



## Chapter Four: Mid-Mississippi

The 1870s were crucial years of transition in the history of St. Paul and Minneapolis. St. Paul in 1870 was the largest city in Minnesota, with 20,030 people. Its economic foundation as a distribution point for goods was based on its geographic location at the head of Mississippi steamboat navigation. Upriver, between St. Paul and the Falls of St. Anthony, the Mississippi was too treacherous, turbulent and rocky for shipping.<sup>1</sup> St. Paul, the state capital, had established itself as a focus of Minnesota politics and a regional home for federal agencies. The capital city was a logical location in 1866 for the Corps of Engineers office. Despite the advantages of St. Paul, by 1880 Minneapolis had outgrown its older downriver rival and had become the Upper Midwest's most important manufacturing and transportation center. The river, but not steamboat traffic, was the key to economic supremacy. The Falls of St. Anthony, the most abrupt drop in the 2,348 miles of the Mississippi's course, created water power for industrial growth which in the 1870s enabled millers and merchants to lead the way in developing Minneapolis as a business and cultural center of the upper Mississippi Valley.

The communities on both sides of the Falls of St. Anthony were joined in 1854 by the first structure to span the Mississippi River. This suspension bridge was opened for traffic four years after John H. Stevens built the first permanent home on the Minneapolis side of the river. The village of St. Anthony on the east side of the falls was incorporated into Minneapolis in 1872, and from that year the new city's growth was dramatic. It tripled in size in the 1870s, quadrupled its population in the 1880s, and by 1900 had over 200,000 residents.<sup>2</sup> In the first years, the lumbering industry dominated Minneapolis; by the 1890s the city was the nation's leading sawmill center. But the sawmills were pushed away from the falls in the 1870s by the new industry of flour milling which would dominate the future of Minneapolis. In 1870, only 193,000 barrels of flour were processed at Minneapolis from the 17,660,476 bushels of wheat grown by Minnesota farmers.<sup>3</sup> By 1880, Minneapolis had become the largest producer of flour in the United States. Minnesota farmers in that year harvested

The Falls of St. Anthony have been under improvement for 100 years. The lower and upper locks were completed in 1968.

TABLE 7 FLOUR PRODUCTION AT MINNEAPOLIS 1860-81

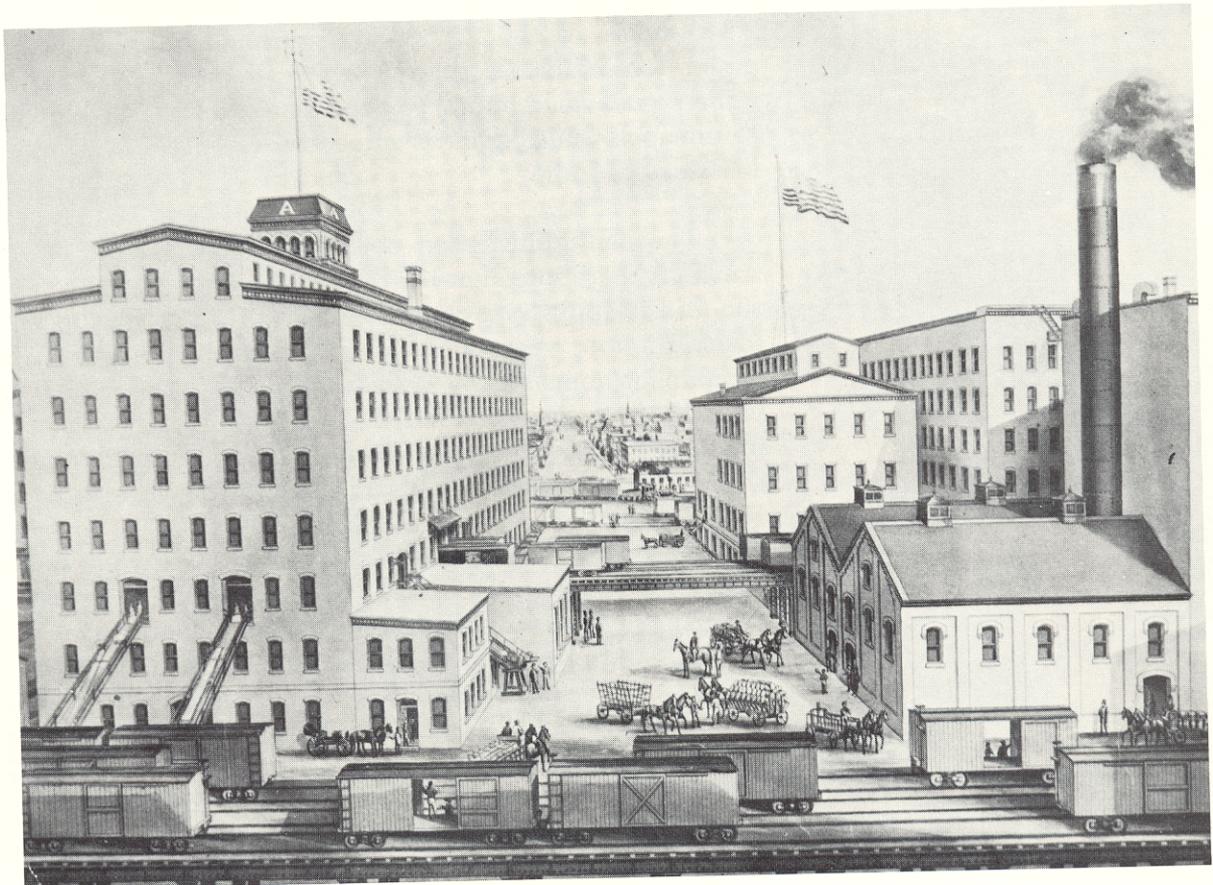
Year	Barrels	Year	Barrels
1860	30,000	1876	1,000,675
1865	98,000	1877	935,544
1870	93,000	1878	940,786
1873	585,000	1879	1,551,789
1874	727,000	1880	2,051,840
1875	843,000	1881	3,143,243

From: Office of the Chief of Engineers  
Annual Report, 1882, p. 1802

39,399,068 bushels of wheat and the millers at the falls ground 2,051,840 barrels of flour.<sup>4</sup> For the next fifty years Minneapolis would be the nation's leading flour milling center. The peak year was 1916, when 20,443,000 barrels or a little over four billion pounds of flour were packaged for world-wide distribution under the famous brand names of Pillsbury's Best, Robin Hood and Gold Medal.<sup>5</sup>

Another important transition occurred in the 1870s. At the beginning of the decade the whistle of the locomotive was unknown in Minneapolis. By 1880 the "Queen City" was connected to eastern markets by the Milwaukee

The original Washburn "A" Mill was the pride of the Minneapolis milling district in 1874.





The completion of the stone arch bridge across the ancient falls became symbolic of the new position of Minneapolis as the industrial giant of the Midwest in the 1880s. This artistic landmark represents the transition from river to rail and the displacement of St. Paul as a focus of Upper Midwest commerce.

and St. Paul Railroad, to the south by the Minneapolis and St. Louis Railroad, and to the west and north by James J. Hill's line, the St. Paul, Minneapolis and Manitoba, later the Great Northern Railroad. The milling magnates were zealous promoters of railroads as reliable transportation for their products. It was their booster spirit, too, that rebuilt the milling district of Minneapolis twice during that critical decade. On October 21, 1870, a fire destroyed most of the mills on the east side of the river, where the first commercial water power facilities had been constructed by Franklin Steele in 1848. After the fire, James J. Hill purchased the right of way to build his famous stone arch railroad bridge which curves across the river below the falls. Hill completed the bridge, a Minneapolis landmark, in 1883.

In 1874 one of the largest flour mills in the United States, the Washburn A Mill, was completed. It had a capacity of forty-one sets of mill stones; its closest competitor at the falls had fifteen. However, on May 2, 1878, the seven and one-half story stone building blew up. The explosion totally destroyed the large flour mill, and devastated an area comprising one-third of the city's milling



During the 1870s Charles A. Pillsbury went to Europe in search of new processes for milling wheat and brought back innovations that were incorporated in his Pillsbury "A" plant.

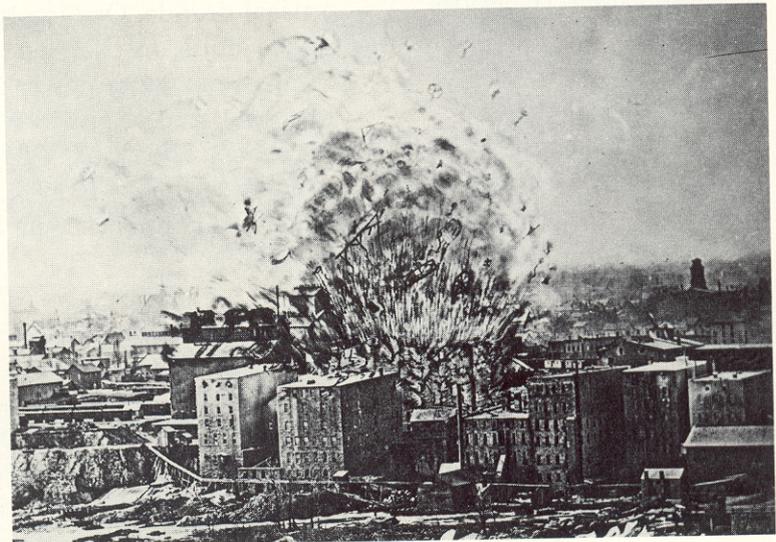


William de la Barre, an Austrian engineer, provided both the technical and managerial leadership in the transition of Minneapolis from a milling to a manufacturing center.

The Washburn "A" Mill did not last long as the largest flour mill in the Midwest. As this artist's sketch shows, the mill exploded in 1878.

capacity, lumberyards, a roundhouse, a planing mill, a machine shop, a grain elevator and a number of homes. Within two years the whole area was rebuilt.<sup>6</sup> At the center was the pride of Minneapolis, the new Pillsbury A Mill. In the design of the mill were innovative processes using steel rollers, which Charles A. Pillsbury had learned about on a trip to Hungary. Pillsbury also installed in the mill "middling purifiers," a unique French invention perfected in Minnesota. Thus, in 1881 Pillsbury's building became the largest and most efficient flour mill in the world.<sup>7</sup>

Just when Minneapolis became the nation's leader in flour production, a new technology showed promise of superseding the milling industry. The key figure in this new development was the Austrian engineer William de la Barre, a dominant figure in the economic life of Minneapolis from the 1880s until his death in 1936.<sup>8</sup> His major interest was hydroelectric power. The Minneapolis Brush Electric Company began to operate the first hydroelectric central power station in the United States in 1882. It went on line in the same year that Thomas Edison put his steam-powered Pearl Street Station into operation in New York City. Another station, the Vulcan Street Plant at Appleton, Wisconsin, on the Fox River, opened on September 30, 1882, only twenty-five days after the Minneapolis plant, to become the second hydroelectric station in the country. De la Barre became the leader in converting the falls of St. Anthony into a center of hydroelectric power generation. He was concerned that the milling industry utilized only 13,000 horsepower of the falls, when the total falls capacity was estimated at about 100,000 horsepower.



Middlings purifiers increased both the quantity and quality of flour through a recycling system using blowers and steel rollers. The process was perfected by millers in the Dundas, Minnesota area, and incorporated into the new Pillsbury "A" Mill.



By 1965 when the last flour mill, the Washburn A, ceased operations, the river was utilized mainly for the production of electricity.

The transition from lumbering to milling to electrical power generation does not end the river story, however. Another dream of Minneapolis businessmen has been realized in the past twenty years. Ever since the Civil War, Minneapolis merchants have wanted to make Minneapolis into a river port. The Corps upper harbor project finally extended the head of navigation for tugs and barges beyond St. Paul into the heart of Minneapolis. River barges can now navigate through a series of locks and dams in the main channel, pass over the ancient cataract, and dock above the falls.

The Corps of Engineers has played an important role in lumbering, milling, hydroelectric and commercial barge phases of the development of the Minneapolis river front. Just as the Corps was instrumental in making St. Paul an important inland port in the nineteenth century and in protecting that city's industrial park from flooding in the twentieth century, so it has also provided federal assistance to Minneapolis during times of riparian expansion.

## The Falls of St. Anthony, 1870-88

The most dramatic intervention of the Corps in the growth of Minneapolis came during the crucial decade of the 1870s. The lumbering and milling companies owed their very existence to the water power of the Falls of St. Anthony. But just when men began to utilize the falls, natural forces were eroding its base. Only 300 feet of limestone remained beneath the cataract when the mills were first constructed. While industry began to dig into the final feet of protective stone to build more mills to exploit the water power, millions of feet of logs each year hammered away at the natural stone apron of the falls. Floods were especially destructive, and water percolating through the thin limestone covering undermined the cataract upon which the future of Minneapolis depended. Few suspected, however, that the falls were in a terminal state of deterioration.

This suspension bridge was the first structure to span the Mississippi. It connected the growing manufacturing districts on both sides of the St. Anthony cataract.

Major Gouverneur K. Warren, the first U. S. Army engineer stationed at St. Paul, sent a report to Washington, D. C., in 1868, warning the chief of engineers that the flood of the previous year had caused serious damage



The solution for the damage to the Falls of St. Anthony was to construct a dike across the channel to prevent further undermining of the limestone. Construction of an apron was in the process when this photo was taken. Note the large logs from the millpond above the falls. These timbers careening over the falls continued to damage the apron below, eventually causing the Corps to withdraw its help from the attempt to maintain the apron.



to the Falls of St. Anthony.<sup>9</sup> Warren reported that another bad flood could destroy the falls altogether, for the sandstone under the thin limestone surface was rapidly deteriorating. Such an event would convert the falls into a series of rapids. This report triggered debates in Congress, the Minnesota State Legislature and the city council of Minneapolis. Before any action could be taken, the river broke through its limestone bed into a tunnel being dug through the falls in a project sponsored by Minneapolis lumberman and miller William W. Eastman, and John L. Merriman, a St. Paul banker. Attempts to develop the potential of the falls were hastening its destruction.



The first district engineer, Major Gouverneur K. Warren, warned Congress of the imminent destruction of the Falls of St. Anthony due to excessive exploitation by businessmen.

The break in the falls occurred on October 5, 1869. Minneapolis businessmen worked feverishly during the next month to have the holes plugged, but with little success. In November the Corps hired Franklin Cook, the chief engineer with Washburn's Minneapolis Mill Company, to survey the falls and recommend improvements. The local business community and the citizens of Minneapolis initially expended \$334,000 and the federal government contributed \$615,000 to maintain the falls between 1870 and 1884.<sup>10</sup> By the time the damage was repaired with a new apron, a 40- by 1,850-foot dike, and two protecting dams above the falls, the ancient cataract had been changed into a public work used largely for private profit. Thus, the first large construction project undertaken by the Corps of Engineers in the Twin Cities was not to aid navigation, but to repair the damage caused in large part by over-zealous attempts to gain water power for flour and lumber mills.<sup>11</sup>



This view of the falls shows the reconstructed apron built by the Corps of Engineers.

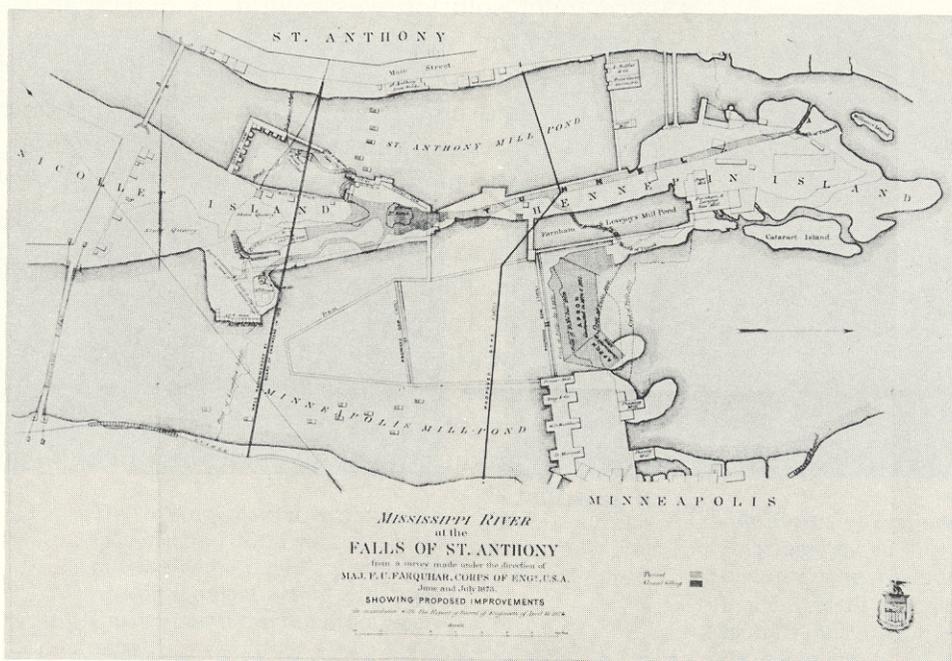
Even after the Corps had rescued this important water power site from destruction, millers continued to exploit the potential of the falls beyond its capacity. To control additional water flow, they built rolling dams out into the main channel, narrowing the river to less than 360 feet. In 1879 logging companies ran four and a half million feet of logs over the falls, which caused damage to the reconstructed dike and apron.<sup>12</sup> Joel B. Bassett, a key lumberman, railroad promoter and investor, and other aggressive businessmen associated with the lumber industry were dumping "large masses of stone, gravel, sand, clay, etc., into the channel." In 1882 the Corps obtained a court injunction against the boom companies to prevent further damages.<sup>13</sup> Three years later, the Corps had to spend more funds on repair work. In 1887 the apron was again damaged when its deck planking was torn off by loose logs shooting through the narrowed channel.<sup>14</sup> This time the Corps threatened civil action against the mill companies and withdrew from further involvement at the falls. The Corps could no longer justify the expense since navigation was not affected by the project.<sup>15</sup> Not until 1937 would the Corps again become involved in work

A spring flood in 1870 brought great quantities of logs down-river to the falls, causing the collapse of adjoining mills on Hennepin Island.



This map of the Falls of St. Anthony milling district shows the location of tunnels and the placement of the Corps of Engineers' dike and apron.

at the Falls of St. Anthony.<sup>16</sup> The regulation and maintenance of the cataract was left, in the private sector, to the energetic and patient engineer William de la Barre. Log jams were a constant concern. In 1905 over 100 million feet of logs jammed the river for two solid miles and put bridges and milling sluices in great peril.<sup>17</sup> Between 1890 and 1913 de la Barre spent \$262,661 of Minneapolis Mill Company and St. Anthony Falls Water Company funds to save the falls from further deterioration.<sup>18</sup>



## Sawdust Controversy, 1880-1900

Descriptions from the milling and lumbering era indicate that the shoreline of the industrial district at the falls was a messy dump of rubble and trash. An editorial in the *Mississippi Valley Lumberman* in 1882 put it more bluntly: "the rivers are and must forever be the common sewer and dumping ground for everybody . . ." <sup>19</sup> Lieutenant Colonel Potter reported in 1913 that the area was not "much in the way of scenery. The river above the falls is more useful to Minneapolis for water power, than for any other purpose." <sup>20</sup> This was the position of industrial leaders at the Falls of St. Anthony and other points along the rivers of the upper Mississippi basin. It was *not*, however, the position of the Corps of Engineers. In 1881 Captain Alexander Mackenzie of the Rock Island office said that "the promiscuous depositing of sawdust in the river is a public evil, and liable to impair navigation." Though the "sawdust controversy" received much publicity in the 1880s, the Corps was also concerned with the practice of depositing raw sewage and garbage into the Mississippi. <sup>21</sup>

At first the Corps of Engineers attempted to "jaw-bone" industry into alternative methods of waste disposal. These efforts were only partially successful. While the Corps threatened litigation against the offenders, a more permanent solution was sought. A partial answer to the problem came in 1902 with the establishment of harbor lines in Minneapolis and St. Paul. <sup>22</sup> Within the harbor lines railroads and city trash collectors were prevented from dumping dirt and refuse on river frontage where it could wash into the main channel in times of high water. Sawdust dumping, on the other hand, continued until the lumber industry ran out of Minnesota white pine and moved west. The growth of sawmilling in Minneapolis is presented in Table 8. About two-thirds of these logs were sawed at the thirty-nine planing mills located in the city. The mill refuse of edgings and sawdust was dumped in the river. It was estimated that in only one year—1880—the sawmills produced one and a half million board feet of sawdust. <sup>23</sup>

**TABLE 8 LUMBER MANUFACTURE ON THE MISSISSIPPI RIVER FROM ST. PAUL TO ST. LOUIS FOR NINE YEARS**

YEAR	LUMBER	SHINGLES	LATHS
	Feet	Number	Number
1886	934,735,854	274,581,750	267,888,340
1887	988,361,094	363,239,750	—
1888	1,048,951,386	423,655,050	—
1889	1,044,555,298	463,132,700	—
1890	1,231,678,960	508,986,705	—
1891	814,228,707	332,666,750	207,722,350
1892	931,806,305	357,014,775	228,042,910
1893	811,576,588	285,897,000	190,394,000
1894	673,572,000	204,198,000	158,586,000
<b>TOTAL</b>	<b>8,479,466,192</b>	<b>3,213,372,480</b>	—

From: Office of the Chief of Engineers *Annual Report, 1895*, p. 2106.



The milling district around the falls in the 1880s was certainly not the same bucolic picture of power and beauty that Jonathan Carver painted a hundred years earlier.



The Corps of Engineers was the only agency in the nineteenth century concerned with regulating debris in the river. As this picture indicates, they were not too effective.

## The Meeker Island Dam Controversy, 1857-1915

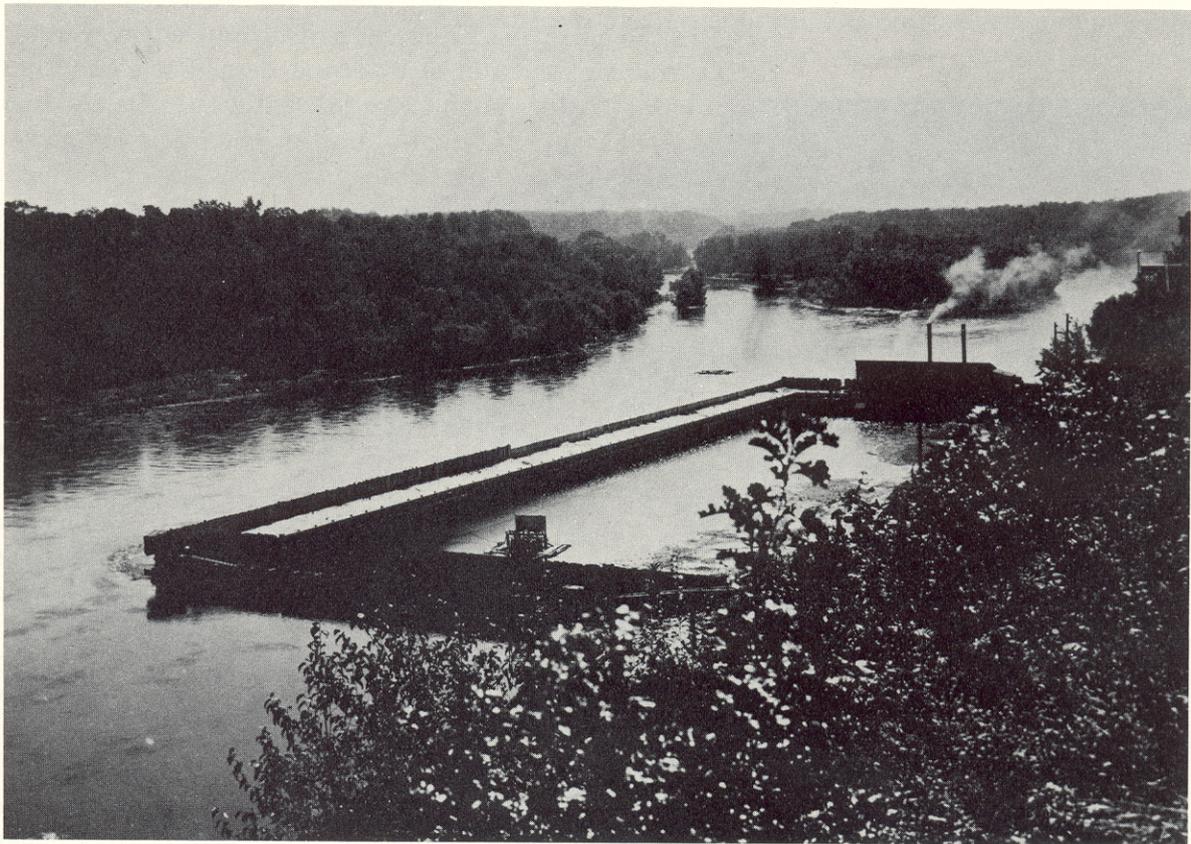
Nowhere can the rivalry between Minneapolis and St. Paul be better illustrated than in the controversy over the proposal to build a lock and dam about two miles below the Washington Avenue Bridge at Meeker Island. The project threatened established commercial and manufacturing investments in both cities, and yet promised to provide an additional power resource, as well as recreational and navigational benefits for the whole metropolitan region. Bradley B. Meeker, a territorial judge, organized a group of Minneapolis businessmen to form the Mississippi River Improvement and Manufacturing Company which obtained permission from the territorial legislature in 1857 to construct a lock and dam below the Falls of St. Anthony. The Panic of 1857 delayed the company's initial efforts and after the Civil War it petitioned Congress for a land grant of 200,000 acres to finance the \$922,121.46 project.<sup>24</sup> Congress, after ordering a survey by the Corps of Engineers, granted the land to the state of Minnesota in 1868.<sup>25</sup> By this time St. Paul businessmen had gained control of the company.

The controversy over the project continued for thirty years, in which time it became a tangled economic and political affair. According to Corps engineer James D. Du Shane, "local pride and the jealousy between St. Paul and Minneapolis" were the major factors.<sup>26</sup> But opinion became divided over the future implications of the project in both municipalities. Many Minneapolis shippers supported the dam because it promised to bring river traffic into the heart of the city. Others in Minneapolis, especially the powerful millers, opposed the dam because it would provide a rival source of water power. Joining the milling interests in resisting the Meeker Island proposal were lumbermen who wanted the free and unimpaired use of the river for log drives. The plan for a lock and dam also divided the St. Paul community. With sixty-three steamboats and 180 barges arriving in St. Paul in 1866, the city's shippers were not ready to relinquish St. Paul's position as the head of navigation on the Mississippi.<sup>27</sup> Other St. Paulites saw the Meeker Island project as a fine opportunity for the capital city to acquire a water power site with a potential for developing manufacturing and milling enterprises.

When it appeared that the Mississippi River Improvement and Manufacturing Company would not be able to resolve its internal conflicts, Congress decided to turn the project over to the Corps of Engineers. On March 3, 1873, Congress appropriated \$25,000 to initiate construction, but a clause in the legislation stipulated that all lands given to the State of Minnesota in the 1868 act must be relinquished to the federal government before any money was expended.<sup>28</sup> The negotiations for land acquisition, an involved process, which included the purchase of Meeker Island from John A. Willard for \$4,500, effectively delayed the project until 1894.<sup>29</sup>

The original Lock and Dam Number One was partially built before Major Francis R. Shunk convinced the War Department that a higher dam with hydroelectric capacity should be considered. This photo was taken in 1908 before the present Ford Dam was begun.

When it became obvious in 1894 that the dam at Meeker Island would at last be built, the struggle between opposing factions became intense. The wrangling was so serious that ten years after the dam was built, it was demolished! The story is complex. It begins with congressional approval on August 18, 1894, for the construction of a Lock and Dam Number 2 to be located near Meeker Island. From this designation it was obvious that a Lock and Dam Number 1 was also promised, but Twin



Cities officials could not agree on an exact site (Adding to the confusion was the fact that Lock and Dam Number 2 was to be built upstream from the proposed Lock and Dam Number 1. The present system is to number dams in order going downstream with Lock and Dam Number 2 downstream from Lock and Dam Number 1).

Lieutenant Colonel William R. King of the Rock Island District was in charge of the design for the Meeker Island Dam (Lock and Dam Number 2), but in October, 1897, the project was transferred to the St. Paul District.<sup>30</sup> Though the Rock Island District had maintained this portion of the river for thirty years, it was sensible to put the St. Paul district engineer who was close at hand in charge of the construction. Major Frederic Abbot even eliminated horse and livery fees from the construction cost by riding his bicycle to the dam site for daily inspections. The construction did not go smoothly. A deep scour occurred on the west end of the dam delaying the construction schedule.<sup>31</sup> Finally, on May 19, 1907, the first vessel, the power boat "Itura," was lifted 13.3 feet and went through the 80 by 334 foot lock.<sup>32</sup>

In the meantime Congress had authorized on March 3, 1899, the construction of a second dam, Lock and Dam Number 1. After much haggling between officials from Minneapolis and St. Paul a site for the dam was picked just above Minnehaha Creek.<sup>33</sup> High water hindered the start of the project. Business interests in Minneapolis and St. Paul used the delay to press for a larger dam that would generate electrical power. Congress reacted by creating a special commission to re-examine the whole dual-dam project.<sup>34</sup> The commission's report of September 26, 1907, did not settle the matter. The report noted that current designs were not high enough to allow power generation, and suggested that the project could be modified.<sup>35</sup> A special board of engineers was called on to make a second study. Even though construction had already begun, the board recommended that a high dam be built.<sup>36</sup> This modification would raise the height of the proposed structure from thirteen and one-half feet to thirty feet. Slack water behind such a dam would submerge Lock and Dam Number 2.<sup>37</sup> A brand-new half-million dollar project would be, literally, washed out!

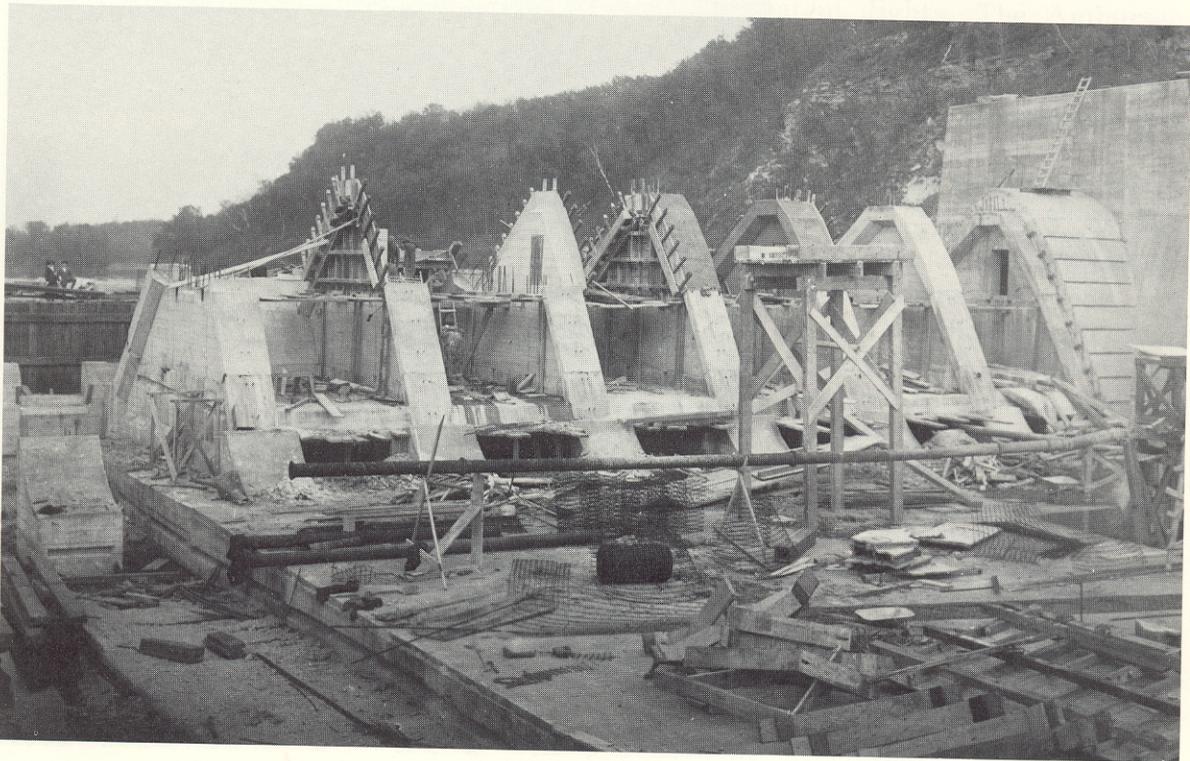
The likelihood that Lock and Dam Number 2 would be destroyed did not go unnoticed. The Dean of the College

of Engineering at the University of Minnesota, Francis C. Sharshon, thought the timber superstructure of Lock and Dam Number 2 should be converted to a dry dock or some other useful thing.<sup>38</sup> Nevertheless, it remained in place and was cut down five feet in 1915, to give a ten-foot clearance for boats passing over it. The structure still remains in the river, a monument to inter-city rivalries.

## The High Dam or the Twin City Lock and Dam: 1910-33

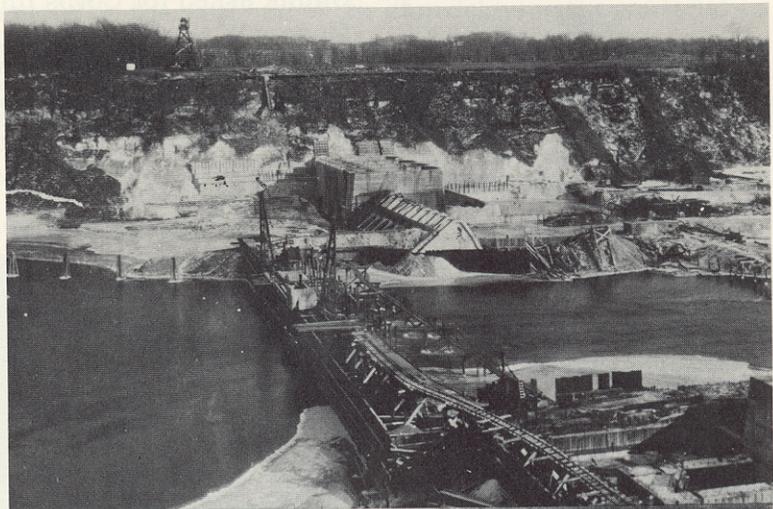
A major force behind the change in dam design at Lock and Dam Number 1 was Major Francis R. Shunk, an innovator and a long-range planner. Shunk had read of the new Ambursen (hollow type) dam and he wished to build one. He also agreed with St. Paul interests that the power possibilities of dams should not be neglected.<sup>39</sup> In 1908 Shunk asked for Corps funds so that he and his assistant, George W. Freeman, could visit dam sites in the East to appraise the potential of Ambursen-type dams.<sup>40</sup> The two got the money and made the trip. As a result the ambitious district engineer became the first officer of the Corps of Engineers to design and build a hydro electric dam in the United States.

The innovative Ambursen hollow dam design can be seen in this October, 1913, picture of the construction of the "high dam" or Twin City Lock and Dam Number One, as it was originally named.

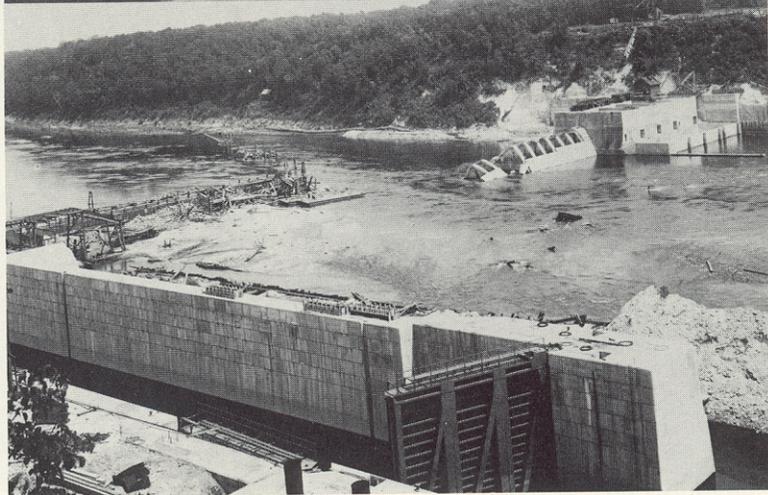


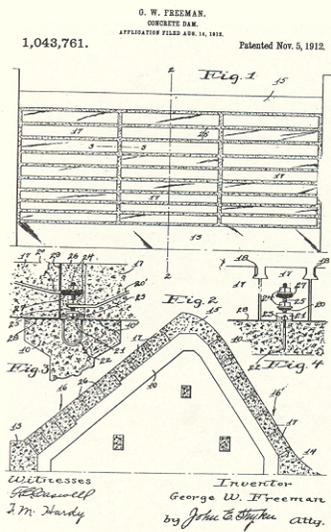
Private companies were very interested in obtaining the power rights of the proposed high dam. But this posed a great problem, for to do so they needed to acquire land adjacent to the dam. But the cities of St. Paul and Minneapolis would not release the land for private development, and private corporations could not, of course, condemn public property. Major Shunk recommended that the federal government build the high dam for navigational purposes, install power plant facilities, and then lease the power generators to private companies. He quoted Elihu Root: "I would proceed then find interpretations to justify it."<sup>41</sup> Shunk had the backing of Representative Frederick C. Stevens, who felt that Congress would approve the plan in order to supply Fort Snelling and other federal agencies with electricity.<sup>42</sup> Shunk also appealed to the Twin Cities business community, pointing out that one high lock and dam would cost less to build and operate than two low ones, would save boats time in passage and could pay for

In February, 1914, a cofferdam was built to allow construction of the Twin City Lock and Dam Number One.



In July, 1914, a flood washed out the cofferdam and destroyed the foundation beneath two sections of the "high dam," causing a delay in the construction schedule and an interesting engineering problem for the Corps of Engineers.





George W. Freeman, a civilian engineer assisting Major Francis R. Shunk, took out a patent on the innovative design features of the Twin City Lock and Dam.

itself in power generated. A high dam would only cost \$310,000 more than Lock and Dam Number 1 which was already under construction. Shunk knew that the federal government only had power to regulate navigation — not to build power plants. But this was just a case of legislative oversight, Shunk felt. He wrote to the mayor of Minneapolis, James C. Haynes, that the whole issue was not a legal concern, but a moral matter.<sup>43</sup>

After visiting Ambursen dams in Maine, Vermont, Massachusetts, New York and Philadelphia, the ambitious engineer was convinced that he could save money and build a much more practical structure by using the Ambursen design. He was especially intrigued by the possibility of entering the hollow structure and passing through it from one side of the river to the other. He even envisioned public vehicles running on a road through the dam.<sup>44</sup>

A hearing on the high dam proposal was held in the St. Paul Commercial Club on January 12, 1910. Contrary to an established pattern of Corps activity, Major Shunk lobbied hard for his plans.<sup>45</sup> He was sure that Congress would act if it knew that the dam had strong local support, and he was successful in getting that support. The next step was to negotiate patent rights. The Ambursen Company wanted \$11,000 in royalties for the use of their design, but Shunk talked them into accepting \$7,500. Then he convinced the chief of engineers that it was a good deal.<sup>46</sup>

The project was about fifty per cent complete in 1912. In that year the newly promoted Lieutenant Colonel Shunk was transferred out of the district, and George W. Freeman, the civilian assistant on the job, took out Patent Number 1,043,761 on his modified design for a hollow concrete dam.<sup>47</sup> Two years later a flood washed out the cofferdam and nearly destroyed the support for the unique structure.<sup>48</sup> The damage was repaired and by 1917 the dam was completed, with facilities for 15,800 horsepower of electrical generation. Its name, Lock and Dam Number 1, was changed to Twin City Lock and Dam but it is known in the metropolitan area today as the Ford Dam.

The Twin City dam was completed in 1917, a monument to the innovative engineering abilities of Lieutenant Colonel Shunk and George Freeman, but its immediate impact on shipping and the generation of electricity was



The Fort Snelling suspension bridge was built by the Corps of Engineers between 1907 and 1911. Though Congress authorized the Corps to let contracts, supervise construction, and modify the design to please the aesthetic tastes of Major Francis Shunk, Congress neglected to specify who would maintain the final structure.

negligible. Finally, six years after its completion, the power capabilities of the dam were utilized, much to the satisfaction of St. Paul. Then a lease was negotiated with the new Ford assembly plant which was built in St. Paul on the east bank of the Mississippi River.<sup>49</sup> The Federal Power Commission had turned down other lease applications from the City of St. Paul, the City of Minneapolis, Northern States Power Company and the University of Minnesota.

Yet the Twin City dam was not utilized for commercial traffic on the river. From 1917 to 1925 only pleasure craft used the upper pool.<sup>50</sup> Part of the problem was the lack of adequate terminals and a turning basin. In 1931 turning basins were completed and terminal facilities were built a year later. Traffic was halted between 1931 and 1933, however, when the Corps built a second lock in the dam.<sup>51</sup> It was erected in anticipation of a growth of river traffic as a result of the construction of the nine-foot channel from Minneapolis to St. Louis.



The dam pictured above has gone under four different names. It began as Lock and Dam Number One, then became known as the "high dam," and then was named Twin City Lock and Dam Number One. It is called the Ford Dam today because of its proximity to the Ford Motor Company assembly plant and the Ford Parkway bridge pictured upstream from the dam.

## Mid-Mississippi Improvements, 1937-69

A nine-foot turning basin in the St. Paul portion of the river was authorized by Congress on April 30, 1935, at an estimated cost of \$300,000. Dredged material was to be used as fill for a highway. Also attached to this project was a proposal to extend the Phalen Creek sewer. It was evident that St. Paul merchants were preparing to utilize the nine-foot channel which was being created by the building of twenty-six dams between Minnesota's capital and St. Louis.

On December 19, 1939, Congress modified the St. Paul project to include a small-boat harbor at Harriet Island, using the excavated material for improving the roadbed on Market Street.<sup>52</sup> As early as 1913, Lieutenant Colonel Charles Potter had reported that the "motor boat" was the "coming navigation" and that the federal government

should provide facilities for its use.<sup>53</sup> Little was done on this Harriet Island harbor project during World War II and the appropriations and land acquisitions were not completed until January 21, 1949.

In the 1930s Minneapolis also pushed for improved terminal facilities. On August 26, 1937, Congress voted to extend navigation beyond the Falls of St. Anthony. Local contributions were needed—in fact, \$1,774,000 worth! The Minneapolis City Council voted this sum for the project on May 5, 1939.<sup>54</sup> The fact that Minneapolis businessmen were willing to support a city contribution this large for bridge and utility modification and land acquisition indicates the extent of renewed civic interest in the river as a commercial resource.

In an attempt to preserve an historic landmark and yet accommodate current navigational needs, the Corps modified James J. Hill's Stone Arch Bridge during the construction of the upper harbor project.

The project was postponed during World War II. There were other delays in acquiring flowage rights and in modifying utility and bridge structures, particularly that of the historic Stone Arch Bridge of the Great Northern Railroad. The first construction began on the lower lock of the Falls of St. Anthony project on July 17, 1950—more than eleven years after it was first authorized.



The lower dam was completed in nine years. By that time (1959) detailed drawings and contracts were ready for the Falls of St. Anthony upper harbor project. In 1963 this project was completed and opened to commercial navigation. The upper lock is the highest on the Mississippi River, with a lift of 49.2 feet. By 1968, river traffic totaling 1,459,639 tons moved through the new facilities at Minneapolis.<sup>55</sup>

## St. Paul Flood Control, 1958-73

The latest large project of the St. Paul District on the mid-Mississippi was a flood control project in St. Paul and South St. Paul.<sup>56</sup> Detailed plans and design work were begun in 1958. Contracts were let in 1961 and the St. Paul portion of the project was completed and turned over to the city on July 15, 1967. A two and one-half mile flood wall and levee enabled St. Paul to develop a new industrial park adjacent to its central business district. The South St. Paul part of the project was delayed by the procrastination of local officials and business interests. Damage done by the flood of 1965 was a devastating consequence of the delay. The South St. Paul sewage disposal plant and the large stockyards were inundated. Within the next three years an earth levee and flood wall were constructed by the St. Paul District. The over-all flood control project provides about fifty million dollars' worth of property with protection from a flood the size of the one in 1965, at a total cost of nine million dollars including federal and local contributions.<sup>57</sup>

## Waterborne Transportation, 1927-77

Since the completion of river improvement projects in the Twin Cities area, the transportation of bulk commodities by river has increased yearly. As shipping costs of competing overland carriers increase because of energy shortages, the river becomes more important in transporting grain, coal, petroleum, steel, chemicals, fertilizer and manufactured products. Steel barges pushed by diesel tugboats began arriving in the Twin Cities in 1927, when the Mississippi Barge Line sent the "S. S. Thorpe" with three 500-ton barges to Minneapolis. In 1974 commercial traffic totaled 9.5 million tons, with 6.7 million

tons transferred at St. Paul and 2.7 million at Minneapolis.<sup>58</sup> Charges in 1977 were \$6.19 per ton for transporting grain from St. Paul to New Orleans. Barges are now designed to hold 1,500 tons and a thirty-five-barge tow on the St. Louis to New Orleans leg is not uncommon. A single 1,500-mile trip from St. Paul to New Orleans can bring in up to \$325,000.<sup>59</sup> River transportation, after a long period of dormancy, is once again becoming an important factor in the economic life of St. Paul and Minneapolis.

## Creative Spirits

Many colorful individuals have contributed to the growth of Minneapolis and St. Paul as a metropolitan center. Among these historic figures are a number of Corps engineers who envisioned the Twin Cities as the core of economic life in the Upper Midwest. Majors Francis Farquhar, Charles Allen, and Frederic Abbot and Lieutenant Colonel George Derby were four of the most active promoters of Twin Cities urban growth during half a century. Two of the most creative men were Major Gouverneur K. Warren and Major Francis R. Shunk.

Major Warren, who served as the first district officer (1866-1870) and Major Shunk, who spent five years (1907-1912) in the St. Paul District, had much in common. Both graduated with honors from West Point. Warren was second in the class of 1850 and Shunk was number one in the class of 1887. Despite their early dedication to military ideals, both men were disillusioned with army life by the time their careers brought them to Minnesota. Warren, called the "fighting fool of Gettysburg," helped to turn this famous Civil War battle from defeat to victory with his brilliant leadership at Little Round Top. At the climax of his war success the newly breveted Major-General of volunteers led the Fifth Corps to a hard-fought triumph at Five Forks, at which point General Philip Sheridan stunned Warren by relieving him of his command! Warren went to both General Sheridan and General U. S. Grant and asked why he had been abruptly transferred out of the fighting units.<sup>60</sup> Neither would give him a satisfactory answer. A few months later, at the end of the war, Warren resigned his volunteer commission and returned to his position in the regular army as Major in the Corps of Engineers.

The question remained, however, why the man who had been called "the leading Corps Commander in the Army of the Potomac" was relieved of his duties after directing his troops to a decisive victory at Five Forks. Warren pressed for a military court of inquiry during the next fourteen years, but with President Grant in the White House his efforts were ignored. Finally, on December 11, 1879, a court of inquiry was appointed. The name of Major-General Gouverneur Kemble Warren was cleared. The court discovered that General Grant had a personal dislike for Warren and gave General Sheridan permission to dismiss him, when he could find cause. Sheridan, in a fit of anger that the victory of Five Forks had been won by the infantry and not the cavalry, relieved Warren of his command. Unfortunately, the final report of the Court of Inquiry was published three months after Warren died on August 8, 1882, at the age of 52.<sup>61</sup> Thus, there was good reason why Warren, embittered by military injustice, requested that his funeral be without military ceremony and that he be buried in civilian dress.<sup>62</sup>

Major Warren with his dark mustache and long flowing hair was a romantic figure. And his professional experience matched his looks. As one of his first assignments, he produced a general map of the trans-Mississippi West. He participated in the Pacific railway surveys in the 1850s and he was the first topographical engineer to explore the Black Hills of South Dakota. Courageous and imaginative, yet practical, he returned to the Corps after the Civil War to propose civil projects that were well-designed and at the same time touched with romantic vision. His reports on the Mississippi River and its northern tributaries became the major reference documents for three succeeding generations of Corps projects in the St. Paul District. In fact, the comprehensive studies conducted by Major Warren were not surpassed in one hundred years.<sup>63</sup> His able promotion of the headwaters reservoir system and the development of the power potential at the Falls of St. Anthony were crucial in the development of milling and manufacturing at Minneapolis.

Major Shunk was as ambitious an officer as Major Warren, but he did not have Warren's flair for publicity. He understood the importance of electrical power generation and designed and built the first hydro electric power plant on the Mississippi River, but he regularly refused the

requests of university professors and engineering editors to speak and write on his creative plans for building the high dam at Minneapolis. In fact, Shunk let his assistant engineer, George Freeman, take out the patent and receive the acclaim for this imaginative work. A bachelor, who roomed at the Willard Hotel in St. Paul while he served as district engineer, Shunk was adept at quiet diplomacy in bringing together long-standing rivals in Minneapolis and St. Paul. His devotion to detail, his political acumen and his respect for individual rights were notable.<sup>64</sup> Shunk, like Major Warren, was disillusioned by military superiors who were more concerned with tradition than with opportunities for new technological development. After serving twenty years in the United States Army Shunk wrote to William Baker in 1908 that a military career was not governed by law, but by regulations and influence. He observed to Baker that army life was a "species of insanity."<sup>65</sup>

Lieutenant Colonel Charles L. Potter, who succeeded Shunk as district engineer, personified the conservative tradition. Potter proposed no new projects. He reported in 1915 that "this office is approaching a condition where there will be little but maintenance in it and this force must be reduced."<sup>66</sup> During his years in the St. Paul office his unique contribution consisted of the design for an ice cofferdam, which was judged too complicated and costly to build.<sup>67</sup> Potter's greatest battle was fought to keep the engineering offices in the Old Post Office Building from being transferred to an army storehouse.<sup>68</sup>

Yet Lieutenant Colonel Potter saw the humor in his situation. For his efficiency report in 1914 he wrote, "I know of no special knowledge which I possess which can have any bearing on my status as an Officer or an Engineer." Then he added, "I formerly mentioned some, (*sic.*) but in the light of more advanced years and mature judgment, I doubt now whether I ever had them, and if I did, they have been too long in disuse to be worthy of mention."<sup>69</sup> Potter revealed the same sense of humor and lack of ambition when the Commercial Club of Grand Forks inquired about the possible drainage of Red Lake into the Mississippi River. The district engineer noted three possible alternatives. The first would be to drain Red Lake into the Mississippi at Lake Bemidji, a distance of 33 miles, up an elevation of 168 feet. He estimated that it would cost more than the Panama Canal was worth

to pump water through that route, and “the Government Treasury is not in a position to undertake another Panama Canal.” The second alternative was to drain Red Lake by gravity, which would mean connecting it with the Mississippi below Brainerd. The only problem with that project was the difficulty of tunneling under many stretches of the “upper regions of the Mississippi River.” The third alternative Potter proposed was to let Red Lake drain past Grand Forks and then reverse the direction of the Red River of the North so water would flow into the Minnesota River. Potter disarmingly suggested that such a project “might be done for a hundred million dollars.”<sup>70</sup>

After Warren and Shunk left, no major comprehensive project was undertaken by the St. Paul District until the 1930s, and then the project was not initiated by a district engineer. Thus, Majors Warren and Shunk remain two of the outstanding creative district engineers in the early history of the St. Paul office. Their work significantly benefited the growth and development of the Minneapolis-St. Paul metropolitan area.

The Mississippi River in the area of the Falls of St. Anthony no longer has the rugged natural look of the 1700s nor the foul squalor of the late 1800s, but reflects the urbanization of the metropolitan area.



## Notes

1. *Annual Report*, 1896, p. 254; 1891, p. 2148; 1892, p. 1781.
2. Theodore C. Blegen, *Minnesota*, pp. 177, 249-51.
3. Lucile M. Kane, *The Waterfall that Built a City* (St. Paul: 1966), p. 99.
4. Kane, *The Waterfall that Built a City*, p. 100.
5. Blegen, *Minnesota*, p. 357; James Gray, *Business Without Boundary: The Story of General Mills* (Minneapolis: 1954), pp. 25-40.
6. Ernest A. Sturtevant, *History of the Great Mill Explosion at Minneapolis with a View of the Ruins After the Fire* (Minneapolis: 1878).
7. Charles B. Kuhlmann, *The Development of the Flour-Milling Industry*, p. 132.
8. George Loughland, "William de la Barre, 1849-1936," *Byllesby Management and Engineering Corporation* (Chicago: 1936), II, no. 5.
9. 41 Congress, 2 session, *House Executive Documents*, no. 1, part 2, p. 210.
10. 49 Congress, 1 session, *House Executive Documents*, no. 1, pp. 1722-25.
11. A good summary of this event can be found in Kane, *The Waterfall that Built a City*, pp. 62-80.
12. *Annual Report*, 1880, p. 1567.
13. *Annual Report*, 1882, p. 236.
14. *Annual Report*, 1887, p. 223.
15. See Major Charles J. Allen's report, in *Annual Report*, 1887, Appendix AA-1, pp. 1660 f; 1888, p. 201.
16. Rivers and Harbors Act of August 26, 1937 (72 Congress, 1 session, *House Documents*, no. 137).
17. *Minneapolis Sunday Times*, May 21, 1905.
18. William de la Barre to Lieutenant Colonel Charles L. Potter, April 8, 1913, SPD, Letters Sent (press copies) NARG77.
19. Clippings from *Mississippi Valley Lumberman*, SPD, Scrapbook of Newspaper Clippings Relating to River Improvement, 1877-94, NARG77. See also *St. Paul Pioneer Press*, October 18, 19, 1882.
20. Lieutenant Colonel Charles L. Potter to OCE, December 13, 1913, SPD, Letters Sent (press copies) NARG77.
21. *St. Paul Pioneer Press*, April 1, 1882; both Major Charles J. Allen and Major Francis M. Farquhar endorsed restrictive legislation on sawdust disposal; see *Minneapolis Journal*, April 29, 1891.
22. Mayor Robert Smith, St. Paul to Lieutenant Colonel William R. King, March 18, 1896 and Lieutenant Colonel William R. King to OCE, June 27, 1896, both in SPD, Letter Sent, Nov. 1889-Jan. 1898, NARG77.
23. *St. Paul Pioneer Press*, April 14, 1881; for a broader discussion of this issue see Albert E. Cowdrey, "Pioneering Environmental Law: The Army Corps of Engineers and the Refuse Act," *Pacific Historical Review* (August, 1975), XLVI, pp. 331-349.
24. Kane, *The Waterfall that Built a City*, pp. 92-97, discusses the early history of this project.
25. *Annual Report*, 1881, p. 24; Act of July 23, 1868, *Statutes at Large*, vol. 15, p. 169.
26. James D. DuShane to Lieutenant Colonel William R. King, April 1, 1897, SPD, Press Copies of Letters and Reports Sent by An Assistant Engineer, Relating to the Mississippi River, NARG77.
27. Mildred L. Hartsough, *From Canoe to Steel Barge on the Upper Mississippi* (Minneapolis: 1934), pp. 160-84.
28. *Annual Report*, 1886, pp. 257-58.
29. James D. DuShane to Lieutenant Colonel William R. King, January 2, 1896, SPD, Press Copies of Letters and Reports Sent by an Assistant Engineer, Relating to the Mississippi River, NARG77; Lieutenant Colonel Charles L. Potter to OCE, March 31, 1915, SPD, Letters Sent (press copies) NARG77.
30. *Annual Report*, 1898, p. 318.
31. *Annual Report*, 1905, p. 431; 1906, p. 471; 1907, p. 497.
32. *Annual Report*, 1907, p. 498.
33. Rivers and Harbors Act of March 3, 1899; *Annual Report*, 1908, p. 530; Lieutenant Colonel William R. King to Secretary of War, July 6, 1896 and January 25, 1897; Brigadier General William P. Craighill to Secretary of War, January 25, 1897, all in SPD, Letters Sent Nov. 1889-Jan. 1898, NARG77.
34. *Annual Report*, 1906, p. 472.
35. 60 Congress, 1 session, *House Executive Documents*, no. 218.
36. 61 Congress, 2 session, *House Executive Documents*, no. 741; Board of Engineers to OCE, January 21, 1910, SPD, Letters Sent (press copies) NARG77.
37. *Annual Report*, 1911, pp. 475-76; 1915, p. 1887.
38. Lieutenant Colonel Charles L. Potter to Francis C. Sharshon, January 2, 1913, SPD, Letters Sent (press copies) NARG77.

39. Major Francis Shunk to OCE, December 1, 1909, SPD, Letters Sent (press copies) NARG77.
40. Major Francis Shunk to Brigadier General Alexander Mackenzie, March 26, 1908; a report on the visit can be found in Shunk to OCE, November 24, 1909; both are in SPD, Letters Sent (press copies) NARG77.
41. Major Francis Shunk to Major Charles S. Riche, January 3, 1909, SPD, Letters Sent (press copies) NARG77. The Act of July 25, 1912, allowed the secretary of war to make provisions for future development of water power in the construction of dams for navigational purposes. *Statutes at Large*, vol. 37, p. 233.
42. Major Francis Shunk to Major Charles S. Riche, January 3, 1909, SPD, Letters Sent (press copies) NARG77.
43. Secretary of War Henry L. Stimson also held this view; Stimson to Representative Joseph F. Johnston, June 12, 1912, and Major Francis Shunk to James C. Haynes, February 17, 1908, SPD, Letters Sent (press copies) NARG77.
44. Major Francis Shunk to OCE, November 24, 1909, SPD, Letters Sent (press copies) NARG77.
45. Major Francis Shunk to Major Charles S. Riche, March 19, 1909, and Shunk to Major Charles S. Bromwell, January 6, 1910, SPD, Letters Sent (press copies) NARG77.
46. Major Francis Shunk to Ambursen Hydraulic Construction Company, April 11, and June 27, 1911, SPD, Letters Sent (press copies) NARG77.
47. Patented November 5, 1912 (No. 1,043,761), SPD, "Miscellaneous" Subject File, 1906-43, misc. civilian engineers, NARG77.
48. *Engineering News*, July 2, 1914; Lieutenant Colonel Charles L. Potter to E. E. Bretman, February 25, 1914, SPD, Letters Sent (press copies) NARG77; *Annual Report, 1915*, pp. 1029-30.
49. Federal Power Commission Project No. 362; hearing held on March 2, 1923, SPD, "Miscellaneous" Subject file, 23/1420 Federal Power Commission. NARG77.
50. Robert C. Williams to William S. Mitchell, July 26, 1927; the terminals are described in Williams to the Secretary, Mississippi River Commission, January 19, 1928, SPD, Miscellaneous Correspondence File, misc. Circular Letters, NARG77; see also 66 Congress, 2 session, *House Executive Documents*, no. 652.
51. *Annual Report, 1932*, p. 1113.
52. 76 Congress, 3 session, *House Executive Documents*, no. 547.
53. Lieutenant Colonel Charles L. Potter to OCE, October 24, 1913, SPD, Letters Sent (press copies) NARG77.
54. *Annual Report, 1940*, p. 1158.
55. St. Paul District, U. S. Corps of Engineers, "St. Anthony Falls Upper Harbor Project," a brochure for public distribution, no date, St. Paul.
56. St. Paul District, U. S. Corps of Engineers, "St. Paul-So. St. Paul Flood Control Project Mississippi River," a brochure for public distribution (August, 1961), St. Paul.
57. For a complete description of this project see Colonel Otto J. Rohde's report to OCE, January 28, 1957, SPD, St. Paul Flood Control project file, St. Paul.
58. *St. Paul Pioneer Press*, July 3, 1976.
59. *St. Paul Pioneer Press*, October 31, 1976.
60. Emerson Gifford Taylor, *Gouverneur Kemble Warren* (Boston: 1932), p. 222.
61. Henry L. Abbot, "Gouverneur Kemble Warren," *Proceedings of the Association of the Graduates of the U.S. Military Academy* (1883), pp. 14-15.
62. Taylor, *Gouverneur Kemble Warren*, pp. 238-39.
63. William H. Goetzmann, *Army Exploration in the American West 1803-1863* (New Haven: 1959) pp. 25, 313-16.
64. Major Shunk once wrote to the Duluth office apologizing because he forgot to pay their office messenger ten cents for sewing a button on his coat, Major Francis Shunk to Chief Clerk, U. S. Engineer Office, Duluth, March 27, 1911, SPD, Letters Sent (press copies) NARG77.
65. Major Francis Shunk to William Baker, September 9, 1908, SPD, Letters Sent (press copies) NARG77.
66. Lieutenant Colonel Charles L. Potter to District Engineer Officer, Wheeling, West Virginia, March 15, 1915, SPD, Letters Sent (press copies) NARG77.
67. Lieutenant Colonel Charles L. Potter to Major Frederick W. Alstaetter, March 26, 1914, SPD, Letters Sent (press copies) NARG77.
68. Lieutenant Colonel Charles L. Potter to OCE, April 15, 1915, SPD, Letters Sent (press copies) NARG77.
69. Lieutenant Colonel Charles L. Potter to Division Engineer Western Division, St. Louis, January 9, 1914, SPD, Letters Sent (press copies) NARG77.
70. Lieutenant Colonel Charles L. Potter to Commercial Club Grand Forks, March 25, 1915, SPD, Letters Sent (press copies) NARG77.