LAND'S END

A History of the New Orleans District, U. S. Army Corps of Engineers,
and Its Lifelong Battle with the Lower Mississippi and
Other Rivers Wending Their Way to the Sea

by

Albert E. Cowdrey

1977

IN COMMAND, NEW ORLEANS DISTRICT

DISTRICT ENGINEERS, NEW ORLEANS

RESIDENT MILITARY ENGINEERS, NEW ORLEANS[1]
Under Superintending Engineer for Gulf of Mexico Frontier

Captain	James Gadsden[2]	1818[3]	
Captain	W. H. Chase[2]		1828[4]
2nd Lt.	A. H. Bowman	Feb 1833	Jun 1833[3]
Captain	J. G. Barnard	Mar 1840	Dec 1847[5]
1st Lt.	P. G. T. Beauregard	May 1841	Nov 1846[6]
1st Lt.	Henry L. Smith	Nov 1846	Jun 1848
Captain	J. G. Barnard	Jun 1848	Nov 1852
1st Lt. (Bvt. Maj.)	P. G. T. Beauregard	Jun 1848	Apr 1857

Under Board of Engineers for the Gulf Coast

Captain (Bvt. Maj.)	P. G. T. Beauregard	Apr 1857	Jan 1861
Bvt 2nd Lt	W. H. McFarland	Jan 1861[7]	

CHIEF ENGINEER, DEPARTMENT OF THE GULF
Under Commanding General, Department of the Gulf (USA)

1st Lt.	Godfrey Weitzel	Mar 1862	Dec 1862
1st Lt.	D. C. Houston	Dec 1862	Jul 1864
Captain	Peter C. Hains	Jul 1864	Jun 1865
Captain	Miles D. McAlester	Jun 1865[8]	

NEW ORLEANS ENGINEER OFFICE
Under the Board of Engineers, New York

Major	Miles D. McAlester		Nov 1868
Major	F. E. Prime	Nov 1868	Apr 1869
1st Lt.	D. W. Payne	Apr 1869	Jun 1869
Captain	Charles W. Howell	Jun 1869	1881
Major	Amos Stickney	Dec 1881	Jul 1884
Captain	Thomas Turtle	Jul 1884	Feb 1885
Major	D. W. Heuer	Feb 1885	Oct 1887

Under Southwest Division (HQ New York)

Captain	W. L. Fisk	Nov 1887	Jan 1891
Major	James B. Quinn	Feb 1891	Nov 1899
Major	M. B. Adams	Dec 1899	Jun 1901
1st Lt.	E. M. Adams (Temp)	Jun 1901	Jul 1901

Under Gulf Division, New Orleans
After 24 July 1901

Lieut.	E. M. Adams (Temp)	Jul 1901	Oct 1901
Lt. Col.	Henry M. Adams	Oct 1901	Aug 1904
Lt. Col.	Clinton B. Sears	Aug 1904	Jul 1906
Colonel	E. H. Ruffner	Jul 1906	Jul 1907
Major	James F. McIndoe (Temp)	Jul 1907	Sep 1907
Colonel	E. H. Ruffner	Sep 1907	Aug 1908
Lt. Col.	Lansing H. Beach	Aug 1908	Jun 1911
Major	Harry Burgess (Temp)	Jun 1911	Sep 1911
Lt. Col.	Lansing H. Beach	Oct 1911	Aug 1912
Major	E. H. Schulz	Aug 1912	

NEW ORLEANS ENGINEER DISTRICT
Under Gulf Division, New Orleans, La.

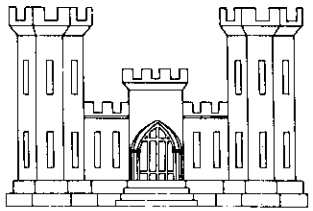
Major	E. H. Schulz		Oct 1916
Major	Julian L. Schley	Oct 1916	May 1917
Colonel	J. C. Sanford	Jun 1917	Nov 1917
Mister	T. E. L. Lipsey	Nov 1917	Mar 1919
Major	E. J. Dent	Apr 1919	Sep 1919
Colonel	Herbert Deakyne	Sep 1919	Feb 1920
Major	E. J. Dent	Mar 1920	Dec 1923
Colonel	C. McD. Townsend	Dec 1923	Jun 1926
Major	Malcolm Elliot	Jun 1926	Oct 1927
Captain	Lewis A. Pick	Oct 1927	Jul 1928
Major	R. F. Fowler	Jul 1928	

FIRST NEW ORLEANS DISTRICT
Under Gulf Division, New Orleans, La.

Major	R. F. Fowler		Jun 1932
Lt. Col.	Max C. Tyler	Jun 1932	Nov 1932
Major	Henry Hutchins, Jr.	Dec 1932	Jul 1936
Lt. Col.	Robert W. Crawford	Jul 1936	Mar 1938
Lt. Col.	L. W. Miller	Mar 1938	Aug 1939
Captain	Robert G. Lovett	Aug 1939	Nov 1940

NEW ORLEANS DISTRICT
Under Lower Mississippi Valley Division,
Vicksburg, Miss.

Lt. Col.	Clark Kittrell	Nov 1940	Jan 1942
Colonel	Dewitt C. Jones	Jan 1942	Apr 1943
Colonel	George H. Hudson	Apr 1943	Jul 1945
Colonel	Fisher S. Blinn	Jul 1945	Feb 1946
Colonel	Leonard B. Gallagher	Mar 1946	Mar 1947
Colonel	John R. Hardin	Mar 1947	Jul 1949
Colonel	Charles G. Holle	Jul 1949	Apr 1953
Colonel	Charles T. Tench	Apr 1953	Jun 1955
Colonel	William H. Lewis	Jul 1955	Aug 1958
Colonel	George C. Cookson	Aug 1958	Aug 1961
Colonel	Edward B. Jennings	Aug 1961	Jul 1964
Colonel	Thomas J. Bowen	Aug 1964	Jul 1968
Colonel	Herbert R. Haar, Jr.	Aug 1968	Jul 1971
Colonel	Richard L. Hunt	Jul 1971	Jul 1974
Brig. Gen.	E. R. Heiberg III	Jul 1974	Aug 1975
Colonel	Early J. Rush III	Aug 1975	



FOURTH MRC DISTRICT
Under the Mississippi River Commission,
New York and St. Louis

Captain	A. M. Miller	1882	
Colonel	Amos Stickney	Aug 1882	Feb 1886
Major	Charles W. Raymond	Feb 1886	Dec 1886
Captain	Dan C. Kingman	Dec 1886	Oct 1890
Captain	John Millis	Oct 1890	Oct 1894
Major	James B. Quinn	Nov 1894	Nov 1894
Captain	George McC. Derby	Nov 1094	Jun 1898
Major	J. H. Willard	Jun 1898	Nov 1898
Captain	Henry Jervey	Dec 1898	Mar 1899
Major	George McC. Derby	Mar 1899	Sep 1902
Captain	Charles S. Bromwell	Oct 1902	May 1904
Lt. Col.	Henry M. Adams	May 1904	Jul 1904
Major	James F. McIndoe	Jul 1904	Sep 1907
1st Lt.	Wilbur Willing	1908	
Major	Harry Burgess	Aug 1908	Jul 1910
Captain	Robert R. Ralston	Jul 1910	Dec 1910
Major	Harry Burgess	Dec 1910	Dec 1911
Major	Clarence O. Sherrill	Dec 1911	Aug 1914
Major	W. G. Caples	Sep 1914	Nov 1916
Major	Richard C. Moore	Dec 1916	Apr 1917
Captain	Beverly C. Dunn	May 1917	
Lt. Col.	George M. Derby	May 1917	Aug 1919
Colonel	H. S. Hetrick	Aug 1919	Jan 1920
Major	E. J. Dent	Jan 1920	Feb 1920
Colonel	J. Franklin Bell	Feb 1920	Sep 1920
Major	R. T. Coiner	Sep 1920	May 1924
Major	H. S. Bennion	May 1924	Aug 1926
Major	W. H. Holcombe	Aug 1926	

NEW ORLEANS RIVER DISTRICT
Under Lower Mississippi Valley Division,
Vicksburg, Miss.

Major	W. H. Holcombe	Sep 1928	

SECOND NEW ORLEANS DISTRICT
Under Lower Mississippi Valley Division,
Vicksburg, Miss.

Major	W. H. Holcombe		Apr 1931
Lt. Col.	J. N. Hodges	Apr 1931	Aug 1935
Lt. Col.	J. H. Carruth	Aug 1935	May 1936
Lt. Col.	William F. Thompkins	May 1936	Jul 1940
Lt. Col.	Clark Kittrell	Jul 1940	Nov 1940

[1] Not an official title. [2] Superintending Engineer. [3] *Monthly Returns* missing, 1819-1832. [4] Moved to Pensacola, 1828. [5] *Returns* show no officers permanently at New Orleans, 1834-1840.

[6] Duties at N.O. divided between Beauregard and Barnard. [7] Ordered to duty in Mexico. [8] Forts seized by troops of State of La., 12 Jan 1861. [9] Title changed Jul 1865 to "Chief Engr. Dept. of La."

FOREWORD

In 1975 members of the Corps of Engineers celebrated their organization's 200th anniversary—a remarkable record of service to the American people. Conscious of our long history, we have undertaken to secure from competent scholars accurate and readable studies of our past.

On arrival in New Orleans, I found that a history of the New Orleans District had been prepared by one of my predecessors. However, since the other publication, much water had flowed down many rivers, hurricanes had spread death and destruction over wide areas, and other major and minor disasters had occurred requiring new solutions. The Congress and the White House had also passed laws and regulations which required new thinking and new methods in promulgating new life and property saving projects. These were all taken into consideration by Dr. Cowdrey as we updated the history. He has not only brought the history up to date but he has also strengthened and upgraded the whole narrative.

The result is more than a simple district history. Here we gain appreciation of how the people of our region made their land habitable by learning to control their waterways for navigation and flood control—and then set out to solve the problems of pollution which had been caused in part by their own success. The role of the Corps in both development and protection has been a great one. For 174 years the men and women of our organization have worked for and with the Louisiana environment. Their accomplishments have woven an outstanding story that has become a study piece for students from over the world. Above all, this book is the story of the New Orleans District and its people, past and present.

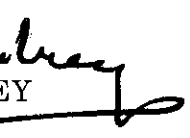
EARLY J. RUSH III
Colonel, CE
District Engineer

ACKNOWLEDGEMENTS

While the author alone is responsible for the interpretations advanced in this work, and for any errors which may occur, he acknowledges fully that whatever is useful in it belongs in large measure to the many people, in and out of the Corps, who assisted him.

Preparation of the original history was made possible by assistance from Robert W. Blakeley, Chief of the Office of Administrative Services, OCE; of Dr. Jesse A. Remington, Lenore Fine, and other members of the Corps' Historical Division; of Professor Charles Roland of the University of Kentucky; and of staff members of the National Archives, the Library of Congress, and the Howard-Tilton Memorial Library. The present retitled and enlarged volume adds new material which the author garnered during his own work as a member of the Historical Division, as well as new research specifically directed at events in the New Orleans District. Materials supplied by Fred M. Chatry, Chief, Engineering Division, New Orleans District, were particularly useful.

The author's gratitude goes to old friends, and a new commander, in the District itself: to Bruce Sossaman, Public Affairs Officer; to Daniel Alloy, Chief, Office of Administrative Services (now retired); to Michele Rome, who typed the manuscript; and to members of the District, past and present, who gave him his first instruction in the ways of the Corps and who granted the interviews cited in these pages. Colonel Early J. Rush III, has presided over the project. Warren B. Dodd, Executive Assistant to the District Engineer, has done more than any other individual to make the history possible. For the many others who assisted, but whose names cannot even be listed here, the dedication of this volume will have to serve as the author's acknowledgement of their skill and efforts, freely given.



ALBERT E. COWDREY
Baltimore, 1977

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INTRODUCTION

In the time scale of geology, the Mississippi River is something new under the sun. In Cretaceous times, the Mississippi Embayment was an arm of the sea, and the drainage of the Middle West, halted by a range of low hills in what would become Missouri, ran north toward the St. Lawrence. Then the glaciers of the last Ice Age advanced. At the edge of the glaciers, about the line of the present Missouri and Ohio Rivers, streams ponded, merged, and sought a new outlet to the south. The falling sea level caused by the formation of the ice sheet had meantime emptied the Embayment, and across this land, which had lately been seabottom, a new river began to incise its course. This was the lower Mississippi; the time was only about 1 million years ago.[1]

During the Ice Ages the level of the sea rose and fell as the glaciers periodically melted and formed anew, and these changes were written into the valley of the Mississippi. When the sea retreated, the river cut deep braided channels into the marine deposits; returning after ages of high water, it buried its former channels under fresh alluvium. In time, despite the melting of the glaciers and the consequent rising of the sea, the Embayment filled with alluvium, and the Mississippi took its present form, a stream meandering in broad loops across the surface of a great wedge of clay and sand.[2] The present layer of earth was laid down in the last 30,000 years, and the present delta of the river—not only the outlet through Plaquemines but the five former outlets whose traces remain upon the surface sediments—took form during the past 10,000 years.[3] What men called the Father of Waters was a geologic child.

The forces that shaped the land never ceased to work. The sediment that filled the Embayment warped and depressed the faulted bedrock. The greatest earthquake ever recorded on the North American continent was caused in 1811 by a settling of the Mississippi Structural Trough near New Madrid, Missouri. The last attempt of the Mississippi to form a new outlet was frustrated by the works of man in the mid-20th century. The land the Mississippi built continued to change, as Lafcadio Hearn wrote of its islands a century ago, "more slowly, yet not less fantastically, than the clouds of heaven."[4]

The Alluvial Valley or flood plain of the Mississippi emerged as a region of rich bottom lands averaging 50 miles in width that ran south some 600 miles from Cape Girardeau, in the Commerce Hills of Missouri. Here, long before the coming of European man, the river established its own unique "regimen." In times of low water, it ran in a channel bounded by natural levees raised above the level of the plain. These levees took form because the heaviest burden of silt precipitated near the edges of the river during overflows. During great floods, on the other hand, much of the flood plain became the channel of the Mississippi—28,000 square miles of swamp and forest that played an essential part in the river's functioning.[5]

The swamps were natural reservoirs that prolonged but mitigated floods by retaining vast quantities of water during rises and releasing it again as the river fell. Near the Gulf, natural outlets—Bayou Plaquemine, Bayou Manchac, Bayou Lafourche, the Atchafalaya River—helped to carry off the water. Flooding was a natural, almost yearly phenomenon, not a devastating occurrence at intervals of decades. Utilizing its flood plain, the river expanded or contracted according to need. It constantly changed its channel, yet retained an approximately stable length. Always eroding the concave banks of its many turns, the Mississippi gradually shaped them whenever the land would allow, into immense nooses. Then, in times of flood, it cut off one or more noose, shortening its length by as much as 15 miles. But within the new, direct channel its velocity increased, undermining some weak bank below the cutoff. The increased erosion below soon compensated for the length that had been lost upstream. The bends of the Mississippi migrated southward over the course of ages, yet the river became what engineers called a "poised stream"—one with all its major forces in balance.

When men set about building a civilization in the flood plain, they had to interfere with this natural balance. Unless they were willing to give up cities, towns, large-scale agriculture, and industry, and live at a subsistence level, the river had to be restrained. To raise its natural levees was the simplest and cheapest course, and the first Europeans had hardly settled in the Valley before they adopted it. Yet, the levee system cut across the regimen of the river at almost every significant point. Land-building ceased with the seasonal overflows. The river in flood was denied use of the Alluvial Valley and confined to its low-water channel, plus whatever additional cross section the levees themselves could provide it. The swamp reservoirs were cut off. For various reasons the distributaries were tampered with.

Inevitably, the waters rose as they were constricted. Pressures against the levees increased. Floods ceased to be yearly phenomena at the cost of becoming infrequent catastrophes. During great floods the whole immense mass of water, moving at great velocity, debouched upon the Delta. Here the changes taking place on the whole river registered their combined effect.

The deltaic plain was the part of the Valley in which major tributaries ceased to enter the river and distributaries begin to leave it.[6] Above the deltaic plain the points of land where the Mississippi met with other streams pointed south; within it they pointed north. By this reckoning the Delta began at Old River, above Baton Rouge, where the Red River entered and the first and greatest distributary, the Atchafalaya, left the Mississippi.

The Delta was a curious landscape. Most of the world was sky. Almost absolutely flat, the land broke up near the sea like a puzzle into the streams and hummocks of the salt marsh. Vulnerable to rising water brought by the river and to the wind and falling water of tropical storms, society required artifice to survive in a region where nature might reasonably have asked a few more eons to finish a work of creation that was incomplete.

Since 1803, the U. S. Army Corps of Engineers has played a constantly increasing role in adapting the Delta to the requirements of man. The Engineers have been charged with opening the streams to commerce, protecting farmlands and cities from flood, and cleaning up the ruin after storms. They have had to deal with the great river in all its moods—and, as Mark Twain said, "one might as well bully the comets in their courses... as try to bully the Mississippi into right and reasonable conduct."[7] Since the Louisiana Purchase, their achievements and failings have written much of the Delta's history.

In 1970, some 3.5 million people inhabited the New Orleans District. The population was growing; industry and cities were spreading. But beneath the visible society was a physical substructure little noticed by visitor or resident—the delicate artifice of flood and storm control which made human settlement possible at all.[8]

CHAPTER ONE

THE AGE OF LOCALISM

The French were the first Europeans to struggle with the problems of the Mississippi. Columbus may have seen the mouths of the river during the course of his mysterious fourth voyage—the River of Palms shown on the "Admiral's Map" in the Spanish archives has been called the first portrayal of the Passes of the Mississippi.[1] DeSoto did see the river, and after his death his followers became the first Europeans to witness a Mississippi flood, a great one that lasted 80 days and drowned the land to the branches of the tallest trees.[2] But the exploration of the Spanish left no mark outside their chronicles.

Instead, it was the French, late in the 17th century, who explored, built forts, made treaties with the Indians, and scattered the banks of the river with names that have clung to it ever since. When, in 1717, Jean Baptiste LeMoyne, Sieur de Bienville decided to move the capital of his colony from "the sterile lands of *Biloxi, Mobile,* and *St. Louis Bays,* to the rich country bordering the Mississippi,"[3] he began the changing of the Delta's landforms. For the site he chose, though higher than the surrounding swamp, was subject to overflow and had to be protected if it was to be inhabited at all.[4] Sieur Blond de la Tour, one of Bienville's engineers, examined the site and found "only... some unimportant houses, scattered here and there, made by voyageurs who had come down from Illinois." The region seemed so unpromising that he protested against establishing the capitol there; overruled by Bienville, he had a "pretty long and wide" strip cleared along the river and set to work:

> ...with the help of some piqueurs, he traced on the ground the streets and quarters which were to form the new town, and notified all who wished building sites to present their petitions to the council.... It was ordained that those who obtained these plots should be found to enclose them with palisades, and to leave all around a strip at least three feet wide, at the foot of which a ditch was to be dug, to serve as a drain for the river water in time of inundation. The Sieur de la Tour deemed these canals, communicating from square to square, not only absolutely necessary, but to preserve the city from inundation, raised in front... a dike or levee of earth, at the foot of which he dug a similar drain.[5]

By 1727 New Orleans had a levee over a mile long, a yard high, and 18 feet wide at the top.[6]

As the levees grew, the French, in 1724, introduced the practice of holding riparian landholders responsible for maintaining them. The reason, of course, was that the people settled first on the high lands of the natural levees. Not only were these lands safer from floods, they were exceptionally fertile, for the river deposited large-particled loam upon the banks and carried the finely-divided and much less workable clays into the backlands. Also,

Laying out New Orleans.

mists flowed into the lowlands and crops saturated with heavy dews could be killed by a brief dip of the temperature below the freezing point. But as the backlands were settled, riparian dwellers increasingly resented the servitude written into their deeds. The levees protected all, but all did not do their share in the cost of maintenance. The flood of 1735, marked not only by its high stages but by its six-month duration, destroyed most of the levees in the young colony. The landowners were evidently remiss in replacing them, for an ordinance of 1743 threatened them with forfeiture of their property unless the levees were completed by the first of the following year. The practice of entrusting vital and very expensive public works to a few individuals meant that low, weak levees built to no standard and maintained with ignorance and ill grace became the rule.

The Louisiana Purchase brought an influx of new settlers, but no change in basic levee law. American Army Enginers had other duties. Major Decius Wadsworth of the Corps was sent to the new territory at the time of its transfer to the United States,[7] but his duties were military—to survey the defense of a remote and vunerable acquisition.[8] Civil duties would not begin until the War of 1812 had come and gone.[9]

Despite the exploits of Perry on the Lakes and of Jackson at New Orleans, the war by and large was a humiliating affair. Every failing of American society and every weakness of American arms was mercilessly revealed.

American soldiers often fought badly. The huge country was still mostly wilderness, and moving troops to any spot threatened by an enemy was a slow and costly business. Jackson's presence at New Orleans was as much a matter of luck as of management. And danger did not come only from outside. Sectional loyalties were strong, and a party of New Englanders threatened to secede from the Union when the war ruined their trade. The peace was hardly signed when America began to make preparations for an "inevitable third war" against England. The lessons of 1812-1815 were studied by national leaders with added urgency because they were convinced that a new war would be fought, and that it would be essentially a replay of the one just past. From this belief grew a new program for America, masterminded by such leaders as Henry Clay and John C. Calhoun. To protect the country against the British fleet, the seacoast must be ringed with defenses. To bind its people together a national system of communications must be built. A new kind of government would be needed to carry out this program. Vast works which promised little immediate profit would have to be financed by the Federal Government or the states. Since the United States was an undeveloped country, where skill went at an even higher premium than capital, the Army Engineers began to take on a variety of unaccustomed duties.

Founded in 1775, the Engineers had an erratic history before the 19th century. On the day before Bunker Hill the Continental Congress had provided for one chief engineer and two assistants to be assigned to the army. Late in 1776, Washington had been authorized to raise a Corps of Engineers to serve for 6 months.[10] The Corps was formally organized in 1779, but disbanded after the conclusion of peace in 1783. A Corps of Artillerists and Engineers was created in 1794 when war threatened again, but the modern Corps of Engineers did not take form until 16 March 1802. At that time, Congress authorized the President to establish a corps of 16 officers and 4 cadets, to "be stationed at West Point, in the State of New York, and... constitute a Military Academy; and at all times to do duty in such places and on such service as the President of the United States shall direct."[11] At its beginning, then, the Corps included West Point, and the Military Academy formed the only school of engineers in the United States until the establishment of Rensselaer Polytechnic in 1824.[12]

Soon civil duties beckoned. At the time of West Point's founding, President Thomas Jefferson had looked forward to a civil role for its graduates, and the needs of an undeveloped nation soon made his hopes a reality. As a French visitor to the United States noted in the 1830's, "the greatest difficulty which the Americans encountered in the execution of their public works, was not to procure the necessary capital, but to find men capable of directing operations." The "officers of the engineer corps and of the topographical engineers," he pointed out, "were those who filled the need."[13]

Both civil and military roles took form in Louisiana. In any program of national defense, the state, site of a British invasion, would be one of the points to be protected. On 21 March 1815—less than 3 months after the Treaty of Ghent was signed—Brigadier General Joseph G. Swift, the Chief Engineer, wrote acting Secretary of War Alexander J. Dallas that he had made arrangements for sending

> ... Officers of Engineers to the various Important Ports and harbors between Maine and New Orleans, for the purpose of Inspection, and Reporting fully upon, the present state of Fortifications—and to select, if requisite, judicious Sites for New Works to protect the principal positions on the Sea Board and the avenues to them. —I have commenced upon the above plan by sending an Officer of Engineers to South Carolina

> and Georgia, and I have Officers ready to proceed to Mobile and New Orleans—I shall retain this office in N. Y. 'til I receive your orders upon this subject—[14]

Lieutenant Hyppolyte Dumas was dispatched to Mobile and New Orleans, and the next year, Lieutenant James Gadsden followed. Repairs were started on local forts. Gadsden was promoted to captain, and by November 1818 had received the title "Superintending Engineer for the Gulf of Mexico Frontier." By this time Spain had ceded Florida to the United States, and Gadsden reported to Major General Andrew Jackson, Commander of the Department of the South, on the conditions of the Florida fortifications, especially of Barrancas in Pensacola Harbor.[15] Thus, Engineer work in Louisiana began to shape up. Their first responsibility was to fortify the nation's soft underbelly; the Gulf region was to be treated as a unit, and placed under a superintending engineer. This pattern would remain unchanged until the 1850's.

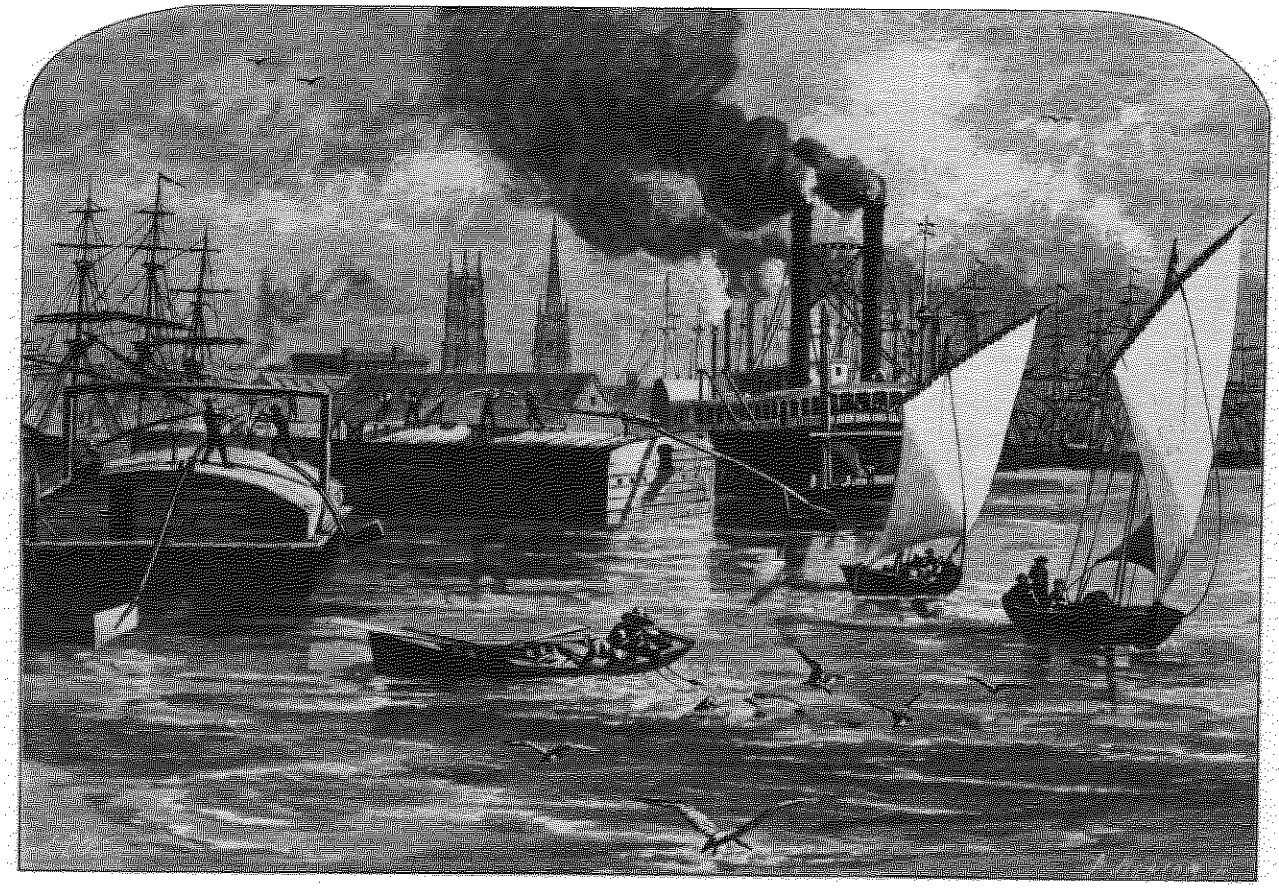
Linked to the new military activity was a plan for unifying the nation by constructing a network of national roads and canals. Originally sketched by Treasury Secretary Albert Gallatin in Jefferson's time, the internal improvement program received a new impetus from the experiences of war. Aided by favorable laws and court decisions, growth of the program during the 1820's decisively enlarged the mission of the Corps of Engineers.

In 1816, on the authorization of Congress, President Madison employed Simon Bernard, one of Napoleon's engineers, and assigned him to the Corps of Engineers with the rank of brigadier general. A Board of Engineers for Fortifications was then created, with Bernard a member. Despite considerable jealousy from his American colleagues, Bernard played a decisive part in the development of the Corps during the succeeding decade.[16] Bernard and his fellow members of the Board embarked on an exhausting program of travels about the country, beginning at New Orleans in February 1817.[17] Here Captain William T. Poussin, one of a staff of topographical engineers recently employed by the government, joined him the following month.[18] Together with Lieutenant Colonel Joseph G. Totten, another member of the Board, these officers played an important role in shaping the new national policy. Bernard, Gadsden, and a third officer formed a Board of Commissioners on the Gulf of Mexico Frontier and recommended the sites to be fortified. Gadsden was appointed to superintend the work, which the Chief of Engineers enumerated as "the Works at Mobile Point, at the Rigolets, at Chef Menteur, at Plaquemine(s) and at Grand Terre." He was promised "such assistants as the strength of the Corps will permit," and the Chief of Engineers undertook to advertise for proposals to furnish "Brick & Stone & Workmen at Mobile, Lake Pontchartrain, River Mississippi & Lake Barataria."[19] A contract for the fortification work was signed with a civilian, Nathaniel Cox, who was to serve as "Agent (of) Fortifications" at New Orleans. Provision was made to spend about $43,000 per month for "nearly three years," according to the optimistic first estimate of the Chief of Engineers.[20] Between 1819 and 1830 the future Forts Jackson, Macomb, Pike, and Livingston—and the smaller Battery Bienvenue and Tower Dupres on Lake Borgne—began to rise. In 1841 work started on Fort St. Philip as well. Most formidable of the forts was Jackson, a structure combining great strength with enormous firepower. Gaining fame in the Civil War, the fort would defend the river until 1898.[21]

Meantime, Congress at the urging of representatives from the developing west, began to make provision for exploring and mapping the Mississippi and Ohio, and clearing obstructions from their channels.

Traffic on both rivers was swelling as their borderlands were settled. The farmers of the Ohio country still shipped their produce to New Orleans by raft and keelboat, but in 1811 the steamboat began its career upon the western waters. In 1819 Congress authorized the Engineer Department to survey the tributaries of the Mississippi,[22] and in 1820, it voted $5,000 for a survey of the Mississippi and Ohio, "for the purpose of facilitating and ascertaining the most practicable mode of improving the navigation of those rivers."[23] During the last three months of 1821 Captain Hugh Young, Captain Poussin, and Lieutenant Stephen Tuttle carried out the survey under the direction of the Board of Engineers, mapping the river with considerable thoroughness from St. Louis to New Orleans. The Board's report of 1822, based upon the work of these officers, helped to influence Congress to undertake clearance of the river. The main danger to navigation was "snags," dead trees toppled into the river by caving banks. Some of these, called "planters," became fixed in the bed of the stream; others, called "sawyers," were more loosely anchored, and oscillated with the current just below the surface of the water. Snagging was an obvious first step to make the river a useful commercial and military highway. Though superficial by later standards, much of the language of the report passed into that of a House committee which recommended government action.[24]

Armed with the report, Westerners and Southerners argued that the navigation of the great river was as much a national concern,



The Mississippi at New Orleans.

and as deserving of the taxpayer's dollar, as ocean commerce. However, many lawmakers doubted that the Federal Government had constitutional authority to improve rivers. In the spring of 1824, Chief Justice John Marshall decided in the case of *Gibbons* v. *Ogden* that Congress held power over commerce on all navigable waterways—a legal breakthrough that made the federal civil works program possible. Congress acted, and on 24 March 1824 President James Monroe signed the first law committing the Federal Government to improve the Mississippi River.[25] Seventy-five thousand dollars was appropriated to enable the government to build and operate snag boats to clear the Mississippi from the mouth of the Missouri to New Orleans, and the Ohio from Pittsburgh to its junction with the Mississippi. This work would continue with some interruptions until 1854.

Congress next turned to surveys. An act of 30 April 1824 authorized the President to employ Army Engineers to draw up surveys, plans and estimates "for the routes of such roads and canals as he may deem of national importance, in a commercial or military point of view, or necessary for the transportation of the public mail...."[26] The language of the act clearly reflected the government's new, close ties with private capital. Members of the Engineers, especially the Topographical Engineers, now were loaned to private companies whose activities were supposed to be of national interest.[27] In this capacity the Topographical Engineers surveyed, among other works, the Chesapeake and Ohio Canal and "the railroad from Baltimore to the waters of the Ohio." In addition, work progressed under Engineer guidance on the Cumberland National Road, surveys for the improvement of the Tennessee River at Muscle Shoals, and for a proposed canal across Florida. A national road from Washington to New Orleans, also projected, bogged down in political squabbles among the proponents of four competing routes.[28] Considering that at this time the Corps consisted of 22 officers and 10 full-time Topographical Engineers, the ubiquity of its members and the importance of their activities were astounding.[29]

Yet the program of internal improvement was politically premature. After 1828 Andrew Jackson emerged as the popular spokesman of all the interests which did not share in the benefits of the American System. He broke up the alliance between government and business, crushed the Bank of the United States, and condemned Federal partnership with private capitalists. He proposed to turn the job of improvement over to the States, and vetoed a test bill giving Federal aid to the Maysville Road Company in Kentucky. Since the Maysville Road would have run past the plantation of his archenemy Henry Clay, there was some question of personal spite about the veto.[30] Later, however, Jackson developed a set of standards for future projects which went beyond the politics of personal revenge. He ruled that internal improvement projects were to receive the aid of the United States only if they related to the seacoast, to navigable waterways, or to the transshipment of foreign commerce in some clear and direct way. Then, to drive home his point, he vetoed a Rivers and Harbors Act, and threatened to do the same with others in the future.[31]

It will surprise no one familiar with the ways of politics to learn that Jackson's administration backed many activities of precisely the sort which the President condemned. Indeed, by contrast with his successors in the White House, Jackson was rather favorable to internal improvements.[32] Yet, his administration did mark a turning point, after which such projects increasingly fell victim to constitutional scruples, state jealousy, and sectional conflicts. A law of 1838 forbade Topographical Engineers to work for private companies.[33] Survey work for railroads had ended and was not resumed until the

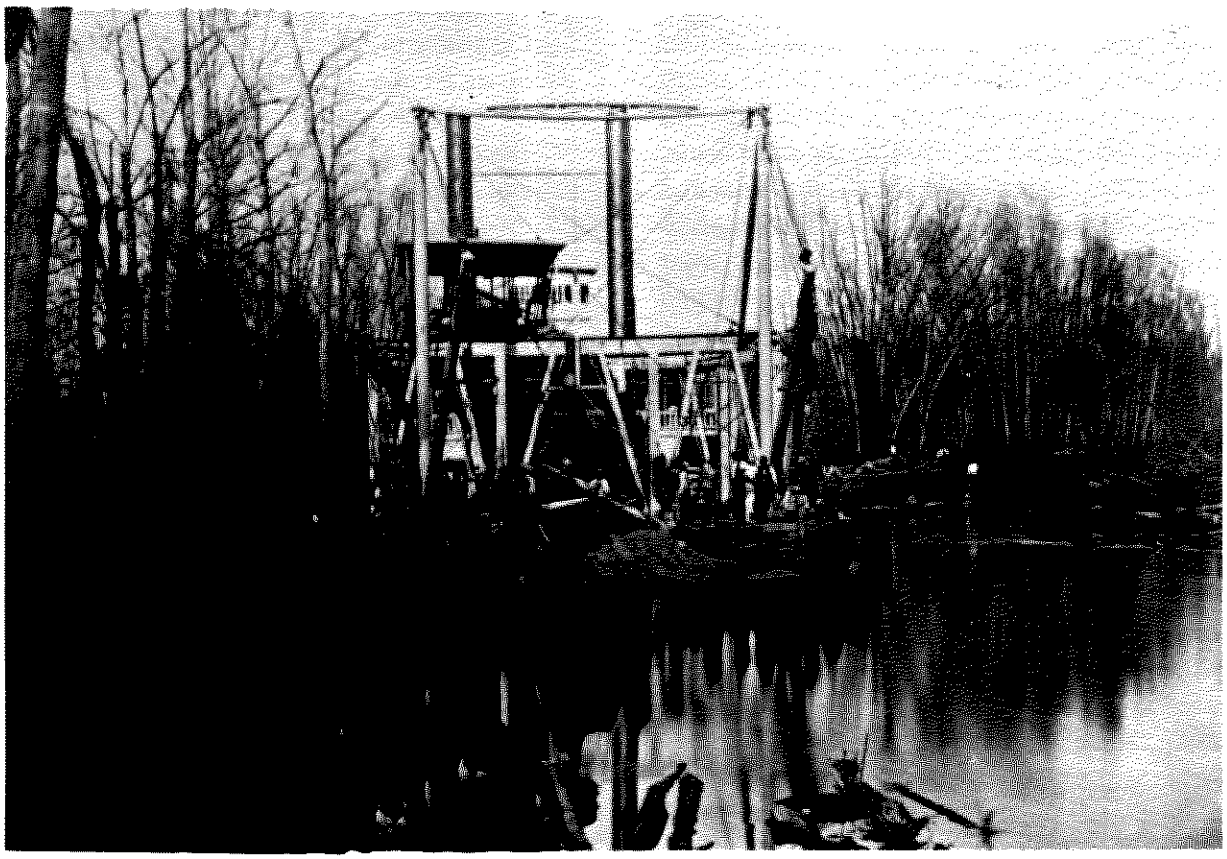
1850's. Other forms of improvement suffered more than the railroads, whose profits attracted private capital and local aid. Failure of Congress to make appropriations several times interrupted the work of the snag boats, and in 1855 the government sold the boats and abandoned the Mississippi to nature. The civil-works program was in decline. Great continuing works were undertaken by fits and starts, appropriations for the year ahead could never be counted upon, and promising works begun in one season were abandoned in the next. Fundamentally, the United States was a country of strong local loyalties, whose people believed in keeping the national government weak and its budgets small. Not until the emergence of the Republican Party would a power come on the national scene capable of gathering and applying the political force necessary to a continuing program of Federal action, and then only after the Civil War had permanently altered the nation's priorities and its ideas of the nature and powers of the national government.

Engineer operations in the Gulf region during these years included snagging carried out under the Chief of Engineers upon the Mississippi River; that of resident military Engineers at New Orleans on the fortifications of the city; and civil works occasionally assigned to these same men. In addition, the Topographical Engineers—after 1831 organized as a separate bureau of the War Department—carried out important survey work, culminating in the great Delta Survey of 1850-1861, one of the decisive events in the history of the Alluvial Valley.

These Federal efforts were supplemented by a determined effort on the part of the riparian states to reorganize the work of levee building on a sounder and more imaginative basis. After the great floods of 1849-1850 Congress also made an interesting though unsuccessful attempt to help the states to help themselves, as a substitute for direct Federal action. Finally, the period before the Civil War was marked by the appearance of river conventions, drawing support from a variety of interests along the river and from politicians as diverse as John C. Calhoun and Abraham Lincoln. The sum of all these efforts, Federal and state, was to demonstrate the ineffectiveness of uncoordinated local action, to give both the states and the Engineers some preliminary experience in organizing to meet the problem of the river, and to give those entrusted with the Delta surveys—the civil engineer Charles Ellet and the Topographical Engineers Captain Andrew A. Humphreys and Lieutenant Henry L. Abbot—the chance to draw up comprehensive plans for Federal action in the Valley.

On the Mississippi River, the snag boats were for years directed by their inventor, Henry M. Shreve. Famous as a steamboat builder and operator, Shreve was appointed as civilian superintendent of improvements on the Mississippi and Ohio and held the post from 1826 to 1841. He designed and built the first snag boats, and under general supervision of the Engineers worked indefatigably to clear the banks and channel. A man of immense energy, unencumbered by "book learning" and ready to dare anything, Shreve was a good representative of his age. His work extended to the Red River, which he found blocked by a gigantic raft. At the urging of Chief Engineer Colonel Charles Gratiot, he attacked the raft, snagging and blasting the dead trees and blocking up bayous by which the river had found ways around the obstacle. Restoring a moderate current to the main channel, he broke through into the upper river.[34] In 1835 he founded Shreve's Landing in what was still the territory of the Caddo Indians. The town was incorporated in 1839 and in 1871 would be chartered as the city of Shreveport.

Other efforts by the redoubtable "captain" were not so lucky. He tried several experiments with cutoffs, including one across



Scenes of the Great Red River Raft—1873.

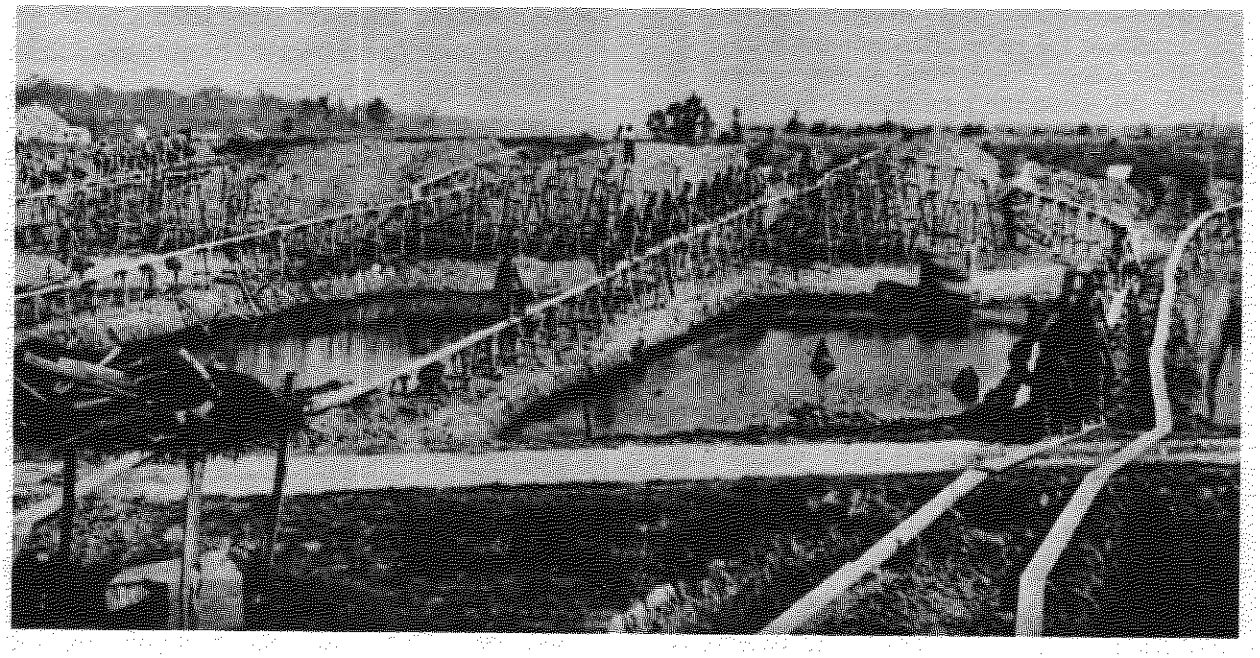
Turnbull's Bend where the Red River entered the Mississippi and the Atchafalaya left it. His purpose was to shorten the river and to permit steamboats to avoid shoals which had formed below the Red, but his work created a puzzle of five distinct channels—the Mississippi, the Red, the Atchafalaya, and the Upper and Lower Old Rivers (as the branches that had formed Turnbull's Bend came to be called), which plagued the Engineers until the middle of the twentieth century.[35] Moreover, "Shreve's Cut-Off," as contemporaries called it, along with Raccourci Cutoff which the State of Louisiana ordered to be made against the advice of its own state engineer, became the subject of studies by Ellet, Humphreys and Abbot, and many others. These studies made a general prohibition against cutoffs a part of accepted engineering lore. Not until the 20th century would the Engineers prove the controlled cutoff to be feasible.[36] A dominating figure in the history of the Valley, Shreve's influence was not always for the good. His bold, experimental approach led him into far-reaching errors as well as brilliant inventions and achievements.

Experiment, successful and unsuccessful, also characterized the efforts of the states to work out successful flood control policies. Action was essential; in Louisiana alone, nearly 5 million acres remained subject to periodic flooding. Until midcentury, the old reliance upon riparian landholders to build and maintain the levees continued without significant change. However, this policy became increasingly unrealistic as settlement

went apace behind the natural levees. Riparian owners demanded, and eventually compelled, their states to tax all residents in proportion to the benefits received. In Mississippi, taxation of the backlands began in 1846, though responsibility for actual levee construction remained a servitude of the riparian holders. By 1856 a complex system had emerged in Louisiana based in part upon the new and useful concept of the levee district. A levee district might be a parish or several parishes combined; it was run by a board of commissioners who possessed power to tax all residents of alluvial land, to let contracts, order new levees constructed, and repair old ones. Power to issue bonds was granted later in the century. The commissioners also were empowered to call out forced drafts of slaves to combat crevasses. "The (levee) Commissioners," wrote the Louisiana civil engineer Caleb G. Forshey, "employed engineers, enacted rules for levee dimensions, and raised this work of protection to the dignity of a profession."[37]

In 1849 and 1850 extremely severe flooding occurred, inundating a large part of New Orleans as well as the Delta farmlands. Congress, anxious to help insofar as states-rights dogma would allow, enacted the Swamp Lands Act, which granted the riparian states about 27.8 million acres of flooded lands lying within their borders. The states were to levee and drain these lands, and to pay for the work by selling the reclaimed land, which would presumably rise in value as the work progressed. The attempt to solve the flood problem by creating a sort of perpetual-motion machine, with revenue producing improvement and improvement producing revenue, ran as well as most such machines. The cost of reclamation was underrated, the work itself—notably in Louisiana—grossly mismanaged, and by the mid-1850's the scheme had evidently failed.[38]

Yet groundwork for national action was laid as a result of these same floods. In 1850 Congress appropriated $50,000 for a topographical and hydrographical survey of



Levee Building—old style. Convict and free labor work side by side at the Morganza Crevasse, 1890.

the river.[39] The decision to try to learn something about the Mississippi before attempting to control it was as wise as it was unusual. The Bureau of Topographical Engineers was assigned the work, and Captain Andrew A. Humphreys and Lieutenant Colonel Stephen H. Long undertook the survey, which was to last, with long interruptions, for 11 years.[40] At the same time, Charles Ellet, a civil engineer, began a second survey under the direction of the Secretary of War. The result was not only a fresh and comprehensive look at the river, but a vigorous clash of ideas whose outcome helped to shape Federal policy for generations to come.

Ellet's study of the river was relatively brief, and his report, *The Mississippi and Ohio Rivers* was published in 1851.[41] Roughly handled by Humphreys and Abbot, Ellet's work also received discriminating praise from later Engineers.[42] Its greatest weakness lay in a lack of extensive and precise measurement of the river's actual form and behavior. Ellet wrote:

> It is not the intention here, however, to enter into a minute discussion of the uninteresting and almost useless details of the recent floods in the lower Mississippi. The great object before us—to contrive measures for the protection of the Delta from overflow—is not to be attained by a microscopic examination of such local phenomena.[43]

Humphreys was to rest his conclusions upon precisely such a "microscopic examination." In consequence, even when he drew wrong conclusions, he was believed; even when Ellet drew right ones, his work remained suspect to the river's engineers. Ellet's work also betrayed its author's hobbies and private enthusiasms, too often with an insufficiency of proof that made the book an easy target for critics. *The Mississippi and Ohio Rivers* was eloquent on the possibilities of using reservoirs both to impound floodwaters and to release them at low-water stages for the improvement of navigation. Ellet ignored—as his critics were quick to point out—the unsuitability of the flat Alluvial Valley for dams, the role of rainfall within the Valley itself in causing floods, and the critical questions of precise location, feasibility, and cost in tributary basins where dams might be appropriate.[44]

The strength of Ellet's book was intuitive, and this strength was to be visible mainly in retrospect. While Humphreys committed himself to the "levees only" thesis, Ellet viewed the levee system as no better than a necessary evil.[45] He saw the river controlled by a complex of different means, mutually supplementing one another. Levees, reservoirs, and artificial outlets, working together, could control the river, he thought; no single engineering work, by itself, could accomplish that goal. He discerned the fact that the levee system would raise flood heights, and he warned against optimistic efforts to gloss over a serious danger.[46] Later generations would give Charles Ellet very high marks indeed as a prophet.

Appearing 10 years after Ellet's work, the *Physics and Hydraulics* of Humphreys and his new associate, Lieutenant Henry L. Abbot, used the earlier work as a foil and often took the form of an adversary document.[47] In some matters, it should be noted, the two reports were in substantial agreement. Both opposed the creation of cutoffs, on the ground that they raised flood heights below the cuts while lowering those above. Both failed to see the possibility of a controlled outlet for the river—the modern floodway or spillway—for use only in time of great floods. But these agreements did not obscure a basic contrast in methods, conclusions, and style.

For the *Physics and Hydraulics* was strong at almost every point where Ellet was weak, and correspondingly weak where he was strong. The book's claims were large, and they

were made without hesitation:

> A plan of investigation was adopted far more extended than any previously attempted upon any river.... The operations necessary to carry out this plan, it was conceived must furnish the mass of material essential to establish the fundamental principles of river hydraulics . . . . All knowledge requisite to accomplish the objects of the present investigations has been secured.[48]

As in the Gospel, people listened to Humphreys and Abbot at least in part because they "spoke as one having authority." But this authority was based upon measurements of a rigor, comprehensiveness and ingenuity that helped to establish a new standard for engineers, not only in the United States but abroad. Abbot and his civil and military assistants measured the intricate effects of the swamp-drains, and discerned the importance of rainfall in the Valley itself in causing floods. They produced a descriptive analysis of the river's bed and cross sections, of the behavior of its sediments, of the effects of crevasses, that had never been approached for thoroughness. They tried to sum up the behavior of the river in a comprehensive equation that would provide a basic tool for improving all large streams. Their work became a monument in engineering literature, and in the efforts of Americans to understand, so that they could control, the Father of Waters.[49]

Nevertheless, the very importance of the *Physics and Hydraulics* perpetuated its errors as no lesser work could have done. Humphreys and Abbot believed that the bed of the Mississippi was not ordinary alluvium, but an ancient blue clay laid down in a previous geological epoch, and, most important, that a levee system would itself protect the Alluvial Valley from floods. Neither assertion was true, but inclusion in the *Physics and Hydraulics* guaranteed perpetuation of these errors. Finally, the distinguished career that lay ahead of Humphreys—as a hero of Gettysburg and the Wilderness, and as Chief of Engineers after the war—would give the father of the *Physics and Hydraulics* the power, the opportunity, and the temptation to try to make his work an official dogma rather than a scientific study. How he succumbed to that temptation will be recounted in the next chapter.[50]

By comparison with the great surveys of the Topographical Bureau, the early history of the Corps of Engineers in the Gulf region was a record of beginnings rather than of mature achievements. Nevertheless, in the decades before the Civil War the Engineers evolved a mode of organization, built or completed fortifications that were to play a great role in the war, and made significant beginnings in several important public works near New Orleans, including efforts to clear the passes of the Mississippi.

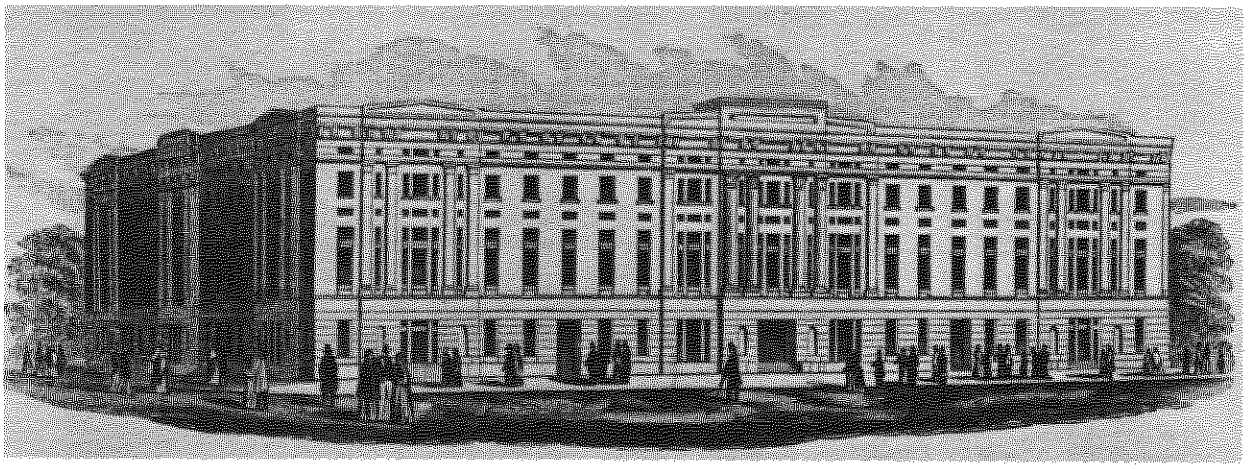
Until 1828 the Superintending Engineer for the Gulf of Mexico Frontier—Captain (later Major) William H. Chase—resided at New Orleans. In that year the government's decision to fortify Pensacola caused Chase to move his headquarters to the site of the work. The Corps attached great importance to the future of Pensacola, with its fine natural harbor, and Engineer officers investigated the possibility of connecting it with Mobile Bay, the Mississippi Sound, Lake Pontchartrain, and the Mississippi River by a protected waterway paralleling the coast.[51] Pensacola became the center of military activity in the Gulf, and it was from this spot that Chase exercised general supervision of the whole "frontier" until the 1850's. Apparently no officers were permanently stationed at New Orleans between 1834 and 1839, but in March 1840 Captain John G. Barnard arrived to superintend the construction of Fort Livingston on Grand Terre Island in Barataria Bay. In September he received an assistant,

Second Lieutenant Henry L. Smith, who was to serve consistently in the area until his death in 1853. A year after Barnard's assignments, First Lieutenant Pierre G. T. Beauregard was sent to New Orleans on temporary duty from Pensacola, where he had been Chase's assistant. This native Orleanian apparently liked serving at home, for he contrived to remain there pretty consistently except when called away to war. In May his temporary duty ended when he was assigned to superintend Forts Pike and Wood (later called Macomb), the guardians of the Rigolets and Chef Menteur. Barnard meantime had undertaken repairs of Fort Jackson and the old French Fort St. Philip on the Mississippi River.[52] Thus the organization of the Gulf Coast emerged as a prototype Engineer division, with headquarters at Pensacola and resident officers at New Orleans and other important points.

Though the "division" was at first concerned only with fortifications, its members gained experience in both field service and civil works during the decades before the Civil War. The approach of the Mexican War brought Chase and Barnard assignment to a special Board of Engineers to "examine the Gulf Coast with reference to defense." When fighting broke out, Beauregard was sent to Tampico, while Barnard remained at New Orleans until 1847, when he was ordered to report to Captain Robert E. Lee, chief engineer with Winnfield Scott's army. Six months later the war was over, and Barnard and Beauregard returned to New Orleans to resume their regular duties. Beauregard, however, won the rank of brevet major for his work in Mexico, and after some shuffling to and fro, he emerged in 1852 with responsibility for the forts formerly under Barnard's command. At about the same time he undertook, on orders from Washington, an ambitious though short-lived program of civil works as well.[53]

The Mexican War had caused a flareup in the quarrel between North and South, as the sections debated the future of slavery in the conquered territories. But in 1850 the dispute was apparently settled by compromise. With a Whig President in the White House, a brief revival of interest in Federally-financed internal improvements took place in 1852-1853. Beauregard examined a site for a proposed harbor on Lake Pontchartrain, directed the construction of New Orleans' new Custom House for the Treasury Department, and attempted to open a ship channel from the Mississippi into the Gulf. In addition, a variety of river and harbor works in Mississippi and Louisiana—and, shortly afterward, in Texas as well—were assigned to First Lieutenant Henry L. Smith. When Smith died of yellow fever at Madisonville during the epidemic of 1853, Texas was turned over to Beauregard and later to his assistant Second Lieutenant Walter H. Stevens. These endeavors of the early 1850's were a preview of future duties of the New Orleans Engineer Office.[54]

At the time, however, they were premature. The period of civil works activities under Millard Fillmore was short-lived, like his Presidency. In 1853, Franklin Pierce, a strict constructionist with a cabinet dominated by states-rights advocates, came to power. Not only did appropriations for civil works almost cease in 1854, but well-established policies for the congressional appropriation for snag boats, and his secretary of war—Jefferson Davis, future president of the Confederacy—sold the boats in 1855 for about one-fifth of their cost to the firm of Eads and Nelson, of St. Louis. James Eads, future builder of the Mississippi jetties, and his partner then offered to contract with the government for the clearance of the Mississippi, Missouri, Ohio, and Arkansas Rivers, guaranteeing as a condition of payment that the number of steamboat wrecks caused by snags would be reduced by 30 percent within 5 years.[55] The proposal passed the House but died in the Senate. The results were



The New Custom House, at New Orleans.

disastrous. In their last working year, ending 30 June 1854, the boats removed over 56,000 obstructions from the river. When operations were resumed a decade later the Mississippi would have become a maze of snags and wrecks, including wartime casualties of the fighting that marked the passage of Farragut and Grant. The Federal Government then would have the job of replacing the boats at greatly inflated postwar prices.[56]

By the mid-1850's all national concerns were being pushed aside by the renewal of sectional conflict. As if to signal the end of an era, Major William Chase, the pillar of the Engineers in the Gulf region since the 1820's, was reassigned in 1856, and resigned from the Corps in October of the same year. On 9 April 1857 the Corps created a Board of Engineers for the Gulf Coast, of which Beauregard was ranking member, the others being Stevens (New Orleans and Galveston), Captain John Newton (Escambia Country—that is, Pensacola—Florida), and Captain Danville Leadbetter (Mobile). Corps organization in the region remained in approximately this form until the eve of the Civil War.

In November 1860 Beauregard was appointed superintendent of West Point, and on 5 January 1861 was relieved of his duties at New Orleans by Brevet Second Lieutenant William H. McFarland. Within a week the works near New Orleans were "wrested from the U. S. by insurgents." Beauregard returned to New Orleans on 25 January and resigned his commission effective 20 February 1861. Stevens followed his example.[57] Already old comrades were taking up arms against each other. In April, Beauregard, as a Confederate officer, directed the bombardment of Fort Sumter. An era characterized by brick forts, major surveys, and tentative essays at civil works was ending. The war that would end the age of localism had begun.

CHAPTER TWO

THE FEDERAL COMMITMENT

The decade of the 1860's was the worst the Delta had yet endured. As everywhere in the South, war meant great loss of life and uprooting of population; then came the revolutionary destruction of black slavery, overthrow of the old ruling class, and the beginning of a troubled journey toward a new kind of society. For the Delta, the decade was also one of recurring natural disasters. The ruin caused by the flood of 1858 had not been repaired when war broke out, and new floods followed in 1862, 1866, and 1867, any one of which would have been a serious calamity in time of peace. The return of peace found the people of the Mississippi flood plain in a truly desperate situation, improverished yet obliged to undertake the costly job of restoring the levees before the recovery of agriculture—on which everything else depended—could begin.[1] Ironically, the Delta ultimately found salvation at the hands of the very agency that had played so large a part in devastating it—the Federal Government.

The reconstruction of the Mississippi Valley meant two things: reopening the channel of the river to navigation, and protecting the land against floods. In some ways these problems were intimately related, in some ways quite different. To New Orleans, reopening the river and clearing the Passes meant economic revival for a city whose life depended upon trade. To farmers of the northwestern United States, a reopened river seemed to promise an opportunity to force lower rates upon railroads by the competition of cheap waterborne transport. For people who lived in the flood plain, the emphasis was quite different: transportation was important, but flood control was a matter of life or death. Northern business interests that invaded the South in the wake of the armies had their own concerns. Buying into commercial real estate and agricultural lands, eastern capital acquired a growing practical interest in the progress of flood control—an interest which became greater as railroads built their vunerable trackage across the flood plain. The political and economic tributaries of the Mississippi ramified even farther than its tributary streams. The New York Chamber of Commerce, Jay Gould's railroad empire, the Granges of Illinois and Wisconsin, the cotton and sugar growers of the flood plain, and the commercial houses of New Orleans all had their own special needs. All pressured the Federal Government to secure action that would favor themselves.[2]

The government's reaction to these pressures was equally complex. Transformed by the Civil War, Washington wielded powers that Americans had never conceded to it before. While constitutional questions would continue to be raised for decades to come about its right to spend money for flood control, the

debate would take place against a new factual background. The war that had wrecked the Delta had so strengthened the Federal Government that a comprehensive national policy for the Mississippi had for the first time become possible.[3] Yet action came slowly. Washington began by moving along familiar grooves—surveying the problem, making reports that brought no action—while embarking on programs very similar to those that had existed before the war. Then, gradually, and by ways no one could have foreseen, it moved toward major new programs of channel maintenance and flood control. Old habits died hard, and 14 years elapsed between the war's end and the first decisive break with the past.

Beauregard's resignation from the Corps in 1861 and that of First Lieutenant Henry L. Smith the following month left no Army Engineers in the Gulf region, except one at Key West and one at Fort Pickens in Pensacola Harbor.[4] From this low point the number of Corps personnel began to rise as New Orleans became the objective of Federal strategy aimed at conquering the Mississippi Valley and cutting the Confederacy off from its western supply bases. In 1862, a Department of the Gulf was created under Major General Benjamin F. Butler.[5] Lieutenant Godfrey Weitzel, who had worked on New Orleans' defenses from 1855 to 1859, became the first Chief Engineer of the new department.[6] After the rapid conquest of New Orleans in April the Federal army headquarters there became his duty station. At the end of 1862 Major David C. Houston replaced Weitzel, but the following month responsibility for the permanent fortifications of New Orleans was turned over to Captain John C. Palfrey, who commanded at Ship Island. In November 1863 his duty station became New Orleans and in March 1864 the forts at Pensacola were added to his command.[7] Thus two distinct commands emerged, one attached to the army and serving its needs, the other concerned with the immobile fortifications of the region.

From the Department of the Gulf evolved the Engineer District. In June 1865 Major Miles D. McAlester became Chief Engineer in time to see the department pass out of existence. For a time he bore the title "Chief Engineer of the Department of Louisiana," while another officer[8] took over Engineer duties with Major General Philip Sheridan's army of occupation. In December 1865 the defenses of New Orleans and Ship Island were given to McAlester, and by March 1866 he was described as being in charge of "Engineer operations on the Gulf of Mexico." By a curious game of musical chairs McAlester had now moved into a position closely resembling Major Chase's old command. In his new role McAlester soon began to undertake civil works very similar to those of prewar days. An Engineer letter of July 1866 charged him with "improvements of mouth of Mississippi River," and by January 1867 he was dredging Southwest Pass. His report from New Orleans of 29 March 1867 bore the heading "United States Engineer Office," and with the adoption of this title the evolution back to a peacetime resident Engineer was complete.[9] The continuity with prewar days was plain. Yet changes wrought by the war made possible a continuous expansion of civil duties that contrasted strongly with the tentative and sporadic efforts of earlier times. Within a decade, the Engineer Office at New Orleans would take responsibility for a melange of such works, including the maintenance and improvement of New Orleans and Galveston harbors, surveying for an Intracoastal Waterway, and improving a host of minor harbors, rivers and streams stretching from the Pearl River to the Rio Grande.[10]

Opening the Mississippi was the first major Federal problem. At war's end the river was in

an appalling state. Snag boats had not operated since 1854, and dozens of wrecks, including some left by the war, encumbered the channel. Caving of forested banks had added the usual quota of "planters" and "sawyers" to the streams. Urged on by many pressures—including a memorial sent to Congress in 1866 by the politically potent Union Merchants' Exchange of St. Louis[11]—the Federal Government began to move into an area where its authority was traditional, and political pressures made action necessary. By mid-1867 the Engineers had established an Office of Western River Improvements and under Colonel John N. Macomb the rebuilding of the snag boats began.[12] To deal with wrecks, "submarine armor, diving-bells, and electro-magnetic batteries for exploding torpedoes" were added to the snag boats' more conventional fittings. After more than 10 years the Federal Government was back in the business of channel clearance. But this was only a beginning.

Farmer agitation against rates charged by the railroad trunk lines grew rapidly in the years following the Civil War. The attractions of the Mississippi as an alternative route to market—cheap, well adapted to the transport of bulk goods, a water highway "free for every man to run his boat and where no corporation should own the track—"[13] were very great, as a succession of national river improvement conventions made plain. But if the river was to become once again a main road of commerce, New Orleans must be made a satisfactory port for transshipment of goods. This meant clearing from the Passes of the Mississippi the bars which were obstructing trade. All the commercial and farming interests of the Mississippi Valley wanted this improvement, and the opening of the Passes, plus snagging, represented the least action that Congress felt it could safely take to free the Mississippi for navigation. In March 1867 Congress authorized the Secretary of War to build and operate two steam dredge boats to open navigable channels through the bars of the Mississippi.[14] In June the Secretary of War passed on the job to the New Orleans Engineer Office.

After the duties of war and the confused transition to peace, the Engineer Office at New Orleans had received an old assignment, backed by a new urgency. In struggling to open a channel through the Passes, McAlester and his successor, Major Charles W. Howell, found themselves at a critical point in the evolution of the Corps and its civil works responsibilities.

At each of its mouths the Mississippi lost velocity as it met the waters of the Gulf, and dropped its burden of silt and the "bedload" of heavy sand and sediment that was pushed along the bottom of the river. These sediments piled up forming a bar which gradually obstructed the river mouth. At the crests of its bars, the Mississippi oftentimes ran only 8 to 12 feet deep in the major passes. By the late 1860's it was not uncommon for oceangoing ships to require 25 feet of water, and the Port of New Orleans was becoming more and more isolated from the most profitable forms of commerce.

Attacks on the bars had their own history. In 1726 the French attempted to loosen the bar at Southwest Pass by dragging an iron harrow across it.[15] In the next century and a half, a number of devices were tried: a bucket drag in 1837; harrowing again at Southwest Pass, which opened a temporary channel in 1852; privately constructed jetties of board and pilings in 1857; and a final try at "stirring up" between January and August 1860.[16] Successes were temporary at best. Though many other rivers were afflicted by bars—including the Rhone, Danube, and Vistula—the Mississippi was distinguished by its size (fourth largest river in the world) and the fact that it discharged into the sheltered Gulf of Mexico where tidal action was weak.[17] In addition, the Mississippi was exposed to tropical hurricanes

during half the year, which meant that any solution to the problem of the Passes had to be one that the next storm surge would not destroy. Few more perplexing problems faced the hydraulic engineers of the 19th century than this, and careers were made or wrecked on the bars of South Pass, Southwest Pass, and Pass a Loutre.[18]

Federal action began in June 1866 when Congress voted $75,000 to improve the mouth of the Mississippi—first such appropriation since the Civil War.[19] In July an Engineer order specified use of a private contractor, and McAlester engaged Horace Tyler, who had an imaginative new idea to offer.[20] Tyler adapted a double-ender steamboat with conical four-bladed screw propellers below the keel, and an auxiliary harrow at each end. Functioning as drills, the screws proved capable of tearing up the bar material. But the adapted steamboat was a jerry-built affair which suffered many breakdowns, while Tyler offered McAlester increasingly imaginative excuses. Finally in May 1867 the contract was cancelled, when it appeared that the contractor was "likely to accomplish no results."

Meantime, in March 1867, Congress had authorized the Secretary of War to build and operate two steam dredgeboats on the Mississippi. McAlester now submitted plans and specifications for building an elaborate improvement upon the principle of Tyler's dredge. Sixteen-foot screw propellers at each end of the boat and iron scrapers were to do the work of harrowing the bar. His plans were approved in June, and a Boston firm entered the low bid of $223,000 for the work. By October McAlester was in New York "perfecting plans, etc.—for Steam Dredge for Mouth of Mississippi River." His assistant Lieutenant David Payne went to Boston to oversee the work, which was long and difficult.[21] Not until July 1968 did the new-christened *Essayons* undertake the sea voyage to New Orleans, where she arrived without serious accident.[22] By October marked success was being claimed for the new craft, which was gnawing at the bar of Pass a Loutre.[23] Yet disillusionment followed and the whole question of the Passes had to be reopened. What had gone wrong with the *Essayons*?

> She was commanded (stated a report of the New Orleans Engineer) by competent and disinterested officers of the Federal Navy. These men performed their duty faithfully. The dredge-boat was repaired and altered without regard to expense, and the experiment of dredging has been conclusively made. It has failed to maintain permanently a much greater depth of water than that which nature has prescribed as the regimen depth on the bar. Dredging has, therefore, proved a failure. To deepen the bar at the season when there is little current is not very difficult. (But) the whole labors of a season have been, and may be again, destroyed in a night.[24]

It was against the background of this expensive failure that McAlester's successor, Captain Charles W. Howell, received orders in 1871 to make surveys and estimates for a ship-canal to connect the Mississippi River with the Gulf of Mexico.[25]

The origin of this idea went back at least to 1837, when Major William Chase explored the possibility in a report to the Chief of Engineers. Chase favored the idea, but no action was taken to implement it.[26] In 1852 an act appropriated $75,000 for "opening a ship channel between the Mississippi and the Gulf," and a board of one Naval and three Engineer officers convened to decide how the appropriation should be spent.[27] Beauregard was a member of that board, which concluded that the limited funds available made impractical any course other than stirring up the bar at Southwest Pass. But in its report, the Board went on to discuss four methods of opening the Passes, in increasing order of difficulty and expense: stirring up, stirring up assisted by dredging, contraction of the river by jetties, and closing

the useless passes.[28] If all else failed, they recommended consideration for a ship canal as a "plan to fall back upon." Howell took the position that all else had failed, and that, expensive as it was, the ship canal could be justified by its benefits to navigation. Following Chase's proposal, Howell recommended in 1874 that the canal be built near Fort St. Philip, where the river was separated from the Gulf only by a narrow strip of marshy land. The canal was to be protected by a lock, and would open into Breton Sound, where adequate depths of 30 to 40 feet were to be found on a stable bottom of firm clay.[29] Once built, the canal would provide a permanent solution to the recurrent problem of the Passes.

In making this proposal, Howell could count on strong backing. The prestige of ship canals was high since the completion of Suez in 1869. The most famous military engineer in the New Orleans area was Pierre Beauregard, and Beauregard had come to favor the canal. The business community of New Orleans had inspired the original investigation by Chase, and took up the plan anew in the 1870's. Finally, the idea was embraced by Brigadier General Andrew Humphreys, and Humphreys was not only *the* expert on the river, after July 1866 he was also Chief of Engineers.[30]

Yet there was opposition from the start. Howell's estimate of the cost of a canal was $7.4 million, and he admitted that this did not include "amounts required for engineering, superintendence, and contingencies." A later estimate by Humphreys raised the cost above $10 million. Perhaps a solid front in the Corps of Engineers might have succeeded in putting over the canal, but the Corps itself was divided. In June 1873, an Engineer Board met at Washington to consider the canal and approved it with one significant abstention. Colonel John G. Barnard, President of the Board, who once had shared the responsibilities at New Orleans with Beauregard, entered a minority report. He declared that defense problems and the possibility of storm damage to ships waiting in Breton Sound made the canal a dubious idea. Instead he suggested that thought be given to a jetty system. Prophetically, he rejected Southwest Pass and Pass a Loutre as the proper site for jetties, and pointed instead to South Pass: narrow, relatively straight, yet entirely adequate, when cleared, for the passage of large ships.[31] Doubts caused by the high cost of the canal—intensified by the severe depression that struck the country in 1873—were reinforced anew by this division among the Engineers. At about the same time as the Engineer proposal, Congress began to consider an alternative put forward by civil engineer James B. Eads of St. Louis.[32]

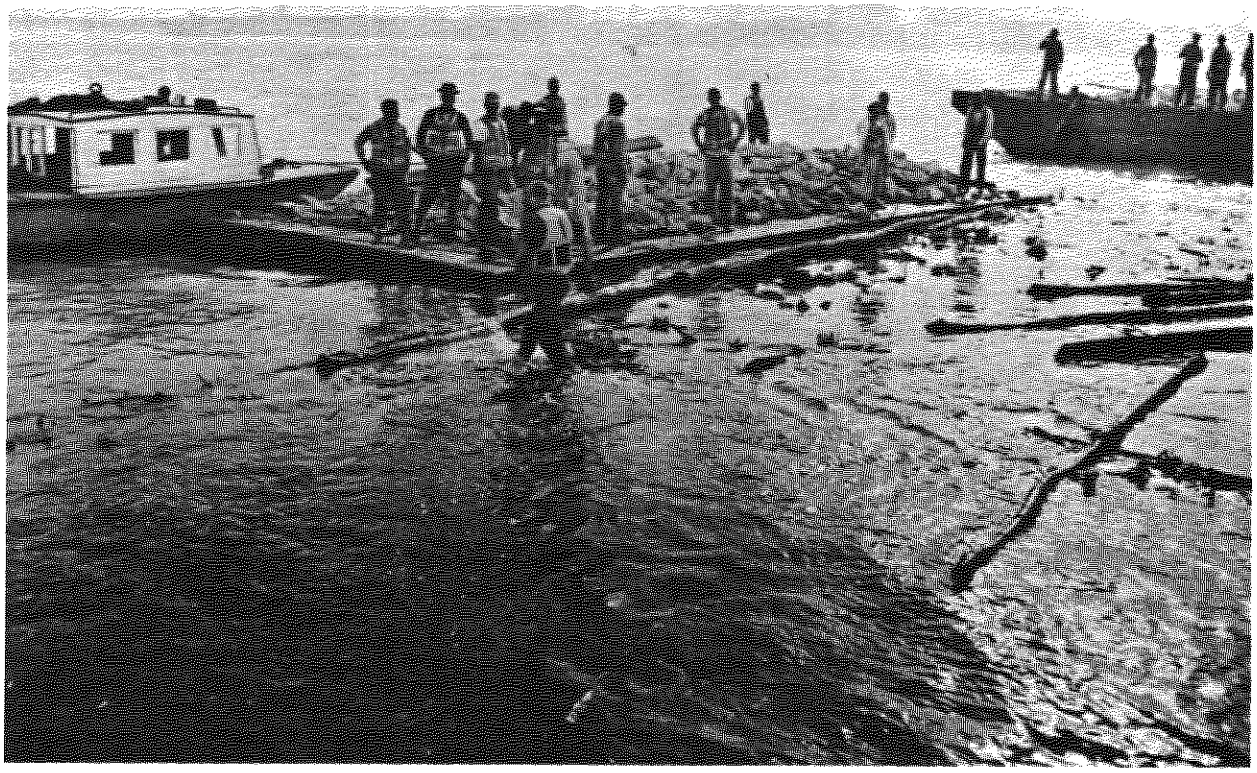
Eads had already won considerable fame as a shipbuilder for the Navy during the Civil War, and as an able engineer both before the war and after it. He had salvaged wrecks in the Mississippi, using a diving bell of his own invention, and in 1874 was building a steel bridge of original design across the river at St. Louis. Gifted in a variety of ways, Eads was not only an engineer, but an organizer, at home in office or field, able to rule a mob of immigrant laborers or confront a congressional committee with equal skill. He knew how to get the backing of moneyed men, and he had a gift for self-advertisement, a flair for propaganda. In many ways he resembled his Robber Baron contemporaries, but without their dishonesty and technical ignorance. He was no mean opponent, as the Chief of Engineers was to discover.[33]

According to his own statement, Eads first urged the jetty plan upon a group of Congressmen visiting the mouth of the river in May 1873. Shortly before the end of the year he made a formal proposal to open Southwest Pass by means of jetties for a payment of $10 million. Debate began in Congress, and at first the proponents of the canal prevailed; in June

1874 the House appropriated $8 million to begin construction of the canal.[34] But a Senate committee rejected the bill. In view of the conflict over the two plans, Congress then set up a mixed board of experts composed of three Army Engineers, three civilians, and one member of the Coast and Geodetic Survey. Its report, in January 1875, emphasized the division within the Corps and two Engineers—Brigadier General Cyrus B. Comstock and Brigadier General Barton S. Alexander—voted with the three civilians and the Coast and Geodetic Survey officer to approve the jetties and recommend South Pass for the experiment.[35] The House, sensitive to political pressure in the West and ready to approve any plan that gave a promise of working, promptly voted to pay Eads $8 million for opening Southwest Pass, with an annual maintenance grant of $150,000. During debate the Corps was both attacked and defended, but probably Missouri Congressman Edwin O. Stanard, who reported the bill, gave the best statement of why Congress accepted Eads' proposition; the Engineers had so far failed, the Treasury was in no good state, and Eads offered to get results first and charge the government later.[36]

The Senate drove a harder bargain. First it insisted on South Pass instead of Southwest. Barnard had already recommended this pass for engineering reasons, but the Senate was influenced by the fact that the pass was entirely worthless as it stood, with only 8 feet of water over the bar. Construction work would not obstruct navigation, and, if Eads failed, he would leave things no worse than they had been before.[37] The Senate also determined to pay Eads only $5.25 million, in a series of payments as successively deeper and wider channels were attained. Maintenance and interest on retainage, however, raised the total to $8 million over the 20 years that the contract would run. Eads was to get his own backing and was to be paid nothing until the specified channels had been achieved and certified by officers of the Corps of Engineers.[38] The job of checking Eads' work was given, not to Howell at New Orleans, but to Brigadier General Cyrus B. Comstock, who had voted for the jetties on the board of 1874.[39] After Eads had established his base of operations, First Lieutenant Charles E. B. Davis was sent there to check his work. In 1876 Captain Micah Brown took over his duties. Under this setup, Eads began the work of giving New Orleans a permanent passage to the sea.

Eads' struggle proceeded on three levels simultaneously. Engineering work began as his workmen built Port Eads on the bank of South Pass and ran a telegraph line to New Orleans. At Port Eads material was accumulated, and the workmen, supervising engineers, and the Army Engineer officer assigned to observe the work had their quarters.[40] On 14 June 1875 work got under way on the alteration of South Pass. This involved two separate operations, one at the mouth of the Pass where the jetties were being built, and one at the Head of Passes, where South Pass was further obstructed by a shoal. Structure of the jetties was simple. To a line of pilings willow mattresses were attached and sunk with broken stone. On this foundation, alternate layers of broken stone and fresh mattresses were laid. When the surface was reached, a railroad line was run out on piers laid over the pilings and concrete poured from dump cars into wooden molds. The east jetty proceeded directly out from East Point, the extremity of the land; the west jetty, since it stood within the old mouth of the Pass, was connected to the west bank by a structure known as Kipp Dam. Most complex and demanding work came within the Pass, where wing dams were built to increase scour, and at the Head of Passes, where structures described as "T-dams" redirected the flow of water to scour away the shoal. Additionally, sill dams were constructed across Southwest Pass and Pass a Loutre to reduce slightly the flow of

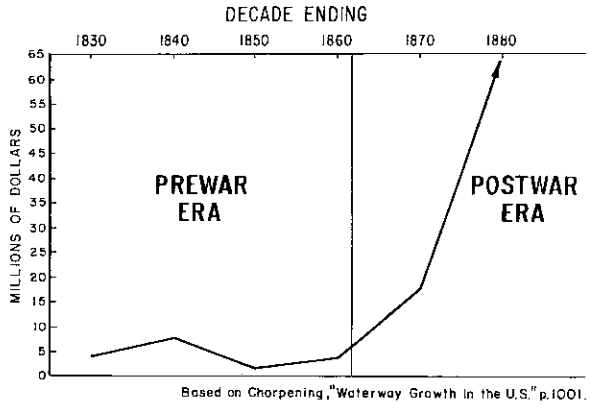


"Walking on the Water." Evenly distributed crushed rock gradually sinks a willow mat beneath the water. *(Photo by C. Fortier)*

water into the main passes and force it through South Pass.[41]

Eads' second struggle was his continuing fight for money. Congress was slow to pay, and the government's leisurely methods drove the engineer to distraction. Large debts had to be incurred, and excursions were instituted for visiting capitalists to enable them to examine the works for themselves.[42] Every effort was made to paint the most encouraging picture of the jetties' progress, and every possible pressure brought to bear on a reluctant Congress to secure easier terms. Eads claimed that the channel prescribed for the final payment, 30 by 350 feet, was too large for South Pass to bear, and he lobbied vigorously for alterations in the bill, getting one change in 1878 and another in 1879.[43] Thus the financial and political war went on beside the engineering work.

Intimately involved with the success of this fight was Eads' third battle—with the Corps of Engineers. Eads portrayed himself as a David fighting the Goliath of the Corps, a picture which contained both truth and falsehood. The Engineers were by no means unified in



Federal appropriations for waterways development.

opposition to the jetties, but Chief of Engineers Humphreys fought them relentlessly.[44] The Corps was his life, and Congress' action in giving Eads so important a work as opening the Passes struck him as being an attack on the organization—a feeling which the remarks of some members of Congress may have encouraged.[45] Egotism also played a role. Humphreys had become a captive of his own classic, a theologian defending his own Holy Writ. The *Physics and Hydraulics* said that jetties could not succeed, for a new bar would form, requiring them to be lengthened year by year.[46] As reports of his own officers piled up, showing that the bar was not reforming, Humphreys in no way changed his position; he seemed to feel that anybody who supported the jetties was impugning his own status as the final authority on all aspects of the Mississippi River. In taking this line, he increasingly set himself in opposition to national policy as established by Congress.

Howell seconded his chief's hostility. He took surveys which showed—surprisingly, in view of what was actually happening—that the Gulf just beyond South Pass was shoaling as Humphreys said it would.[47] He then leaked the results of his surveys to potential investors in the jetties and to the New Orleans newspapers.[48] The surveys of Captain Micah Brown were sent through official channels, eventually winding up in Humphrey's hands. Eads was not able to see them until they had been printed in the report of the Secretary of War, by which time, of course, they were long out of date. The officers Eads approached for survey results told him that their reports could only be shown to their superiors.[49] Meantime Howell made his opposition public. "I know," he wrote in an open letter to two New Orleans newspapers, "that... seaward of the outer end of (Eads') jetties the Gulf has shoaled at a rate which, if continued, will in eighteen high-water seasons bring the Gulf bottom to the surface, and necessitate the prolongation of the jetties at least seven and a half miles.[50]

But Eads was a vigorous partisan as well as an engineer, and he had potent backers who were not inclined to lose their investment. A bribe bought the backing of General Beauregard for the jetties. An open letter to the Secretary of War brought an order to Comstock to allow Eads access to the surveys.[51] As the facts of the surveys came to light, they gained added weight from the accurate and extensive work that Captain Brown was doing at Port Eads. He found a channel forming which, despite many changes in the alluvial bottom, was clearly growing wider and deeper. Brown painstakingly measured the depth of the sea on radial lines fanning out from the jetties, and sent to Washington charts which proved conclusively that no new bar was forming.[52] Running between its artificial banks of piling and willow mattresses, crushed stone, and poured concrete, the Mississippi was hurling its sediment down the continental slope into water so deep that Eads' own estimate of two generations as the lifespan of his jetties would prove to be too short. By 1877 oceangoing ships of the largest size were regularly entering the Mississippi by the smallest of the major passes.[53]

But General Humphreys was not content to admit error. His last fight was against the creation of the Mississippi River Commission, in which he saw a plot to advance the fortunes of Eads.[54] On 22 June 1879 the President approved the bill setting up the Commission. It was widely understood that he would appoint Eads one of the civilian members. Eight days later Humphreys retired from the Corps of Engineers. He was 69 years old, and covered with well-deserved honors. But his last years of power had been embittered by a controversy in which he showed the worst, instead of the extraordinary best of himself.

The triumph of the jetties played a significant part in the creation of the

JAMES B. EADS, C.E.
502 CHAMBER OF COMMERCE
ST. LOUIS, MO.

Mr. Eads died about may 1887

Captain W. H. Heuer
U. S. Engineers
Inspector of the Jetties &c.

Dear Sir.

Please accept my thanks for the annual report upon the Improvement of South Pass for the year ending June 30th 1881, with the maps accompanying the same, all of which I found two days ago on my return from Europe.

This constitutes, in my opinion, the most valuable and exhaustive report yet made on this work.

I have the honor to be
Very truly yours
Jas. B. Eads

Mississippi River Commission that followed. Congress had dared to ignore established precedents, had put a representative of the country's growing body of civil engineers in charge of building of a great public work, and had been justified by the results. With one success to its credit, Congress was more ready to listen to those who claimed that, for political, economic, and humanitarian reasons, it was time to adopt a comprehensive national policy for the protection and development of the Mississippi Valley. This would mean coming to grips with the intertwined problems of navigation and flood control, and the constitutional limitations which appeared to allow the Federal Government to act on the former but not the latter. It was high time that the effort was undertaken, for the record of floods in the Mississippi Valley since the Civil War was a grim one.

The postwar Federal Government began to interest itself in the flood problem in December 1865 when Secretary of War Edwin M. Stanton ordered Humphreys' to make a tour of inspection of the ruined levee system. Humphreys' report was gloomy. In the Delta alone he counted 59 crevasses, one of which was 2 miles long and flooded thousands of fertile acres at every rise in the river. A million and a half cubic yards of earth,

Humphreys estimated, would be necessary to fill the gaps, let alone bring the levees up to necessary grade. Humphreys' report was notable for his statement that the Federal Government—"some authority entirely beyond the influence of local interests," as he expressed it[55] must intervene to build the great mainline levees which he considered necessary if the Valley were ever to realize its potential.

But the government, though ready in 1865 to take surveys, was far from ready to take action. Humphreys' report was printed by the Senate, but nothing else was done. In early 1869, Abbot reported on progress since Humphreys' survey, and found the picture discouraging. He noted that "the State of Louisiana alone seems to have made a determined effort to close the breaks in the levees," but that, despite an expenditure of $2.7 million, "the early flood of 1867 caused immense destruction throughout the States."[56] The depression of 1873, followed immediately by the disastrous flood of 1874, capped the misery of the Valley. Alarmed at reports from the impoverished, flooded districts, Congress created yet another mixed board, generally called the Levee Commission, which was to "investigate and report a permanent plan for the reclamation of the alluvial basin of the Mississippi River subject to inundation...."[57]

The Levee Commission's report was impressive both for its analysis of what was wrong and for its recommendations on what was to be done. The Commission found 143.4 miles of crevasses south of Commerce, Missouri. It found the local levee boards desperately poor, without credit, and often incompetent in their methods of building levees. As a result of inadequate heights and erosion of the river's banks, 107.5 miles of levee had been destroyed in Louisiana alone since the end of the Civil War. Comprehensive reforms in construction methods, height and standard grade were needed. Above all the localism of the flood control system must be ended. "The army of defense," wrote the Commission, "has been content to remain a simple aggregation of independent companies, with here and there a battalion under the command of a board of officers. That victory has not more frequently perched upon their banners is surely not surprising."[58] Recommendations were revolutionary. Each of the six great drainage basins from Cape Girardeau to the sea should have "a chief engineer, armed with ample powers." These should include plentiful funds, the right of eminent domain in obtaining rights-of-way, and the power, in times of emergency, to draft for labor every able-bodied man within "a reasonable distance" of the levee. Policy decisions should be taken by a "general board of commissioners composed of a president and the several district chiefs with a permanent organization and stated times of meeting." This board should have no superior but "the supreme authority from which it derives its legal existence...." Whether this should be the Federal Government or some mutual compact of the riparian states, the Levee Commission did not presume to say.[59]

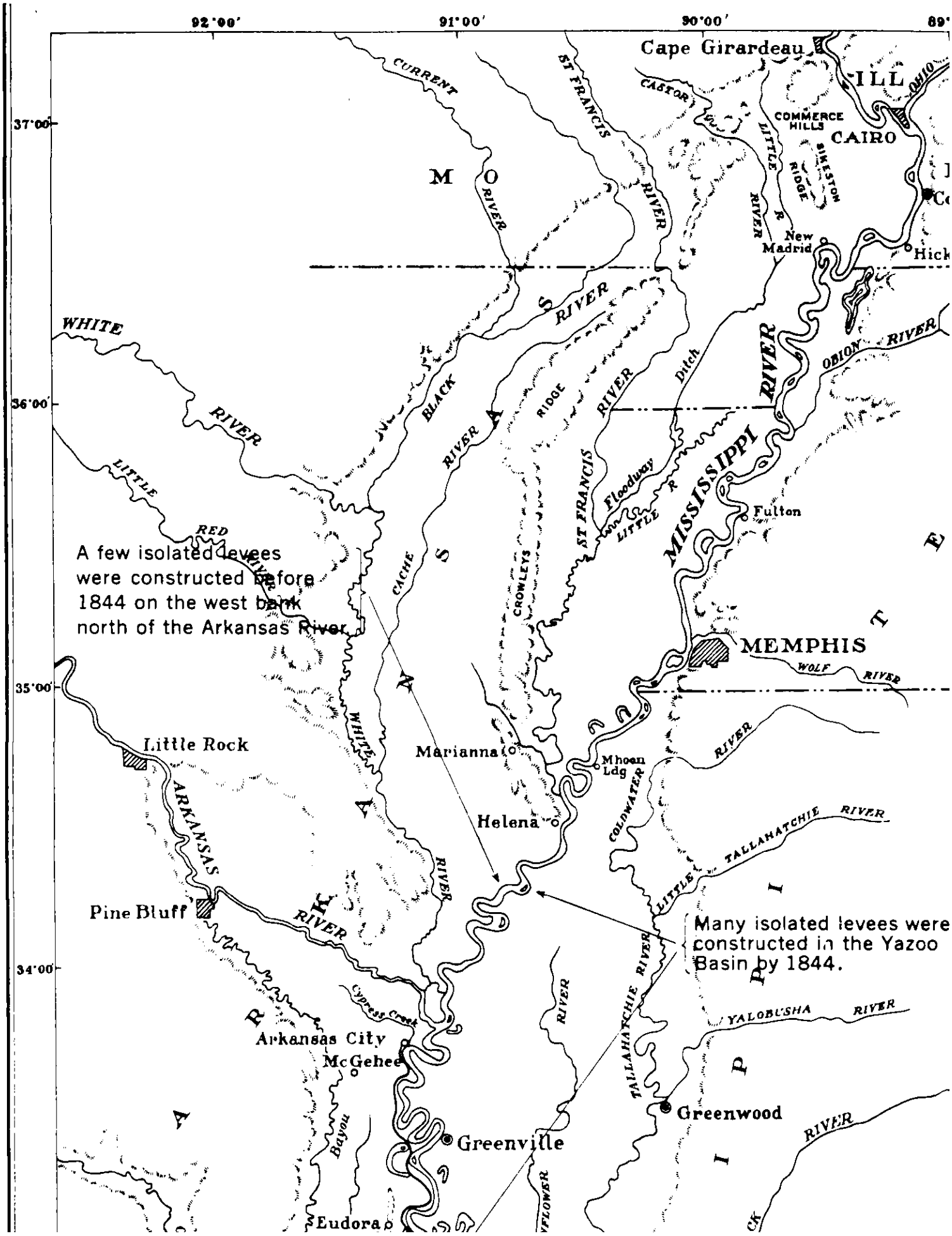
Such a plan was, to say the least, politically premature and was never acted upon. Yet as a sign of the times it was by no means unique. In the decade following 1874,[60] three major river conventions met to demand unified political action among all the people of the Valley.[61] Events forced the river into national attention. As Reconstruction ended, southern strength in Congress rose. Eads built his jetties to the accompaniment of wide publicity. The river's fame increased as some of the best books ever written about it appeared, ranging from the 1876 reissue of the *Physics and Hydraulics* to Mark Twain's three popular classics, *Tom Sawyer*, *Huckleberry Finn*, and *Life on the Mississippi*.[62] Amid rising Delta power and quickening public interest, Congress began the serious work of developing a national policy for the river.

In March 1879 Representative Randall L. Gibson of Louisiana brought before Congress a plan to create a permanent body, organized along the lines of the mixed commissions of 1874 and 1878, with broad but ill-defined powers to deal with the river. The lack of precise definition was essential to avoid constitutional restrictions on Federal action, and also to avoid collision between the advocates of navigation and those of flood control. Representatives of the Valley and their allies were quite willing to have the ultimate role of the Commission decided by the Commission itself, and by the course of events. The House of Representatives accepted Randall's bill creating a five-man Commission. Three members were to be Army Engineers, two were to be civilians, and the president was to be chosen from the military.[63] The alternative plan for a seven-man Commission, with only three Army Engineers, three civilians, and one member from the Coast and Geodetic Survey, was worked out by the Senate Select Committee on the Improvement of the Mississippi River and its Tributaries. Senator Samuel J. R. McMillan, in debate, put his finger on the conflict between civil and military engineers underlying these changes when he said:

> It is not to be concealed here that this (Senate version) is a part of the extension of the improvement by jetties at the mouth of the river, and this plan is but a continuation of those jetties. Now, while I concede the engineering ability of Mr. Eads I do not believe that the survey authorized by this bill should be under the control of influences outside the Engineer Corps of the Army...[64]

Under the leadership of Senator Lucius Q. C. Lamar of Mississippi, however, the Committee's bill prevailed. Attempts by the Corps' friends to restore the House version and efforts by Eads' supporters to allow President Hayes to choose the Commission's president from the civilian members were both defeated by large margins. The final version, in which the House acquiesced, was in essence the compromise measure that Lamar wanted.[65] He took the pragmatic view that, since the Army Engineers would do most of the practical work of the Commission, its president had better be chosen from among them.

With the creation of the Mississippi River Commission the Federal commitment to solve the problems of the river began.[66] The act creating the Commission was the egg from which a new era would hatch, both for the people of the Valley and for the Corps. The possibility that this might be so was clearly understood both by the proponents and the enemies of the new organization. The ill-defined powers of the Commission suggested that the men who created it deliberately framed the law in such a fashion that its constitutionality would be difficult to challenge, while the way was left open for the Commission, once in business, to enter the field of flood control.[67] The New Orleans District had been the site of many of the events which shaped the new national policy. Now the Commission was to reshape the nature and duties of the District, to say nothing of reshaping human life throughout the Alluvial Valley as well.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Cape Girardeau
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ST FRANCIS
CASTOR
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New Madrid
Hick
MISSOURI
WHITE
RIVER
BLACK
OBION
Ditch
RIDGE
Floodway
Fulton
MISSISSIPPI
ARKANSAS
LITTLE RED
CACHE
CROWLEYS
ST FRANCIS
MEMPHIS
WOLF
A few isolated levees were constructed before 1844 on the west bank north of the Arkansas River.
Little Rock
ARKANSAS
WHITE
Marianna
Mhoon Ldg
Helena
COLDWATER
TALLAHATCHIE
Pine Bluff
Many isolated levees were constructed in the Yazoo Basin by 1844.
YALOBUSHA
Arkansas City
McGehee
Cypress Creek
Bayou
Greenwood
Greenville
YAZOO
Eudora