Henry Bosse's Views of the

Upper Mississippi River

COVER: MECHANIC'S ROCK, DES MOINES RAPIDS, 1889. *BACKGROUND PHOTO:* FROM THE BLUFFS AT TREMPEALEAU, WIS., LOOKING UPSTREAM, 1885.
OPPOSITE: MINNEISKA, MINN., 1885.

Henry Bosse's Views of the Upper Mississippi River

John O. Anfinson • District Historian • St. Paul District, Corps of Engineers

QUEEN'S BLUFF, 1885

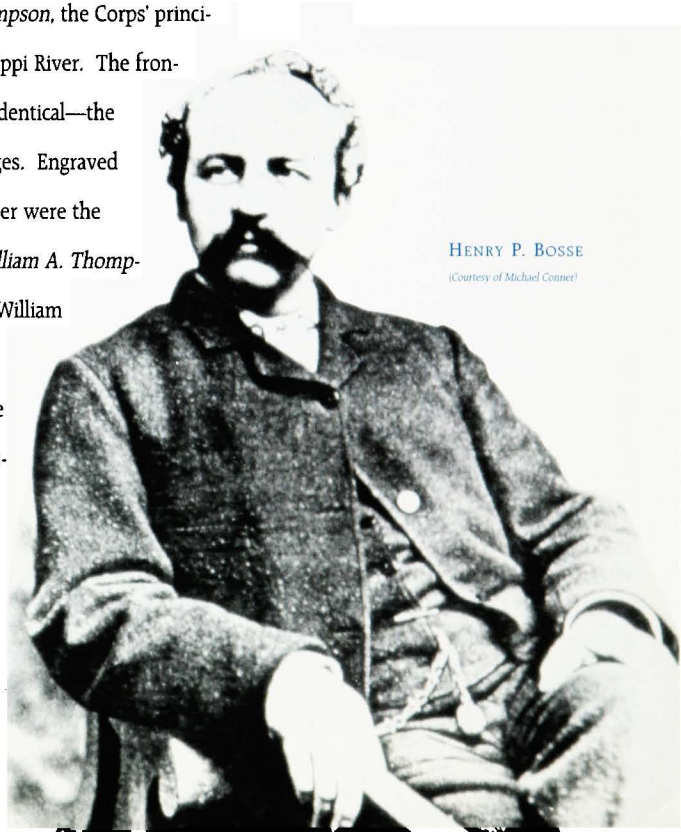
Discovering Henry Bosse's Mississippi

Forgotten in the library of a long-past Chief of Engineers, stowed in the pilot house of a dredge boat, set aside in the clock tower building of a Corps of Engineers office lay the works of one of the Mississippi River's greatest photographers. For one-hundred years, the artist—Henry P. Bosse—remained unknown. Then in the spring of 1990, a Washington, D.C., antique dealer discovered an album of Bosse's images in the study of a house that had belonged to Major General Alexander Mackenzie. General Mackenzie had been the Corps' Chief of Engineers, or top ranking officer, from 1904 to 1908. Within a year, this album would be worth over a million dollars and Bosse praised as one of the late nineteenth century's finest photographers.

Shortly after discovering the album, the antique dealer called the Corps of Engineers. He called because the album's frontispiece read: *Views on the Mississippi River*, from negatives taken and printed under the direction of Major A. Mackenzie, Corps of Engineers, U.S.A. by H. Bosse, Draughtsman, 1883-1891. The album held 169 large, oval, blue or cyanotype photographs and documented the Corps' early work on the upper Mississippi River.

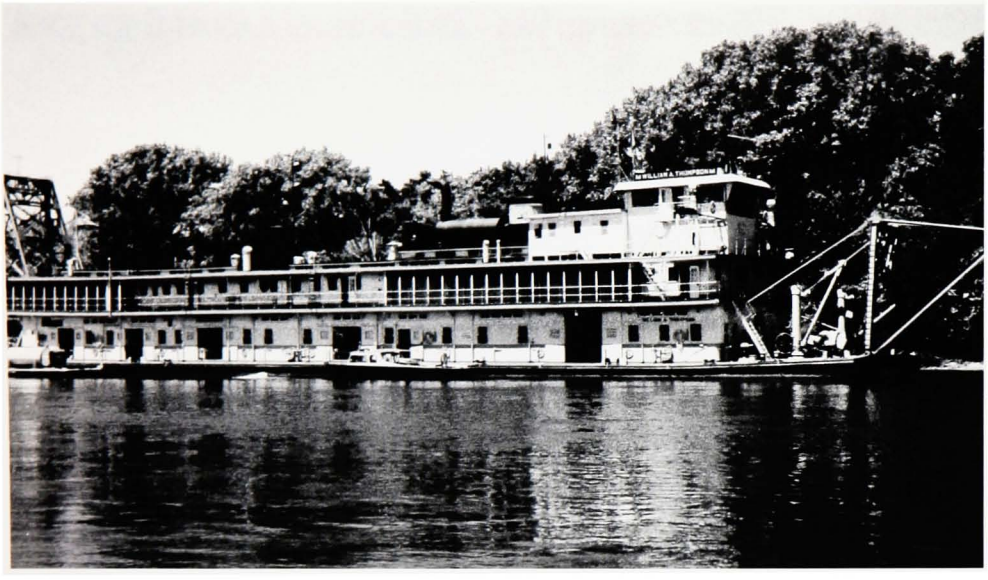
When the antique dealer showed the album to exhibitors at a photographic fair in Washington, they were most interested in the album's artistic value. They found the cyanotypes "fabulous" and "unbelievable," and one offered him $20,000 for the album—an unheard of price for the work of an unknown photographer. Believing the images to be much more valuable, he declined.

Shortly afterwards, the Corps' St. Paul District located a similar album on the *William A. Thompson*, the Corps' principal dredge boat for the upper Mississippi River. The frontispiece and most of the prints were identical—the same subjects and the same oval images. Engraved in gold letters on the hard leather cover were the words: "Presented to *U.S. Dredge, William A. Thompson* by Mrs. William A. Thompson." William Thompson had worked for the Corps from 1878 until his death in 1925. He spent all 47 years on the upper Mississippi River, 16 of them with Bosse at Rock Island, Illinois. Bosse may have given Thompson the album as a personal gift or as a working document. Thompson's widow apparently pre-



HENRY P. BOSSE

(Courtesy of Michael Conner)



DREDGE *WILLIAM A. THOMPSON*

sented the album to the dredge about the time of its christening in 1937, and thereon it sailed for some fifty years.

The Rock Island District also found a collection of Bosse's work in its offices in the Clock Tower building on the Rock Island Arsenal. Rock Island's collection is unique. Some images are bound and some are unbound; some are cyanotypes and some are not. Many of the photographs are oval, as in the other two albums, but others are rectangular. Some of the rectangular prints have concave or convex corners. Some of the oval images have a crocheted pattern or an ornate design around them; others have wavy lines radiating from the oval. In some photographs Bosse painted in clouds, horizon lines, and other features to complete his composition. Together, these images reveal a more complex artist than do the simple oval prints.

Certain that he had discovered a collection of truly exceptional photographs, the Washington antique dealer brought his album to Sotheby's auction house in New York. They could judge the value of Bosse's work. Sotheby's handles thousands of prints every year, most by world-renowned photographers. Sotheby's experts were struck by the clarity and artistic quality of Bosse's images and told the dealer that the collection ranked among the best nineteenth century works they had seen. Sotheby's estimated the album's value at $40,000 to $60,000, and it sold for $66,000 in their Fall 1990 sale. After the auction, a San Francisco art dealer and one of the album's new owners claimed that he could sell the album immediately for $650,000 and that it would eventually be worth over a million dollars.

Affirming Bosse's talent and the art dealer's optimism, an expert at the Smithsonian Institution's National Museum of American History called Bosse's photographs "incredible, fantastic" and "truly extraordinary." That no one knows Bosse, she said, is surprising, given the quality of his work. She described his photographs as exceptionally clear and modern and observed that they reveal the shift in American photography from romantic to industrial and geometric subjects. Sotheby's further elevated Bosse's artistic stature in its Spring

Rock Island Collections

1995 photographic catalogue. In the catalogue, Sotheby's photography department celebrated its twentieth anniversary, highlighting the most important discovery of each year. For 1990, it selected Bosse's work. "Among the most exciting moments at any photographic auction," Sotheby's declared, "are ones in which a high price is paid for the work of someone who—until the auction—is completely unknown." Bosse's photographs provided such a moment. His "sumptuous blue studies awed everyone who saw the album during the auction preview."

Yet, Henry Bosse's photographs are more than art. They chronicle the first systematic effort to recast the upper Mississippi from a natural river into a modern commercial highway. They present the river's working boats: the snagboats and dredges. They show the timber industry's steamboats, log rafts and milling centers that dominated the upper river's commerce during the late nineteenth century. They illustrate the railroad and wagon bridges, carrying the river's competition and whose piers created obstacles as dangerous as any offered by the river. Bosse's photographs feature the cities and towns taking root on the river's banks. Together, they comprise a rich essay on the evolution of one of the world's greatest rivers.

Recasting the River

When Bosse arrived in St. Paul, Minnesota, in 1875, the upper Mississippi River still possessed most of its natural features. It had uncounted side channels, backwaters, snags, sandbars and wide shallows, which delayed, stranded and sometimes sank steamboats. A spring flood could reroute the main navigation channel. During low water, no continuous channel existed. It flowed along one side of the river for a short reach and then crossed to the other. Between reaches, sandbars rose near to or broke the water's surface. The natural river undermined its banks, swallowing the rocks, soil and trees that fell into it, giving birth to new hazards. George Merrick, in *Old Times on the Upper Mississippi,* recounts that a steamboat pilot had to know the river so well that he could,

> *on a night so perfectly black that the shore line is blotted out, run his boat within fifty feet of the shore and dodge snags, wrecks, overhanging trees, and all other obstacles by running the shape of the river as he knows it to be—not as he can see it.*

This was the river of Mark Twain, the river during the heyday of steamboating. Through his photographs, Bosse details how the Corps of Engineers first began reshaping the natural river's landscape and ecology.

To achieve the image he wanted, Bosse sometimes added elements to his photos. Note how he matched the horizontal line running off the bluff top by painting in the horizon line on the right.

RICHTMAN'S QUARRY AT FOUNTAIN CITY, WIS., 1891

"The majestic bluffs that overlook the river, along through this region, charm one with the grace and variety of their forms, and the soft beauty of their adornment. The steep verdant slope, whose base is at the water's edge, is topped by a lofty rampart of broken, turreted rocks, which are exquisitely rich and mellow in color — mainly dark browns and dull greens, but splashed with other tints."

MARK TWAIN

LIFE ON THE MISSISSIPPI

FROM THE BLUFFS AT TREMPEALEAU, WISCONSIN, LOOKING UPSTREAM, 1885

Early Channel Improvement

Bosse came to the Mississippi River at St. Paul nine years after Congress had authorized the first system-wide project to improve the river for navigation. Under this effort, the Corps tried to establish a continuous, 4-foot-deep channel through dredging, snagging, clearing overhanging trees and removing sunken vessels. The Corps based the channel's depth on the low water year of 1864. Ideally, if another year as dry as 1864 occurred, the improved river would have at least four feet of water in it, allowing most steamboats to pass. Limited by the project's scope and funding, the Corps changed the river little under the 4-foot project, and navigation remained hazardous.

With its population and agricultural output booming and with railroads threatening to monopolize bulk shipping, the Midwest pressed for more meaningful river improvements. River towns led the quest. Bosse photographed many of these towns. He captured some as pioneer villages, emphasizing their pastoral character. He filmed others as burgeoning commercial centers.

On June 18, 1878, Congress responded to the Midwest's demands by authorizing the 4 1/2-foot channel project, the first project to fundamentally change the upper Mississippi River's character. Under this project, Congress direct-

GENOA

FROM THE HEAD OF DAYTON'S BLUFF (ST. PAUL) LOOKING UPSTREAM, 1891.

Rock Island Collections.

As Twain's steamboat paddled up the Mississippi River, the villages and cities he passed impressed him so that he wrote: "We had a glimpse of Davenport, which is another city on a hill — a phrase which applies to all these towns; for they are all comely, all well built, clean, orderly, pleasant to the eye, and cheering to the spirit; and they are all situated upon hills."

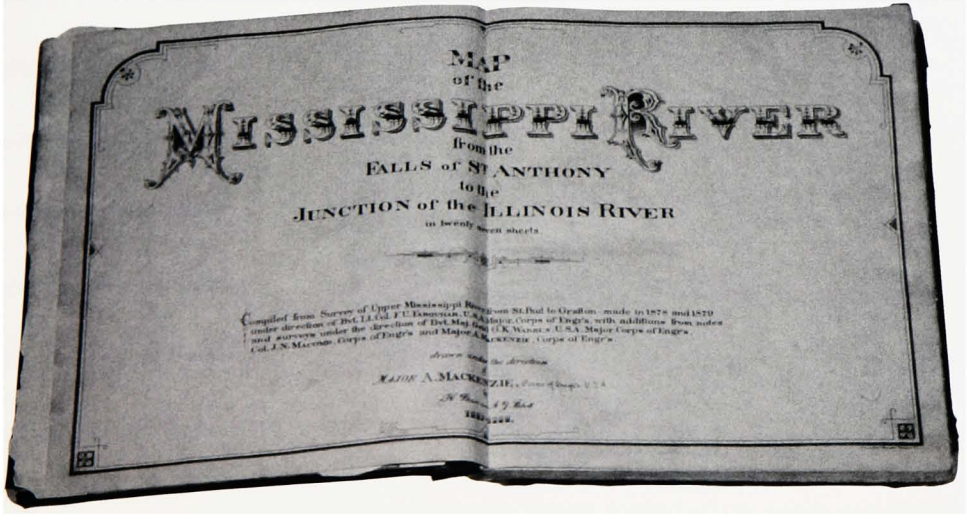
MARK TWAIN

LIFE ON THE MISSISSIPPI

ed the Corps to create a continuous navigation channel, 4 1/2-feet deep at low-water, from St. Paul to the mouth of the Illinois River at Grafton, Illinois. This project and the upper Mississippi River valley during the era of its construction are the focus of Bosse's photographs.

Before the Corps could begin remaking the upper Mississippi River, it needed to understand the river better. So during the winter of 1877-1878, Major Francis U. Farquhar, the Rock Island District commander, directed his engineers to synthesize all the earlier river maps into a general map of the upper Mississippi from St. Anthony Falls to Grafton. When completed, the new map included 26 sheets. Not satisfied with the map's detail and coverage, Farquhar asked the Chief of Engineers for $60,000 to resurvey the river, and on July 8, 1878, the chief approved.

1887-88 Map
Rock Island Collections.



To draw the new map, Major Farquhar needed a talented draftsman. Farquhar had been the St. Paul District Engineer from 1873 to 1878, and Bosse had worked for St. Paul in 1875 and maybe longer. Knowing Bosse's skills, Farquhar probably asked him to move to Rock Island.

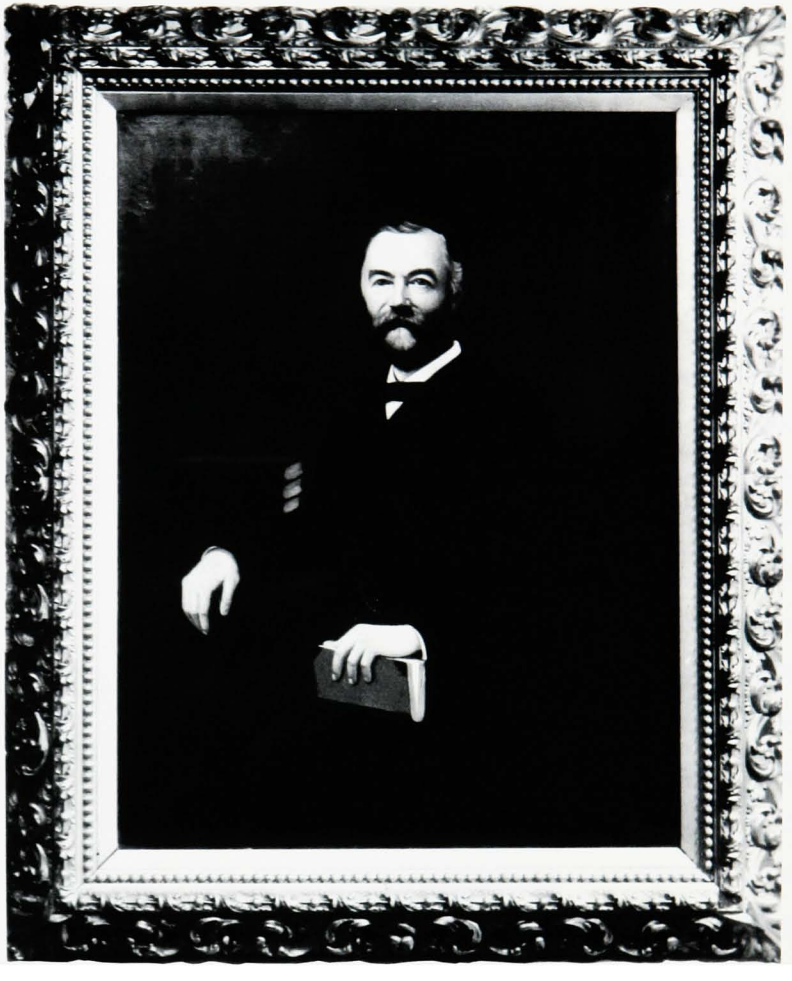
Between 1878 and 1879, the Engineers conducted their survey. They sounded the river to find its deepest and most continuous channel. They calculated the drainage areas of its tributaries, figured its elevation at low and high water and its slope between towns. Finally, they completed a 27-page map of the upper river between St. Paul and Grafton illustrated by Bosse and his assistant, A.J. Stibolt. The government did not publish the map until 1887-1888. By participating in the survey and drawing the maps, Bosse must have become intimately familiar with the geometry of the river's landscape and all its moods.

While Major Farquhar initiated the 4 1/2-foot channel project, Alexander Mackenzie would become its principal architect. Arriving in June 1879 as a Captain, he remained in charge of the Rock Island office for 16 years. Over these years, he formed a close friendship with Bosse. Mackenzie knew the river well before going to Rock Island. He had been born near the river at Potosi, Wisconsin, on May 25, 1844 (less

than six months before Bosse), and had attended grammar and high schools in the river port of Dubuque, Iowa. In 1860 Mackenzie entered the United States Military Academy and graduated four years later at the top of his class.

To achieve the 4 1/2-foot channel, the Corps would have to narrow or constrict the river. They did this by building wing dams and closing dams. Long, narrow piers of rock and brush, wing dams jutted into the river from the main shoreline or from the bank of an island. The Engineers placed the wing dams in a series along one or both sides of the channel to reduce its width at low water, which usually occurred in the late summer and fall. By narrowing the river, they increased its velocity (like the nozzle of a garden hose being tightened down), enabling the river to cut through sand and debris in the main channel. Moving faster, the river carried more sediment, some of which settled out in the calmer waters behind or between the wing dams. Within a few years, the space between the dams filled with sand and plants. In this way, the Engineers constricted the river, gradually moving its banks inward. Through his photographs, Bosse detailed every phase of this process.

Wing dams depended upon the volume of water in the river. Without enough water, they could not scour the channel. Hundreds of islands divided the natural river, dispersing its waters into innumerable side channels and sloughs. By



Bosse Painting of General Alexander Mackenzie.
F. Quaintance

dividing the river, they reduced the flow available for the main channel and thereby its depth. To deliver more water to the main channel, the Engineers built closing dams. These dams ran from the shore to an island or from one island to another. While the river could flow over them when high, for most of

the year the dams directed water to the main channel.

As wing dams and closing dams increased the main channel's velocity and volume, they accelerated bank erosion. Wing dams, by forcing the river away from one shore and against the other, were especially responsible. To stop the erosion, the Corps armored hundreds of miles of shoreline with brush mats and stone.

Channel constriction did not eliminate the need for dredges and snagboats. When Captain Mackenzie took command of the Rock Island office in 1879, the snagboat *General Barnard* was the District's only major work boat for the upper Mississippi River. To vigorously pursue the channel constriction project, he began arguing for a government fleet. By 1882 Mackenzie had acquired four towboats, three steam-launches, fifty-five stone barges, and "the necessary complement of quarter-boats, pile-drivers, & c." In addition, he had added the snagboat *J. G. Parke* and the dredge *Phoenix*. Bosse

U.S. STEAMLAUNCH "ELSIE" TOWING BRUSH, 1889.

LAYING BRUSH FOR MATS, 1891.

WING DAM CONSTRUCTION

Alberta Kirchner Hill spent 17 summers with her father's fleet as they built wing dams. From the building boat, she recalled, "...I could even smell the delightfully blended odor of the willows and of the creosoted marline twine with which the bundles were held together. It came to me strongly every time the men hoisted a swishing bundle of brush to their gunny-sack-protected shoulders...."

THROWING ROCK ON BRUSH MATS, 1891.

WINGDAMS BELOW NININGER, MINN., 1891

And: "No sooner had a barge of rocks been pulled up to the dam than the symmetry of the load was destroyed as the men began the routine of sinking the mat. ...From the quarterboats you could hear the big rocks hitting each other, like a rapid-fire rage. ... as the mat went down under the load.... a splashing began. The sound grew in intensity as the mat sank lower and lower in the water."
"OUT WITH THE FLEET," MINNESOTA HISTORY, 1961.

would draw some of the boat plans, and as Corps work boats became essential to the Engineers' river improvement strategy, he photographed much of the fleet.

Neither dredging nor channel constriction worked at the Des Moines and Rock Island Rapids. The Des Moines Rapids extended more than eleven miles upstream from Keokuk, Iowa, and the Rock Island Rapids, composed of seven chains of rock, stretched nearly 14 miles from Rock Island upstream to LeClaire, Iowa. During low water both rapids became nearly impassable, forcing larger steamboats to transfer their goods and passengers to smaller boats.

As early as 1829, the government had considered improving these rapids for navigation. While the Corps excavated some rock from the Rock Island Rapids between 1854 and 1856, it did not seriously attack this trouble spot until after the Civil War. The Engineers began removing rock again in the fall of 1867, and proceeded chain by chain until, in

Snagging Scene, 1885.

Rock Island District Collections

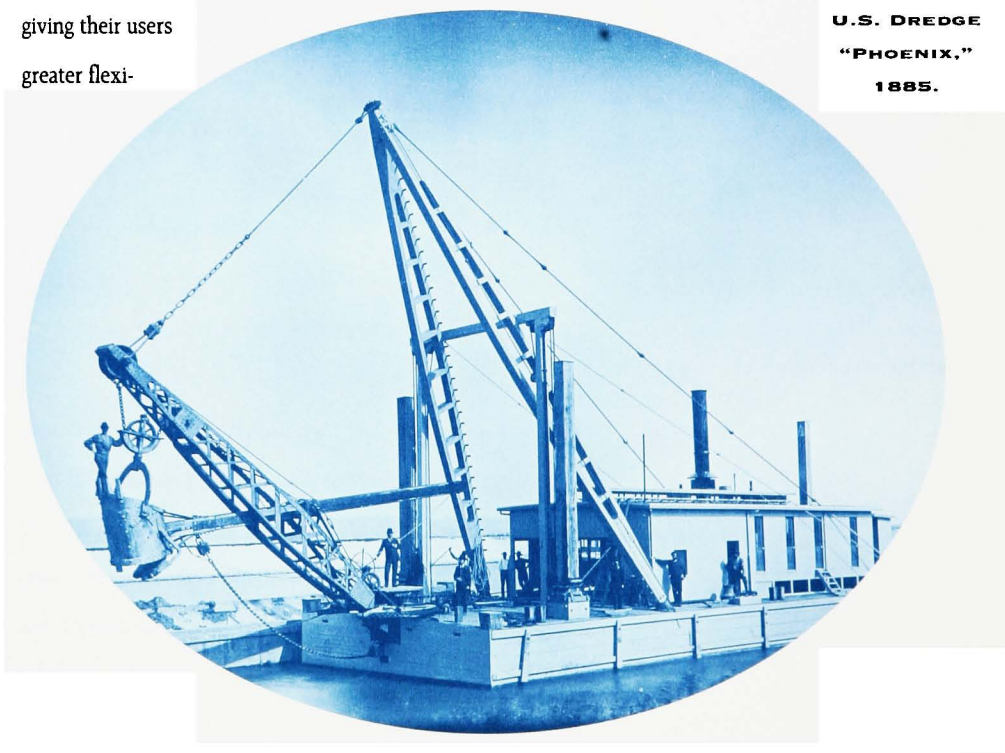
1886, they had excavated most of the channel to a minimum width of 200 feet and a minimum depth of 4 feet. While this channel made the Rock Island Rapids more navigable, they were still treacherous.

Rather than assault the Des Moines Rapids directly, the Engineers decided that it would be easier to build a canal paralleling the river. Begun on October 18, 1867, the project required ten years to complete. Opened in 1877, the canal served upper Mississippi River traffic until the fifty-mile-long reservoir formed by Keokuk and Hamilton Water Power Company lock and dam, completed in 1913, flooded it. Bosse's photographs of the canal and locks demonstrate his ability to present complex engineering subjects gracefully. *(see p. 5)*

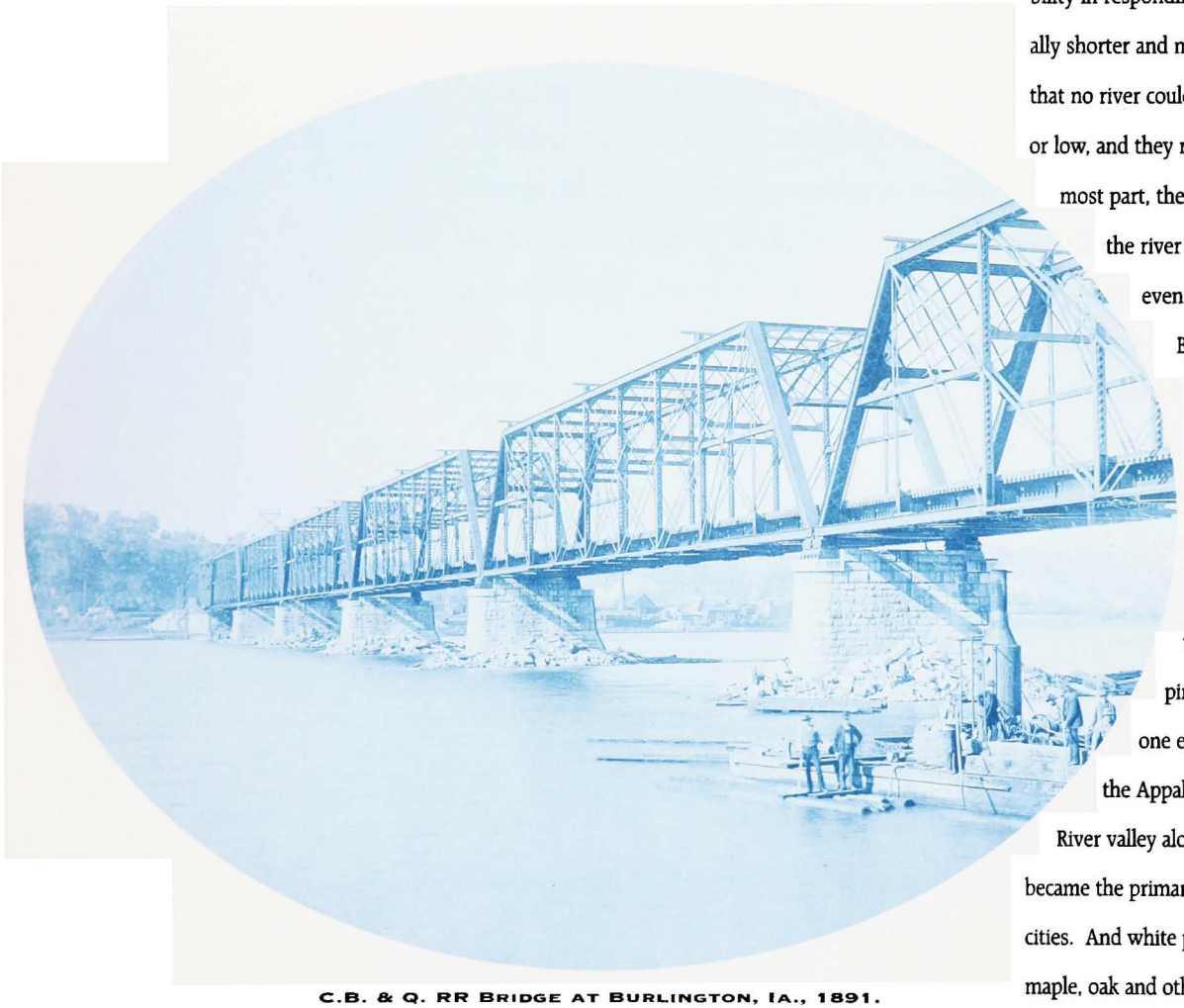
His images of railroad and wagon bridges further reveal this talent. Major Mackenzie undoubtedly directed Bosse to photograph these bridges because their piers created a new peril for steamboats. Mackenzie regularly complained about the problem to his superiors. "I would repeat my urgent recommendation made in all previous reports," he wrote in his 1884 report to the Chief of Engineers, "that the Government shall take such action as will relieve the navigation interests of the great tax now imposed on them by the failure of bridge companies to properly facilitate navigation through their bridges." Mackenzie kept making this plea because steamboats—driven by strong winds or caught in the tricky currents created by the piers—kept running into the bridges. And the number of bridges was growing quickly.

The first two railroad lines had reached the upper river in 1854, and over the next four years seven more established railheads on the river's east bank. The Civil War delayed railroad expansion, but between 1865 and 1869, three railroad lines crossed the Mississippi into Iowa. By 1880, thirteen railroad bridges spanned the upper river.

Railroads held many advantages over waterway transport. Railroads moved their freight quicker, giving their users greater flexi-



U.S. Dredge "Phoenix," 1885.



C.B. & Q. RR Bridge at Burlington, Ia., 1891.

bility in responding to market changes. Rail lines were generally shorter and more direct, and they reached deep into areas that no river could serve. Trains ran when the river was high or low, and they ran when the cold of winter froze it for the most part, they ran throughout the year. Consequently, the river lost grain and passenger traffic to railroads even as the Corps improved the river.

By the 1890s, timber rafting remained the only significant river traffic. So it is not surprising that Bosse photographed raftboats and lumberyards. Commercial lumbering began in western Wisconsin and Minnesota in the late 1830s and grew rapidly during the 1840s and 1850s. Vast forests of white pine stood in Wisconsin and Minnesota. By one estimate, one-sixth of the white pine west of the Appalachian Mountains stood in the Chippewa River valley alone. Stout but easily cut and milled, it became the primary building material for most Midwestern cities. And white pine had another unique quality; unlike maple, oak and other hardwoods, it floated.

Timber products dominated the upper river's commerce from the 1870s to the first decade of the twentieth century. They comprised the greatest quantity of merchandise shipped on the river, and they accounted for most of the total value of

RAFTBOAT W.J. YOUNG, 1885.

Log and lumber rafts increased in size as the timber industry grew. Before 1860, large Mississippi River rafts contained 300,000 to 500,000 board feet of logs and lumber. By 1870 some rafts held two million board feet, enough lumber to build 125 houses and covering an area of three to four acres, roughly the size of three or four football fields. In 1895 one raft transported seven million feet of logs and lumber and at least one carried up to ten million board feet. The typical raft held less than two and one-half million feet.

goods that moved on it. More than passenger traffic or grain hauling, timber shipping would justify federal spending on river improvements. Bosse undoubtedly photographed the timber industry to show how important the river and the Corps' work still were to the Midwest's economy.

Bosse and Mark Twain present vivid images of the rafting industry, although from differing perspectives. Returning to the river in 1882 after a long absence, Twain compared life on the river to his experience some 30 years earlier. "Up in this region" he observed, "we met massed acres of lumber-rafts coming down—but not floating leisurely along, in the old-fashioned way, manned with joyous and reckless crews of fiddling, song-singing, whisky-drinking, breakdown-dancing rapscallions; no, the whole thing was shoved swiftly along by a powerful sternwheeler, modern fashion; and the small crews were quiet, orderly men, of a sedate business aspect, with not a suggestion of romance about them anywhere." Yet, Bosse's photographs of the raftboats are decidedly romantic.

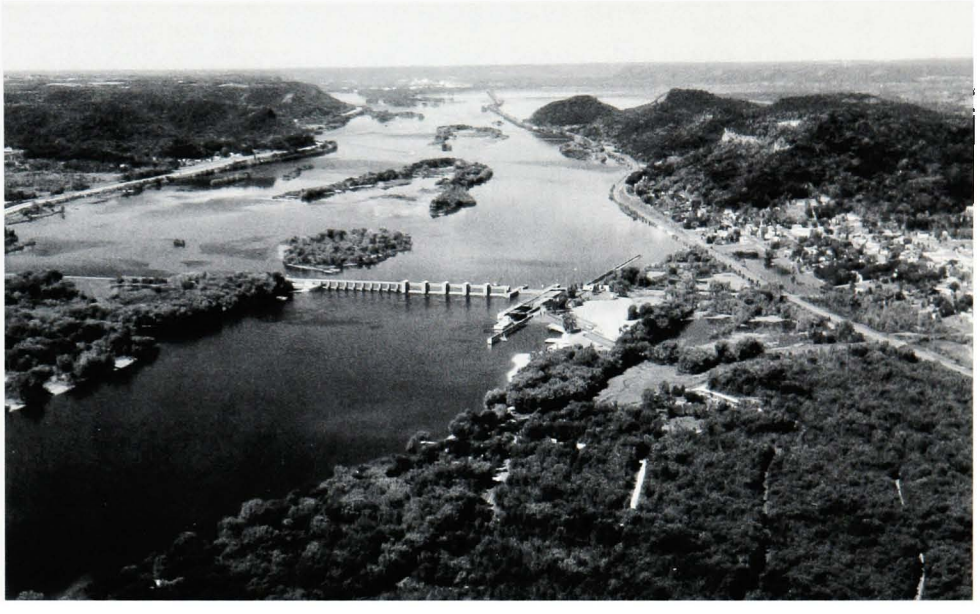
Timber shipping on the upper Mississippi River fell with the white pine forests of western Wisconsin and northern Minnesota. By 1909, mills on the river generated only one-quarter of the lumber they had eight years earlier. Of more than 100 raftboats plying the upper river in 1893, 50 remained in 1904, and only four in 1912. In 1915, the *Ottumwa Belle* guided the last lumber raft down the Mississippi from Hudson, Wisconsin, to Fort Madison, Iowa.

FORT MADISON, IA., 1891.

The Mississippi After Bosse

Timber's demise left the upper Mississippi River with no important commodity, and for the next two and one-half decades Midwesterners would struggle to revive river commerce. In 1907, Congress authorized a 6-foot channel. Like the 4 1/2-foot project, the new project called for channel constriction, and the Corps began building more wing dams and closing dams and adding to the old ones, making them higher and longer. Under the 4 1/2- and 6-foot channel projects, the Corps built over 1,000 wing dams between the Twin Cities and La Crosse, Wisconsin, alone, a distance of 143 river miles.

Still little traffic used the river. In 1922, the Interstate Commerce Commission ruled that "Water competition on the Mississippi River north of St. Louis is no longer recognized as a controlling force but is little more than potential." In effect, the Commission declared river commerce dead and the Midwest a landlocked region. Over the next eight years Midwesterners fought to restore commerce. They would draw support from the largest and smallest businesses in the valley, from most of its cities, from the Midwest's principal farm organizations, and from the major political parties. Responding to their movement, Congress included the 9-foot channel project in the 1930 Rivers and Harbors Act. Under this project, the Corps of Engineers built Locks and Dams 3 through 26 from Red Wing, Minnesota, to Alton, Illinois, during the 1930s.



Lock and Dam No. 6, Trempealeau, Wis.
By Marc Krumholz, St. Paul District

These structures joined locks and dams already constructed at Keokuk (1913), St. Paul (1917) and Hastings (1930).

The locks and dams again changed the river's landscape and ecology. Above the dams, the new reservoirs flooded many low-lying islands and created long, wide reservoirs. Just below the dams, where the tailwater of the dams downstream reaches its lowest point, the river retains many of its islands and braided channels. At their lowest point, the reservoirs still cover the wing dams and closing dams. Looking at the river today, few people realize how greatly it had been altered by wing dam construction. Henry Bosse's photographs offer a compelling reminder.

Discovering Henry Bosse

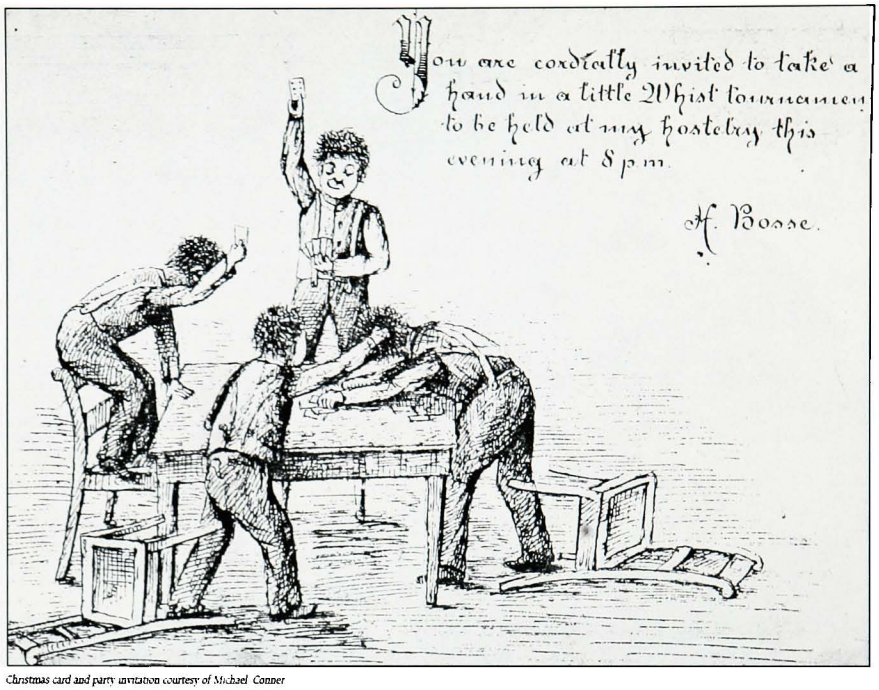
H. Bosse, draughtsman, now ranks with America's important nineteenth century photographers, but who was he? Henry Peter Bosse was born in Magdeburg, Prussia (a province of Germany), on November 13, 1844, on the estate of his distinguished grandfather, General Neithardt von Gneisenau. Gneisenau became the Prussian army's principal strategist between 1813 and 1815, when Napoleon Bonaparte was conquering much of Europe. German historians credit Gneisenau with rallying the Prussian troops to help defeat Napoleon at the Battle of Waterloo. Bosse was the son of Gneisenau's daughter, Julia, and a Count Neithardt Bosse.

Bosse in his youth. Courtesy of Michael Conner

Henry Bosse spent his early years on his grandfather's estate, "where tutors fitted him for his studies at higher seats of learning. Besides his classical studies at Magdeburg, the provincial capital, he studied engineering and art." As Bosse's photographs show, he learned both subjects well. Bosse soon left Germany. According to the 1900 census, he arrived in the United States in 1865, when only 21 years old. We do not know where he lived and what he did between 1865 and 1870. The 1870 Census of the United States lists him as a resident of Chicago, where he operated a book and stationary shop with a fellow German immigrant. Bosse left this business the next year to become a bookkeeper with a construction firm.

His career with the Corps of Engineers began in 1874, when he joined the Corps' Chicago office. Staying with the Corps, Bosse moved to St. Paul, the next year. The 1875 St. Paul city directory lists him as living at the Cosmopolitan Hotel and working for the Corps' U.S. River and Harbor Improvement Office. By 1878 he had moved to the Rock Island District, for which he worked as the district's chief draftsman until his death in 1903.

Bosse received praise in all his obituaries. The *Rock Island Argus* proclaimed him "one of the cultured, well-known and highly regarded men of the city ...." The *Rock Island Daily Times* declared that "In Rock Island Mr. Bosse was one of the best known and most respected citizens and his loss to the city will be keenly felt." And the *Rock Island-Moliner Volks-Zeitung*, a local German-language newspaper, lauded Bosse as a craftsman of the highest order and one of the most knowledgeable men on the Mississippi River's topography. The obituaries note that Bosse had a distinct aristocratic and military carriage. He so impressed his fellow workers in Rock Island that they renamed one of the District's steamboats the *Henry*

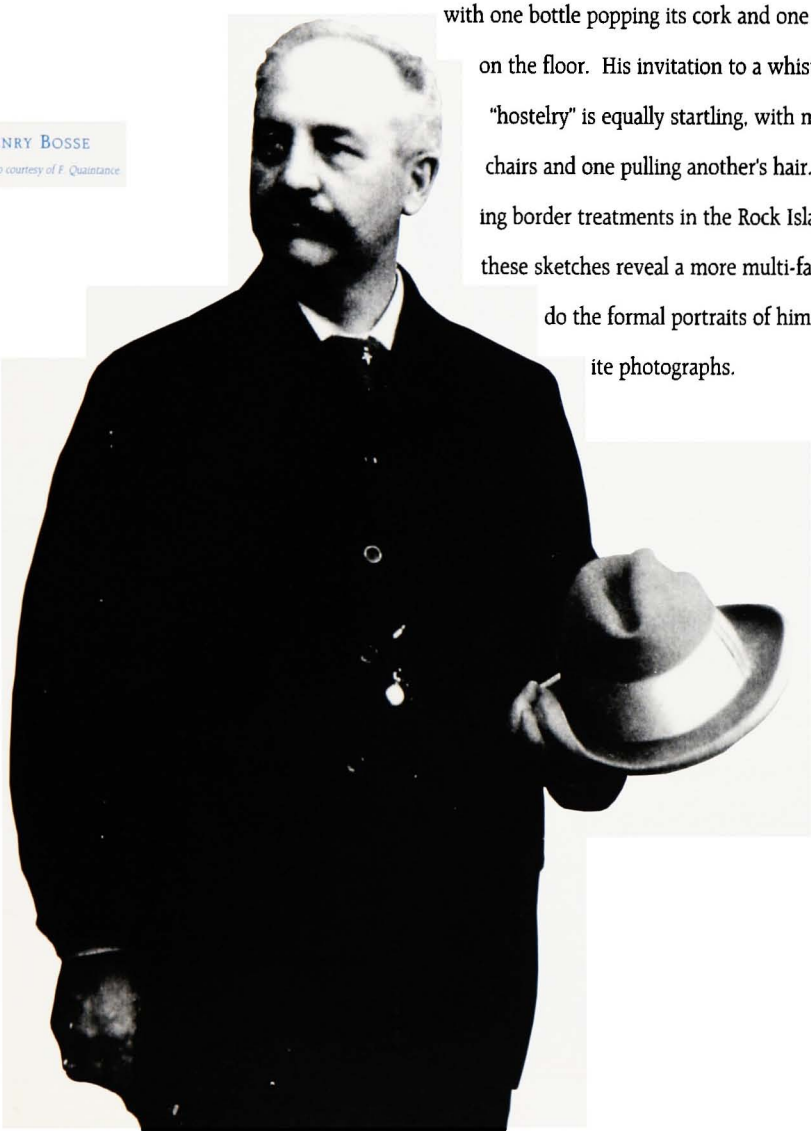


Christmas card and party invitation courtesy of Michael Conner

Bosse after he died.

This image belies Bosse's carefree side. Reaching back to his days at the Chicago card and stationery shop, Bosse sketched dinner and party invitations, greeting cards and illustrations. Some are whimsical: a Christmas card of a Huck Finn-like boy holding a drafting pen and an image of himself

floating down the Mississippi River in a half-barrel, with his camera perched above him and one hand dragging in the water. Others are outrageous: his invitation to a dinner party in which stickmen wine bottles are dancing around a table, with one bottle popping its cork and one lying broken on the floor. His invitation to a whist party at his "hostelry" is equally startling, with men standing on chairs and one pulling another's hair. Like the varying border treatments in the Rock Island collection, these sketches reveal a more multi-faceted man than do the formal portraits of him or his exquisite photographs.



HENRY BOSSE

Photo courtesy of F. Quaintance

Precious Art, Invaluable History and a Priceless River

Henry Bosse's photographs comprise a rare essay on an important era. During this era, the Midwest began moving from a pioneer territory to an established agricultural and commercial region. And the Corps, at the Midwest's insistence, began reshaping the Mississippi's physical landscape and ecology.

If Bosse's photographs only recorded these important developments, they would still be worthy of much acclaim. But, they are more than the snapshots of a draftsman charged with documenting a Corps project. They are the work of an artist. They demonstrate a modern and sophisticated sense of composition. They depict not only the great natural beauty of the river but the fascinating geometry of newer, industrial developments, such as wagon and railroad bridges, locks and canals. As one admirer has observed, they capture a shift in American photography from a romance with nature to a romance with steel. And they help explain our national romance with the Mississippi River.

Wagon Bridge at Winona, Minn., 1892.

DeSoto, Wis., 1891.

Acknowledgements:

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MARCH 1996

US Army Corps of Engineers
St. Paul District

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