

## Chapter Two: The Corps and the District, 1866-1976

In August 1866 Major Gouverneur Kemble Warren arrived in St. Paul and opened a government engineer's office in the MacKubin's block to fulfill a congressional order for the Corps of Engineers to conduct surveys of the upper Mississippi River and its tributaries. Little did Major Warren realize that he was initiating a tradition of federal, state and local relationships in the upper Midwest for water resource development that would be followed for the next one hundred years.

Local newspapers paid particular attention to Major Warren's arrival. The *St. Paul Pioneer Press* saw his presence as vital to the transportation needs of the city. According to the paper, the Mississippi had too many sand bars, too many secondary channels and was too wide and too shallow to provide for adequate steamboat service. The *Stillwater Messenger*, the *LaCrosse Republican* and the *LaCrosse Democrat* joined the St. Paul paper in praising the selection of Gouverneur Warren as an officer highly qualified to draw up plans for the needed improvements.<sup>1</sup> Though only thirty-six years old, Warren had established a national reputation for his engineering abilities and military leadership. After graduating second in his class of 1854 at West Point, the young officer had earned the title of the "good Lieutenant" among the mountain men and Indians during his explorations of the West. He was the first explorer of the Black Hills.<sup>2</sup> His general map of the region west of the Mississippi published in 1858 had become a standard authority, not only for its accuracy, but also for its cartographic methodology.<sup>3</sup> During the Civil War, Warren had earned the brevet rank of Major General and was acclaimed as a hero of the Battle of Gettysburg for his leadership at Little Round Top. Some military historians claimed that his valiant efforts there signaled the turning point of the Civil War.<sup>4</sup> Just before this battle the Major General made a hurried three-day trip to Baltimore to marry Emily F. Chase. After the war Warren resigned his volunteer commission and returned to duty as a major in the Corps of Engineers. His wife, Emily, did not accompany the ex-general to Minnesota, as she was expecting the birth of their first child.<sup>5</sup>

The first district engineer stationed in St. Paul, Major Gouverneur K. Warren, made a comprehensive study of the geological origins of the Mississippi River watershed. This map, first published in 1875, depicted the Gulf of Mexico extending to the present site of St. Louis and suggested that the original source of the great river was Glacial Lake Agassiz in the Red River Valley.

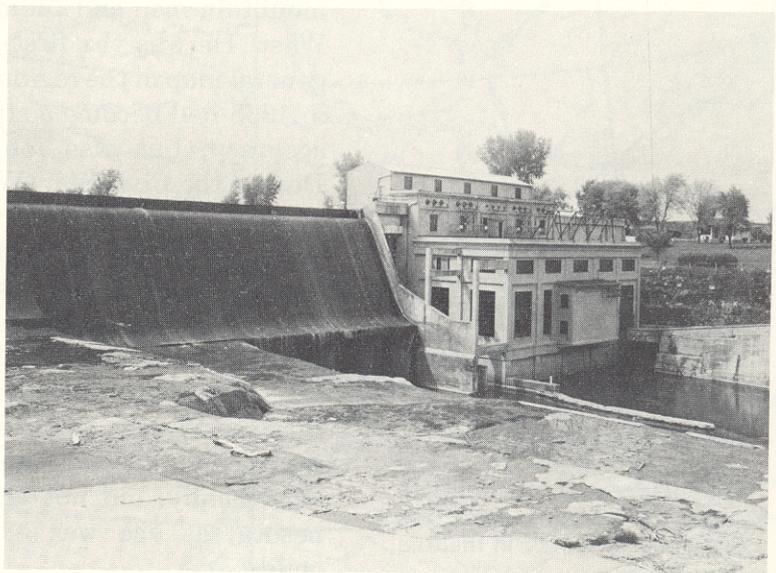


The first district engineer stationed in St. Paul, Major Gouverneur K. Warren.

Before Warren arrived in St. Paul, he had been given general directions for his work in the upper Mississippi and its tributaries. His appropriation and directions had come from Congress. Yet it was clear that he had considerable autonomy in selecting both the methods and establishing the priorities for the work. Because the Corps of Engineers is today such a large and visible national institution; many myths have emerged regarding its power and activities.<sup>6</sup> This mythology often stereotypes the Corps as a monolithic, tightly organized, single-minded, tradition-bound military agency. Like most myths, these are based on partial documentation of selected events. As one examines the history of the St. Paul District from Warren's day on, the Corps of Engineers appears less monolithic and more as a complex, decentralized, multipurpose, pragmatic, quasi-military, quasi-civilian federal agency comprising boards, commissions, divisions, districts, special projects, educational institutions, international organizations and intergovernmental programs.

The main focus for the planning, construction and operation of the public works activities of the Corps of Engineers is the district. Emphasizing this factor, Chief of Engineers Major General Harry Taylor wrote in 1925 that "Probably no field offices of any federal bureau have a greater degree of autonomy than the engineer districts."<sup>7</sup> The district has been called the "workhorse" of the Corps.<sup>8</sup> In the district, at the grass roots level of government operation, the creative energies of the Corps have been

The Northern States Power Company dam on the Cannon River (Lake Byllesby) is one example of the many dams and reservoirs built by private interests in the St. Paul District. This photograph was taken in 1947, about forty-five years after the dam was built.





The municipal power dam at Little Falls, Minnesota, as photographed in 1905. Such structures were built to satisfy local needs without consideration for a comprehensive view of water supply and use.

tempered by external forces such as private corporations, special interest groups, the mass media and the activities of other government agencies.

All leadership responsibility in the district, as in the Corps as a whole, rests with military officers. They are routinely reassigned. A tour of duty lasts about three years at the present, the same amount of time Major Warren served in the St. Paul office (1866-70). Because district officers are frequently rotated, they are possibly able to be more objective in decision-making under the pressure of corporate, consumer and political groups vying for "most favored status" in local controversies. The fact that responsibility extends up the chain of command, insulates district officers from some of the stress of conflicting factions. It also facilitates prompt action in times of emergency. During a natural or man-made disaster district engineers can readily call upon the full resources of the military to provide immediate assistance to local communities.

District officers are not all experts in specific engineering problems.<sup>9</sup> Their primary function is one of management and decision-making. Expertise in engineering come from large civilian staffs and hired consultants. This reliance on civilian experts predates the founding of

district offices. When Lieutenant James H. Simpson left his government road-building project in Minnesota in 1858, for example, he gave his successor the names of eight competent civil engineers in the Minnesota area who could be relied upon for consultation, examinations and superintendence of construction.<sup>10</sup> As Corps responsibilities for civil works have grown so has the reliance on civilians. At the present time, for example, the St. Paul District has in its employ some 900 civilians who are under the direction of two Corps military officers.

In the past the distinction between civil and military duties has not been always clear-cut in the Corps, either for the organization as a whole or for individual officers. Often district engineers have had to wear two hats. In fact, at times they wore none. Today's Corps officers usually wear uniforms; their predecessors at the turn of the century seldom did.<sup>11</sup> But more to the point, St. Paul district officers have served as commanders, of military units concurrently with their public works assignment.

As a part of the army, the Corps is in the executive branch of the government, but it has more often worked directly with Congress than through the chain of command in the executive branch.<sup>12</sup> Its functions have been enlarged by Congress, often in response to special needs of congressional districts. W. Stull Holt's history of the Office of the Chief of Engineers makes the point that Congress is the only agency with the right to formulate a national or even a regional policy of water resource development.<sup>13</sup> It has been the primary function of the Corps to carry out the will of Congress. It does not have the power to initiate surveys, make improvements, construct or regulate without specific orders from Congress.

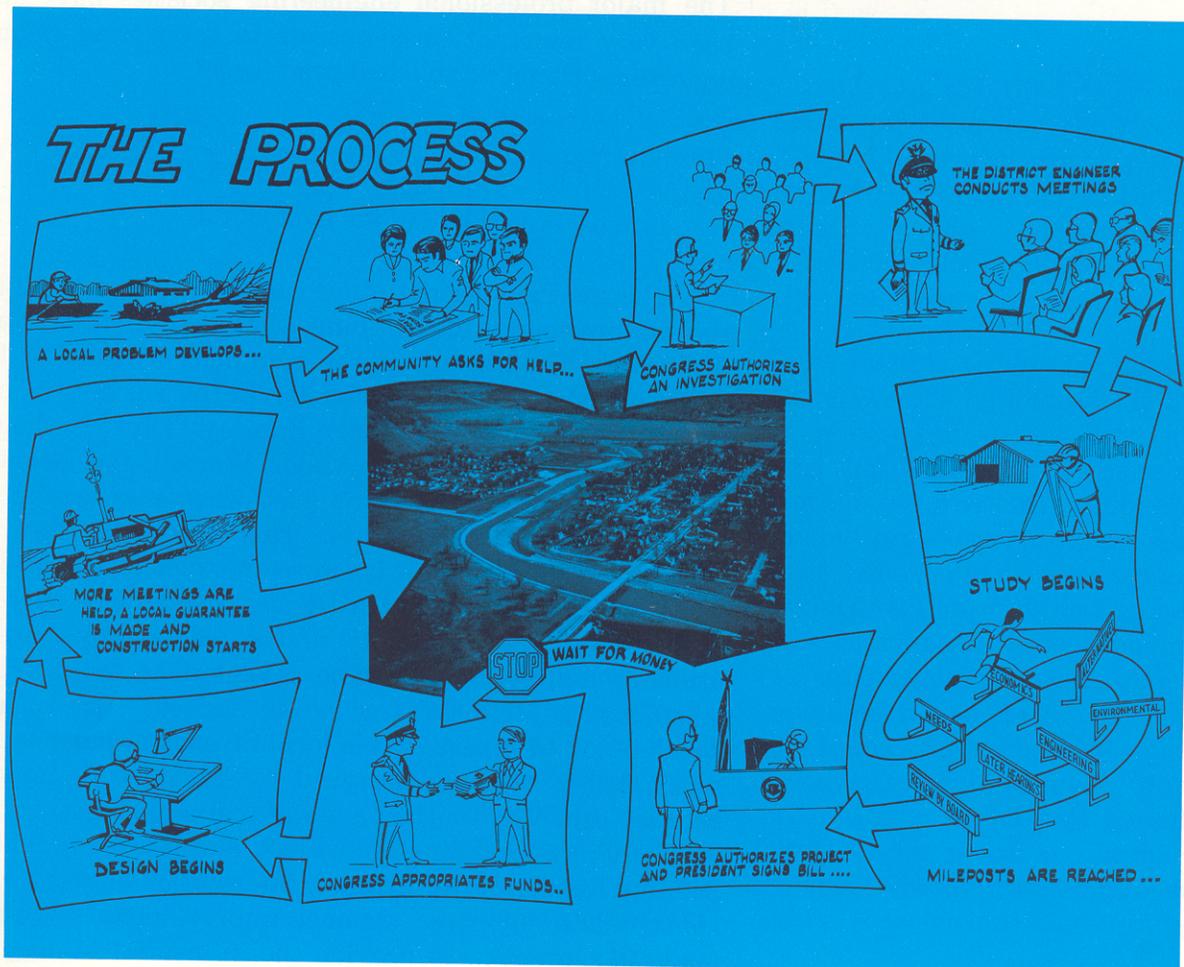
Under early district engineers, such as Warren, Corps involvement in major public works was generally a three-fold process. It began with a preliminary examination; detailed surveys and plans with estimates of costs followed; and lastly, after funds were appropriated, the Corps carried out the plans.<sup>14</sup> Congressional review followed each step of the process. When engineers made recommendations to Congress they were focused on solving specific local problems. As a result, comprehensive national or regional programs seldom evolved.

Exceptions to the three-step procedure have occurred and the process has been significantly modified over the

years. Occasionally units of the Corps have initiated actions and regulated water resource development without preliminary examinations and detailed surveys being submitted to Congress. Only recently has the Corps been given responsibility for initiating comprehensive proposals for water resource management.

Congress has not always acted in accordance with the recommendations of the Corps, and there have been times when the reports and recommendations of the district engineers were in opposition to the views of division engineers, the Board of Engineers and the chief of engineers. Until 1922, the Board of Engineers had reported adversely on seventy percent of the surveys and examinations authorized by Congress.<sup>15</sup> On the other hand, General Taylor reported in 1925, of all the projects recommended by the Corps, Congress adopted eighty percent.<sup>16</sup> Once a decision is made by Congress, it is the duty of the Corps to carry it out.

As this diagram attempts to show, the complex process of initiating Corps projects has many of the checks and balances characteristic of our democratic system.



Its effectiveness in executing the wishes of Congress has made the Corps more an agent than an innovator of public works design and development. The conservative Corps approach to problem-solving criticized by Arthur Morgan and others has an historical basis.<sup>17</sup> The Corps has never been authorized to propose new legislation. Nor does the Corps have an easily documented tradition of encouraging or rewarding innovative problem-solving. New materials, unique methods and creative ideas have usually been assimilated into Corps projects after they have been designed, built and tested elsewhere, often in countries outside the United States.

Assimilation rather than innovation is characteristic, not only of Corps engineers, but also of American engineering practice in other large organizations in the twentieth century. Extensive innovations in automobile production, housing or communications, to name a few industries, have not always been encouraged by giant corporations.<sup>18</sup> The major professional engineering societies have also been very reluctant to co-operate in sponsoring radical departures from "established practice."<sup>19</sup>

## The Congress, The Corps and The District

The St. Paul district office was first opened to study the improvement of shipping channels in the upper Mississippi watershed and the man most responsible for obtaining legislative approval for Corps surveys of the rivers was Senator Alexander Ramsey. Thus, it should come as no surprise that Major Warren and Senator Ramsey exchanged views on just what was needed to provide these improvements. This was done both in personal meetings and by correspondence. Their discussions were not limited to general policy. One specific concern was the possibility of the federal government utilizing a dredging machine invented by a St. Paul steamboat captain. Warren wrote Ramsey that he had decided not to invest in this local invention, but instead purchased a machine designed by Stephen H. Long.<sup>20</sup> Ramsey sent Warren the names of individuals who might be useful prospects for employment, and Warren provided Senator Ramsey with technical information on wing dam construction for river channel improvement.<sup>21</sup> Warren made it a practice to provide the influential Minnesota

senator advance copies of his Corps reports. In fact, he sent his first major report on the upper Mississippi River to Ramsey's senate office in March of 1867 requesting that 85 copies be printed for the War Department.<sup>22</sup>

The discussions between Warren and Ramsey revolved around the problems of navigation. Such congressional concern with water resource development has gone through at least five stages in the past 150 years.

#### *Congressional Indecision (1802-65)*

An authorization of \$30,000 in 1802 for the repair and erection of public piers on the Delaware River is often cited as the first appropriation for a Corps of Engineer public works project. During the next 150 years most Corps projects were initiated by similar legislation. Congress designated each specific project and provided guidelines for its construction.

The period between 1802 and the Civil War was characterized by great indecision regarding the role of the federal government in public works. Since public works were generally considered an obligation of the individual states, comparatively few projects were authorized by Congress. The introduction of the steamboat in western waters helped to change this perspective.

After the Supreme Court ruled in *Gibbons v. Ogden* that the Congress had the power to regulate all interstate commerce, Congress was swamped with petitions from western states asking that something be done to improve steamboat navigation. As a result, one of the seminal pieces of legislation in Corps history was passed: the General Survey Act of 1824.<sup>23</sup> Funds were appropriated for a project under the direction of Major Stephen H. Long, to clear channels for navigation in the Ohio and Mississippi rivers. It was unique legislation in giving power to carry out this mandate to the president.<sup>24</sup> The office of the executive rather than Congress decided which surveys for internal improvements should be made. More than 100 surveys were ordered in a twelve-year period: eighty-four for canals, forty-four for rivers and harbors and eighteen for national roads. Over forty were approved for construction.<sup>25</sup> (The act was repealed in 1838, returning the power to Congress).

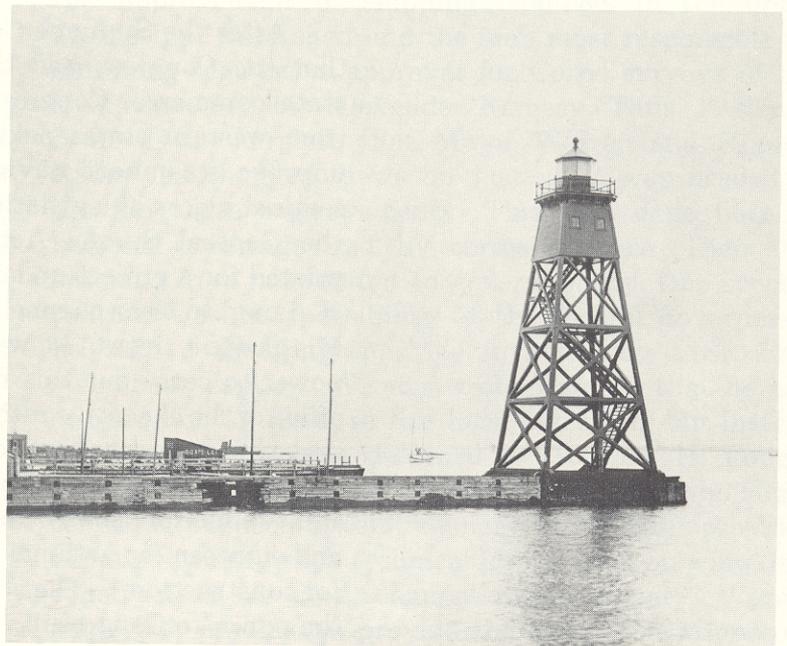


Public works activities of the federal government have been under a separate office in the Department of War (Army) since J. J. Abert was made chief of engineers in 1838.

The first bill relating only to rivers and harbors was passed in 1826, authorizing twenty construction projects.<sup>26</sup> By 1830 Congress had authorized so many public works projects that the Corps was taxed to find qualified men to supervise all of them. Congress spent over nine million dollars on public works in the twelve-year period from 1826 to 1838, and each Corps officer supervised between ten and fifteen surveys or projects.<sup>27</sup>

Between 1838 and 1852 Congress did not approve any rivers and harbors legislation.<sup>28</sup> There were many reasons.<sup>29</sup> Congress was preoccupied with sectional rivalries and constitutional matters. As important an impediment was the contest for power between the executive and Congress. For political reasons both wanted control over internal improvements. A third factor was the rivalry of western cities. Their competition for transportation terminals helped to stalemate federal legislation for building canals or improving waterways for commercial use. Another significant factor was the development of the railroads as alternative transportation system. Railroad construction began in the late 1820s and by 1860 a 30,000-mile network had been completed east of the Mississippi.<sup>30</sup> Railroad interests joined with the cities they helped to create in opposing the federal development of inland waterways, but utilized the expertise of Corps engineers in planning and developing their alternative transportation network.

During the period of congressional indecision (1802-65), few Corps projects were funded. One federal concern, however, was the safety of American commerce. Thus lighthouses, such as this one in the Duluth area, were built by the Corps of Engineers.





Zachary Taylor, in his career as a Corps officer, worked on the improvement of transportation networks in the upper Mississippi Valley. As president of the United States, he was instrumental in obtaining public works appropriations after a long Congressional deadlock regarding federal subsidies of the transportation industry.

An era of relative peace between 1815 and 1860 was another factor restricting federal public works construction. Although President Andrew Jackson's administration expended almost seven million dollars for the improvement of national waterways, it became difficult after 1840 to justify Corps construction as a necessity for military preparedness.

During the panic of 1837 many state-supported public works projects went bankrupt.<sup>31</sup> There was a great need to co-ordinate public works in some sort of comprehensive national system. Many members of Congress opposed any further funding until such a national plan was developed.<sup>32</sup> Civilian engineers who were just attaining professional status, on the other hand, opposed any large federal program of public works in which military engineers would control design, construction and maintenance.<sup>33</sup>

After 1838 Democratic presidents formed a solid wall of opposition, damming up all attempts to pass an omnibus rivers and harbors bill.<sup>34</sup> But the political climate changed when the Whigs came to power. Presidents John Tyler, Zachary Taylor and Millard Fillmore encouraged appropriations and in 1852 a two-million-dollar river and harbors bill was passed.<sup>35</sup> This money was spent by 1855. The only other sizable funding of Corps projects during this period was for surveys and intermittent improvements on the Ohio and Mississippi rivers.

Thus metropolitan, sectional, departmental and professional rivalries, alternative transportation systems, peacetime retrenchment, economic cycles, comprehensive planning and political realities were crucial factors in this period in the authorization and funding of federal projects administered by the Corps.

#### *Navigation (1866-1908)*

After the Civil War and the assassination of President Abraham Lincoln, Congress gained strength over the executive in the balance of power in the federal government and began a consistent program of annual appropriations for waterway improvements. In this period the "commerce clause" of the constitution as interpreted by the Marshall Court was used to justify the regulation and improvement of navigable waters. The annual reports of the chief of engineers between 1867 and 1884 contain data on rivers and harbors projects which covers 32,000

pages of fine print. The pertinent legislation alone covers more than 260 pages. All of the authorized projects were intended to improve navigation. Until 1950 about ninety percent of all funding for Corps construction was for navigation projects.<sup>36</sup>

The concept of navigation was expanded to include many related activities after 1866. For example, in 1888 navigation in New York harbor was hindered by an accumulation of garbage and debris and Congress acted to meet this problem by ordering the Corps to regulate the disposal of refuse.<sup>37</sup> Between 1890 and 1952 more than 1,368,000,000 cubic yards of refuse were towed to sea from New York—enough to completely fill the inner harbor 200 times. The word “debris” was then defined to include mining waste. In 1893 a special commission was created within the Corps of Engineers to stop the dumping of the waste tailings from hydraulic mining operations into the navigable streams of California.<sup>38</sup>

In the late 1880s and early 1890s a series of laws was passed by Congress which placed the regulation of bridges, roads, pipes and wires crossing navigable rivers

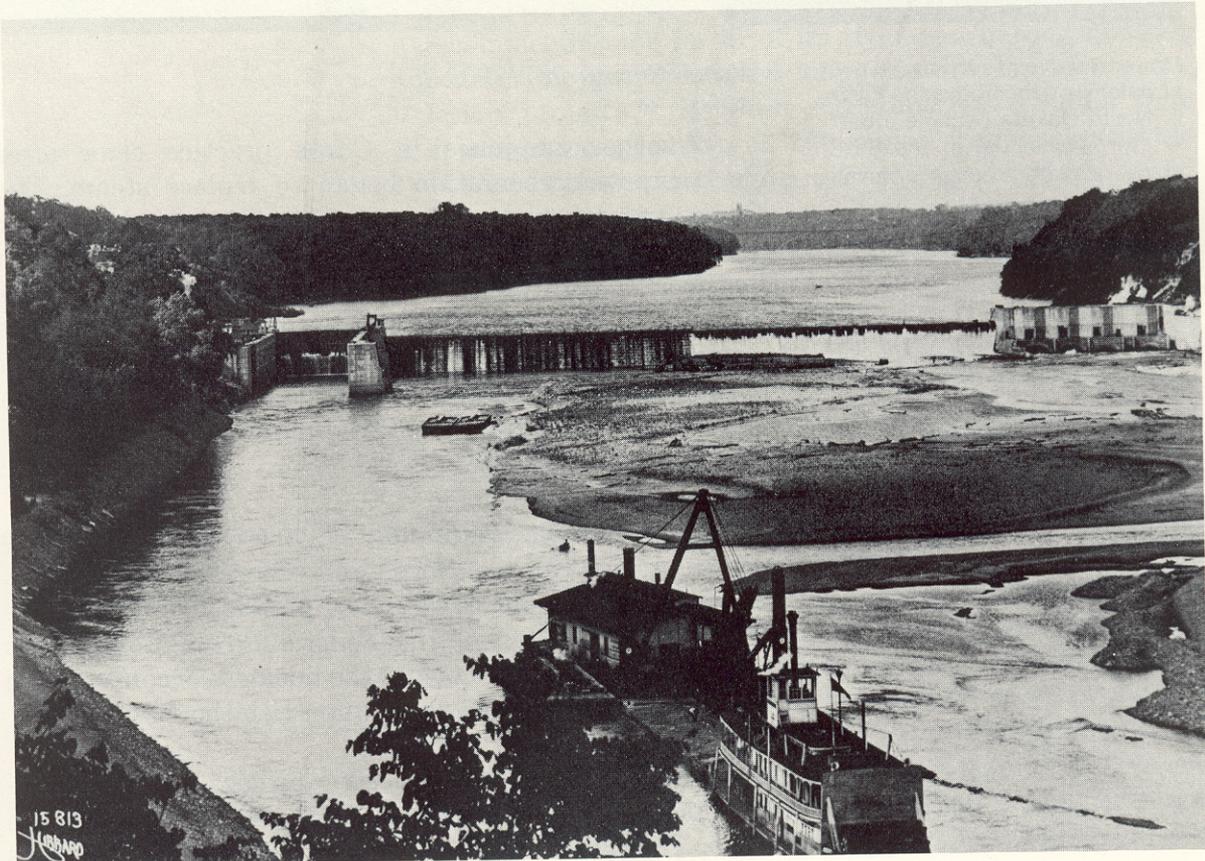
Surveying is one of the first field activities which lay the groundwork for technological improvements. Pictured below is the Northern States Power Company crew staking out the site of the power dam which was built on the St. Croix River at Taylors Falls, Minnesota, in 1905.



under the jurisdiction of the secretary of war.<sup>39</sup> In 1899 the Corps was given the power to remove sunken vessels and other obstructions to navigation.<sup>40</sup> As will be discussed in detail later, the Corps also received permission to begin building dams, levees, piers and other terminal facilities which would directly aid navigation. The power to improve navigation was even extended to removing vegetation from lakes and rivers. In 1899 the Corps was asked to destroy water hyacinth when its growth threatened navigation.<sup>41</sup>

Navigational projects have dominated Corps activities until the recent past. One of the earliest projects of the St. Paul District was the construction of the "high dam" on the Mississippi between Minneapolis and St. Paul. This structure became known as the Ford Dam after the powerhouse was activated to supply electricity to the Ford Motor Company assembly plant. A second lock was added to accommodate traffic on the nine-foot channel in the 1930s.

The Corps of Engineers has become involved, by congressional mandate, in many other aspects of water resource regulation and development, including the duty of representing the United States on international commissions that control boundary waters. Yet its primary task has always been related to the navigational interests of the nation. Since the first appropriation for navigation in 1802, the Corps has developed and improved over 25,000 miles of navigable inland waterways.<sup>42</sup> Navigation has been the all-inclusive rationalization for federal funding of Corps activities since 1824.<sup>43</sup>





Water reservoirs such as the one at Baldhill on the Sheyenne River in North Dakota became a part of Corps planning in the third stage of water resource development.

#### *Water Reservoirs (1909-35)*

Another emphasis in Corps practice came after electric power generation began to replace steam. The Corps had constructed dams and was involved in power generation well before 1909. In fact, military engineers had worked for over fifty years before 1909 with varying types of water power generation along, within and across navigable streams. In 1909 Congress passed legislation requiring the Corps to consider the potential for hydroelectric power in making all preliminary surveys for navigational projects.<sup>44</sup>

This was the beginning of co-operative efforts in planning between the Corps and other federal agencies. The great expansion of electrical power systems and the consequent creation of the Federal Power Commission (FPC) brought the Corps into the business of constructing hydroelectric dams in co-operation with the FPC.<sup>45</sup>

The first large hydroelectric project designed, constructed and operated by the Corps was the Bonneville Dam, completed in 1938.<sup>46</sup> Since that time the Corps

has built more than sixty dams which in 1973 produced over seventy-one billion kilowatt hours of electricity. This total represented about twenty-four percent of the nation's water power capacity.<sup>47</sup> Most of these dams began production in the 1950s.

Soil erosion, often around Corps-constructed reservoirs and navigational projects, has been a constant problem. In 1930 Congress established a Beach Erosion Board within the jurisdiction of the Corps of Engineers to assess the problem and recommend improvements by which the shores and banks of lakes and rivers could be maintained.<sup>48</sup> Studies and spending in this area have increased. In 1968 Congress authorized the Corps to spend up to one million dollars on emergency shore protection and up to \$50,000 to protect any bridge, road or public work that was endangered by bank erosion.<sup>49</sup>

#### *Flood Control (1936-65)*

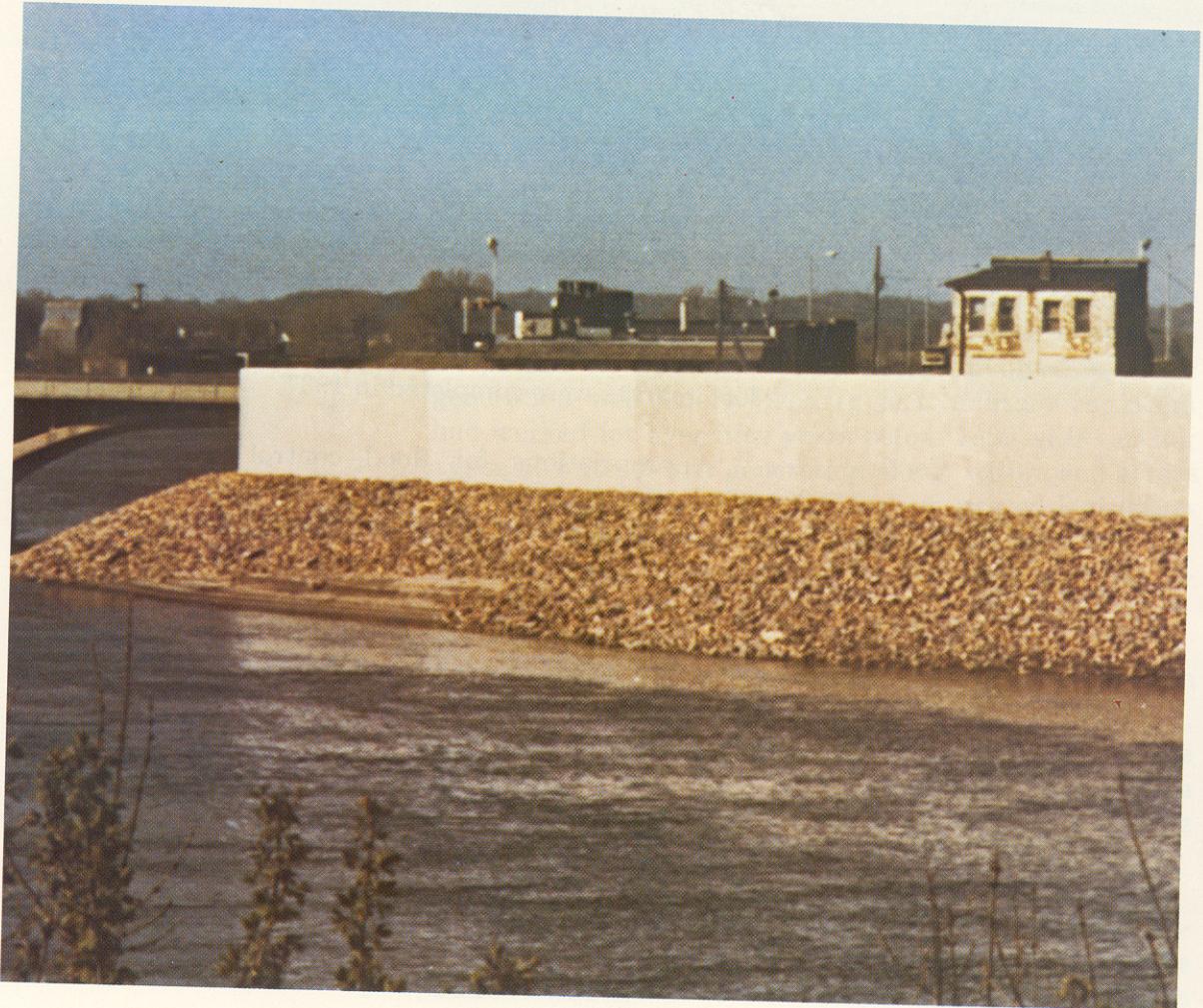
The Corps has been involved in flood control since the creation of the Mississippi River Commission in 1879. In 1917 the Corps was asked to include flood control recommendations in all of its river and harbor surveys, but it was never provided money to develop flood regulation projects.<sup>50</sup> Between 1925 and 1927 funds were appropriated to study all 200 major river basins in the United States and produce written reports which would reflect multi-purpose water resource planning.<sup>51</sup> These "308" reports were completed in 1937.

Appropriations for flood control projects in the majority of American communities came after 1936. In that year the first general flood control legislation was passed by Congress.<sup>52</sup> The General Flood Control Act of 1936 also provided for the study of drainage systems, recreational facilities, fish and wildlife management, the utilization of dams for highway crossings and the management of water consumption. Flood control projects became a massive undertaking after World War II. The 1944 Flood Control Act (also known as the Pick-Sloan Plan) called for the construction of 103 dams on the Missouri River watershed, storing 110 million cubic acre of water. Within the Missouri River development were six gigantic reservoirs with shorelines longer than some of the Great Lakes. The Flood Control Act of 1960 extended Corps responsibility to flood plain management. This has been

the crucial aspect of flood control, for flood-caused property losses since 1936 have increased steadily and are now estimated at over one billion dollars per year.<sup>53</sup> The escalating costs are mainly the result of real estate development of urban flood plain land.

By 1977 there were over 550 flood control projects either under construction or completed in the United States. The Corps has spent over eight billion dollars enlarging river channels, constructing diversions and building reservoirs and levees in order to protect property valued at approximately forty billion dollars. In addition to constructing these congressionally authorized projects, the Corps has been given the power to act whenever disaster from floods or hurricanes threatens an area. The Corps can also spend up to two million dollars on small individual flood control projects without specific congressional approval.<sup>54</sup>

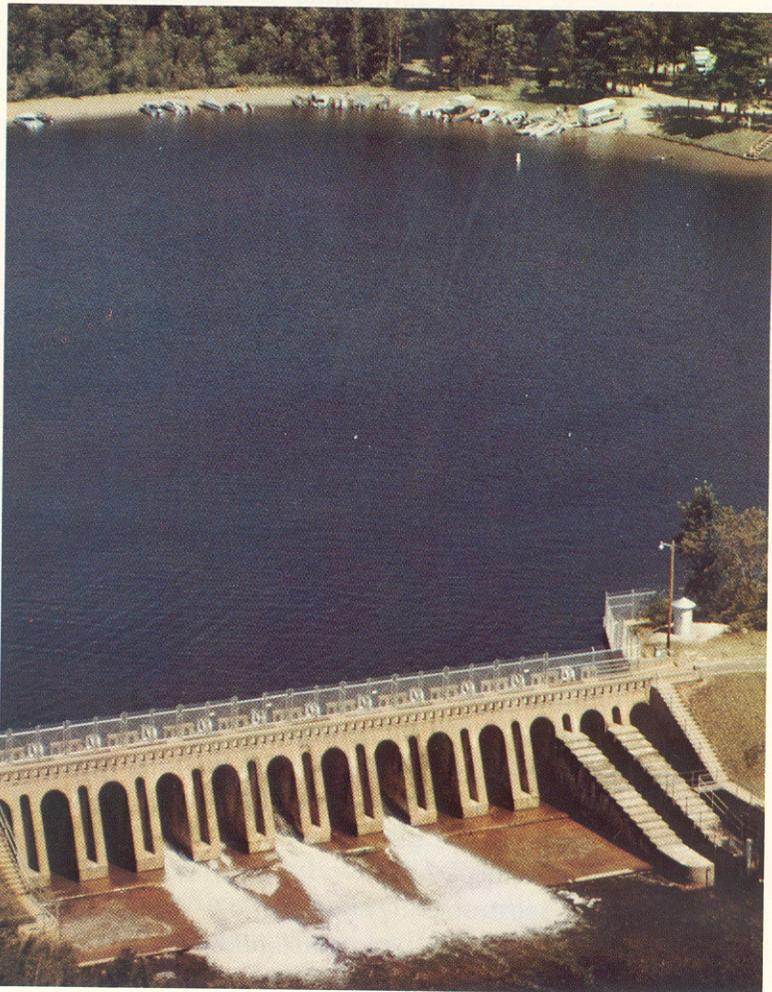
Flood control projects such as the levee and flood wall built to protect the city of Mankato, Minnesota, have come to dominate the construction of the St. Paul District.



### *Water Resource Development (1965-present)*

Congress has been moving toward a comprehensive and co-ordinated national water resource program in the second half of the twentieth century. Only within the past ten years, however, has legislation authorized the Corps to expand into comprehensive water resource development and environmental studies.<sup>55</sup> Progress in national planning has been greatly accelerated since the Water Resource Planning Act was passed in 1965.<sup>56</sup> This law authorized the creation of seven commissions made up of federal, state, interstate, local and nongovernmental units which were charged with the long-range comprehensive planning for a national water resource program.

Preservation of relatively unspoiled and undeveloped waterways received consideration in 1968 with the passage of the Wild and Scenic Rivers Act.<sup>57</sup> A year later



The latest thrust of Corps activities has centered on recreational facilities. The camping site at Cross Lake, Minnesota, is a popular vacation area and helped to contribute to the 376 million visitor days in 1975 that made the Corps of Engineers the largest manager of recreational facilities in the United States.

Congress passed the National Environmental Policy Act setting up stringent procedures for environmental impact statements.<sup>58</sup> In accordance with this act, the Corps is required to prepare and file a separate environmental study for each project it undertakes. In 1970 the president signed the Environmental Quality Improvement Act establishing a program for upgrading projects that contribute to the elimination of air and water pollution. Two years later, Congress further defined its concern for water quality by passing the Federal Water Pollution Control Act.<sup>59</sup> Also in 1972 federal legislation provided for an inventory of all dams twenty-five feet or more in height.<sup>60</sup> The Corps was directed to draw up recommendations for a comprehensive national program of safety inspection and regulation of dams.

At the same time Congress was enlarging the goals and work load of the Corps, it also was taking away some of its traditional authority. The Water Quality Act gave the Environmental Protection Agency (EPA) the power to regulate and issue permits for the discharge of effluents. The EPA was also given the responsibility for determining the need for, and impact on, any water stored in a reservoir built by a federal agency.<sup>61</sup>

## The Office of the Chief of Engineers

From the very beginning of the St. Paul District, the Office of the Chief of Engineers has functioned as power broker between the secretary of war (later army), the Congress, special interest groups and the district office. Actually, few engineering decisions were made by the chief of engineers. When congressmen or private individuals wanted something specific done, they usually contacted the local government engineer's office. When they wanted to change, modify or nullify existing plans of the district engineer, complaints, requests and demands were sent to the secretary of war (army) or the chief of engineers. The chief of engineer's office thus served as a board of appeal, as well as the central clearing point for congressional directives and a final accountable office for projects under district supervision.

Major Warren's many letters and reports in his first year in St. Paul clearly illustrate the evolution of this relationship between the regional office and the chief of engineers. Warren began his tenure by reporting to Chief

Engineer Andrew A. Humphreys in great detail about the problems he encountered, as well as providing a personal account of the work in progress. General Humphreys was too busy to acknowledge Warren's letters, and finally wrote that his lack of response did not indicate an indifference to Warren's progress.<sup>62</sup> Thus a pattern was established. The St. Paul office kept the chief of engineers informed on his accomplishments, but expected no interference with day-by-day activities except in response to a complaint sent directly to the chief's office.

Such a complaint was sent to Chief Engineer Humphreys five months after Warren assumed his duties.<sup>63</sup> In late November, 1866, Warren had returned to New York City to be with his wife and newborn son. In order to stay with his family, the major requested a change of station to an eastern assignment. The application was not approved and Congressman Ignatius Donnelly became concerned about the status of Warren's survey work.<sup>64</sup> The St. Paul engineer explained to General Humphreys that in order to write his final report on navigational improvements on the upper Mississippi, he needed to consult both resource material and other engineers that were more accessible in New York.<sup>65</sup> Subsequently, Secretary of War Edwin M. Stanton granted Warren permission to stay in New York to complete his report.<sup>66</sup> Warren had actually over-worked during the fall of 1866 putting in eighteen-hour days, trying to complete his field surveys so that he could be in the east for the winter. By April, 1867, he was once again back on the upper Mississippi River.

Major Warren kept the chief of engineers informed of his activities, and he also consulted freely with other Corps personnel. Colonel Israel C. Woodruff, Brevet Major General James H. Wilson, William M. Roberts, M. D. McAlister and Major H. S. Long were among those who corresponded with Warren exchanging information about engineering questions and personnel needs.<sup>67</sup> Between August 9, 1836, and September 16, 1869, Warren received 144 letters of application from individuals interested in obtaining work on the upper Mississippi river survey.<sup>68</sup> There seemed to be an adequate supply of civilian personnel, but from Warren's day on the Corps of Engineers faced a shortage of officers to supervise the great amount of work generated by congressional legislation in the last decades of the nineteenth century.

After the Civil War the Corps of Engineers was expanded to include a maximum of 109 officers under the command of the chief of engineers.<sup>69</sup> Each officer had multiple duties. In the office of the chief were five divisions. The first two were concerned with fortifications, battalions, armaments, personnel and so on. The fourth and fifth divisions had responsibility for property, estimates, maps, explorations and surveying of lakes. Only the third division was directly responsible for river and harbor improvements.<sup>70</sup>

The Corps remained at 109 officers until 1898. During the Spanish-American War, the number of officers was increased to 127. By that time its largest force was in the rivers and harbors division: the seventy-one officers of that group reported directly to the chief of engineers.

Between 1898 and World War II the chief of engineers tried to obtain congressional approval for enlarging his staff. Although the Corps was increased to 160 in 1901, there was a net loss of military personnel in civil works activities because Corps officers were sent to the newly acquired possessions in the Caribbean and the Pacific.<sup>71</sup> The scarcity of officers in the states meant that it became impossible to fill vacancies in districts with officers whose rank was commensurate with the duties they were expected to perform.<sup>72</sup> In 1901, for example, twenty officers below the rank of major were in charge of large federal engineering projects. By 1903 only twenty-seven officers were available for duty in fifty-four districts.<sup>73</sup> Though the Corps was allowed to increase its staff to 188 in 1904, it had only forty-eight officers not assigned duty with the regular army.<sup>74</sup> About thirty percent were attached to the chief of engineers to take care of fortifications, river and harbor works, lighthouses, water supply, federal buildings and properties in Washington, D.C., the improvements in Yellowstone Park, the survey of the Great Lakes, the mining and debris commission in California, the Panama Canal commission and the engineering school at Willets Point in Queens, New York. In 1910 Congress agreed to increase the number of Corps officers by sixty over a five-year period.<sup>75</sup> But in 1912 the St. Paul office was put in charge of a first lieutenant, John H. Hodges.

The new engineers authorized by Congress in 1910 were to be recruited from the military academy at West

Point. If enough men could not be obtained from the academy, the Corps could recruit civilian engineers. Full advantage was taken of this option. Civilians were eligible for commission as second lieutenants if they had a diploma in engineering from a technical school, were between the ages of twenty-one and twenty-nine, were unmarried and had completed a competitive examination testing their mental, moral and physical aptitude.<sup>76</sup>

The next increase in personnel was authorized in 1917 when World War I created a need for 277 additional officers.<sup>77</sup> Only about twenty percent were assigned duty as engineers for a growing number of public works projects. In 1918 the staff was increased to 359 officers, and by the end of the war it had grown to 505.<sup>78</sup> At the time of the armistice, only one percent of these men were connected with non-military duty. The St. Paul office was put under the command of a civilian, George W. Freeman, during this period. Many officers, including Brigadier General Alexander Mackenzie, who had been in charge of upper Mississippi River improvements between 1880 and 1894, came out of retirement to assume the duties of district officers. The civilian employees who took over the districts during the war received neither the honor nor the compensation of those in military service.<sup>79</sup>

In 1921 the Corps had 192 harbors and 294 rivers under improvement, as well as 83 other projects, mainly connected with canals.<sup>80</sup> The budget for that year was \$57,165,841.47. Of the 505 officers in the Corps only 69 were available to supervise these domestic public works. In the following years the projects and appropriations for Corps work grew dramatically, but the number of military personnel was not increased in proportion.

While the number of military personnel in the Corps has increased in war time, the overall effect of war on the Corps has been a faster growth in the number of civilian employees. A civilian bureaucracy has taken over many Corps managerial and engineering responsibilities. The growth of civilian personnel within the Corps in the twentieth century is phenomenal. By 1965, according to the Civil Works Study Board, the Corps of Engineers was largely a civilian and not a military organization.<sup>81</sup> In that year only 140 officers were assigned duty with Corps public works projects, while the Corps employed more than 32,000 civilians, not including con-

Table I

*GROWTH OF CORPS APPROPRIATIONS, 1824-1950*

<i>Decade</i>	<i>Appropriations</i>
1824-30	\$ 3,900,000
1831-40	7,800,000
1841-50	1,400,000
1851-60	3,300,000
1861-70	17,300,000
1871-80	60,400,000
1881-90	108,500,000
1891-1900	166,700,000
1901-10	254,700,000
1911-20	347,200,000
1921-30	674,200,000
1931-40	1,904,000,000
1941-50	3,126,900,000

From: ASCE *Transactions*, Paper No. 2643 (1952), p. 1001.

struction workers. By 1975 there were over 40,000 civilian employees working for 250 Corps officers. The primary reason for this growth has been the expansion by Congress of Corps work and responsibility as the major federal public works bureaucracy.

## The District and the Division

During the last part of the nineteenth century two regional levels of organization emerged in the Corps of Engineers. In the early years projects were organized around the officers in charge of them. In 1884 the annual report of the rivers and harbors division of the Office of Chief of Engineers described projects under four headings: Atlantic coast and Gulf of Mexico; western rivers; lakes, harbors and rivers; and Pacific coast.<sup>82</sup> In that same year division engineers were first appointed to supervise the project engineers in the four geographic sections. By 1889 the forty-six project engineers in the Corps were put under Corps officers who served as the heads of five divisions: Pacific, Northeast, Northwest (which included the St. Paul office), Southeast and Southwest.

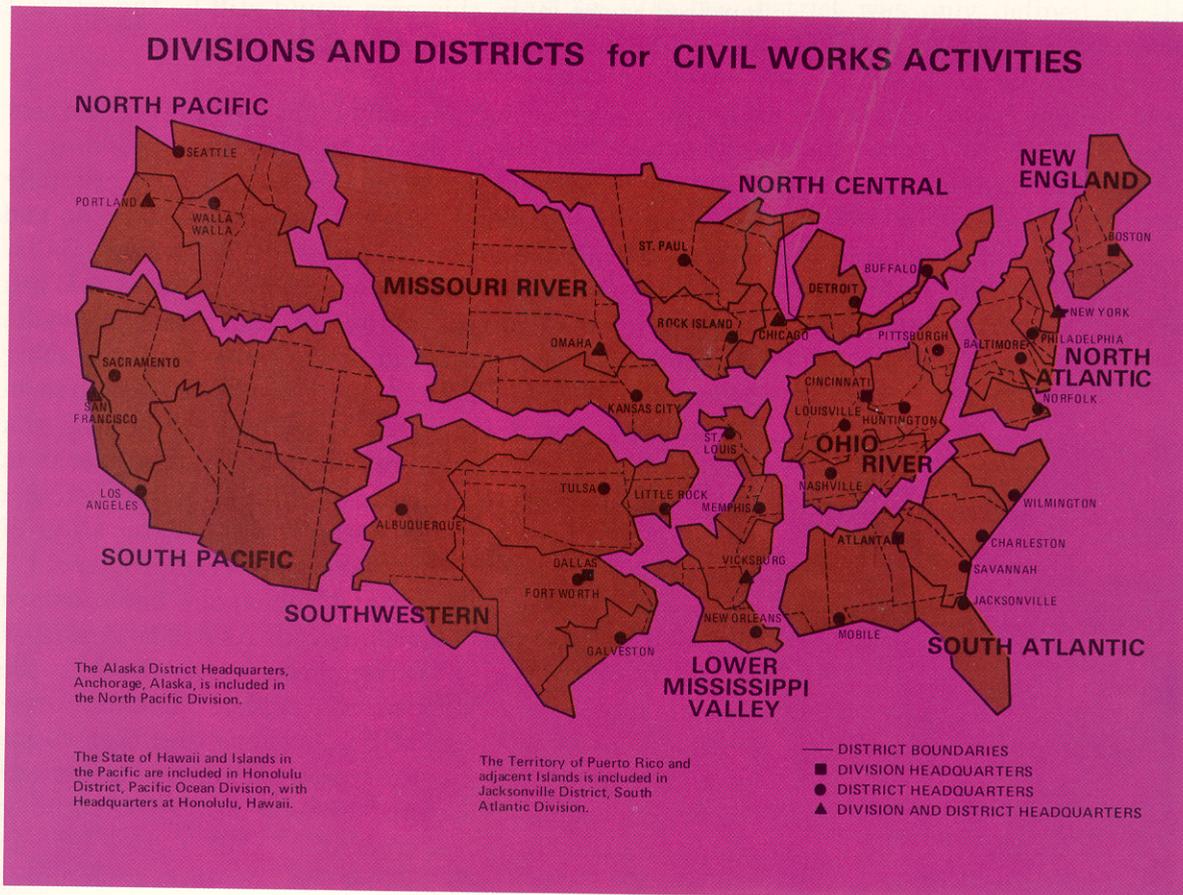
In 1893 the "projects" were officially called districts, but they were not given district names until 1908. By that year there were fifty-three districts which were organized in nine divisions: Northeast, East, Gulf, Central, Lakes,

Northwest, West, Pacific and Northern Pacific. St. Paul was in the Northwest Division. In 1930 there were eight divisions. The St. Paul District was a member of the Upper Mississippi Valley Division while Duluth was in the Great Lakes Division.<sup>83</sup> Not until 1913 were districts described in terms of geographic boundaries, rather than by the projects under examination, construction or operation.<sup>84</sup>

After World War II the Corps had grown to eleven divisions and forty-one districts.<sup>85</sup> Reorganization reduced the number of districts to thirty-seven by the 1970s. The St. Paul office has been a part of the North Central Division with headquarters in Chicago since 1955.

Districts and divisions have emerged out of the necessities of administration and technological growth rather than from any rational organization charts. In fact, the organization is still in flux and could be drastically changed if Congress should decide either to enlarge or restrict present Corps duties.

By 1973 the Corps of Engineers had reduced its public works organization to eleven divisions and thirty-seven districts.



## The District

Gouverneur Warren set precedents in his tenure as a project engineer, especially in his relationships with Corps and congressional leadership. On the local level, as well as within the St. Paul region he began a tradition of using technological know-how to improve the well-being of a growing metropolitan area.

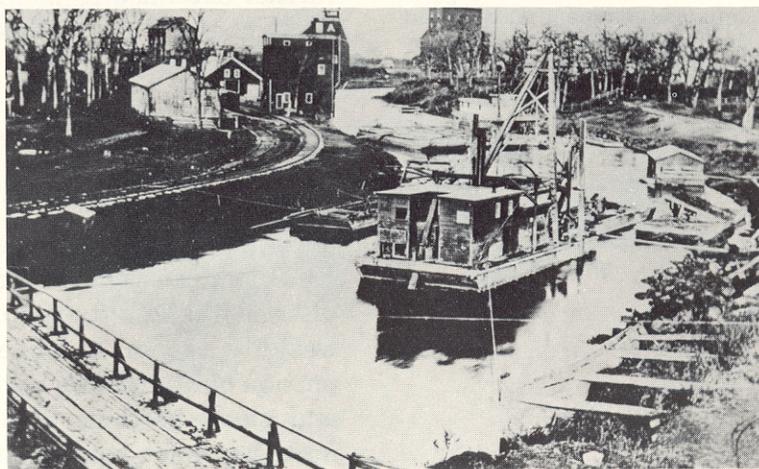
Warren first sought out two well-known Mississippi steamboat captains, George B. Knapp and N. F. Webb. They took the major on an inspection trip of the St. Croix, Minnesota and upper Mississippi rivers as far downstream as the Des Moines rapids.<sup>86</sup> Captain Webb thought that Major Warren worked harder than any man he had ever known, adding that after three years in the district Warren had become "an old man."<sup>87</sup> Webb showed the government engineer the Beef Slough sand bar, a bold protrusion into the Mississippi River formed by a secondary channel of the Chippewa River. Warren noted that it was "one of the great obstacles to navigation."<sup>88</sup> One hundred years later, this area would still be the greatest single obstacle for Corps channel maintenance.

Upon completing his preliminary survey, Warren sent reports on the three rivers to Governor William R. Marshall of Minnesota, asking him to read them critically and offer suggestions.<sup>89</sup> Marshall promised to do so and provide a "full and accurate" reply.<sup>90</sup> Warren sent similar reports to Governor William M. Stone of Iowa.<sup>91</sup> When Warren returned in the spring of 1867, he once again informed Governor Marshall of his plans for the coming season. He wrote, "I shall take no positive course in prosecuting my duties this season before seeing you personally and others interested in the public works in my charge."<sup>92</sup> Later that year Warren appeared before a group from the Executive Department of the state of Minnesota to discuss Corps plans for river improvement.<sup>93</sup> He also addressed a group of Minneapolis businessmen and politicians on the same subject.<sup>94</sup> As will be described in the next chapters, Warren became involved in the problems faced by Minneapolis millers in their overdevelopment of the Falls of St. Anthony and their needs for a more dependable water supply. Warren also advised the St. Paul Common Council on flood problems revolving around a causeway constructed in 1862 across bottom land in West St. Paul.<sup>95</sup> Thus, the first district engineer

became a consultant for many water resource problems in addition to his orders to survey the navigation needs of the upper Mississippi River. Warren's flexibility in responding to local interests began a tradition of Corps involvement in the economic growth of the area.

Flexibility in defining the district boundaries was another characteristic of the development of the St. Paul District. The physical boundaries have been altered considerably over the last 110 years. Though the Office of the Chief of Engineers (OCE) began to print reports from St. Paul in 1867, the boundaries of the district were not clearly defined in the annual reports until 1915. In that year the district actually encompassed the Mississippi River from its source to the lower end of Lock Number 1 between St. Paul and Minneapolis, the tributaries of the Mississippi River from its source to and including the Chippewa River in Wisconsin, the Red River of the North and its tributaries and those international boundary waters in Minnesota which flow towards Hudson Bay.<sup>96</sup>

Prior to 1915 the district was only defined by the projects assigned the Corps officer stationed in St. Paul. In 1866 Major Warren was in charge of surveys of the Mississippi River from its source to Rock Island, and of the Minnesota and Wisconsin rivers.<sup>97</sup> In 1872 projects on the Wisconsin River were transferred from the St. Paul to the Milwaukee office.<sup>98</sup> In 1873 the Mississippi River below the Falls of St. Anthony came under the jurisdiction of the Rock Island office. Major Francis U. Farquhar of the St. Paul office continued to supervise projects at both Rock Island and St. Paul, and the two district offices were combined for a brief period in 1878.



Nineteenth-century dredging operations in the St. Paul District concentrated on the Red River of the North. Pictured here is a Corps dredge working at Moorhead in 1879.



Major Charles J. Allen, Jr., served the longest tenure of any district engineer at St. Paul (1879-90).



Lieutenant Colonel William A. Jones served the St. Paul District during the period in which the district's boundaries were extended to Montana. He was responsible for the development of Yellowstone Park. Engineers under his command constructed the first roads and planned tourist facilities to preserve the natural beauty of our first national park.

In 1877 improvements on the Red River began. A year later dredging and channel-clearing commenced on the St. Croix River, on the boundary between Wisconsin and Minnesota.<sup>99</sup> To the west, the St. Paul engineer's domain was also extended in 1877 as far as the upper Missouri River.<sup>100</sup> For ten years (1877-87) the St. Paul office was in charge of a section of the Missouri River in Montana above the mouth of the Yellowstone River. Activity in this area paralleled the district's responsibility for road-building in Yellowstone Park from 1883 to 1895. During 1888 the work on the Missouri was extended to include all of that portion of the river between Sioux City and Fort Benton. In 1889 the entire project was transferred out of the St. Paul office.<sup>101</sup>

During these early years there was overlapping jurisdiction between the St. Paul and Rock Island offices, and between St. Paul and Duluth. From 1873 until 1886 the St. Paul engineer served all three districts. A similar overlapping of responsibility occurred in 1911-12, 1915-18, and 1922-26. In 1919 the international boundary waters in Minnesota which flow to Hudson Bay were taken from the St. Paul District and put under the Duluth office.<sup>102</sup> The responsibility for these waters was transferred back to St. Paul in 1953. Finally, in 1955, the Lake Superior region and the Duluth District were put back into the St. Paul District.<sup>103</sup>

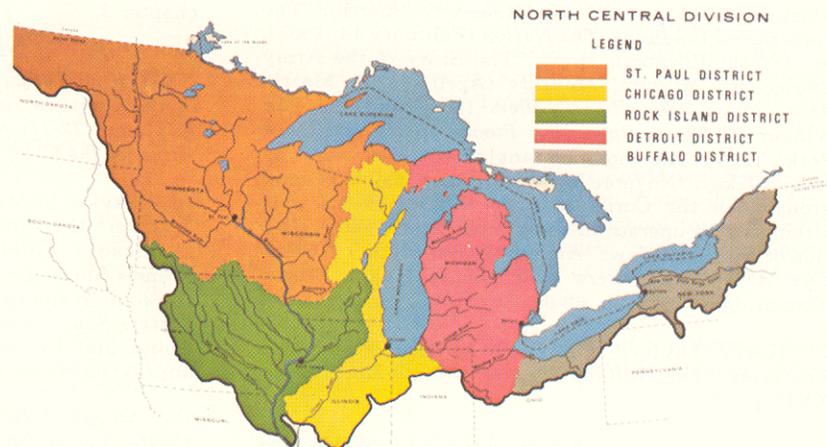
The St. Paul District's jurisdiction over the Mississippi River has been extended twice since 1915. In 1919 the portion of the Father of Waters southward from the Falls of St. Anthony to the mouth of the Wisconsin River was added to the district. In 1940 this area was further extended to include Lock and Dam Number 10 at Guttenberg, Iowa, 614 miles above the mouth of the Ohio River.<sup>104</sup>

The eastern boundaries of the district were modified in 1930 when the whole of the Wisconsin River system was added to the St. Paul District.<sup>105</sup> In 1941 a small portion of the western peninsula of Upper Michigan was within the eastern boundary of the district. In 1977 the district was said to comprise "... western Wisconsin, [the] westerly portion of Upper Peninsula of Michigan, major portion of Minnesota, northern and eastern North Dakota, and small portions of northeastern South Dakota and northern and northeastern Iowa embracing drainage

basins of Mississippi River and tributaries from its source to mile 614 above mouth of Ohio River; Red River of the North and tributaries; those streams north of Missouri River Basin in North Dakota; U.S. waters of Lake of the Woods and its tributaries; and U.S. waters at Lake Superior, and its tributary basin west of Au Train Bay, including Isle Royale in Lake Superior."<sup>106</sup> The Michigan portion was reassigned in 1978 to the Detroit District.

Today the St. Paul District encompasses parts of five states. It is organized around the headwaters of three major drainage systems, centering in the St. Paul-Minneapolis metropolitan region. The boundaries of the St. Paul District define more realistically than do artificial political boundaries the perimeter and center of the day-by-day life of the people in this area.

From St. Paul and Minneapolis as the hub, transportation routes, newspapers, radio and television reach out to the boundaries of the district. Food processing, sports and entertainment activities, religious institutions, wholesale and retail stores, medical and educational services and financial institutions are all tied together. This homogeneous region, an area of similar climate, and for the most part, of dominant north-European ancestry, is enclosed within the boundaries of the St. Paul District of the Corps of Engineers.<sup>107</sup>



The St. Paul District now covers portions of six states and waterways which were once the responsibility of the Duluth, Milwaukee, and Rock Island districts.

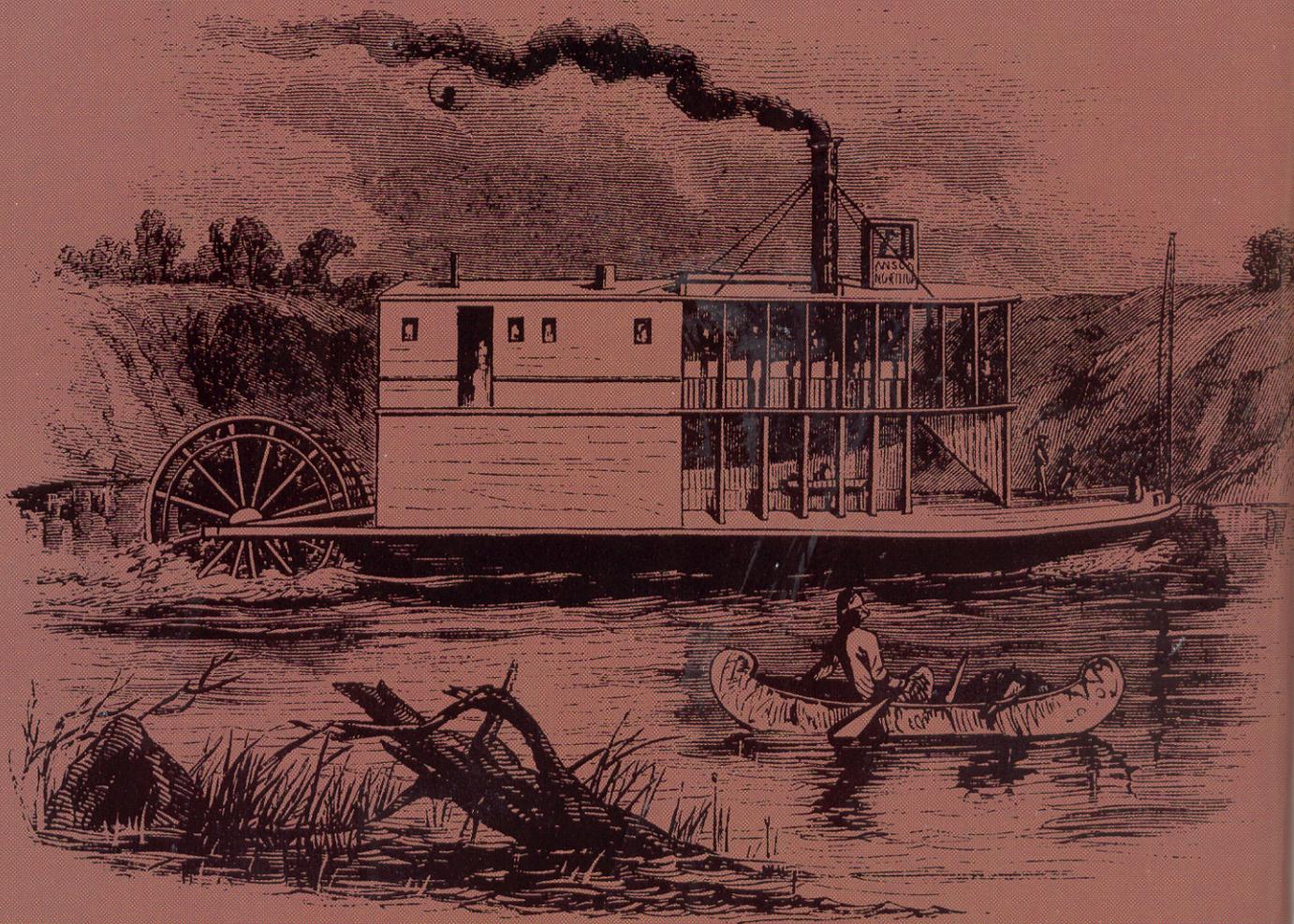
## Notes

1. Newspaper clippings and in letter book, June, 1865—December, 1867, in the Gouverneur K. Warren papers, New York State Library (thereafter cited as NYSL), Albany, New York.
2. The only biographical treatment of Warren's career is Emerson Gifford Taylor's *Gouverneur Kemble Warren The Life and Letters of An American Soldier 1830-1882* (Boston: 1932); this study, however, does not cover the professional life of Warren in the post-Civil War years. Consequently, his work in the St. Paul office must be studied from manuscript collections.
3. William H. Goetzmann, *Army Exploration in the American West, 1803-1863* (New Haven: 1959), pp. 440-60; an edited account of the "Memoir of Lieut. G. K. Warren, Corps of Topographical Engineers, upon the Material Used and Methods Employed in Compiling the General Map to Illustrate the Reports of Surveys for Railroad Routes from the Mississippi River to the Pacific Ocean," Topographical Corps of Engineers, *Reports of Explorations and Surveys to Ascertain the Most Practicable and Economical Route for a Railroad from the Mississippi River to the Pacific Ocean*, II, pp. 87-102.
4. Henry L. Abbot, "Gouverneur Kemble Warren," *Proceedings*, Association of Graduates of the U. S. Military Academy (West Point: 1883), p. 8; David McCullough, *The Great Bridge* (New York: 1972), p. 161.
5. Abbot, "Gouverneur Kemble Warren," p. 7; McCullough, *The Great Bridge*, pp. 160, 457-60.1 Washington Roebling married Gouverneur Warren's sister, also named Emily, thus bringing the Warren and Roebling families together in New York City during the building of the Brooklyn bridge.
6. Arthur E. Morgan, *Dams and Other Disasters: A Century of the Army Corps of Engineers in Civil Works* (Boston: 1971), pp. 397-409; Robert G. Sherrill, "The Pork-Barrel Soldiers," *The Nation* (February 14, 1963), pp. 180-83; Elizabeth Drew, "The Story of the Army Engineers," *Atlantic Monthly* (April, 1970); Martin Heuvelmans, *The River Killers* (Harrisburg: 1973); William E. Elam, *Spreading Floods to the Sea* (New York: 1946). The most blatant charge was made by Harold Ickes: "No more lawless or irresponsible Federal group than the Corps of Army Engineers has ever attempted to operate in the United States either outside or within the law." Arthur Maass, *Muddy Waters: The Army Engineers and the Nation's Rivers* (Cambridge: 1951), pp. 62-66.
7. Harry Taylor, "Civil Works of the Corps of Engineers," *The Military Engineer* (March-April, 1925), XVII, p. 101.
8. "The Interrelationship Between Civil Works and Military Missions," *Annual Report*, 1965, p. xxvii; W. Stull Holt, *The Office of the Chief of Engineers of the Army: Its Non-Military History, Activities and Organization* (Baltimore: 1923), p. 95.
9. Cecil H. Wood, "The General Education Movement and the West Point Curriculum," (PhD thesis, Columbia University, 1951); John P. Lovell, "The Cadet Phase of the Professional Socialization of the West Pointer: Description, Analysis and Theoretical Refinement," (PhD thesis, University of Wisconsin, 1962); *Report of a Board of Army Officers and Distinguished Civilian Educators Appointed to Study the Curriculum of the U. S. M. A.*, November 7, 1945. Lieutenant Colonel Charles Potter commented that district engineers "do not do their own engineering." Potter to the Office of the Chief of Engineers (hereafter abbreviated OCE), July 7, 1910, St. Paul District (hereafter abbreviated SPD), Letters Sent (press copies) National Archives Record Group Number 77 (hereafter cited as NARG 77).
10. Simpson recommended C. H. Drew, C. H. Crehore, J. L. Sewall, William Payte, E. C. Clarke, E. A. Holmes, A. J. Hill, and De Witt Langford, SPD, Letters Sent and Received by the Office of U. S. Government Roads, 1856-1858 (file no. 345), NARG 77.
11. See, for example, pictures of Major George M. Derby, Captain William V. Judson, Major Charles Potter and Major Hiram M. Chittenden in *St. Paul Pioneer Press*, September 14, 15, 1905.
12. I. Y. Schermerhorn, "The Rise and Progress of River and Harbor Improvement in the United States," *Journal of Franklin Institute* (April, 1895), CXXXIX, pp. 264-66; Maass, *Muddy Waters*, pp. 62-66.
13. Holt, *Office of the Chief of Engineers*, pp. 7, 31-32; for expanded documentation see John R. Ferrell, "Water Resources Development: The Role of the Army Engineers, 1824-1930," (manuscript in the OCE, Historical Division).
14. The exact procedures have been modified over the years and are still in a state of transition because of new legislation such as that requiring an environmental impact study on each project. See Holt, *Office of the Chief of Engineers*, pp. 62-66; Charles M. Clusen, *Engineering A Victory for Our Environment: A Citizen's Guide to the U. S. Army Corps of Engineers* (Washington: 1972), chapter 2.
15. Taylor, in *Military Engineer* (March-April, 1925), XVII, p. 98; Gilbert A. Youngberg, "The Civil Activities of the Corps of Engineers," *Military Engineer* (1921), XIII, pp. 73-77; Maass, *Muddy Waters*, p. 22; Holt, *Office of the Chief of Engineers*, p. 24.
16. Taylor, in *Military Engineer* (March-April, 1925), XVII, p. 99; *Annual Report*, 1891, pp. 316-18. On the Minnesota River project recommended by Major Francis Shunk but rejected by the Board of Engineers, see John Wade to August Larson, June 2, 1909, SPD, Letters Sent (press copies) NARG 77. Major James B. Quinn and Colonel O. M. Poe also disagreed over improvements at Allouez Bay in Superior, Wisconsin.
17. Morgan, *Dams and Other Disasters*, pp. 124, 172-76, 232-34, 248-51, 298-302.
18. Donald A. Schon, *Technology and Change: The Impact of Invention and Innovation on American Social and Economic Development* (New York: 1967), pp. 75-

- 111; Joseph C. Goulden, *Monopoly* (New York: 1968); Roger Burlingame, *Henry Ford* (New York: 1955), pp. 116-22; Alfred P. Sloan, *My Years with General Motors* (New York: 1963), pp. 71-94; Oscar Newman, *The Sensible Space* (New York: 1973); Eugene J. Meehan, *Public Housing Policy: Convention Versus Reality* (New Brunswick: 1975).
19. Edwin T. Layton, *The Revolt of the Engineers: Social Responsibility and the American Engineering Profession* (Cleveland: 1971), pp. 201-18; R. Richard Ritti, *The Engineer in the Industrial Corporation* (New York: 1973); Monte A. Calvert, *The Mechanical Engineer in America, 1830-1910* (Baltimore: 1967), pp. 272-81.
20. Major Gouverneur K. Warren to Alexander Ramsey, March 19, 1867, NYSL, Warren Letter Book.
21. Major Gouverneur K. Warren to Alexander Ramsey, March 19, 1867, NYSL, Warren Letter Book.
22. Alexander Ramsey to Général Gouverneur K. Warren, March 30, 1867, NYSL, Warren Letter Book.
23. General Survey Act, in *Statutes at Large*, vol. 4, p. 32; C. H. Chorpeneing, "Waterway Growth in the United States," in American Society of Civil Engineers (ASCE), *Transactions* (1952), pp. 988-89; Holt, *Office of the Chief of Engineers*, pp. 5-7; Forest G. Hill, *Roads, Rails and Waterways: The Army Engineers and Early Transportation* (Norman: 1957), pp. 37-56; Leland R. Johnson, *The Falls City Engineers: A History of the Louisville District Corps of Engineers United States Army* (Louisville: 1974), pp. 43-46.
24. Hill, *Roads, Rails and Waterways*, p. 49; *Statutes at Large*, vol 4, p. 32.
25. Hill, *Roads, Rails and Waterways*, pp. 59-60.
26. Act of May 20, 1826 in *Statutes at Large*, vol. 4, p. 175; Schermerhorn, in *Journal of Franklin Institute* (April, 1895), CXXXIX, p. 259; Hill, *Roads, Rails and Waterways*, p. 165.
27. Chorpeneing, in ASCE, *Transactions* (1952), p. 1001; Hill, *roads, Rails and Waterways*, p. 179; Schermerhorn, in *Journal of Franklin Institute*, (April, 1958), CXXXIX, p. 261.
28. Holt, *Office of the Chief of Engineers*, pp. 9-10; Hill, *Roads, Rails and Waterways*, pp. 181-86.
29. Johnson, *The Falls City Engineers*, pp. 84-85; Hill, *Roads, Rails and Waterways*, pp. 69-79, 194-98.
30. George Rogers Taylor, *The Transportation Revolution 1815-1860* (New York: 1951), p. 79.
31. For a good discussion of state canals see *Preliminary Report of the Inland Waterways Commission*, (60 Congress, 1 session Senate Documents, no. 325); Taylor, *The Transportation Revolution*, p. 52; Carter Goodrich, *Government Promotion of American Canals and Railroads 1800-1890* (New York: 1960), pp. 66-68.
32. Hill, *Roads, Rails and Waterways*, p. 74.
33. Raymond H. Merritt, *Engineering in American Society, 1850-1875* (Lexington: 1969), p. 126-29.
34. Goodrich, *Government Promotion of American Canals*, pp. 41-48.
35. Holt, *Office of the Chief of Engineers*, pp. 10-11; Hill, *Roads, Rails and Waterways*, pp. 186-92.
36. Chorpeneing, in ASCE, *Transactions* (1952), p. 1001; E. H. Ruffner, *The Practice of the Improvement of the Non-Tidal Waters of the United States* (New York: 1886), p. 5.
37. *Statutes at Large*, vol. 28, p. 360; vol. 25, p. 209; Chorpeneing, in ASCE, *Transactions* (1952), p. 1007; Holt, *Office of the Chief of Engineers*, pp. 40-41, 77.
38. *Statutes at Large*, vol. 27, p. 507; Chorpeneing, in ASCE, *Transactions* (1952), p. 1008; Holt, *Office of the Chief of Engineers*, pp. 37-38, 75-76.
39. The first legislation on the construction of bridges was passed in 1888, see *Statutes at Large*, vol. 23, p. 148.
40. Chorpeneing, in ASCE, *Transactions* (1952), p. 1008; Holt, *Office of the Chief of Engineers*, pp. 39-40, 76-77; Acts of June 14, 1880, August 2, 1882, September 19, 1890, in *Statutes at Large*, vol. 21, p. 197; vol. 30, p. 1154.
41. Chorpeneing, in ASCE, *Transactions* (1952), p. 1008.
42. *St. Paul Pioneer Press*, July 13, 1975.
43. Taylor, in *Military Engineer* (March-April, 1925), XVII, pp. 95-103; Henry L. Abbot, "The Corps of Engineers," *Journal of the Military Service Institution of the U. S.* (1894), XV, pp. 413-26; Henry C. Jewett, "History of the Corps of Engineers to 1915," *Military Engineer* (August, 1946), XXXVIII, pp. 340-46; Schermerhorn, in *Journal of Franklin Institute* (April, 1895), CXXXIX, pp. 252-71; Chorpeneing, ASCE, *Transactions* (1952), pp. 976-1041.
44. Chorpeneing, in ASCE, *Transactions* (1952), p. 1004; Holt, *Office of the Chief of Engineers*, pp. 44-45; The Federal Water Power Act, in *Statutes at Large*, vol. 41, p. 1063.
45. Glen E. Edgerton, "Water Power and Navigation the Applications of the Federal Water Power Act," lecture given to the Engineer School found in SPD, Federal Power Commission misc. general correspondence, NARG 77; Holt, *Office of the Chief of Engineers*, pp. 44-45.
46. United States Department of the Army, *Hydro Power: the Role of the Corps* (Washington: 1976), pp. 23-30.
47. *Annual Report, 1973*, p. 37.
48. Rivers and Harbors Act of 1962, sec. 103, *Statutes at Large*, vol. 76.

49. Rivers and Harbors Act of August 13, 1868, sec. 111 (Public Law 90-483), *Statutes at Large*, vol. 82, p. 735.
50. *Statutes at Large*, vol. 39, p. 948.
51. Chorpeneing, in ASCE, *Transactions* (1952), p. 1004; 68 Congress, 1 session, *House Documents*, no. 308.
52. The Flood Control Act of June 22, 1936, authorized about 270 flood control projects, *Statutes at Large*, vol. 49, pp. 1570-72; *Annual Report*, 1936, pp. 3, 6.
53. Robert C. Branyan, *Taming the Mighty Missouri: A History of the Kansas City District Corps of Engineers 1907-1971* (Kansas City: 1974), pp. 71-73; *Annual Report*, 1965, p. 4.
54. Flood Control Act of 1948, sec. 205, *Statutes at Large*, vol. 62, p. 1182; *Annual Report*, 1965, p. 4.
55. Water Resources Planning Act of July 22, 1965 (Public Law 89-80), *Statutes at Large*, vol. 79, p. 244.
56. Water Resources Planning Act of July 22, 1965 (Public Law 89-80), *Statutes at Large*, vol. 79, p. 244.
57. Wild and Scenic Rivers Act of October 2, 1968 (Public Law 90-542), *Statutes at Large*, vol. 82, pp. 906-26.
58. National Environmental Policy Act of 1969 (Public Law 91-190), *Statutes at Large*, vol. 83, pp. 852-56.
59. Federal Water Pollution Control Act of October 18, 1972 (Public Law 92-500), *Statutes at Large*, vol. 86, pp. 816-903.
60. Federal Dam Inspection Act of August 8, 1972 (Public Law 92-367), *Statutes at Large*, vol. 86, pp. 506-07.
61. *Annual Report*, 1973, p. 81; Federal Water Pollution Control Act, sec. 102 (Public Law 92-500), *Statutes at Large*, vol. 86, pp. 816-903.
62. General Andrew A. Humphreys to Major Gouverneur K. Warren, November 8, 1866, NYSL, Warren Letter Book.
63. General Andrew A. Humphreys to Major Gouverneur K. Warren, December 19, 1866, NYSL, Warren Letter Book.
64. Major Gouverneur K. Warren to General Andrew A. Humphreys, December 21, 1866, NYSL, Warren Letter Book.
65. Major Gouverneur K. Warren to General Andrew A. Humphreys, December 21, 1866, NYSL, Warren Letter Book.
66. War Department Special Orders No. 62 (February 5, 1867), found in NYSL, Warren Letter Book.
67. Major Gouverneur K. Warren to Colonel Israel C. Woodruff, September 30, 1866; Brevet Major General James H. Wilson to Major Gouverneur K. Warren, October 24, 1866; William M. Roberts to Major Gouverneur K. Warren, May 15, 1867; M. D. McAlister to Major Gouverneur K. Warren, April 1, 1867; Major H. S. Long to Major Gouverneur K. Warren, June 25, 1867 all in NYSL, Warren Letter Book.
68. Letters of Application Letter Book, August 9, 1866 to September 16, 1869 in Warren papers, NYSL.
69. *Annual Report*, 1877, pp. 132-42.
70. *Annual Report*, 1877, p. 131.
71. *Annual Report*, 1903, pp. 3-4.
72. *Annual Report*, 1902, p. 5; 1903, p. 4.
73. *Annual Report*, 1903, p. 5.
74. *Annual Report*, 1909, p. 6.
75. Rivers and Harbors Act of February 27, 1911, sec. 5, *Statutes at Large*, vol. 36, p. 957.
76. Lieutenant Colonel Charles Potter to H. B. Anderson, April 29, 1915, SPD, Letters Sent (press copies), NARG 77.
77. *Annual Report*, 1917, pp. 3-4.
78. *Annual Report*, 1918, p. 4.
79. *Annual Report*, 1918, p. 93.
80. *Annual Report*, 1922; Holt, *Office of the Chief of Engineers*, p. 24.
81. Civil Works Study Board, "The Interrelationship Between Civil Works and Military Missions," *Annual Report*, 1965, pp. xxvii-xxx.
82. *Annual Report*, 1885, p. i-iv.
83. *Annual Report*, 1931, p. 7.
84. Circular letter from OCE, March 25, 1913 in SPD, "Miscellaneous File," misc. circular letters, NARG 77; the first mention of the change in the *Annual Reports* was made in 1915.
85. *Annual Report*, 1947, pp. iii-iv.
86. Testimony of William H. C. Folsom at St. Paul Chamber of Commerce public hearing on January 18, 1900, found in *Proceedings*, p. 27, SPD, Letters Received and Sent, NARG 77.
87. N. H. Webb to Major Gouverneur K. Warren, January 3, 1867, NYSL, Warren Letter Book.
88. Major Gouverneur K. Warren to General Andrew A. Humphreys, September 29, 1866, NYSL, Warren Letter Book.
89. Major Gouverneur K. Warren to William R. Marshall, November 7, 1866, NYSL, Warren Letter Book.

90. William R. Marshall to Major Gouverneur K. Warren, November 12, 1866, NYSL, Warren Letter Book.
91. Major Gouverneur K. Warren to William M. Stones, November 7, 1866, NYSL, Warren Letter Book.
92. Major Gouverneur K. Warren to William R. Marshall, March 30, 1867, NYSL, Warren Letter Book.
93. William R. Marshall to Major Gouverneur K. Warren, August 10, 1867, NYSL, Warren Letter Book.
94. Charles E. Flandrau to Major Gouverneur K. Warren, August 10, 1867, NYSL, Warren Letter Book.
95. Major Gouverneur K. Warren to The President and Common Council of the City of St. Paul, August 24, 1868, NYSL, Warren Letter Book; see also Gouverneur K. Warren to Alexander Ramsey, January 14, 1870, in Alexander Ramsey Papers, Minnesota Historical Society.
96. *Annual Report, 1915*, p. 1028.
97. Gouverneur K. Warren, *Report on the Survey of the Upper Mississippi River and Its Tributaries* (39 Congress, 2 session, *House Executive Documents*, no. 58); Warren, *Report on the Transportation Route Along the Wisconsin & Fox Rivers Between the Mississippi River and Its Tributaries* (Washington: 1869); Warren, *An Essay Concerning Important Physical Features Exhibited in the Valley of the Minnesota River* (Washington: 1874).
98. *Annual Report, 1873*, p. 50.
99. *Annual Report, 1897*, p. 85.
100. *Annual Report, 1878*, p. 95; *1879*, pp. 127-28; *1880*, pp. 169-70; *1881*, p. 231; *1882*, pp. 227-28; *1883*, pp. 234-35; *1884*, pp. 237-38; *1885*, pp. 259-60; *1886*, p. 249; *1887*, pp. 215-16. Officers in charge were Lieutenant Edward Maguire (1877-1883), Captain James B. Quinn (1883-1887) and Captain Clinton B. Sears (1887).
101. *Annual Report, 1889*, pp. 240-41; *1890*, p. 215.
102. *Annual Report, 1920*, pp. 1225, 1399.
103. *Annual Report, 1955*, p. 1003.
104. *Annual Report, 1940*, p. 1198.
105. *Annual Report, 1930*, p. 1225.
106. *Annual Report, 1973*, II, 27-31.
107. Theodore C. Blegen, *Minnesota: A History of the State* (Minneapolis: 1963), pp. 559-61; Lucile M. Kane, *The Waterfall That Built a City* (St. Paul: 1966), pp. 98-113; Mildred L. Hartsough, *The Development of the Twin Cities (Minneapolis and St. Paul) as a Metropolitan Market* (Minneapolis: 1925), p. 58.



The "Anson Northrup" was first used on the Mississippi River above the Falls of St. Anthony in the 1850's before it was transferred to the Red River of the North.