foundered. Ships lost or damaged in the storm near Duluth include the *Umbria*, the *Elwood*, the *George Spencer*, the *Amboy*, the *Ira H. Owen*, the *Crescent City* and the *John Naysmythe*. Further up the North Shore, the *Madeira* struck Gold Rock, north of the Split Rock River. Only the first mate perished, but he wasn't the only sailor to die in the storm: The gale claimed thirty-three souls, nine of them just outside Duluth's ship canal.

A crowd estimated in the thousands gathered near the ship canal to watch ships attempt to ride out the storm. The *Mataafa*, with the *James Naysmyth* under tow, appeared out of the squall in midafternoon, steaming hard for the canal and the safety beyond it. Her captain ordered his men to cut the *Naysmyth* free so it could anchor and ride out the storm. As the *Mataafa* entered the

ship canal, currents and wind gusts forced the ship into the north pier, then carried it back into the lake before slamming it broadside against the pierhead. About 150 yards from shore, the *Mataafa* settled to the lake bottom and split in two.

Desperate sailors in both the fore and aft cabins—which were still above water—signaled for help. Members of the U.S. Life Savers stood helplessly on shore, as waves created by the storm were too strong, preventing them from launch their lifeboats. That night thousands of Duluthians lined the shore, standing vigil as the storm pounded the wounded ship. When the Life Savers finally reached the *Mataafa* the next morning they found the captain and fourteen sailors alive in the cabin; they had

stayed warm burning furniture as firewood. Tragically, the nine crew members trapped in the freighter's stern drowned or froze to death.

During the fury of the storm the aerial bridge's ferry car had been lashed in place over the north pier. Both the bridge and its gondola held firm, and city engineer McGilvray said the bridge had weathered the storm “without a tremble.”



The lid from a box of cigars produced by the Duluth Cigar Company depicting the *Mataafa* accident and doomed freighter in honor of those lost on the vessel. [IMAGE: ZCP]

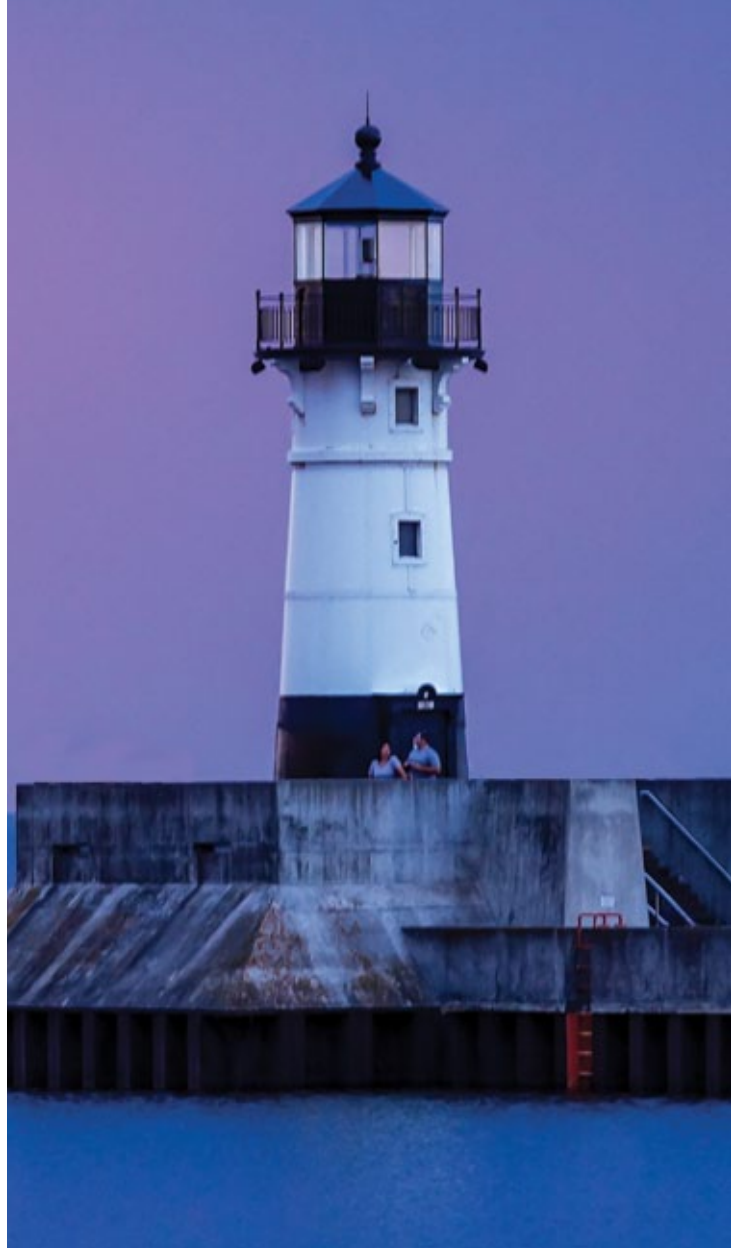
The North Pier Light

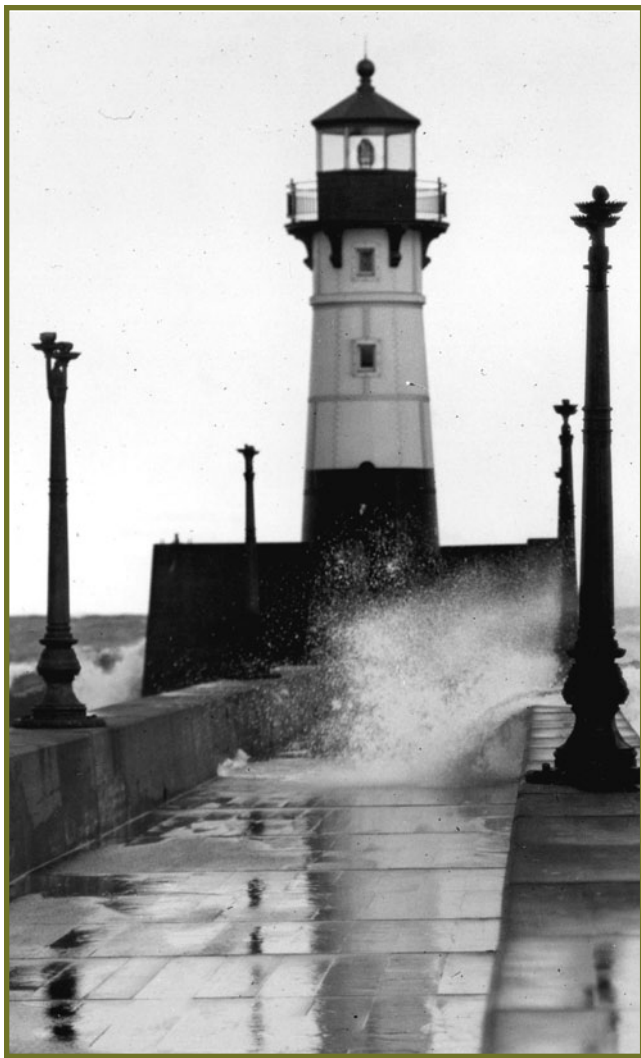
The great storm of 1905, aka the Mataafa Storm, proved a point the Lake Carrier's Association—owners of the Great Lakes commercial shipping fleets—had been making for years: Since the canal was only three hundred feet wide, the South Pier Light wasn't sufficient for mariners to guide their craft at night or in foggy weather, even with the help of the Rear Range Light. Too far south and a ship would run into the pier; too far north and it would beach on the rocky shore. The LCA made repeated pleas to the Lighthouse Board to build a light but were turned down time after time. Frustration led the organization to place a temporary light at the end of the North Pier in 1908.

A year later, the Lighthouse Board called the Duluth Harbor “one of the worst and most dangerous on the whole chain of [Great] Lakes.” The report—along with the evidence from 1905's Mataafa Storm—bolstered the LCA's argument and Congress appropriated funds to build a lighthouse.

Building began in late 1909 and finished after the opening of the 1910 shipping season. An iron tower enclosed by steel plates, the North Pier Light stands thirty-seven feet tall, measures ten-and-a-half feet in diameter at its base, and tapers to a diameter of eight feet at the top. An octagonal cast-iron lantern holds a Fifth Order Fresnel lens made in Paris in 1881, originally illuminated by a 210-candlepower incandescent electric lamp. In clear conditions, the light can be seen eleven miles away. Keepers first displayed it the night of April 7, 1910.

Because the South Breakwater Light was red, the North Pier's Light was initially white—and that part of town didn't need any more red lights. In 1901 the steamer *Harlem* nearly beached itself against Minnesota Point because the captain mistook the red lights of Duluth's notorious St. Croix District, home to brothels, as the ship canal's navigational lights. The





The Duluth Ship Canal's North Pier Light photographed in 1915 by Hugh McKenzie. [IMAGE: LSMC]

ferry *Estelle* warned the *Harlem's* captain, who was able to veer his vessel out of danger at the last moment, just missing the canal's newly built concrete north pier. The paper reported that three red lights could be seen from the water, one a switch light, another on a saloon at Buchanan Street and St. Croix Avenue, and the third "on a brick building occupied by some...sirens" ("siren" was then a popular euphemism for prostitute). Apparently the captain thought that the saloon on Buchanan Street was the south pier of the canal. A few months earlier the steamer *Sir Henry Bessemer* nearly grounded for the same reason, and a few days after that the *Charles Maples* did beach itself because of the lights. The newspaper suggested that if "saloons and houses of ill repute use colored lights, they should be required to use green ones."

Later, as prostitution cleared out of the district, both lights changed to more navigationally appropriate colors, the South Breakwater Light to green and the North Pier Light to red, allowing skippers to more easily identify the canal's entrance.

The 1905 storm, particularly the grounding of the *Mediera* at Gold Rock, also spurred the Lighthouse Board to appropriate funds for another navigational beam just north of the Split Rock River. Now owned by the Minnesota Historical Society, the Split Rock Lighthouse is one of the most visited historic sites in the state.

While all have been rendered obsolete, the three historic navigational lights located on the Duluth Ship Canal appear on the National Register of Historic Places and each has become eligible to be transferred at no cost to another public agency or nonprofit through the National Historic Lighthouse Preservation Act. The Rear Range Light was sold in 2008. The South Breakwater Outer Light became available in 2016 and the North Pier Light in May 2021. If no qualified custodial organization claims them, the lighthouses will be auctioned off.



The Duluth Aerial Transfer Bridge's gondola car photographed in 1908 by a photographer working for the Detroit Publishing Company. [IMAGE: LOC]

The Life of the Aerial Transfer Bridge, 1905–1929

Modern Steel Structural eventually had to replace the entire overhead works of the bridge where the trucks rolled along the rails; besides the trucks operating poorly, the rail they rolled on had not been properly aligned. With a new truck system in place in February 1906, MSS had satisfied its obligation to Duluth and the bridge, and the City took complete control of the span. In March McGilvray reported that the bridge had run perfectly since February 6, handling two hundred to three hundred teams of horses and thirty thousand people a day. He estimated the cost of operating the bridge at “one-fifth of one cent per passenger for operation, maintenance, interest, and power.”

Over the next year McGilvray petitioned the city for improvements on the bridge, mostly for safety. He ordered a metal net to be installed over the ferry car to protect passengers and teams from falling ice in the winter. he also asked for a hand-railed gangway attached to the lower chord of the truss and a covered stairway to access the truss—he wanted to stop the “dangerous acrobatic feats” required of bridge workers to maintain the structure (see page 39). In February 1907 the *Duluth Evening Herald* reaffirmed McGilvray’s report to the city, explaining that the ferry had not missed a trip in a year, having safely moved 50,000 teams and 2.5 million passengers making six to eight passes an



The gondola car showing the ice shield installed in 1906. [IMAGE: LSMC]

hour. Later a telephone, heating system, and two back-up electric motors were added to the gondola car. McGilvray ordered that the bridge be overhauled every eighteen months

The engineer had become something of a local celebrity. After the bridge went up, strongly Democratic Duluth loved him, and his fishing and curling exploits (he was an accomplished skip), as well as his friendship with popular Democratic Governor John A. Johnson, were reported in both daily newspapers. In 1908, newly elected Republican Mayor Roland Haven tried to appoint another engineer to McGilvray's job, but the overwhelmingly Democratic Common Council refused to affirm the

mayor's selection, keeping McGilvray in the position until 1912, when he chose to return to private practice with William Patton before striking out on his own in 1916.

With the aerial bridge operating smoothly, its history became one of maintenance and incidents surrounding it and the canal it crossed. In November 1908 another great storm hit the western tip of Lake Superior, causing lake waters to roll so high bridge operations were suspended for the first time since the Mataafa Storm. Waves washed over the concrete piers and struck the gondola car, which rested fifteen feet above the water.

By 1910 the ferry made seventy-five round trips a day during operating hours, and the time between trips no longer allowed on-the-fly maintenance. That year bridge superintendent Leonard Green made overhauls an annual event. It took ten days for its operators to get the bridge into top shape; the ferry *Ellen D.* was put into service for those who wanted to cross the canal.

A 1913 incident displayed just how disruptive a bridge closing could be—especially an unexpected one. At 1 P.M. on September 4, as the ferry car approached the north pier with a load of passengers (no teams or automobiles were aboard) a frayed cable snapped, and the gondola ground to a halt. The car had not reached the end of its journey, so passengers had to descend by ladder. A ferry was put into service while the bridge underwent repair, but it only carried passengers. Dozens of wagons, teams, and autos were stranded on Minnesota Point for two weeks.

Another great storm stopped bridge operation on April 28, 1914. Incoming boats were forced to turn back and ride out the gale on the open lake—the waters were too rough to navigate the canal. Twenty-five Park Point residents spent the night in the ferry car; others were forced to find rooms in hotels.

Opposite: The Duluth Aerial Transfer Bridge photographed in 1908 by a photographer working for the Detroit Publishing Company. [IMAGE: LOC]



1908
ST. IGNACE
MICH.



AERIAL FERRY BRIDGE MYTHS

People have told plenty of tall tales regarding the aerial ferry bridge over the years. In 2005 Richard Sundberg told a reporter that his parents, Albert and Rose, were caught in a stalled ferry car during the stormy night of September 6, 1927, while rushing to the hospital from their home on Park Point. Rose was in labor, and baby Richard couldn't wait for the car to get to the other side, so he came into the world "right there on the bucket of the bridge." At the time city officials were hotly debating replacing the bridge, and its every malfunction made headlines—yet there is no mention of Sundberg's birth in a single Duluth newspaper, and weather records show that September 6, 1927, was a sunny day in the Zenith City.

Another highly likely apocryphal tale tells of a woman named "Aerial" who claimed to have been conceived on the gondola. When you consider that the ferry car was usually quite crowded and always had an operator on board, her parents exploit would likely have been public spectacle. And the ferry took just over a minute to cross, so if the story is true it is doubtful her father ever boasted of his accomplishment.

One more unverified incident melds comedy with tragedy. The story goes that a young betrothed couple began arguing as they rode the ferry car. When the ride was over, the distraught woman descended the ferry car, ran to the edge of the pier, and threw herself into the canal. Her dramatic suicide attempt was supposedly foiled by her enormous hoop skirt: When she landed in the canal, instead of sinking, she bobbed like a buoy until rescuers arrived and plucked her to safety.

In 1918, Public Utilities Commissioner Philip G. Phillips recommended that the fresh water supply to Park Point be placed over the top of the aerial bridge. When the canal was rebuilt in the late 1890s, workers installed a six-inch main that carried water supplied by the Lakewood Pump House from beneath South Lake Avenue through the canal to Park Point. But repairs and water loss were becoming financial burden. A month or so before the proposal, a ship passed through the canal dragging anchor, which snagged and broke the water line. Park Point citizens had no fresh water for several days. Phillips cited the fact that a gas line already ran across the top of the bridge and its "upkeep has practically cost nothing." The new main crossed the bridge by the next October.

A blizzard in February 1922 buried the city, turning it into what the *Duluth News Tribune* described as "a labyrinth of tunnels and narrow snow-banked lanes." Minnesota Point had been hit hard, with snowbanks as high as trolley cars. Worse, a cable on the aerial bridge had snapped, cutting off Park Point. Repairs took eight hours to make, but they were delayed until the storm abated. When the bridge returned to operation, one of its first duties was to transport a National Guard tank to Park Point to help clear snow.

The transfer bridge never had an accident with a vessel—not that there hadn't been close calls. Operators said that sometimes the gondola came so close to a vessel, a collision would have occurred "if the boat had been covered with one more coat of paint." The closest recorded call came November 8, 1921, when the *Joshua Rhodes* came within fifteen feet of the car. While the gondola carried a full load of cars, trucks, coal wagons, and fifty passengers, a malfunction stopped the car about two-fifths of its way south across the canal as the *Rhodes* approached. Bridge operators leaped into action: One rang the emergency signal on the bell while the other climbed atop the ferry car and waved his



The steamer *D. O. Mills* passes beneath the aerial bridge in a photograph made for the Detroit Publishing Company in 1908. [IMAGE: LoC]

arms, trying to get the attention of the *Rhodes'* captain. A nearby tug blew its whistle as a warning and waited to help push the *Rhodes* if necessary. Luckily, officers on the *Rhodes* were able to steer the ore boat clear of the car, passing safely.

By 1925, the aerial transfer bridge was nearing the end of its life. The bridge simply could not keep up with the needs of the city. In 1901, when the aerial bridge was still an idea, just shy of 53,000 people lived in Duluth and only one of them, wealthy grain commissioner Benjamin E. Baker, owned an automobile (a single cylinder Oldsmobile runabout—although photographer J.R. Zweifel claimed his Locomobile steamer got to the Zenith City first). In 1925, the population was closing in on 100,000 and 17,340 automobiles and 2,600 trucks drove

Duluth's streets. The bridge had in part created the growth that was rendering it obsolete: With a convenient mode of conveyance to cross the canal, Park Point had experienced a population boom of more full-time residents and businesses, and it increased its role as "Duluth's Playground." With more and more people living, working, and playing on the Point—and getting there via automobile. Soon there wouldn't be enough hours in the day for the bridge to move everyone and everything that needed to cross the canal.

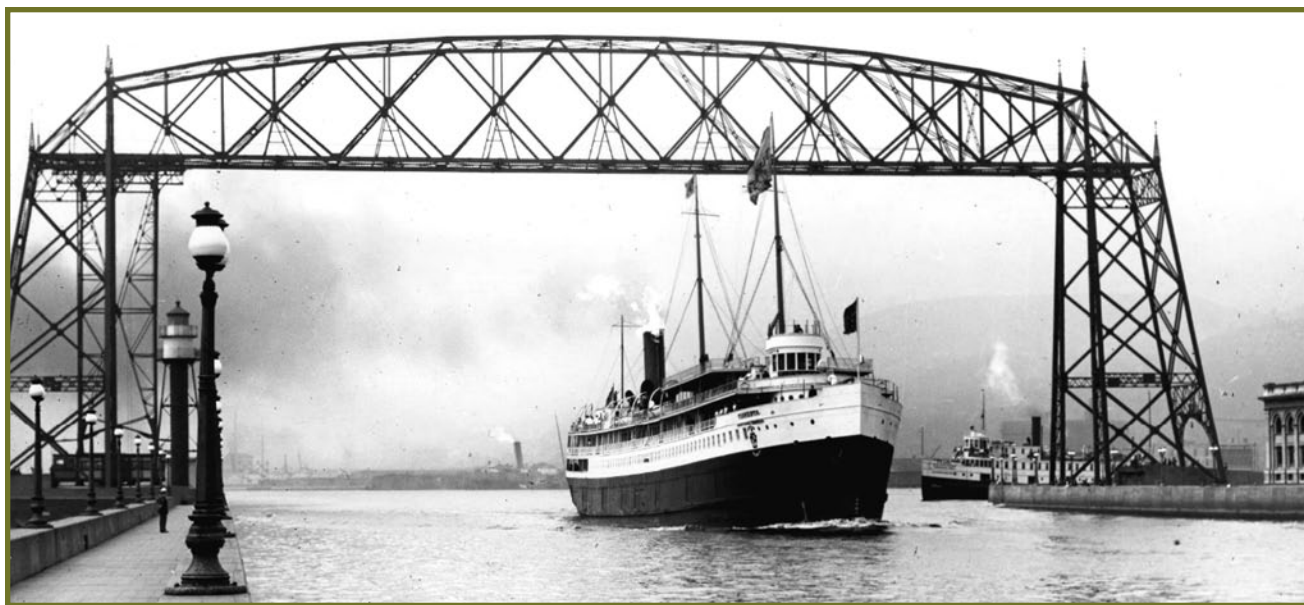
In May 1925 Public Utilities Commissioner Phillips asked the City Council to take the responsibility of maintaining the bridge out of his hands. When Mayor Sam Snively, also the city's Public Affairs commissioner, balked at the idea, Phillips

expressed his anger: “What are we going to do in the future when the aerial bridge is declared unsafe? What will you do, if you are mayor a few years from now, and I ask you and the rest of the council to take responsibility for the bridge?” No one replied. When asked by a reporter if the bridge was in any immediate danger, he simply replied that, “It is over twenty years old and can’t be expected to last forever.”

In July 1926 J. C. Craig thought the bridge was plenty safe—to jump from. Sanctioned by Snively and other city officials, Craig intended to break the record leap of 133 feet set by Steve Brodie when he launched himself off the Brooklyn Bridge. Craig planned to jump from the top of the bridge, 186 feet above the water. But strong winds made it impossible for him

to reach the very top, and he had to jump from a beam on the lower edge of the span—at 140 feet just high enough to set the record. Craig put on a blindfold, walked forward and backward, hung from his toes, and, as the newspaper stated, basically “frolicked about” before leaping.

Despite its role as Duluth’s icon, the aerial bridge was fast becoming—like daredevil Craig—nothing more than a novelty. Closing in on its projected life span, the bridge was serving more as a tourist attraction than a practical way of crossing the canal. The next few years would see Duluth officials battling over how best to replace the bridge. Just as building the first aerial bridge was fraught with obstacles, it would be a bumpy ride before anyone crossed the canal on a new bridge.



The passenger steamer *Tionesta* photographed passing under the aerial bridge in 1920 by High McKenzie. [IMAGE: UMDMLSCA]



The whaleback steamer *Alexander McDougall*, named for its Duluth inventor, photographed in 1915 by High McKenzie. [IMAGE: UMDMLSCA]

Barnstorming the Aerial Transfer Bridge

The first plane to barnstorm the Duluth Aerial Bridge—that is, to fly below its top span—was a “flying boat” named *Lark of Duluth*. Behind its stick sat pilot by Tony Jannus, described as “a wiry, cool-nerved young man who gives one the feeling of confidence in his ability.” The plane was purchased by Duluth Boat Club financier Julius Barnes and named to reflect the upcoming summer water carnival hosted by the club, the “Lark o’ the Lake.” Newspapers reported the plane was owned by a mysterious “W. D. Jones,” whose name cannot be found in Duluth directories of the time. It was likely a pseudonym was likely because Barnes was paramount to the success of Duluth’s grain industry and considered far too valuable to be flying about

in what was then unproven technology. On June 25, 1913, the *Lark* took select passengers on exhibition flights. With “Jones” aboard, the *Duluth Evening Herald* reported, “the boat sailed under the aerial bridge and along the lake shore to the curling club, being the first flying boat to pass under the bridge and the first to fly over Lake Superior.”

Five years later, on March 18, 1918, pilot Wilber Larrabee became the next person to pilot an airplane beneath the aerial bridge. Larrabee, of Minneapolis, was in town to perform a “revue” of acrobat flying, with the dive beneath the bridge his headline maneuver. Unfortunately, a follow-up article on Larrabee did not provide any details of the stunt and only reported that it had been accomplished. Others would follow Larrabee, but few would leave a record of the event—and that has caused legends to brew.

Duluthian William Magie is thought to have flown through the transfer bridge in 1923 or 1924. In 2005 Magie’s wife Lucille told a reporter that Magie was a mail pilot who flew his WACO biplane through the bridge in 1924. When he landed, police were waiting for him—but they let him go when he explained it was just a prank. Another version of the story claimed that Magie performed the stunt “on a \$50 bet” and that he “flew a Curtiss Jenny biplane under the Aerial Lift Bridge, did a half-loop and flew back over the bridge.”

Duluthian David Hartley inherited film footage of someone flying through the transfer bridge. Shot from the plane’s cockpit, it shows the bridge coming closer and closer until the plane passes through and flies beyond. Hartley’s father knew a character named “Dusty Rhodes,” a sometimes-bootlegger “notorious for doing things like that.” Rhodes was likely the film’s pilot—if that was his real name.



Hugh McKenzie snapped this image of a biplane flying under the aerial bridge, most likely piloted by Wilbur Larrabee in 1918. [IMAGE: LSMC]

Ship Canal Tragedies Beneath the Transfer Bridge

The Duluth ship canal can be a very dangerous place when gale-force winds stir up its waters. The stormy night of April 28, 1914, when water washed over the ship canal's piers and struck the aerial bridge's gondola car (see page 48), also took a life. Twenty-four-year-old laborer Sivo "Stans" Sanden, a resident of the Torvilla Hotel a few blocks north of the canal, bet a companion one dollar that he could walk the North Pier from end to end. Setting out from beneath the aerial bridge, Sanden darted from one light post to the next, hiding behind each post as the waves crested, then running to the next post before another wave breached the canal. About halfway through his adventure, bridge operators saw Sanden hesitate, throwing off his timing. The next wave hit, sweeping him over the pier and into the canal's roiling waters. He may have hit his head along the way: Witnesses said he made no attempt to swim to safety. Police and members of the U.S. Life Savers Station arrived quickly, but despite their efforts Sanden was never found.

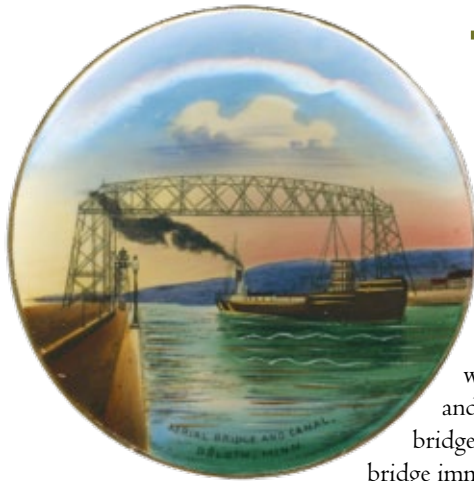
Despite the ferry bridge's frequent malfunctions, not a single event resulted in the death of a gondola car passenger. A *Duluth News Tribune* article published in 1956 reported that a driver of a team pulling a laundry wagon beer drove his horses and wagon right off the one of the bridge's approaches while the gondola car was still crossing the canal. The team and wagon fell into the canal, where the horses drowned.

In 1916, Duluth, Missabe & Northern Railway Chief Engineer H. L. Dresser similarly drove his car off the bridge's North Pier approach and into the ship canal. Dresser later told the *News Tribune* that he accidentally pressed the accelerator rather than the brake, causing the vehicle to burst through the steel barriers of the aerial bridge gate and into a waiting one-horse delivery wagon owned by the Bridgeman-Russell Creamery.

A stunned crowd of onlookers watched as "the auto and driver and the horse and wagon with a tremendous crashed plunged from sight beneath the waves." According to the newspaper, "The struggling animal urged by the smashing battering ram behind broke through the steel gates as if they were paper and catapulted high in the air. The machine leaped after that, turned a complete somersault." James Ten Eyck, coach of the Duluth Boat Club's legendary rowing team, was waiting for the ferry when the accident occurred; he "stripped to his undergarments," dove into the canal, and secured a life line to Dresser, which pulled him from the canal. Dresser suffered a broken rib and severe shock. The horse, harnessed to the wagon, did not survive.



Dresser's car being pulled from the Duluth Ship Canal. [IMAGE: LSMC]



The Duluth Aerial Bridge as Icon

Duluth's unique bridge became an icon of the Zenith City almost before it first began operating in 1905. As the first transfer bridge built in the western hemisphere, and the first steel-truss bridge of its kind, Duluth's bridge immediately gained a national reputation.

It was a must-see for visitors, and local retailers found an eager market for items decorated with images of the bridge, including fine China pitchers, vases, serving plates, lace plates, salt-and-pepper cellars, and cup-and-saucer sets. They printed the bridge on postcards and letterheads; stamped or embossed it on metal napkin rings, penholders, letter openers, spoons, and cigar boxes; and engraved it on silver spoons and gold lockets. Meanwhile, Duluth school children made clay models of the bridge, and grown men created scale replicas. You'll find one on display between the Suites Hotel and Hoops Brewing in Canal Park's Meierhoff Building.

Duluth's famous span lost none of its charm after its conversion to a lift bridge, and today its image appears on dozens of corporate and organizational logos, including the city's and that of its police department. Duluth's shops in the Canal Park Business District carry all sorts of bridge-related items, from t-shirts to bridge-shaped chocolate. Artists have celebrated the bridge in myriad forms, from painting to poem to song. The covers of dozens of books—including the one in your hands—have

featured the aerial bridge. And today you can watch the bridge lifting and lowering live from anywhere by visiting the Duluth Harbor Cam (www.duluthharborcam.com).



A postcard of the aerial bridge published ca. 1906. [IMAGE: ZCP]



A 1928 etching of the aerial bridge by artist Louis Orr. [IMAGE: MHS]



The Plan to Convert the Bridge

The residents of Park Point have never held their tongues when it came to matters of crossing the canal, and in 1927 they were ready to put their money where their mouths were. On January 27, representatives of the Park Point Community Club approached the City Council with a well planned and well presented proposal. After

showing the inadequacy and rising cost of operating the ferry bridge, they proposed an idea that had already been proven successful all over the world: A vertical lift bridge, which would allow continuous foot and vehicle traffic except when raised to allow vessel passage. The group had also hired the Kansas City, Missouri, firm of Harrington, Howard & Ash to draw up the plans presented to council. Founded in 1914, HH&A was well respected. By 1928 they had built three dozen lift bridges. The firm's principal partner, John L. Harrington (pictured top left), was a gifted civil engineer who had earlier been partnered with John A.L. Waddell, who invented the lift bridge (see page 60).

The plans called for a twenty-four-foot-wide roadway with two streetcar tracks and pedestrian sidewalks on either side. Harrington explained that the new bridge could also incorporate much of the existing bridge's structure, saving cost and time. Most importantly, the new bridge would be no more a potential hindrance to shipping than had the transfer bridge.

Park Point resident Samuel Clark Dick (pictured top right) spoke on behalf of the Park Point Community Club, which estimated the cost at \$550,000. The Pointers then offered to pay one third of the cost through special assessments on their properties. As proof of its sincerity, the group provided a petition

signed by 235 Park Point property owners, which represented 39 percent of land owners who controlled 49 percent of the Point's taxed property. Dick reportedly traveled to New York City to obtain the signature of Julius Barnes, the Point's largest land owner; at the time, Barnes was serving as the president of the United States Chamber of Commerce. He later donated \$75,000 to the bridge's conversion. The Council recognized a good thing when it saw one. Acting at its regular meetings in February, the Council passed the necessary resolutions to get the project moving.

Building the new bridge forced the city to jump through some of the same hoops it had navigated with the original bridge's construction. Bonds had to be approved by legislators and Duluth voters. Since the bridge occupied federal ground it needed the approval of Congress, the U. S. Army Corps of Engineers, and the Department of War. The Lake Carriers Association, representing the shipping industry, also had to give its OK.

Things moved surprisingly fast, and they couldn't have gone smoother for the city. By the following April Duluth had all the required permissions it needed to convert its bridge, but first it had to sell the bonds to finance it and hire a firm to start building it by late 1928. The bond drive started immediately, but the construction bid process resulted in just two proposals, both far exceeding estimates as the city hadn't considered the additional costs of winter construction. As it had in 1904, the city was forced to re-advertise for bids, delaying work until 1929. Duluth received five proposals for the work, and the contract ultimately went to the lowest bidder: The Kansas City Bridge Company (KCBC).



THE FERRY CAR'S FINAL RUN

On the morning of July 1, 1929, the aerial transfer bridge's gondola car crossed the canal for the last time. The *Duluth News Tribune* described the scene: "With its battered old warning bell tolling, the whistle of the Park Point street car bleating mournful accompaniment and ships tooting, the ferry car of the famous Duluth aerial bridge made the last trip of its career of 24 years at 8:45 A.M. today.... Tears stood in the eyes of James Murray, veteran bridge car operator, selected to pilot it on its last voyage, as he started it back to the mainland from Park Point."

Along with Murray's fellow bridge operators—William Maynard, Urban Nehring, Frank Lampert, and superintendent Leonard Green—the gondola car carried dignitaries including Duluth pioneers Richard Thompson, John D. Campbell, and Henry Van Brunt, who took part in the first test trip in February 1905; city officials Mayor Snively, commissioners Evans and Phillips, and police chief Eustache Barber; Anna Borth, who was the first woman to cross in the ferry bridge back in 1905; and Ann Murray, a Park Point resident who reportedly rode the ferry bridge more times than any other person outside of an operator. Many others not named by the newspaper also took the final trip. Those conspicuously absent from the event included engineers Thomas McGilvray and CAP Turner.

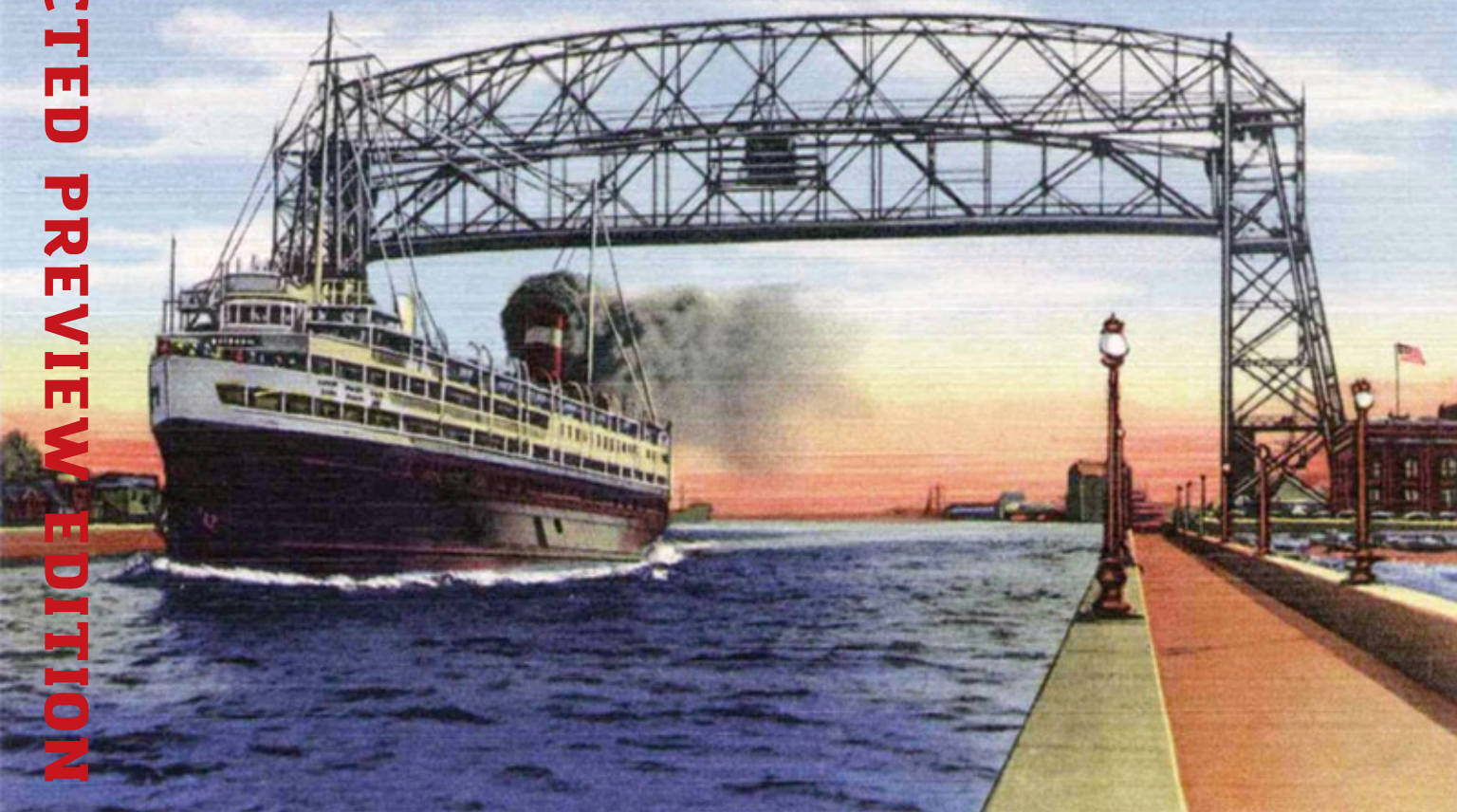
Murray pulled the lever to start the car's final journey after Commissioner Chris Evans had given the brief command: "Let's go." The car passed from the North Pier to the South, paused while the steamer *Charles L. Hutchinson* navigated the canal as the last craft to pass under the ferry bridge, and then returned to the North Pier. The *News-Tribune* reporter captured the Murray's final moment on the bridge: "After bringing [the gondola car] to its final stop [Murray] removed the control lever and stepped slowly from the operator's cab to the main platform. 'It was a good old car and I hate to see her go,' he said to the other veteran operators who were all on hand to make the last trip."

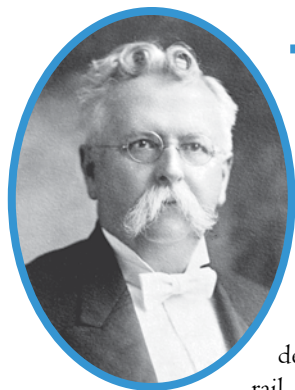
Only one obstacle remained: The approval of the Corps of Engineer's Major P. C. Bullard, who controlled the canal. Bullard had three concerns. First, he wanted two "comfort stations" built at either end of the bridge—bathrooms for spectators watching it lift. He also thought the bridge needed additional, redundant cables to provide more safety. Harrington, Howard & Ash quickly agreed to both requests. Finally, Bullard was concerned that the roadway was not fireproof. Engineer Harrington explained the how the materials used in the roadway made it fireproof, satisfying Bullard. Duluth was clear to build its bridge.

But first, CAP Turner got in the way. When Turner discovered Duluth's plan to convert his beloved bridge, he met with city officials, offering alternative ideas he claimed would dramatically cut costs. He argued that the bridge's overhead span did not need to be raised in order to accommodate the lifting roadway as HH&A had proposed. Instead, the old bridge could simply be raised about six feet by enlarging the pier foundations beneath its towers. Harrington declared the idea unfeasible, and pointed out that it did not comply with federal requirements.

At the City Council meeting of January 14, 1929, commissioners took sides, setting off a heated debate Chris Evans and James E. Foubister supported Turner, while Phillips, W. S. McCormick, and Mayor Snively stood behind the Harrington Plan. The next day the *Duluth Evening Herald's* headline screamed "BRIDGE DEBATE STIRS COUNCIL." Two weeks Philips he again called for the city to consider Turner's plan. When the discussion turned into an argument, Snively moved for adjournment because Phillips was absent, which meant a 2–2 vote. Snively and McCormick walked out. The next day the headlines roared "COUNCIL BREAKS UP IN A BABBLE: AERIAL BRIDGE PROBLEM DISRUPTS MEETING." At the next meeting, with Philip's present, the Turner plan was shot down in a 3–2 vote. Duluth was ready to convert the bridge.

The Aerial Lift Bridge





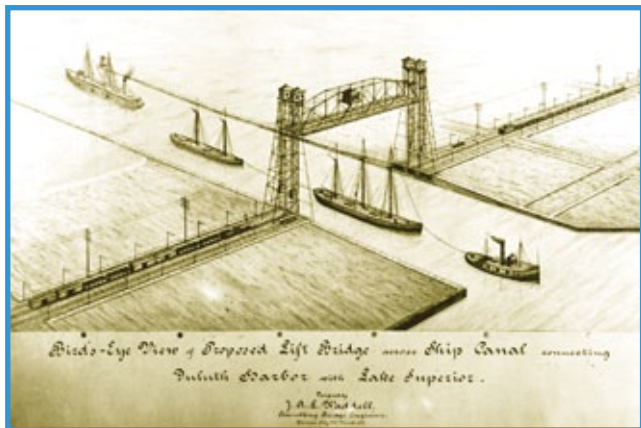
The First Aerial Lift Bridge

Dr. John A. L. Waddell (1854–1938, pictured) designed the world's first aerial lift bridge to span the Duluth Ship Canal for the city's 1892 contest (see pages 16–18). Waddell's plans included a roadway for wagon traffic, a sidewalk for pedestrians, and two lines of heavy gauge rail to allow industrial trains to access

Minnesota Point. Waddell knew his unique design was something special, and at its corner he placed viewing towers that could also serve as tea rooms. While Waddell's design did not win the contest, Duluth officials consider it “the most suitable and economic structure as regards both construction and operation” and presented it to the U.S. Corps of Engineers for approval. But Corps officials considered the steam-powered

contraption too likely to fail mechanically, potentially blocking canal traffic. Waddell's plan idea was rejected for Duluth.

The Canadian-born civil engineer was undaunted. He brought his idea to Chicago, where in 1893 it was built to carry South Halsted Street over the Chicago River. It is known today as the South Halsted Street Bridge and remains in operation. Waddell eventually designed more than one hundred similar vertical lift bridges and other bridges, including the Columbia River Interstate Bridge, the Steel Bridge, and the Hawthorne Bridge in Portland, Oregon; the Marine Parkway–Gil Hodges Bridge and Goethals Bridge in New York City; and the



J. A. L. Waddell's sketch for the first aerial lift bridge. [IMAGE: LSMC]



Chicago's South Halsted Street Bridge ca 1905. [IMAGE: LOC]

Armour-Swift-Burlington Bridge spanning the Missouri River in Kansas City, Missouri. Waddell's career included the plans for over a thousand bridges and other structures in the U.S., Canada, Mexico, Russia, China, Japan, and New Zealand, and his designs established standards for elevated railroad systems.

One of the companies Waddell founded, Hardesty & Hanover, still works on moveable bridges today and in 1999 the firm was hired to overhaul Duluth's lift bridge. And one of Waddell's former colleagues, John Harrington, designed the plans to convert Duluth's transfer bridge into a lift bridge in 1929. The partnership of Waddell & Harrington evolved into HNTB of Kansas City, which still builds bridges today.

Waddell's first lift bridge stood until 1934 when it was replaced by a pony truss bascule bridge, commonly referred to as a drawbridge. Waddell's original 1891 linen plans for his bridge are on display in a meeting room in Duluth's city hall.

A colorized lithograph made from a photograph of Chicago's South Halsted Street Bridge ca. 1894. [IMAGE: ZCP]



Converting the Duluth Aerial Transfer Bridge...

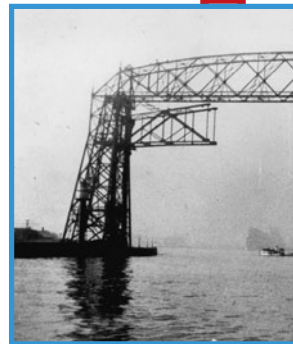
Work converting Duluth's transfer bridge into a vertical lift bridge began on March 25, 1929, when the Kansas City Bridge Company started excavating the bridge's foundations before building replacements capable of carrying the lift span's extra weight. They first tore up the approaches, ending car and wagon service. Pedestrian traffic, accommodated by a gangplank ramp, continued until the gondola car's final crossing on July 1. As operator James Murry stepped off the bridge, the KCBC crew immediately climbed aboard and began dismantling the ferry car.

By August 10 the gondola was gone, along with the hangers that suspended it from the bridge's upper truss. Workers next erected wooden scaffolding to bolster the bridge when its top span was ultimately separated from the original tower. (While the top span was not necessary for a lift bridge's operation, it was retained to carry telephone, electricity, gas, and water lines to Park Point.) Workers then erected another set of taller towers within the framework of the 1904 towers; the top span would rest atop the new towers, forty-one feet higher than the originals, so that when the roadway span raised it allowed a clearance of 135 feet for passing vessels. The new towers would also carry

the massive sheaves and counterweights that raised and lowered the road span.

A crowd estimated at five thousand gathered near the bridge on the morning of October 19 to watch as the KCBC team, armed with acetylene torches, cut straps and rivets, freeing the bridge's 410-ton overhead truss. They then began to slowly raise the top span into its new position, winching it into place by 10:30 A.M. The crowd was never bored. A seaplane pilot flew his plane under the bridge as the span was being raised, and at least one steel worker mugged it up for the crowd, at one point standing on his head atop the bridge's tallest point, kicking his feet in the air.

With the top span in place, workers installed supports connecting it to the original towers. While one team began installing the bridge's mechanical works—sheaves, counterweights, cables, and a combination machinery room and pilot house—two others began assembling the road span's framework. Working from each end of the bridge, the teams assembled the framework in sections. The work took time: It wasn't until January 6, 1930, that the framework was lowered into place at street level, ready for the installation of its nine-hundred-ton roadway.



...Into the Duluth Aerial Lift Bridge

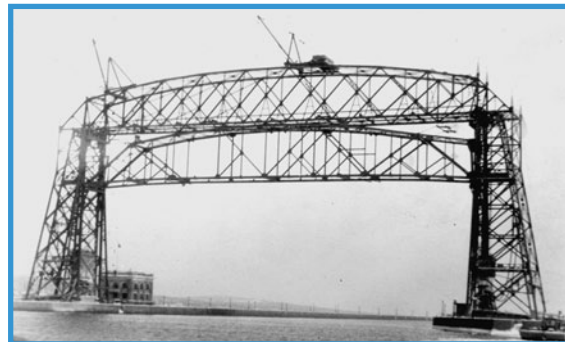
At 8 A.M. on January 12, 1930, the first automobiles traveled over the road span, marking the start of the bridge's new life as a lift bridge (the driver of the first car was never identified). The first streetcar over the canal began its journey at 5:28 A.M. on March 12. About a week's worth of minor details still had to be worked through, and the bridge still needed a coat of paint. Otherwise, it was complete. To celebrate the bridge's opening, the Park Point Community Club held a banquet and a dance.

Numerous inspections and test lifts continued until March 29, 1930, when the Corps of Engineers tug *USS Essayons* passed outbound to officially test the bridge's readiness, becoming the first vessel to pass beneath the completed bridge. The first big carrier to pass beneath the bridge, the *F. E. Taplin*, did so on April 24. Meanwhile, the City Council adopted an extensive set of rules for the bridge's safe operation: Pedestrian rides were strictly forbidden, and violating any rules was punishable by a fine of up to \$100 or eighty-five days in jail. On June 5, 1930, Duluth took possession of its aerial lift bridge. That summer it was painted Essex Green, a color so dark it often looked black.



Above: The construction crew of the Kansas City Bridge Co. poses for photographer L. Perry Gallagher Sr. in January, 1930. [IMAGE: DSN]

Below: A progression of photos showing the Duluth Aerial bridge undergoing its transformation from a transfer bridge to a lift bridge. [IMAGES: LSMC and LL]



How the Lift Bridge Originally Worked

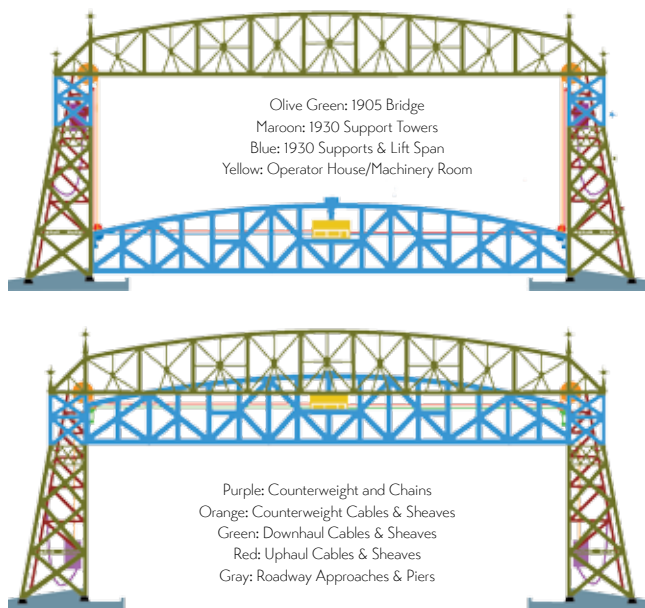
Like its predecessor, Duluth's Aerial Lift Bridge stood as a marvel of engineering, especially considering that the new span was constructed using much of the old bridge. The original bridge's top span, raised forty-one feet, now provided little more than wind bracing, as the new towers carried the moveable road span and massive counterweights. As did the transfer bridge, the top span carried phone lines, electric conduits, and gas and water mains across the ship canal. The power to raise and lower the roadway span came from four ninety-five horsepower electric motors located in the upper level of the two-story pilot house attached to the road span. Together, any two of the motors could

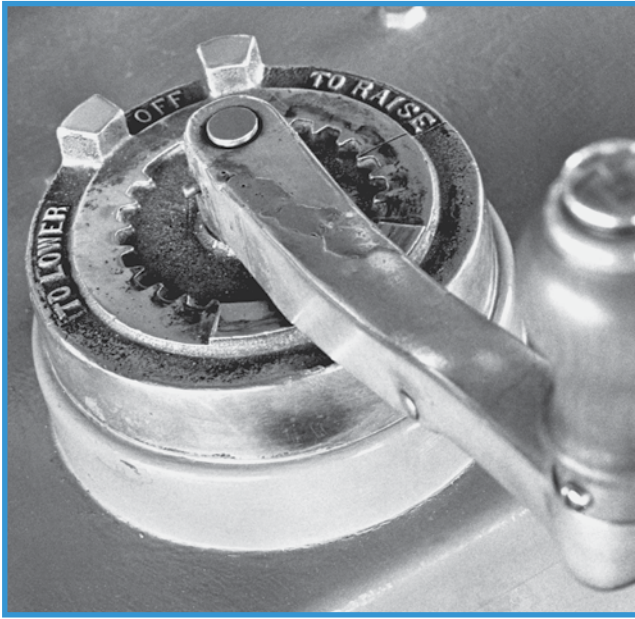
raise the span. Their power came from storage batteries located beneath the South Pier approach, kept charged by city electricity accessed by both a direct line and by tapping into trolley cables that ran along the top of the lift span. The other two generators stood by for emergencies, and the same room housed a gasoline engine should electricity completely fail.

The pilot house's lower level contained the operator's room, which contained levers connected to a host of devices positioned at various points on the bridge and its approaches—mechanical and electric interlocks, traffic gates, bells, signal lights, pneumatic horns, and both telephone and radio communication—to ensure safe movement by land and water. With the engines directly above the operator's room, a bridge tender's workday was loud.

The bridge itself worked not unlike an old-fashioned sash window, with counterweights connected by ropes to raise and lower a window sash. The bridge's 900-ton road span was originally lifted by two 450-ton concrete counterweights, one on each end of the bridge. The span and its counterweights were connected by twelve 1 7/8-inch cables that ran over four sheaves—essentially pulleys twelve feet in diameter and weighing 14 tons each—one at each top corner of the structure. As the span went up the counterweights came down. The cables, in turn, were so heavy (about five pounds per foot) that they too had to be counterbalanced. This was accomplished by attaching large chains measuring 81 feet long (half as long as the cables) to each of the two counterweights and weighing approximately 259 pounds per foot. The chains balanced the cables. When the counterweights go down, the road span goes up, and when the concrete blocks go back up, the roadway comes back down.

The bridge's motors drive winching drums, which wind (and unwind) the cables. Uphaul cables raise the bridge's lift span





Above: The aerial lift bridge's control arm, used to raise and lower the lift span from 1930 to 1986. [IMAGE: DNT]

Right: A hand-colored photo made in 1930 showing the bridge undergoing conversion; the green portion is the 1905 bridge's framework, while the 1929 towers and supports are shown as silver. [IMAGE: UMDMLSCA]

(roadway), which in turn lowers the counterweights and chains to keep the bridge in balance. Downhaul cables do just the opposite, lowering the lift span, which raises the counterweights and chains. So the bridge must be in proper balance at all times. The crew of the Kansas City Bridge Company initially balanced it so well, the counterweights had to be adjusted to compensate for the weight of its Essex Green paint job.

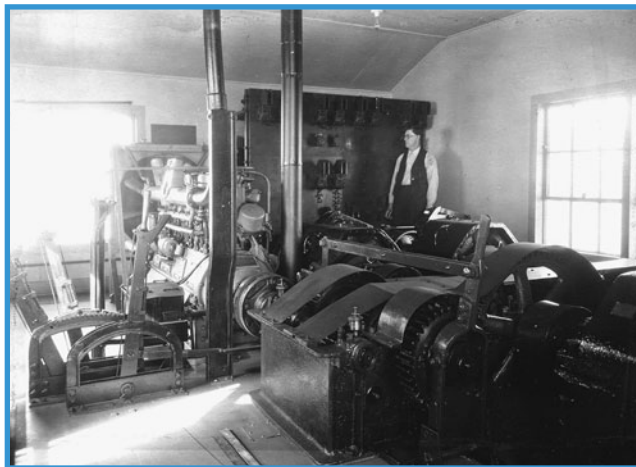
Until 1986 the entire lifting or lowering process was set into motion when an operator turned the handle pictured above.



Inside Operations of the Lift Bridge



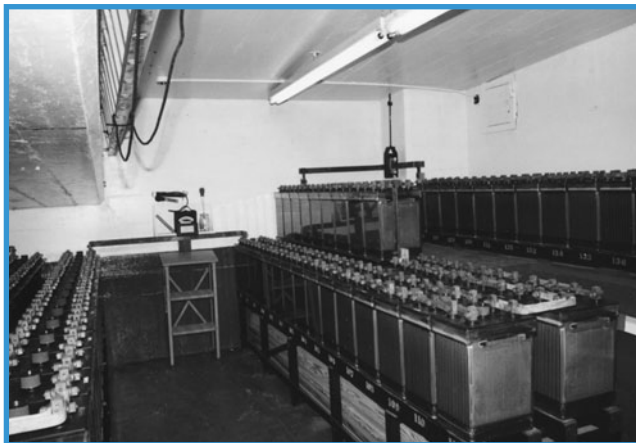
Leonard Green in the pilot house's control room ca. 1930. [IMAGE: GLD]



Green in the pilot house's engine room ca. 1930. [IMAGE: GLD]



Green in the south approach's generator room ca. 1930. [IMAGE: GLD]

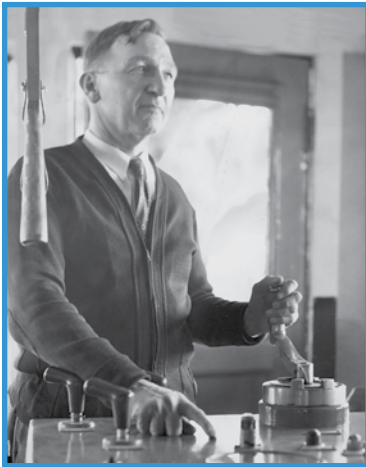


The battery room in the south approach in 1952. [IMAGE: RB]

Aerial Lift Bridge Bosses

Since Duluth's aerial lift bridge began operating in 1930, fifty-six people have served as bridge operator, aka bridge tenders, but just ten have acted as the bridge's superintendent, aka "Bridge Boss." (Over the years the title "Bridge Superintendent" was changed to "Chief Bridge Operator" and ultimately today's "Bridge Supervisor.") The first was Leonard Green, who had been superintendent of the transfer bridge beginning in 1908. Green never retired, dying of a stroke in 1944. Frank Lampert, also a transfer bridge veteran, temporarily took over leadership duties until 1946, when Al Hass was named Chief Bridge Operator. Hass, an electrician, worked for the subcontractor installing the bridge's electronic components during its conversion and was hired as operator when the job was done.

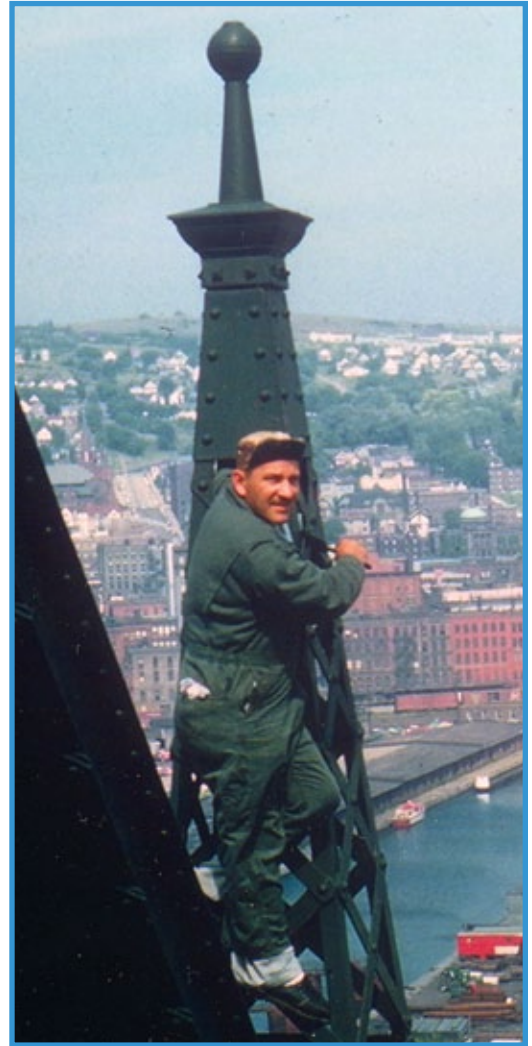
During Hass's tenure on the bridge, the pilot house was warmed by a coal-fired stove, and operators had to carry the coal up to the pilot house in bags, a two-story climb. It was also on his watch that the bridge operators' ritual lunchtime cribbage matches came to a halt. "Someone complained to



Al Hass. [IMAGE: GLD]



Robert Brown. [IMAGE: RB]



Don Bowen. [IMAGE: GLD]

the city fathers and we had to quit,” he explained. Hass retired in 1968. His thirty-seven years on the span was the longest any one person worked on the aerial lift bridge.

Robert O. Brown took the reins from Hass. Brown told reporters that as a kid growing up in Duluth’s West End he wished that someday he could work on the bridge. Prior to joining the bridge crew he served as a merchant marine and worked with Hass wiring the bridge’s electrical system in 1929, but it wasn’t until 1941 before another operator position opened. It took another twenty-seven years before he became the chief. When he retired in 1974, he told a reporter, “Never in my life have I had to drag my feet to go to work...it has been a wonderful career.”

Brown was replaced by Harold Bilsey, who had fifteen days more experience on the bridge than his competition for the job, Richard Lyons. Both were lifelong Duluthians. Bilsey grew up in West Duluth and graduated from Denfeld High School in 1931. In World War II he served two years aboard the *USS Iowa*. He returned to Duluth with a taste for the sea, taking a job



Harold Bilsey. [IMAGE: RB]

on the bridge to stay in close contact with ships and ore boats. Lyons took Bilsey’s spot as chief after he retired in 1976. Also a Denfeld grad, Lyons first signed on when he returned from serving in the Army during World War II. Lyons retired in 1978. His son Lowell recalled how Lyons often told him, “You have to love what you do or

it’s just not worth it.” And his dad obviously loved his job. “Dad was always so proud of it,” Lowell said. “He took pride in how well it ran.”

Lyons’ retirement created an opportunity for Don Bowen, who first stepped onto the bridge in 1957. The Duluth native had spent his early life moving about, growing up on the Iron Range and moving to St. Paul, Chicago, California, and even Hawaii doing everything from driving truck to maintaining naval airplanes. Bowen loved his job, but once joked with the *Duluth News Tribune* that “The trouble is, everyone in the city of Duluth is your boss. They all feel they own the bridge.”

When Bowen retired in 1982 ten-year veteran Steve Douville became Bridge Supervisor. Another lifelong Duluthian and ex-Navy man, Douville was looking for a job in 1972 after returning from service when his brother-in-law spotted an ad for the job in a newspaper. During his tenure, Douville oversaw two of the bridge’s most extensive renovations since its 1929 conversion. At the time of Douville’s retirement in 2005, Duluth Director of Public Works Dick Larson told the *Duluth News Tribune* that “[Steve] lives and breathes the bridge, and really cares about it. He is the bridge.”

The year Douville retired also so the hiring of Paula Hanela, the first and to date only woman to work on the bridge (and since 2015 she and Scott Hill have more experience on the



Richard Lyons. [IMAGE: RB]



Steve Douville. [IMAGE: DSN]



Ryan Beamer. [IMAGE: DNT, PHOTO BY S.KUCHERA]



David Campbell. [IMAGE: DC]

bridge than any other active tender). Her new boss, Ryan Beamer, was another former Navy man and had been a bridge operator since 1998. Beamer used to cringe whenever people said, “I bet your job has its ups and downs,” a joke lazy copy editors have relied on for decades. Beamer was familiar the old chestnut long before he ever set foot on the bridge: He spent five years as an electronics technician on the *USS Kamehameha*, a nuclear-powered ballistic missile submarine. Beamer found weekend work on the bridge stressful. “You don’t sit down. You are constantly standing there, watching traffic, watching boats, watching pedestrians. People attempting to hang on remains a daily occurrence in the summer months... You have to be vigilant.”

Beamer left his post in May 2015, replaced by St. Paul native David Campbell, who had not previously worked on the bridge. An Air Force veteran and former railroad man, Campbell is a master electrician who spent eighteen years working at the Potlatch/SAPPI paper mill in Cloquet before signing on to supervise the bridge. He explained to Minnesota Public Radio

News in 2016 how the bridge is both impressive and relatively simple: “Everything on this thing is big, and everything on it’s heavy,” he said. “But I tell people, it’s nothing but a glorified elevator, that’s all it is.”

If you think you’d like to work on the bridge, you’ll need “a minimum of one year of specialized electrical training, plus two years of experience working with large electrically operated machinery; or three years of experience working with complex mechanized equipment; or one year of experience working with computer-controlled electrical equipment; or a combination of education, training, and experience in the above areas which is accepted as equivalent,” according to the city of Duluth. And if the past is any indication, some time in the Navy might help your chances as well. But you’ll have competition for the position, which in January 2022 came with an annual salary of between \$64,573 and \$78,415: When a job for a lift bridge operator opened in 2016, MPR New reported that the city received 135 applicants.

LIFTING PROCEDURE

The process of raising the aerial bridge's road span for marine traffic begins when a vessel contacts the bridge's pilot house and requests a lift. Originally this was done by a horn signal, but for decades vessels have used marine radio. When a vessel is about one and a half miles from the bridge inbound or just starting its turn to lineup with the bridge outbound, its captain calls the bridge and requests the bridge to lift. A bridge operator's goal is raise the span for no more than twelve minutes. Since 1990, when operators start the lifting process, they set into motion a sequence of events:

1. A recorded message is played, informing tourists and pedestrians of a pending lift. (The voice on the recording is late bridge operator Al Kennedy, who ironically lost his voice before retiring.)
2. The bridge's traffic lights cycle to yellow and then to red, gongs sound, and the "Warning: Restricted Area" lights on both ends of the bridge start to flash.
3. When the traffic lights turn red, an interlock releases, allowing the operator to lower traffic gates. When all gates are down, another interlock releases, illuminating a blue light on the control console, indicating the span is ready to be raised.
4. While the operator at the controls checks the security cameras, another operator visually checks both of the span's sidewalks and the roadway to ensure they are clear of all persons.
5. When both operators are satisfied that the bridge is clear, the "raise" button is pushed.

Duluth Aerial Lift Bridge operators and vessel captains passing through the canal have retained one signal left over from the days before radio: The Captain's Salute, one long horn blast followed by two short blasts exchanged between the vessel's captain and the bridge tenders. It originally meant "Ahoy There!" but in Duluth's ship canal it is essentially an exchange of "Thank you," and "You're welcome."

Aerial Bridge Operators

BOSSSES (YEARS AS BOSS)

Leonard Green, 1908–1944 (1908–1944)
Frank Lampert, 1921–1946 (1944–1946)
Alfred Hass, 1930–1968 (1946 –1968)
Robert Brown, 1941–1974 (1968 –1974)
Harold Bilesey, 1946–1976 (1974 –1976)
Richard Lyons, 1946–1978 (1976–1978)
Don Bowen, 1957–1982 (1978–1982)
Steve Douville, 1972–2005 (1982–2005)
Ryan Beamer, 1998–2013 (2005–2013)
Dave Campbell (2013–Present)

Chuck Anderson, 1970–1973
Mike Vuksich, 1970–1981
Gaylord Korhonen, 1973–2003
Roger Braff, 1974–1988
George Priley, 1976–1989
Jim Wall, 1976–2007
Al Kennedy, 1977–1998
Leo Stepanek, 1979–1996
Thom Reistad, 1981–1986
Don Olson, 1982–2001
Bob Wilcox, 1984–2000
Darrel Moe, 1986–1987
Doug Slosson, 1987–2008
Mike Geist, 1989–1998
Paul Thomas, 1990–2018
George Flaim, 1996–2011
Richard "Dick" Shaul, 1998–2015
Paula Hanela 2001–Present
Scott Hill 2001–Present
Dave Ceryes 2003–2011
Dale Mitchell 2005–2017
Tim Cain 2007–2011
Rob Olson 2008–2011
Brad Campe 2011–2011
Darrel Zimmer 2011 –2011
Jesse Sauve 2015–2015
Craig Wosepka 2015–2015
Mark Nyman 2016–Present
Duane Moller 2016–Present
Seth Honemann 2019–Present

OPERATORS

Thomas White, 1905–1918
John Hicken, 1905–1928
William Maynard, 1916–1918, 1932–1945
James Murray, 1924–1941
Urban Nehring, 1928–1942
Doug Creighton, 1930–1942
Charles Landre, 1930–1955
Armas Vanhala, 1931–1955
Hartley Ness, 1942–1970
Art Gressner, 1942–1972
Milt Anderson, 1945–1970
Cliff Lanthier, 1946–1966
Jim Milne, 1955–1956
Clarence Cohler, 1956–1977
Dennis Peterson, 1967–1967
Alva Eastman, 1967–1984
Don Berryhill, 1968–1970
Ernie Shelton, 1970–1976



The Duluth Aerial Bridge photographed by L. Perry Gallagher Sr. in 1930, the year it first went into service as a lift bridge. [IMAGE: UMDMLSCA]

The Aerial Lift Bridge's First 75 Years

Duluth's Aerial Lift Bridge nearly suffered major damage in April, 1930, just weeks after it first began operating. All six bridge operators failed to hear the whistle of the steamer *L. M. Bowers* requesting a lift. The *Bowers'* captain leaned on the whistle, and it screamed as he split the piers and entered the canal, all the while trying to reverse course to avoid hitting the bridge. Fortunately, an operator quickly raised the bridge, avoiding potential tragedy.

The problem was wind. Depending on conditions and direction, the wind sometimes prevented sound off the lake from reaching the pilot house over the canal's center—a sound blind spot. The problem was addressed the following year when a “mechanical ear” was installed on the north pier (see page 90).

In 1932 another near miss with a vessel prompted more safety initiatives. On June 17 the steamer *Schoonmaker* just missed striking the bridge, which had stopped seventy-five feet above



The Canadian passenger steamer *Noronic* photographed passing under the aerial lift bridge in 1948 by L. Perry Gallagher Jr. [IMAGE: UMDMLSCA]

the water when a circuit in the electric system shorted out. Operators quickly started the emergency engines and lifted clear of the steamer, after which lifting rules were changed, requiring operators to raise the bridge while the vessel was much further out in case the bridge became disabled in any way. The change allowed more time to either fix the problem or reverse the vessel. The city also purchased an electronic failure warning system. As its first decade in operation came to a close, the bridge's lift span had raised 42,775 times.

World War II dominated the bridge's life in the early 1940s, during which the road span's lift total reached 56,444. Steel fueled the war effort, and iron ore came from Minnesota's iron ranges. That ore was shipped through Two Harbors and Duluth, and each ore boat loading in Duluth came and went through the

ship canal. The Twin Ports also became a major shipbuilding center. Between 1941 and 1945, the bridge lifted nearly thirty thousand times for marine traffic, averaging six hundred more lifts per year than the total average of lifts of each year from 1930 to 2005.

Over the winter of 1953–1954 Duluth officials altered the method vessels used to signal the bridge to raise. Since 1930, incoming vessels signaled bridge operators with three long toots. While navigating in fog, ships traditionally gave three short blasts, but too often ship captains leaned on their horns too long in the fog, and often bridge tended misread the message and unnecessarily raised the bridge, wasting time and money and delaying traffic over the canal. Further, signals from boats calling for the aerial bridge to raise often reached the harbor's other



The passenger steamer *North American* photographed passing under the aerial lift bridge in 1955 by L. Perry Gallagher Jr. [IMAGE: UMDMLSCA]

mechanical bridges. So beginning in the 1954 shipping season, captains of incoming vessels learned a new signal to request a bridge raising, one unique to the Duluth Aerial Lift Bridge: Long, short, long, short. The lift total for the 1950s came in at 46,736, but the opening of the St. Lawrence Seaway in 1959 increased harbor traffic—and therefor bridge lifts—in the 1960s, which witnessed 52,741 lifts. In the 1970s, the bridge was raised and lowered 63,395 times, but they weren't all for commercial traffic. Chief operator Bob Brown explained that many of those lifts were made for pleasure craft, and the increased canal traffic was prematurely wearing down the bridge's batteries. Brown

reported that in July 1970, 1,588 vessels passed under the bridge and “552 passages were for excursion boats *Flame* and *Flamingo*.” Other small craft made 404 passages. That meant about 60 percent of all lifts were for non-commercial traffic. Further, the bridge experienced increased automobile traffic, with 119,000 vehicles crossing the bridge that June alone.

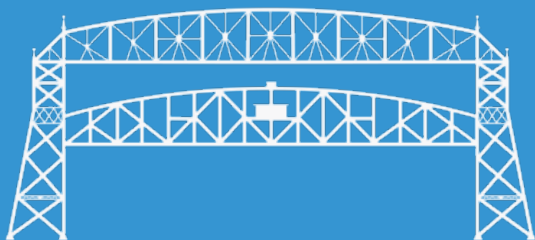
One possible solution would be to limit lifts by establishing “bridge hours”—a limit on the hours the bridge would raise for anything but “essential marine traffic.” The Coast Guard agreed. Boat owners were encouraged to take down antennas, fishing rigs, false smoke stacks, or anything else that could be easily re-

DULUTH'S AERIAL BRIDGE: WHAT'S SO SPECIAL?

By the time Duluth's aerial bridge was converted from a transfer bridge to a lift bridge in 1930, there were hundreds of similar vertical lift bridges operating across the globe, and about 230 are still working today. It certainly isn't the biggest: The 1959 The Arthur Kill Vertical Lift Bridge in Staten Island, New York, has longest road span (558 feet) and is 215 feet tall, about 75 feet taller than Duluth's bridge. So what makes Duluth's bridge so special?

Duluth's famous span was not, as many people believe, the planet's the first aerial transporter bridge—it was the sixth (see page 26). It was, however, the first such bridge in built in North America and the western hemisphere. It was also the first stiff-girded transfer bridge ever built, and the first to use an overhead pulley system for propulsion.

Because Duluth's transfer bridge was transformed into its lift bridge, it immediately became special: One of only three lift bridges to include a top span, which is unnecessary for the bridge's operations. It was retained to carry communication lines, electricity, natural gas, and fresh water to Park Point. The first lift bridge with a top span was the 1893 South Halsted Street Bridge, also the world's first vertical lift bridge (see page 60–61), but it is unclear why a top span was included in the design. The other is the 1913 Murray Morgan Bridge in Tacoma, Washington, which uses an overhead span to carry a water pipe across the Thea Foss Waterway.



moved to reduce a craft's height in order to clear the bridge without requesting a lift. In 1971 the span lifted 5,873 times, 1,700 for the *Flamingo* and *Flame*—both of which, according to Brown, sported “needlessly long radio antennas and false smokestacks.” At an estimated cost to the city of \$23 per lift, those two vessels alone cost Duluth taxpayers \$39,000. Despite the hullabaloo, officials never put “bridge hours” into place.

In 1973 the bridge received its highest honor, a spot in the National Register of Historic Places, “primarily for its engineering qualities,” the Minnesota Historical Society reported. The bridge was one of the few non-buildings on the register at the time, joining what the newspaper called “an elite group of engineering marvels of American history.”

The bridge lifted 59,986 times in the 1980s. In January 1985 city councilor Arno Kahn made an effort to bring back public bridge rides (see page 83), an idea not well received: Many believed the rides both too costly and too dangerous. In the end a warning by the state killed the idea: The bridge was about to undergo a very expensive renovation, paid for in part with state funds (see page 90–91); if the bridge was going to be used to give tourists rides, the state would withdraw its financing.

While the number of lifts dropped in the 1990s to 53,856, Park Point's Community Club made another effort to establish bridge hours in the mid-1990s. With the Coast Guard's consent, the bridge raised and lowered just once every half hour. The Coast Guard considered the experiment a failure, and the next summer bridge returned to lifting on an as needed basis. City officials made another failed attempt at regulating the number of lifts in 1998. After a trial lifting schedule in 2010, in 2011 the Coast Guard established that the bridge would raise every half hour between 7 A.M. and 9 P.M. between Memorial Day and Labor Day weekend. In 2018 that was extended to between March 16 and December 31.

UNCORRECTED PREVIEW EDITION



Barnstorming the Aerial Lift Bridge

Several pilots flew their planes beneath the top span of Duluth's aerial transfer bridge before 1929 (see page 54), and others navigated their aircraft between the top span and the lift span of the aerial lift bridge. One unknown pilot even flew beneath the top span as the bridge was undergoing its transformation from transfer to lift bridge. That flight occurred on October 19, 1929—the very day workers freed and raised the bridge's top span. Newspapers reported that a seaplane began “circling and dipping close to the top of the bridge, and even flying under it while the span was slowly moving upward.” But no one took a picture, and no one took credit.



A Sikorski helicopter flies under the aerial bridge ca. 1952. [IMAGE: LSMC]

A helicopter passed through once, as shown in the photograph below, discovered in the archives of the Lake Superior Maritime Collection at the University of Wisconsin Superior's Jim Dan Hill Library. Unfortunately, the photo includes no notations, so the date and pilot are lost to history. The helicopter appears to be a Sikorsky H-5, first made in 1945, so the fly-through would have to have occurred after that date.

Many people think World War II “Ace of Aces” Richard A. Bong barnstormed the bridge. Bong, a native of Poplar, Wisconsin, shot down forty Japanese planes while flying his beloved P-38, nicknamed “Marge” for his wife. In 2006, John Hoff told a reporter he witnessed Bong take his P-38 through the bridge in 1944. Hoff was then eleven years old, visiting his father's office in the Alworth Building. He swears he saw a P-38 fly in low from the east and emerge west of the bridge. Unfortunately, no one else saw it. Roy Mahlberg said he remembers that the next day the *Duluth News Tribune* featured a photo of Bong's plane flying under the bridge, but research has yet to find it in the newspaper's archives. Bong certainly was capable: he once flew a loop-the-loop under and over the Golden Gate Bridge.

Maybe Hoff did see a P-38 pass under the bridge. If so it was likely piloted by Duluthian Jack Daniel Brown, an Army Air Corps pilot. Brown's descendants recalled that in either 1943 or 1944, he and another pilot were ordered to transport two P-38s from Texas to Nova Scotia. Along the way, Brown flew over Duluth, where he buzzed the Park Point home of his brother, lift bridge operator (and later chief bridge operator) Bob Brown, close enough so his family could see his face. Jack then approached the bridge from the bay side, flew between the aerial bridge's top and lift spans, and headed to the east coast of Canada. Of course, no one took a picture....

Saturday Evening Post Cover

On June 14, 1947, Duluth's Aerial Lift Bridge adorned the cover of the *Saturday Evening Post*, at the time the most popular magazine in America. The cover painting, titled "Ore Barge Duluth, Minnesota," was the work of John Atherton, a native of Brainerd, Minnesota, who found success in New York as both a commercial artist and a fine artist working primarily as a "magic realist." That issue of the magazine included no story on the bridge nor Duluth, but it did mention that Atherton found the Zenith City rather impressive, particularly its "excellent facilities for sledding."

Two years later the magazine did publish an article about the Duluth. Titled simply "Duluth," Arthur W. Baum's piece is an interesting outsider's perspective of the city in post-World War Two America, calling Duluth the "apple-cheeked, blue-eyed, tow-haired...third city of Minnesota" on Lake Superior, "a fluid deity which the city worships." Baum retold the ship canal dig myth and included this passage about the aerial bridge: "Originally the aerial-lift bridge was not exactly a bridge, but a high arch from which was suspended a sort of basket which traveled back and forth with passengers and vehicles across the open canal. It is now one of the fastest vertical-lift bridges in existence, rising to its full height of 138 feet in less than a minute. It is so delicately counterbalanced that when snow or sleet adds to its weight, the matter is adjusted by tucking concrete blocks into small pockets in the counterweights. Duluth eyes are often on the bridge. To strike a rough average, there is a vessel moving through the canal every twenty minutes of the season, night and day."

Baum also noted that Duluth's newspapers "devote regular space to one of the city's odd whimsies, an inordinate interest in the game of cribbage," which lift bridge operators ritually played during lunch breaks until they were forced to stop. Baum

noted that "The number of cribbage boards around town is astounding, and the presence of a near-perfect 28 hand in a tussle between two teams of the City Cribbage League is a matter for a serious news report."



The June 16, 1943, *Saturday Evening Post*. [IMAGE: ZCP]

Duluth: Last Stop on the St. Lawrence Seaway

In his 1947 *Saturday Evening Post* story on Duluth (see previous page), Arthur Baum wrote that “Duluth yearns so passionately for a St. Lawrence Seaway that it has been called ‘an old maid city looking under its bed every night for an ocean.’” While it had long been possible for ocean-going vessels to reach Duluth, they could be no larger than 250 feet long—the limit of the Welland Canal, which connected Lake Ontario and Lake Erie. The long-awaited St. Lawrence Seaway connected Lake Ontario by a new system of channels, canals, and locks, allowing salties up to 730 feet long to reach all ports on the Great Lakes and making the Duluth-Superior Harbor the world’s most-inland seaport. Duluthians, particularly one-time U. S. Chamber of Commerce president Julius Barnes, worked hard to get the seaway since the early 1920s.

On May 4, 1959, at 1:15 p.m. the aerial bridge’s lift span raised for the first saltie to reach the Duluth via the St. Lawrence Seaway, the 475-foot, 10,000-ton freighter *Ramon de Larrinaga* out of Liverpool, England. A crowd of about 3,500 had shown up to witness the event on a blustery day marked by high waves crashing into the rocky shore and piers. Cars blew their horns and fire trucks sprayed a salute over the passing vessel, taking the place of fire tugs that usually herald a grand marine arrival as the canal was too narrow for both the saltie and the fire tugs to navigate simultaneously. Mayor E. Clifford Mork greeted the freighter’s captain, Joseph Meade, and presented him with a key to the city. Julius Barnes was not in attendance, having died fourteen days earlier. He was eulogized as “one of the fathers of the St. Lawrence Seaway.”



The *Ramon de Larrinaga*, the first saltie to reach Duluth via the St. Lawrence Seaway, passes under the Aerial Lift Bridge on May 4, 1959. [IMAGE: LSMC]

The Neptune Statue

When the opening of the St. Lawrence Seaway made Duluth an international port, it was a big deal for the entire state. Minnesota commemorated the event by constructing a large bronze-colored statue of Neptune, Roman god of the seas, and displaying it at the state fair. Standing twenty-six feet tall on a concrete base, the statue depicted Neptune brandishing his trident in his right hand as he cradles a ship in his left—a replica of the freighter *Ramon de Larrinaga*, the first ocean-going vessel of the modern era to pass through the Duluth ship canal and under the aerial bridge. After the celebration ended, the Minnesota State Fair board donated the statue to Duluth. It was installed on the canal's North Pier and praised by Mayor E. Clifford Mork as a “tremendous tourist attraction.”

Many Duluthians considered the statue just plain ugly. For those charged with maintaining it, the statue was a headache, as it was made of neither stone nor metal. Instead, it had been constructed of fiberglass and an unnamed “weatherproof plastic component.” Soon the statue was pock-marked with scars from rocks tossed up by the lake's waves and misbehaving children. Workers constantly patched and repainted the statue, costing the city about \$300 a year to maintain it (a cost of about \$2,800 in 2022).

In 1963, those maintenance woes were solved in a matter of seconds. While taking the statue off its pedestal to perform major repairs, workers using torches to free the structure from its internal supporting pipes accidentally set the statue ablaze. It took just a few minutes to turn the Roman god into a pile of ashes: The material within the fiberglass outer shell turned out to be nothing more than papier mâché.

The Neptune statue along the Duluth Ship Canal ca. 1961. [IMAGE: ZCP]



Ship Canal Tragedies Beneath the Lift Bridge

As much as it does to help local commerce, Duluth's ship canal has had some dark moments. In July 1934, the canal claimed the life of seven-year-old Richard White, who lived nearby at 216 South First Avenue East (today's Canal Park Drive) with his parents, then one of Duluth's few African American families. His parents initially feared he had ran away. A search failed. The next day four children, two boys and two girls ages four to six, confessed that one of them had tripped White, who fell from the north pier into the canal. The children did not call for help. One boy pointed to the other and said, "He did it." The accused replied, "Yes, but you told me to." No charges were ever filed. White's body eventually washed ashore.

On April 30, 1967, the canal's waters claimed the lives of seventeen-year-old Eric Halverson and his sixteen-year-old twin brothers Arthur and Nathan. The three had gone to the canal

to watch massive waves created by a spring squall, venturing out to the North Pier Lighthouse for a better view. Two made it to the lighthouse's relative safety, but the third clung to a light pole short of his goal. A huge wave hit the pier, knocking him into the canal where he drowned. In their attempt to help, his brothers met the same fate. Coast Guardsmen Edgar Culbertson, Richard Callahan, and Ronald Prel rushed to the pier. During their effort to locate the boys, a wave also washed Culbertson into the canal, where he too drowned. United Methodist Church, where the Halvorson family attended services, now includes a memorial to the boys called Three Brothers Chapel. Culbertson, Callahan, and Prel all received the Coast Guard medal, the organization's highest peacetime award for heroism. A plaque commemorating Culbertson's bravery rests on the north pier.

An incident in 1944 was far less tragic, but nonetheless unfortunate. A black bear somehow found its way into the bay near today's Minnesota Slip (now home of the *William A. Irvin* ore boat). The bear eventually entered the ship canal, struggling to find a way out of the water. Three young men set out in a small boat intending to rescue the bear, but the bruin didn't appreciate their efforts. One of them tried to lasso the bear, but missed; the bear used the rope to claw itself onto the boat, where it bit its would-be rescuer and tore his pants before all three young men abandoned ship. The Coast Guard then towed the boat to the docks, successfully lassoed the bear, and attempted to pull it onto the pier. But the bruin wouldn't budge, and officials shot it to prevent further trouble.



For this unfortunate bear, a 1944 swim in the canal ultimately proved fatal. [IMAGE: ZCP]



Aerial Lift Bridge Accidents & Tragedies

The first accident related to the Aerial Lift Bridge occurred in May, 1930. W. J. Odenthal of Killdeer, North Dakota, and his son were driving north along South Lake Avenue on Park Point as the lift span began raising. Odenthal didn't notice the stop sign nor the bridge's warning bells as he drove up the bridge's south pier approach ramp. Consequently, he drove off the ramp, sending the car into the canal. Neither he nor his son were injured. Safety measures were soon added, including gates at either approach to prevent cars from reaching the bridge.

In 1934, seventeen-year-old Melvin Halverson grabbed the edge of a beam on the bottom of the span and held on as the bridge began to rise. A person can support their own body weight only so long—someone of average upper-body strength can hang from a pull-up bar for between one and several minutes. The bridge's lift span must stay in the raised position much longer than “a few minutes” to let a ship pass beneath. At thirty feet his arms gave out; he fell to the pier, hit his head, and died instantly.

Sixteen year-old Minneapolis resident Beverly Brenner ignored warnings in December, 1961, remaining on the bridge's sidewalk until after it began to raise. As the lift span moved upward, she panicked and jumped, but luckily the bridge was only eight feet above the pavement and she suffered only minor injuries.

A nineteen-year-old man tested himself against the bridge in September 1982. Frank Weber and Tom Hanna, both of Grand Rapids, Minnesota, were visiting the canal when the bridge prepared to raise for a small sailboat. Assuming the lift span would

not be up for long, Weber grabbed a rail and ascended with the lift span, but he lost his grip. As Weber began to fall Hanna rushed beneath him to break his fall. Instead, Weber's weight broke Hanna's leg. Hanna's heroics were for naught; Weber died at the scene.

Arguably the most notorious event in the bridge's history occurred in June 1990. At 11:30 A.M. as the bridge prepared to lift to allow an excursion boat to pass beneath it, fifty-year-old woman began walking across the lift span despite its warning bells and flashing lights. She was almost halfway across when she panicked, screaming “Help me! Somebody help me, please!” If she had stayed on the sidewalk and not moved, she could have safely ridden up and back down on the lift span.

Instead she ran back toward the north approach and, when the bridge was thirty to forty feet above the ground, she leaned over and attempted to jump. But she became caught in a **V** of the bridge's metalwork. As the lift span continued upward, it carried the woman toward the stationary north tower; dismembered by the rising bridge, she died instantly. Witnesses described the event as gruesome. The bridge's operators were unaware of the event until after it had happened.

The most recent tragedy occurred in December 1914, when a twenty-year-old man died after jumping from atop the bridge. Police were called to the bridge at 11:30 P.M. and spent four hours negotiating with the suicidal man, who ultimately leaped from the bridge and drowned in the canal.

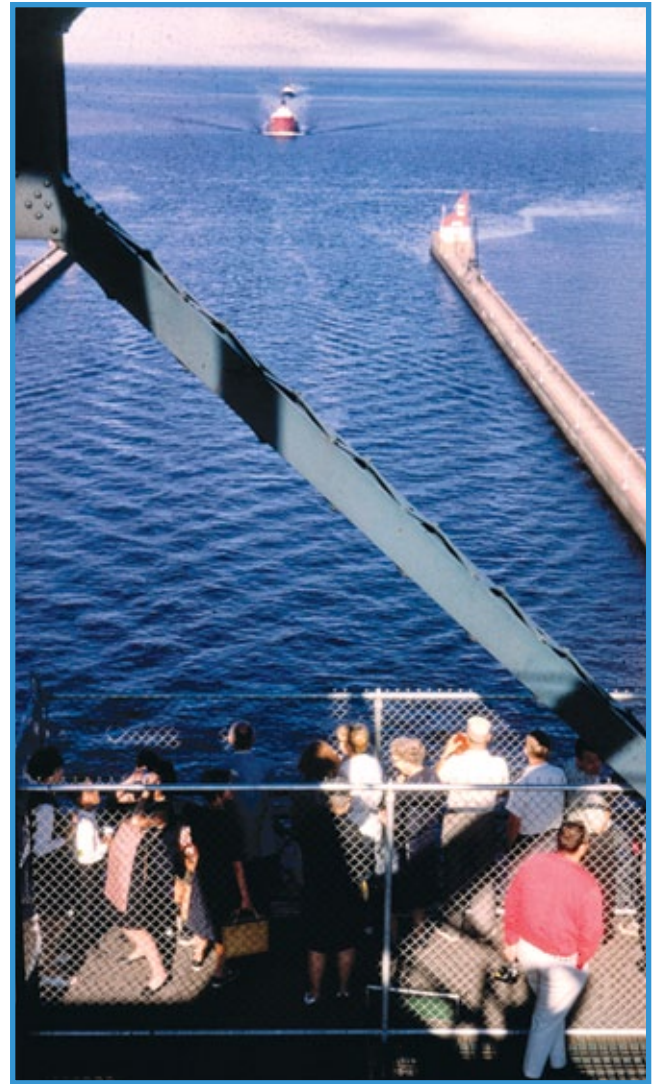


Riding the Lift Span

While Duluth's aerial bridge has been of interest to visitors since it was first built in 1905, in the 1960s Duluth made much more of an effort to make it a tourist attraction. In 1965 City officials resurrected an idea their predecessors had twice dismissed as unsafe: Public rides on the aerial lift bridge as it raised and lowered from June to Labor Day. That August Charles Cox and Dean Carlos of Higgins Industrial Supply Company installed chain-link fencing along the bridge's lakeward sidewalk to create a safe enclosure for riders; the bridge operators called it the "Monkey Cage." Later that month the bridge became a slow and careful carnival ride, and anyone over five years old could enjoy it for twenty-five cents.

"The bridge operators hated it," Bridge Supervisor Ryan Beamer said in 2007. "It made extra work for them, and also created safety concerns that had nothing to do with the bridge's practical operation." Chief Operator Don Bowen validated Beamer's words back in 1967: "This passenger thing really has been nerve-wracking," he told a local reporter. "Now, instead of stopping people, when the bells ring, it's like a dinner bell. People just come running aboard."

Those safety concerns became all too real the day when one woman panicked. As the bridge began to rise, she opened the gate and ran toward the North Pier. Fortunately operator Richard Lyons was keeping an eye on the passengers and quickly shifted the bridge into reverse. But the bridge lost its race with the fleeing woman. When she reached the end of the bridge deck, it was still twenty feet in the air. She jumped and landed on the pier, but not without sustaining serious injuries. If Lyons had not stopped and reversed the bridge, she very well may have died. Despite the bridge operators' dislike of the rides, they continued until 1973.



Tourists take a ride in the "Monkey Cage," ca 1968. [IMAGE: LL]



UNCORRECTED PREVIEW EDITION

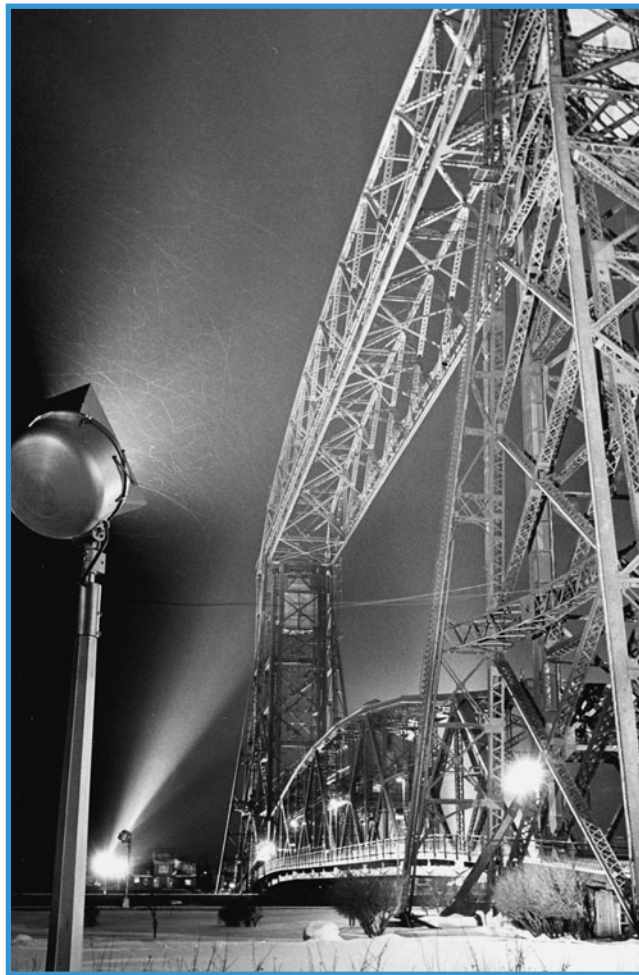
Lighting the Aerial Lift Bridge...

In 1966 the city's Project Duluth Committee took steps to make the bridge a night time attraction by illuminating it with floodlights. "The Aerial Lift Bridge is the symbol of Duluth," chairman John Grinden said. "We want to do everything possible to promote it to dramatize Duluth to tourists." Once the proper permissions were secured, the architectural firm of Bean, Gilmore & Hill designed a scheme using the same system that illuminated Egypt's Sphinx and the Palace of Versailles in France—twelve 1,000-watt mercury vapor lamps and luminaries mounted on eight poles.

The costs, estimated at \$21,000 (over \$180,000 in 2022 dollars) spurred the creation of a fundraising campaign. A one dollar donation meant membership in the "Aerial Bridge Club." On Friday, November 11, the group had met its goal, collecting \$21,000 from 10,000 donors.

On November 17 a crowd of thousands joined dignitaries to watch as state representative John A. Blatnik—who called the lights "a magnificent symbol of the rebirth of our area"—threw the switch to turn on the lights. It took time for the lamps to warm up to full power, but when they did they bathed the bridge in what the newspaper called a "radiant, silver-blue light." The University of Minnesota Duluth marching band broke into "Hey, Look Me Over" before the crowd joined in with the College of St. Scholastica choir to sing "God Bless America."

But detractors pointed out that while the new lighting did make the bridge visible at night, with the bridge's dark Essex green paint, the illumination did "little to make the span more attractive." Grinden told newspapers he eventually wanted the bridge painted "aluminum" so that it would better reflect the light. The paint job, he suggested, could be paid for by money raised from bridge rides.



The bridge lit for the first time on November 17, 1966. [IMAGE: DNT]

...Leads to Painting the Aerial Lift Bridge



As the 1960s came to a close, Duluth's Aerial Lift Bridge was still sporting its coat of Essex green paint, so dark most considered it dreary. A letter to the editor published in the *Duluth News Tribune* on October 10, 1969, called the bridge's condition "deplorable" and the bridge itself an "eyesore." Paint was peeling and rust was clearly visible. Its writer wanted to know why the money coming in from bridge rides wasn't used to maintain the bridge. That curious constituent had to wait another year before the city got serious about painting the bridge. After a false start—the city had grossly underestimated costs—the job was divided into three phases, as Duluth only had enough money for the first phase, surface preparation and spot painting. The other phases, an intermediate coat and a final coat, would have to be spread over a number of years. Much of the work was done by four young men who painted the bridge by hand using brushes: James Russel, Ralph Ruiz, Thomas Sherman, and John Parent, who did most of their work during the summer. The project was eventually finished in 1975, and for the first time since 1905 the bridge was not a shade of green, but a shiny silver. In 1986 workers replaced the 1966 floodlights with thirty-two high-pressure sodium floodlights that bathed the bridge in a golden glow (see page 82), paid for with a donation from Duluth's Rotary Club. Temporary LED lights were used between 2008 and 2019. In 2020 new LED lights were installed on the bridge so that the icon can be illuminated in any of a number of colors in recognition, solidarity, or celebration of people, causes, and events.

Left: Bridge painters James Russel, Ralph Ruiz, and Thomas Sherman ham it up atop the aerial lift bridge in a photo probably taken by John Parent, the fourth member of their crew and only other person likely to be up on the bridge's north tower with them. [IMAGE: RB]

UNCORRECTED PREVIEW EDITION



A Demand for Public Toilets...

In 1971 the federal government's Canal Park along both piers of the Duluth Ship Canal received an \$82,000 facelift thanks in part to Jeno's, Inc., owned by Duluth pizza-roll magnate Jeno Paulucci. Paulucci purchased a portion of the park to create more parking for employees working at its facility across from the Corp of Engineers building at 525 South Lake Avenue. Built in 1915 by regional food wholesale giant Gowan-Lenning Brown, the structure is known today as the Paulucci Building. The Corps of Engineers used the donation to improve its own parking, fix drainage issues, create a circular drive to ease traffic, acquire additional green spaces, plant trees, and improve the lighting to make the area more hospitable to visitors.

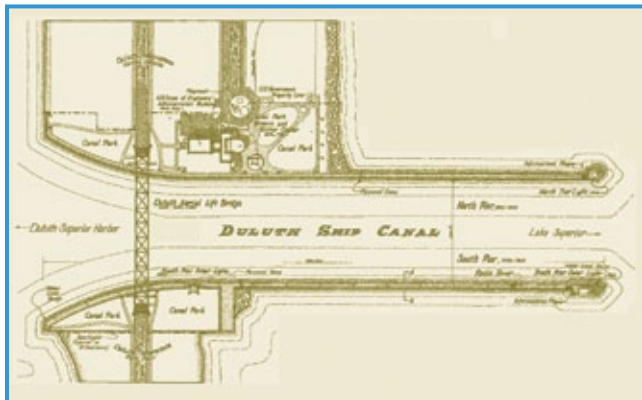
But while everything was coming up roses in Canal Park, it didn't smell all that sweet near the bridge. In fact, it stank like urine. In 1929, as the bridge underwent its conversion, the U.S. Corps of Engineers insisted that the city install "comfort stations," one each in the base of the bridge's approach ramps,

containing bathrooms for use by those waiting to watch the bridge lift and lower. By the late 1960s, the comfort stations were hardly comfortable—they had grown so decrepit the city removed them, using the space for storage. Soon afterward, desperate tourists began relieving themselves in and around the park.

The Corps of Engineers chose to relieve the problem by building restroom facilities adjacent to its two-story Neoclassical headquarters built in 1905 immediately northeast of the bridge's North Pier approach (see page 42). The project's original plans, which called for a one-story structure, were rejected because they didn't match the height of the Corps of Engineers Building. The revised plans called for a two-story structure—but what to do with the extra space? Someone suggested that it could house an exhibit or two about Lake Superior's shipping history, which in turn sparked more ambitious ideas. By the time the building was completed in 1973, what had started as a simple bathroom addition had become the Canal Park Marine Museum.

The front of the facility's final and very modern design, by architects Aguar, Jrying, Whiteman & Moser, resembles the bridge of a Great Lakes freighter and is a striking contrast to its Neoclassical neighbor. A later addition connected the two buildings together. Inside, the facility indeed provides public bathrooms and much more. It tells the rich history of commercial shipping on Lake Superior through fascinating exhibits that range from actual artifacts of maritime history to recreations of sailors' quarters aboard ore boats to scale models of a variety of vessels that once sailed the lake. One of its instalments includes a bench used by passengers on the transfer bridge's gondola car.

The museum owes a debt to former aerial bridge boss Bob Brown. The museum's first curator, renowned Great Lakes historian C. Patrick Labadie, explained in 1983 how Brown's love of history



Details from David Arkin's 1987 diagram of Canal Park. [IMAGE: ZCP]

...Creates a Maritime Museum

made him a key player in the museum's development. "He was among the first to volunteer to gather artifacts and put up displays "I can't begin to remember the number of times I consulted Bob for information about ships or the waterfront."

But while Canal Park now looked great, the rest of the district north of the canal had deteriorated. The brothels and most bars had moved out by the 1930s, and the shanties along the shore cleared away in the mid-1950s with the St. Croix Redevelopment Project, part of the federal Urban Renewal Program. Manufacturers closed up shop and warehouses stood empty. A scrap-metal yard filled the space between Morse and Buchanan Streets, and abandoned cars and major appliances lined the lakeshore from the canal to the corner of the lake.

Once tourists had enough of watching big boats pass beneath the bridge, they had little to do other than maybe grab a burger at King Leo's—later the Canal Park Inn—and dodge French fry-seeking seagulls. The district's three remaining bars, which catered to locals, did little to make tourists feel comfortable. A Holiday Inn built in 1963 stood next to a strip club.

The marine museum's success helped spur a movement now referred to as the Canal Park Renaissance, giving others confidence to invest in the blighted district north of the canal. Over the next twenty years, what was once Duluth's most unwelcoming

area evolved into its center of tourism. Today the Canal Park Business District thrives with dozens of shops, hotels, and restaurants, many of them within renovated historic buildings. As of December 2021 the museum, since renamed the Lake Superior Maritime Museum, has welcomed well over 20 million people—but only some of them have had to use the restrooms.



The original Canal Park and the Lake Superior Maritime Visitor Center. [IMAGE: DENNIS O'HARA]

Renovations to the Aerial Lift Bridge 1931–2000

Much of the aerial bridge's history involves maintenance, renovations, and adaptations designed to improve the bridge's performance and keep it running smoothly and safely. When the lift bridge first went to work, operators had trouble hearing incoming vessels signal to request a bridge lift. In 1931 the city installed a "mechanical ear" tower on the north pier, just west of the lighthouse. Microphones atop a tower could pick up a ship's whistle half a mile away on a stormy night. Radio signals transferred the sound back to a receiver in the pilot house for monitoring. (The Coast Guard also maintained a radio tower atop the South Pier from the 1920s until 1985.)

After nearly twenty years of turning, the bridge's gears were first replaced in 1949. Two years later operators installed a new 153-cell battery system beneath the South Pier approach. The new batteries were safer, took less time to charge, and provided more horse power. From mid December 1952 until the end of February the bridge was not raised as its bearings were replaced and workers began repainting the entire bridge.

In 1955, workers used a "special steel fabricated surfacing" to replace the bridge's worn road deck, which still carried trolley tracks even though Duluth's street car system had

shut down in 1939. Later that summer the paint job started in 1952 was finally finished. The 1932 mechanical ear came down in 1960, replaced by a Raytheon Model I500 Radar Radio Positioning Unit. Now, instead of waiting to hear a horn blast or using binoculars to scan for arrivals, the bridge operators would be alerted to a ship's approach by a blip on a screen. That same year chief operator Al Hass replaced the tap water in the bridge's batteries with distilled water, which nearly tripled their lifespan.

In May 1964 the bridge's four trumpet-shaped brass horns that had greeted ships since 1930 were replaced after sounding an estimated 500,000 times. The new horns—two sets of them—were similar to those used on diesel locomotives; one faced lake-ward and the other toward the bay. A set of synchronized lights flashed in time with the horns. The bridge was getting safer all the time for both the ships that passed beneath it and those who used it to cross the canal. In the early 1970s the bridge was painted silver (see page 86), part of a program that included upgrading the batteries and installing a new emergency engine to replace the back-up gasoline engines.

The bridge's biggest renovation project, a refitting of its mechanical systems, came in 1986. Automobiles had become heavier over the years and



Don Bowen greases sheaves ca. 1960. [IMAGE: GLD]

traffic had escalated dramatically, thereby increasing the load—and stress—on the bridge. To reduce structural stress, the operating machinery within the pilot house's top level was moved to new machinery houses at each end of the lift span (see diagrams below); a new pilot's house was installed as well. New counterweight cables took the place of those that had worn away. The old battery system was retired, supplanted by standard electricity. Nuts and bolts replaced rivets, and the bridge got a fresh coat of paint.

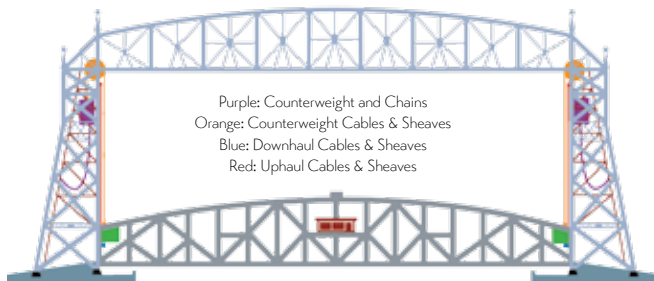
Finally, the single handle that had set the bridge in motion since 1930 was replaced with a computer system, which then bridge supervisor Steve Douville called “a real challenge.” He explained that “Its ability to control two separate machinery spaces roughly a city block apart was amazing. Raising, lowering, starting, stopping, acceleration, and deceleration at various speeds and under various load conditions was truly too good to be true—but the malfunctions ranged from the mysterious to the serious.” Thanks to a quirky computer card, the bridge frequently acted up, and at least once it shut down when the span was fifteen feet from fully raised. Whenever the problem occurred, operators were forced to raise the bridge manually.

In 1999 Duluth hired local firm LHB Engineers and Architects and New York's Hardesty and Hanover, which specializes



The aerial bridge's too-often-offline computer control system. [IMAGE: DSN]

in mechanical bridges, to inspect every inch of the bridge. Hardesty and Hanover discovered a 1/16-inch crack in the southwest sheave's axle shaft. Each sheave axle is 16 inches around and weighs five thousand pounds, hefty enough to support the combined weight of the lift span, counterweights, and cables—half a million pounds for each axle. Other issues discovered by



GETTING “BRIDGED”

Ever since the aerial lift bridge began lifting in 1930, the Park Point Community Club has not been afraid to share with the city its frustration over frequent bridge lifts, which leave cars and pedestrians “bridged”—stuck in traffic waiting for the bridge to raise and lower. Many Park Pointers learn to keep a book in the car to pass the time waiting for the road span to lower, and they always have an excuse if late: “I got bridged” is enough for any other Duluthian to understand the delay. Pointers try to keep their sense of humor: Many of their cars sport a “Park Point Tunnel Pass” sticker.

“Get Bridged” was even the theme of the span’s 2005 centennial celebrations (logo below). Bridge supervisor Steve Douville retired that summer, his last lift occurring on March 31, for an unscheduled “maintenance lift.” But that symbolic event was delayed as it took him longer to reach the pilot house than anticipated: On his way to the bridge, Douville got bridged.

People who get upset at being bridged forget the span’s priority: Staying out of the way of commercial shipping traffic. In fact, one might argue that the “proper” position of the bridge’s lift span is up, and that when lowered for street and sidewalk traffic, the lift span is in a “temporary” position. And while it technically does nothing more than provide a means of crossing the canal, in doing so it physical links Duluth with Minnesota Point—the city’s birthplace—and the community of Park Point, making the city whole. Without the aerial bridge, Duluth would be incomplete.



Workers replace a sheave in 1999. [IMAGE: DSN]

Hardesty and Hanover resulted in another overhaul that called for replacing nearly every moving part of the bridge. The work was so extensive the bridge didn’t raise for four months from mid December 1999 to March 2000. The engineer’s punch list included new motors and control panels, new guard rails along the pedestrian walkways, stronger cable anchorage supports on the counterweights and lifting boxes, new pins in the balance chains, rebalanced counterweights, thicker operating cables, and new sheaves, axle shafts, and pulleys. The towers were reinforced and road span repainted. Finally, the ever-malfunctioning computer-controlled operating system was replaced with much simpler controls. Since then, it takes three minutes for the bridge’s lift span to raise to its full 120 feet.

Between 20028 and 2011 the lift span and both towers were repainted, but lack of state funding has delayed the upper truss and underside of the lift span. Workers replaced the lifting cables in 2016, and in 2021 the bridge was updated with fiber optics and a new camera system.



Duluth's Aerial Bridge in the Twentieth Century

In January 2005, as Duluth's aerial bridge was just months away from its one hundredth anniversary, the city created the volunteer Aerial Lift Bridge Centennial Committee and Mayor Herb Bergson declared 2005 "The Year of the Lift Bridge"—both misnomers, as Duluth's famous span had been a lift bridge for just seventy-five years.

The committee chose a theme, "Get Bridged," and Dick Green, grandson of bridge boss Leonard Green, created its logo. A kick-off celebration included Jack Hicken, son of transfer bridge operator John Hicken. Duluth's Greater Downtown Council helped the committee place bridge statues at various locations throughout the city. Many local artists created souvenir products celebrating the bridge, and several musicians even wrote songs about it. Artist Gary Lundstrom created two bridge exhibits for the Depot Museum while historian Jerry Sandvick provided free "Bridge Tours." The Park Point Community Club gathered three hundred recipes for a book titled *Get Bridged*, while the *Duluth News Tribune* created a special issue titled *Spanning a Century*.

The festivities wrapped up in August with a celebration at Bayfront Park. By then, the volunteer committee had become frustrated with the Bergson administration. Many felt that the city had done little to help promote the bridge's anniversary. So few people showed up at the August celebration that some of the volunteers said they felt as though their efforts had turned into little more than throwing themselves a party.

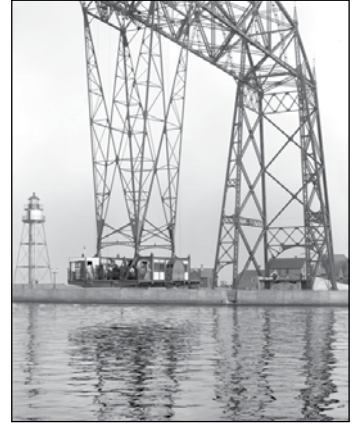
Since then the bridge and its tenders have carried on, quietly moving its history forward; as former bridge superintendent Ryan Beamer said in 2007, "If the bridge is working correctly and we're doing our job right, no one notices."

At the end of the 2021 shipping season, the Duluth Aerial Lift Bridge had lifted 861,253 times since January 1930. Today the bridge and canal remain the focal point of the Zenith City's tourism industry, and most Duluthians—as well as many of the thousands who visit Canal Park every year—understand that, despite its practical purpose, Duluth's aerial bridge always has been and always will be much more than just a way to cross the canal.

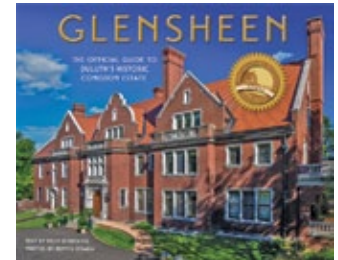
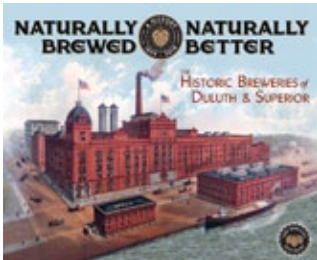


Designs Celebrating the Aerial Bridge...

Get the designs below & other historic Duluth & Aerial Bridge art on prints (framed or unframed on canvas, art paper, metal, or wood), blank greeting cards, puzzles, throw pillows, tote bags, shower curtains, towels, yoga mats, notebooks, phone cases, & more.



...and Fine Books Celebrating Historic Duluth



WWW.ZENITHCITY.COM