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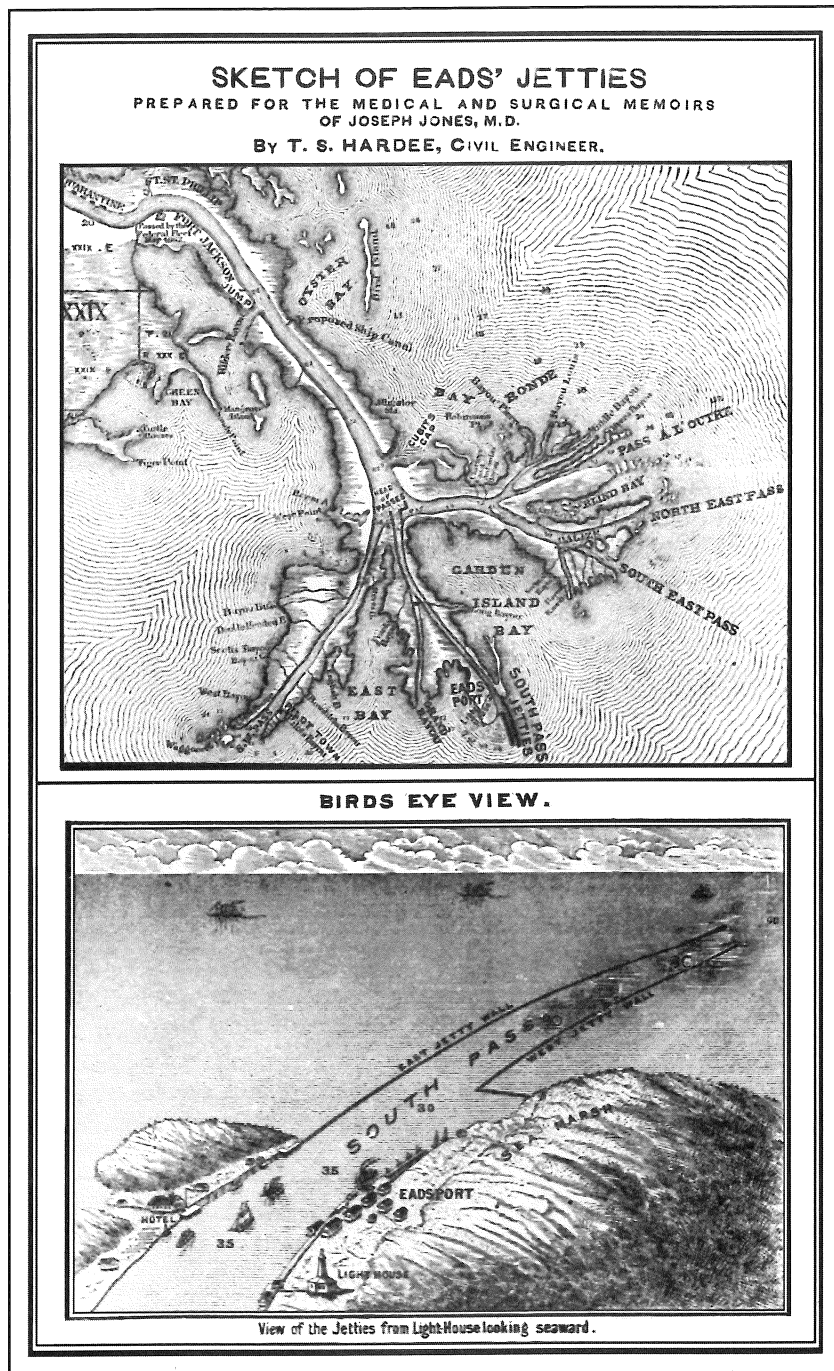
A Referendum on the River: The Mississippi Jetties Controversy

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The River Blockade

On February 18, 1869, New Orleanians awoke to grim tidings. As they scanned their papers, eager for news of the city's markets, they learned that the Mississippi was blockaded again. This time Union gunboats were not responsible for closing the river, as they had in 1862. Instead, a sandbar had formed where the Mississippi emptied into the Gulf of Mexico, effectively shutting the river. Unaware of the danger, a steamship had run aground the previous day. The river's current had then shifted the ship where it clung to the bar, leaving it resting perpendicular to the channel, with no room for other vessels "trying to creep around her stern."¹ Trade ships soon crowded on both sides of the trapped steamer, creating the impression that somebody needed to pop a cork to unleash a flood of commerce. In the following days, unseasonably warm weather and heavy rains caused panic in New Orleans, as laborers scampered to salvage produce stored along the Mississippi's waterfront. New Orleans's economic elites became so worried that the crisis would cause traders to divert produce away from the city's already beleaguered markets that as the blockade dragged on for nearly a month, local papers likened the anxious commercial community to a "hedged in animal."²

The river blockade could not have come at a worse time for New Orleans. Since the start of the Civil War, the city's waterfront, which had creaked beneath the collected goods of the Mississippi valley in the 1850s, had stood nearly empty.³ Even after the war ended, optimists in the city were let down when valley traders, who had shipped goods to market at New Orleans on the north-to-south river route before the war, continued their wartime practice of using more direct west-to-east rail lines. As a post-war study of the nation's commerce noted: "Thanks to the embargo of war, the railroads had gained in four years an advance on the Mississippi which under ordinary favorable circumstances it would have taken them twenty years to have secured."⁴ Assessing the damage, one local estimate suggested that 75 to 90 percent of the region's trade was finding its way to markets other than New Orleans by 1865.⁵ And while many New Orleanians still clung to the myth that trade would always flow down the "great river, which," they claimed, had "been carved out by Nature's God as the natural outlet for the products of the West," realists like the satirist



Thomas S. Hardee, "Sketch of Eads Jetties," 1879. Historic New Orleans Collection.

George Washington Cable scoffed at such nonsense.⁶ Surveying the city's woebegone post-war commercial climate, he huffed that "the moment East and West recognized the practicability of taking straighter courses...[to market] the direct became the natural route, and the circuitous the unnatural."⁷

In the postbellum years, members of the city's commercial community realized that Cable was right: the "natural advantages"—the Mississippi system's streams—that they had counted on to sweep trade to their city paled in significance next to railroads, which they had derided as the "artificial channels of the commerce of the West" before the war.⁸ Reading the shifting landscape of trade, New Orleans lured railroads to town. By 1869 trains ran along the Mississippi's banks, carrying not only trade but a renewed sense of optimism and vitality, missing since before the war.⁹ The bellow of steam whistles, the clank of construction, and the chugging of trains banished the depressing silence that had shrouded the riverfront for years. New Orleans was now connected to its hinterland by river and rails, prompting boosters, meeting at a commercial convention in the city in 1869, to boast: "Recognizing the fact that 'Westward the Star of Empire has taken its way,' we declare in favor of the Crescent City as the seat of a commercial empire, whose sceptre shall rule the world."¹⁰ But the prospect of future blockades at the river mouth clouded such grand visions of the city's future.

As New Orleanians searched for solutions to the problem at the Mississippi's mouth, they asked themselves questions whose answers had far-reaching consequences in the city and nationwide: How best could the river be used? Could people control the Mississippi? If so, how? And who should be trusted to tame the mercurial stream? New Orleanians answered the first question, drawing on more than a century of tradition, to claim that the Mississippi, above all, should serve human uses as a commercial highway. The second question, then, had to be answered affirmatively; the river had to be brought to heel somehow. That left two other queries lingering in the delta's humid air, and those questions spurred years of controversy. On one side of the battle stood New Orleanians who were captivated by the promise of technology. These people called for a canal at the river mouth, to be built and operated by the U.S. Army Corps of Engineers, the Mississippi's traditional steward. On the other side of the fight, championing civilian engineers and the river itself—or so he claimed—James Eads insisted he could pry open the Mississippi's mouth with a system of jetties (artificial riverbanks).

Because it occurred at a crossroads in the nation's economic and environmental history—as railroads imposed the logic of capital on the vagaries of geography—the controversy following the river blockade served as a referendum on technology, the river, and by extension nature, in New Orleans and nationwide.¹¹ The conflict also achieved notoriety because its location, at the Mississippi's mouth, provided a grand stage for such a drama. As competing interests fought to control the river mouth, they used that scene as a didactic landscape, trying to demonstrate that it was possible to extract civilization from a desolate and watery wilderness. The players, too, elevated the events. By the time he became involved in the conflict, Eads had secured his reputation as one of the nation's leading mechanical innovators and experts on the Mississippi, and his principal opponent, Andrew Atkinson Humphreys, the Chief of the Corps of Engineers, also had won fame for engineering genius and knowledge of the river.

The jetties dispute took place on at least three levels: the local, in New Orleans, a city struggling with environmental constraints; the personal and professional, with Eads and Humphreys battling for credibility; and the national, as the country grappled with the role that technology was to play in its future. Locally, the controversy's resolution left New Orleans more dependent on technology and vast engineering projects than ever before, as the city continued fighting to impose order on its unpredictable surroundings. New Orleanians emerged from the conflict with renewed certainty that the river could be tamed, indeed that any environmental problem would ultimately yield to human ingenuity backed by capital. At the same time, in part because of publicity the conflict generated, and in part because of what eventually was a transformed landscape at the river mouth, the professional status of engineers throughout the United States, and Eads's personal fame, continued to climb. Perhaps even more important, nationally, the outcome of the jetties dispute apparently taught even the most skeptical observers around the country that seemingly intractable environmental problems, no matter how complex, would eventually yield to what interested observers labeled the "hand of man."¹²

The Officer, The Entrepreneur, and Big Muddy

The problem facing New Orleans in February 1869 was not a new one. Each year the Mississippi carries more than 275 million cubic yards of solid matter to the gulf.¹³ About ninety miles below New

Orleans, at the so called Head of the Passes, the river divides into several distinct and smaller outlets, including South and Southwest Pass. Because a stream's ability to carry material is proportional to its current—the faster the current the more material can be held in suspension—when the Mississippi divides, the individual passes take only a portion of the main stream's flow, lessening the current in each. Then, where the passes meet the gulf, the current diminishes still further, as the confined river empties into open water. The Mississippi can thus no longer support the bulk of the sediment that it has carried from throughout its valley, and it deposits a portion of its load there, sometimes creating sandbars, as in February 1869. Geologists label this process an example of "dynamic sedimentation."¹⁴

Because of this sedimentation pattern, New Orleanians sometimes wrestled with the river mouth in the city's early years, but more often they adapted to the hand geology dealt them.¹⁵ In the 1820s and 1830s, however, as steamboats carried hundreds of millions of dollars of interstate commerce on the Mississippi system each year, the federal government increasingly involved itself in river improvements, deploying the Army Corps of Engineers to keep the passes clear. Still, even the Corps usually found itself stymied by the dynamic river. After trying a variety of solutions—including a feeble attempt at having jetties built on the eve of the Civil War—the Corps kept returning to dredging, which worked intermittently at best.¹⁶ Finally, in 1869, with the city's economic future at stake, New Orleanians demanded a permanent solution at the river mouth; they called for a canal. Andrew Humphreys and James Eads answered the city's plea, arriving in New Orleans with vastly different training, disparate goals, and incompatible ideas about how to control the Mississippi.

After graduating from West Point in 1833, Humphreys settled into a distinguished career as an engineer. Then, in the wake of the great Mississippi flood of 1849, Congress demanded a survey of the lower river, and Humphreys received the job.¹⁷ As Humphreys began work, Charles Ellet, who had received his training in Europe, struggled with the same task on the Mississippi—a showdown between military and civilian engineers. For generations West Point had enjoyed a monopoly on American engineering. After 1835, though, graduates of Rensselaer Polytechnic Institute began undercutting the status of army engineers. By 1850, when the Mississippi survey began, five other schools also offered engineering programs.¹⁸ With army engineers facing competition from civilians for the first time in the nation's history, Humphreys, always a man of great pride, found himself defending not only his

own, but also his comrades' honor, in a battle for professional credibility and future control of the Mississippi River.

Ellet quickly finished his survey, and his findings, though impressionistic, were nonetheless breathtaking, particularly his recognition that people had exacerbated floods on the river by confining it behind artificial levees and cutting down thousands of acres of forests throughout its valley. In highlighting people's ability to alter the environment on so grand a scale, Ellet presaged the work of George Perkins Marsh, who was to publish *Man and Nature* fourteen years later. Marsh is hailed as one of the fathers of modern environmentalism because he recognized the human impact on processes previously labeled "natural."¹⁹ Ellet, however, arrived at such findings first, writing that "the difficulty in protecting the delta from overflow is produced by the artificial embankments along the borders of the Mississippi, and the cultivation of the prairies."²⁰ In short, technology and deforestation could, together, create disasters that were not "natural" exactly, but in part at least, human-constructed.²¹

With Ellet's reputation threatening army engineers, Humphreys systematically rebutted his rival's conclusions in his survey—known as *Physics and Hydraulics*—which he finished as the country ripped apart at its seams in 1861. If Ellet's work was a model of intuitive argument, based on brilliant insight and limited observation, at nearly five hundred pages, *Physics and Hydraulics* was a towering monument to empiricism. And in conclusions as well methods, Humphreys disagreed with Ellet. Where Ellet warned that the river's "natural" regimen would be ignored at the valley's peril, Humphreys leaned on an unshakable faith in the power of data to reveal the best methods of controlling the Mississippi. He assured readers that within his survey "every river phenomenon has been experimentally investigated and elucidated. Thus every important fact connected with the...physical condition of the river and the laws uniting them [has been] ascertained."²² With that accomplished, Humphreys promised that the problems of river flooding and the bars at the mouth of the Mississippi could be alleviated once and for all.

Humphreys's survey exemplified what Donald Worster labels an "imperial" view of nature. In Worster's telling, the ascendance of Darwinism caused many scientists to reevaluate the natural world, calling for a liberal application of the ostensibly civilizing influence that humans had on their surroundings.²³ For engineers in the United States, this imperial view typified their intellectual culture while serving their professional interests. As Americans increasingly looked

to engineers to mediate their experiences of the environment—to control nature—the profession's prestige grew.²⁴ Consequently, Humphreys gained authority not only because he promised that military engineers could solve problems on the Mississippi with technology, but also because of the empirical foundation on which his claims rested. It helped, too, that the international scientific community regarded *Physics and Hydraulics* as a masterpiece, further elevating Humphreys's reputation. In 1866 he received the ultimate recognition of his professional standing when he was tapped to head the Army Corps of Engineers. From that lofty perch, Humphreys devoted the rest of his career to patrolling the nation's scientific and engineering landscape in order to safeguard his own reputation and the status of all army engineers. He eventually brought his crusade to the river mouth in 1869.

James Eads took a very different path to the mouth of the Mississippi. Eads first met the river aboard the steamboat that brought his family to St. Louis, in 1833, when the vessel sank, carrying his possessions to the bottom.²⁵ Once in St. Louis, though he had no time for formal schooling, Eads proved himself a dedicated autodidact, borrowing books from his employer while working as a talented salesman, a skill that was to help him throughout his life. Eads's greatest gifts, however, lay in his capacity to transfer the fruits of his powerful intellect to his hands, in other words, in an uncanny ability to plan and execute complicated mechanical projects. For example, he designed and built a riverboat model that awed observers with its multiple decks and working boilers, before finding a job on the steamboat *Knickerbocker* in 1839.²⁶ At that time, Eads began an intimate relationship with the Mississippi, studying its waters and seemingly endless moods, but only for a season, before the *Knickerbocker*, too, sank. Before his twentieth birthday, Eads had witnessed two steamboat disasters first-hand. Where some people might have acknowledged the Mississippi's unpredictability, Eads only saw opportunity. He invented a salvage boat and diving bell to pull valuable cargo from the river bottom and partnered with a St. Louis ship-building firm, which agreed to construct the craft he had designed.²⁷ In the salvage business Eads continued his education about the Mississippi. For years he traveled up and down the river system with his salvage operation, spending full days walking on the stream bed, looking for wrecks. Eads later described the Mississippi's bottom "as a record written by God Himself in the language of natural law."²⁸ This was a language that only he

knew, a record that only he had been privileged to read, thus he believed that the time he spent under the river gave him an unparalleled understanding of the Mississippi. His experiences taught him that the laws of nature were knowable and that the river could be manipulated.

Throughout his life, Eads returned to the Mississippi, where he enjoyed triumphs, deepening his conviction that the river was malleable in the hands of an engineer skilled and confident enough to dream big. After becoming one of St. Louis's wealthiest citizens, he designed Union gunboats during the Civil War.²⁹ Following the war, he took on a greater challenge, when he began constructing a bridge over the river at St. Louis. The notion of spanning the Mississippi had intrigued visionaries for decades, but only in theory. Following the war, though, Eads saw that St. Louis needed a bridge over the river to compete with its rival Chicago in an age of steel rails that threatened the Mississippi's stranglehold on the valley's trade. Geography compounded the problem. Located on the Mississippi's west bank, St. Louis required a bridge to maintain its link with eastern railroads and the markets they served. But such an obstacle seemed minor to Eads, who was certain that he was the man to build the bridge.

In the postbellum years, as Eads contemplated his span, the nation began a period of incredible technological advance, in which engineers reshaped the landscape with the help of inexpensive labor. Railroads crossed the continent, mechanical reapers did the work of full teams of men, and a process, pirated from England, allowed mills to produce relatively cheap steel. These innovations served as symbols of a new era of artifice, but no image proved more enduring than the huge bridges daring builders erected around the country. In this context, in August 1867, Eads began constructing the bridge that still bears his name. A shrine to the modern, the bridge sported three arches, each embracing more than five hundred feet. The arches' size was unprecedented, and, onlookers whispered, dangerous. Relying on steel, the miracle material of the day, Eads replied to his many critics that his design was sound.³⁰ Time proved him right.

The construction of the bridge garnered Eads more publicity than he had ever received, cementing his reputation as one of the era's great engineers. And though tragedy marred the project—thirteen men died of Caissons Disease (the bends) during construction—the nation and world watched with awe as Eads's workers extended huge steel arches across the Mississippi. In 1873, however, just as laborers prepared to link the banks of the Mississippi in dramatic fashion, Eads turned his

attention to yet another challenge, the silted passes at the river mouth and a battle with Andrew Humphreys, by then the Chief of the U.S. Army Corps of Engineers.³¹

No Cure, No Pay

In the spring of 1873 participants at a convention of river interests in St. Louis discussed plans for improving the Mississippi. One of the key issues facing the gathering was the condition of the river mouth. Since the blockade of 1869, New Orleanians had begged for a canal to circumvent the unpredictable passes.³² Leaders at the Corps of Engineers, though, had insisted that even if practicable, a canal would prove too costly, so they had deployed a dredge boat to deepen the channel. The Corps named the vessel *Essayons* (French for “let us try”); the *Essayons* failed. Finally, in March of 1873, as another blockade threatened trade, Charles Howell, the Corps officer charged with keeping the river open, lost patience with dredging, deciding, after much prompting from New Orleans’s Chamber of Commerce, that a canal was the only way to guarantee navigation on the river.³³ The bottleneck at the river mouth, and the Corps’s decision to support a canal, provided the backdrop for the river convention.

The majority of the river interests gathered in St. Louis supported the idea of a canal, which seemingly promised a permanent solution to the problem at the river mouth. Then, on the second day of the meeting, James Eads rose and addressed the assembled throng. Eads had the cure for canal fever, he claimed. Over a buzz of protests he suggested that a system of jetties could open the river forever. Eads considered a canal a desecration of the Mississippi, which, he said, could scour itself out if directed to do so by well-engineered jetties. At the convention and later that summer, Eads promised that the river needed only the guiding hand of man to help it behave. Human ingenuity, he was certain, could complete nature’s already good work by shaping the plastic landscape to serve commerce and development. An apostle of technology and progress, Eads assured all who would listen that because of his experience on the river, he should be trusted to save the Mississippi from the disgrace of a canal.³⁴ What he did not realize was that he was treading on terrain occupied by the Corps and in doing so offending Andrew Humphreys, another of the nation’s most powerful engineers.

Eads’s mistake became obvious that fall when steamboat interests, certain his bridge served railroads alone, convinced Secretary of War

William Belknap to instruct Humphreys to investigate whether the arches might impede river commerce. It did not matter that years earlier designers had implemented hinged smokestacks that could be lowered as steamboats passed beneath such obstructions. Humphreys took advantage of the chance to attack Eads, whose civilian status and call for jetties at the river mouth undermined the Corps. Humphreys found that the bridge *was* a threat to river traffic and twisted the knife by insisting that the only way to rectify the problem was to build an eight-hundred-foot canal around the span. Eads refused to dig a ditch around his bridge, and he set out for Washington, where he looked up an old friend, President U. S. Grant, who told Secretary Belknap to drop the matter. After outmaneuvering Humphreys, Eads returned to St. Louis to celebrate his bridge’s opening on May 24, 1874.³⁵

Having kept one canal off the river, Eads was determined to defeat another. But New Orleanians, backed by Humphreys, stood in his way.³⁶ Humphreys not only hoped to maintain the Corps’s hold on the river, but also to place his stamp on one of the enduring engineering problems of the day. Accordingly, when the Corps convened a committee in 1874 to investigate silting at the river mouth, its response was decisive: an artificial canal provided the only hope for free navigation on the Mississippi.³⁷ Eads responded by traveling to Washington again, this time to bring his influence to bear on congressional hearings about the canal. When he arrived at the Capitol, Eads proposed a “no cure, no pay” deal, in which he would receive compensation for his labor only if the jetties he advocated worked. Congressmen, many of whom had been incredulous about jetties, suddenly took notice of the self-promoting civilian engineer.³⁸

Predictably, Eads also drew some fire because of his initiative, with Humphreys and New Orleans’s commercial elites among the first to train their guns on the civilian engineer. Humphreys squeezed off the first shot, suggesting that Eads was a crackpot who lacked the training needed to understand the Mississippi.³⁹ New Orleanians then attacked, fretting that Eads served St. Louis in its quest for commercial dominance by offering the jetties as a Trojan horse at the river mouth—useless technology that would inevitably be overwhelmed by the Mississippi. Twenty-seven of the city’s leading businessmen accused Eads of being an “outsider” on the river, asking him to abandon his pursuit of jetties.⁴⁰ Other New Orleanians begged Congress not to “tolerate the half insane proposition of strangers,” imploring the legislators not to “permit us to be destroyed” by ill-fated schemes. Whereas Eads promised order on the Mississippi, they insisted he would

deliver chaos instead, explaining that the river had taught them humility, and that hubris was misplaced on the great stream.⁴¹

The tenor of Eads's rebuttals was telling, revealing an unshakable confidence in his ability to control the river and an understanding of the opportunity before him to demonstrate his prowess on a national stage. He took on Humphreys first, trading barbs as well as data, even questioning the validity of sections of *Physics and Hydraulics*.⁴² He then answered the businessmen of New Orleans, playing on the era's cult of the self-made man by explaining that "practical knowledge... enables me to speak with much more certainty of the ability of the bar to sustain my proposed works than could be given by any theories founded on assumed conditions which do not exist." As for his ego, he acknowledged that he brimmed with confidence, because, after all, the solution to silting at the passes was "a question of money and brains alone." Finally, donning the mantle of science and reason, he warned his detractors that "what I know of the Mississippi are facts, and facts are the uncut jewels which grind false theories to powder."⁴³ In sum, rather than hide from charges of hubris, Eads embraced them.

Despite Eads's confidence and no-cure, no-pay offer, Congress sent a commission of three civilian and three military engineers, with a member of the Coast Survey to cast a tie-breaking vote, to Europe to study the jetties question before finally granting Eads the contract on March 3, 1875. The deal, though, was not as attractive as Eads had hoped, especially because he would have to build his works at the smaller and shallower South Pass, rather than at Southwest Pass. For Eads, who, like many other engineers of his time, had posterity in mind, working at South Pass seemed short-sighted because he suspected that deep-drafted, ocean-going vessels would soon outgrow the smaller outlet. At the same time, Congress guaranteed only incremental payments, based on the depth of the pass. In other words, Eads would only receive his full fee if South Pass's channel reached twenty-eight feet. Yet Eads recognized that Congress was offering him an opportunity to make good on the river's promise, to create a landscape in which human ingenuity prevailed over the vagaries of the untamed environment. So when presented with the chance to carve his signature in the valley's landscape, Eads eventually accepted.⁴⁴

Three weeks later, Eads stood before a huge crowd gathered in St. Louis's Southern Hotel, celebrating his triumph and demonstrating again his faith in his ability to discern the river's mysteries. The Mississippi presented a challenge, he admitted, but "every atom that moves onward in the river, from the moment it leaves its home amid the crystal springs or mountain snows, throughout the fifteen hundred

leagues of its devious pathway, until it is finally lost in the vast waters of the gulf, is controlled by laws as fixed and certain as those which direct the majestic march of the heavenly spheres." "Every phenomenon and apparent eccentricity of the river," he continued, "is controlled by laws as immutable as the Creator, and the engineer needs only to be assured that he does not ignore the existence of any of these laws, to feel positively certain of the result he aims at." He concluded, to thunderous applause, that "I therefore undertake this work with a faith based upon the ever-constant ordinances of God himself."⁴⁵ In sum, the laws of God and nature worked in harmony, and Eads understood both. A month later he left St. Louis, bound for his new home at the Mississippi's mouth.

Port Eads

In 1875 the river's mouths were a watery wilderness, unsettling to onlookers. One traveler gasped that he had "never beheld a scene so utterly desolate as this entrance to the Mississippi. Had Dante seen it, he might have drawn images of another Bolgia from its horrors."⁴⁶ In his memoir of the jetties' construction, even Eads's assistant, E. L. Corthell, a pragmatic engineer, admitted that his mind had reeled when first confronted with the desolate sight of South Pass. "The whole country," he wrote, was nothing but "a low, flat marsh of mud, reeds, and grasses, which, in long narrow strips, is thrust out into the gulf." As Corthell scanned the horizon for any topographical feature, he found "not even a background of high land to relieve the monotony of the scene."⁴⁷ On that canvas, Eads worked from a palette of technologies to paint an image of progress and civilization, hoping to reassure New Orleanians and people around the nation that the river, even at its wildest, could be shaped by powerful artifice and human expertise.

Even before Eads arrived at South Pass in 1875, it became obvious that winning the jetties' contract would be the easy part of his project. Because of the no cure, no pay deal, he needed investors to keep his venture afloat until South Pass grew deep enough that the government would settle up. Eads thus turned to his entrepreneurial roots, forming a private corporation. He promised shareholders double their investment plus 10 percent when the jetties worked.⁴⁸ Despite these terms and Eads's national reputation, bolstering stockholder confidence proved difficult, especially as Humphreys and his subordinates struggled to scuttle the project. Consequently, throughout his time at South Pass, Eads relied on two strategies to generate favorable publicity and new investors: the creation of symbolic landscapes that would prove his control of the Mississippi, and

the use of dramatic spectacles to illustrate the viability of the jetties. The result of these efforts was that the construction at South Pass remained in the public eye for years to come, maintaining a hold on the nation's imagination.

Aware that Humphreys was penning poison letters about him, published in New Orleans's papers, one of the first things that Eads attempted, in modern terms, was to control the spin by having workers lay telegraph line to South Pass.⁴⁹ He then gave the press something to write about, capitalizing on popular fascination with the jetties by transforming the riparian landscape at the river mouth into a tableau of progress. Laborers built neat buildings at South Pass, which, when juxtaposed with their watery context, were intended to provide observers with evidence of Eads's mastery of the Mississippi—where there had been only an untamed wilderness, hostile to the civilizing influence of commerce, a small village dubbed Port Eads stood.

With Port Eads sentinel at South Pass, the engineer seemingly had tamed a wild land. He then turned to the jetties themselves, staging a series of elaborate events for curious onlookers. Workers first sank parallel lines of piles, the jetties' spine, into the river approximately one thousand feet apart and then connected them with willow mattresses, the works' muscle, sinew, and flesh.⁵⁰ Silt from the muddy Mississippi would fill any gaps in the mattresses, making them watertight. After just a year's work, long, low walls stretched into the gulf, amplifying the scour in the channel. So on March 4, 1876, the anniversary of the day the jetty bill had passed congress, Eads decided to show off, arranging for a large schooner to exit the river through South Pass. Although the vessel arrived at the jetties as the tide fell, and stuck on the bar overnight, it passed through the next morning, apparently demonstrating the works' viability and prompting banner headlines in New Orleans proclaiming Eads the city's savior.⁵¹

Eads's exalted status, though, proved relatively short-lived. Emboldened by his early success, he invited a large group of investors aboard a steamboat junket to South Pass on April 26. That day, revelers swayed to the strains of a full orchestra and feasted on sumptuous meals on the *Grand Republic*.⁵² Eads, meanwhile, noticed another smaller vessel "rushing seaward till almost lost to sight on the bar near the ends of the jetties; now galloping across the channel like a race horse; now zigzagging here and there in its desultory course like a swallow skimming over the water."⁵³ The mysterious craft turned out to be the Corps's steam launch, dispatched to make its own soundings of South Pass. When the *Grand Republic* eventually arrived at Port Eads, a Corps representative boarded the steamboat and began circulating

rumors that a new bar had formed beyond the jetties in the gulf. The party stopped as people struggled to hear the Army engineer's bad news, and when the *Grand Republic* arrived back in New Orleans, the word spread quickly: the jetties were useless, Eads had failed, stockholders beware.⁵⁴

Sensing his venture sinking beneath the weight of investor anxiety exacerbated by a new round of Corps-authored criticism in New Orleans's papers, Eads orchestrated another event to prove the jetties effective.⁵⁵ This time he asked E. V. Gager, the captain of the steamship *Hudson*, to navigate his craft through South Pass. The *Hudson* was a steel-hulled vessel, and thus its crossing presented a test for the jetties. Gager arrived aboard his ship at the head of South Pass on May 12, with the dispute about the jetties still dominating the news in New Orleans. The *Hudson*, which had a draft of more than fourteen feet, came to the jetties as the tide was falling. Gager still gave the order: "Head her for the jetties." Eads and his crew watched, knowing that only the *Hudson's* successful passage could convince skeptics that the Corps's accusations were false. And when the ship made it through the two and a quarter miles of artificial riverbanks they celebrated, certain the event had "restored confidence in the jetties."⁵⁶

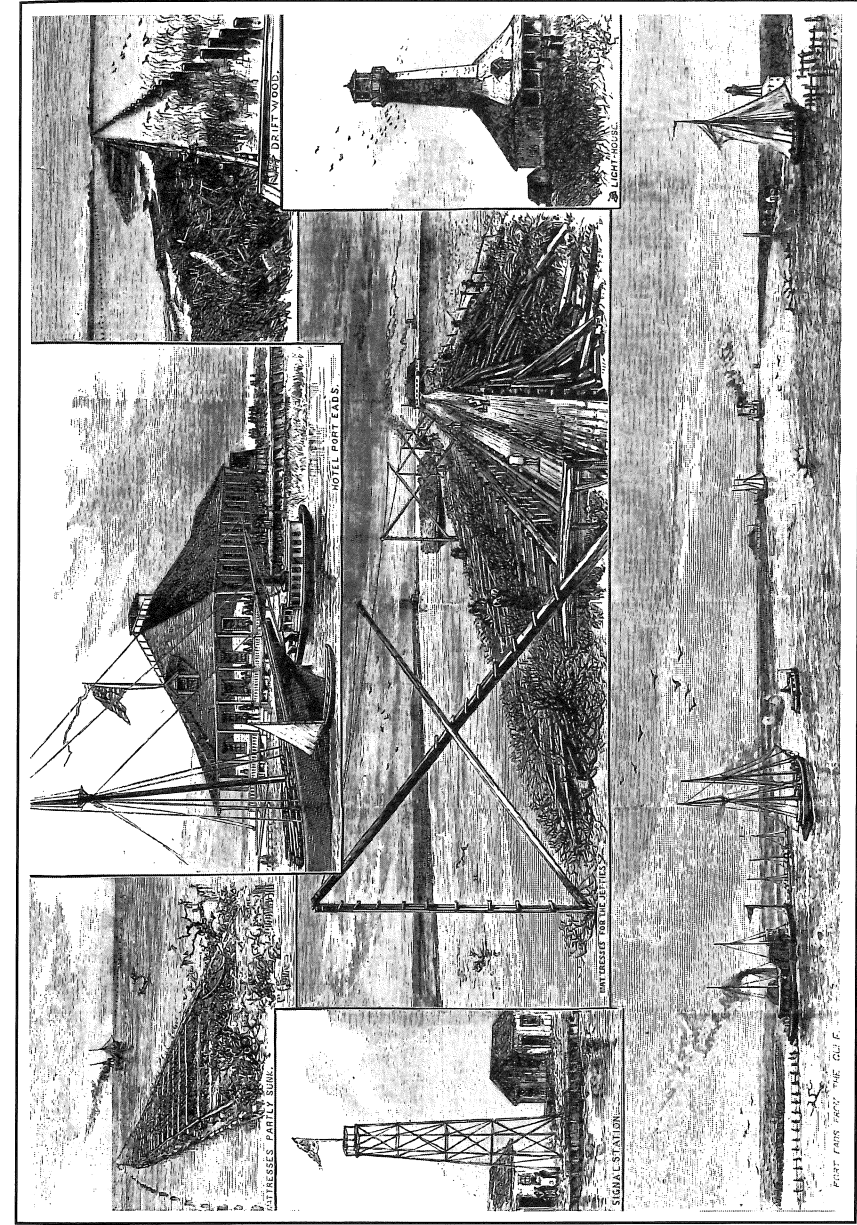
Following the *Hudson's* well-publicized journey, many ocean-going vessels began bypassing Southwest Pass, where the Corps still operated its ineffectual dredge boat, opting instead for South Pass. From July 1877 to July 1878, more than fifteen hundred vessels traveled through the jetties, proving that they worked better than anybody, except perhaps Eads, had expected.⁵⁷ In the latter year, Eads's workers placed massive concrete capstones—some weighing more than two hundred tons—atop the jetties, crowning their achievement and protecting it from the gulf's ravages. Finally, after numerous setbacks, including an outbreak of yellow fever that killed eleven people at South Pass, and much additional meddling by Humphreys and his subordinates, Eads and his crew of sun-baked, sweat-soaked laborers completed the jetties in mid-summer 1879.⁵⁸ With the project finished, E. L. Corthell, Eads's trusted lieutenant, gazed at South Pass from the high ground afforded by Port Eads, remarking on the transformation that he and his crew had wrought in the landscape around them. "Wharves, buildings, jetties, and sea-going vessels have taken the place of the desolation characteristic of the Mississippi River at one of its unused passes," he reflected with considerable pride.⁵⁹

In time, New Orleanians claimed the jetties as part of their extended municipal landscape and evidence of the city's post-war

recovery. Daily trips carried tourists to South Pass to show off the technology that had improved the river.⁶⁰ Eads's own words reveal the scene greeting visitors when they arrived at South Pass: "They [the jetties] constitute a remarkable illustration of how completely the immense forces of nature may sometimes be controlled," he suggested. And though he tried to remain modest, the task was too much for him. After all, the jetties proved without a doubt the power of the hand of man: "by the gentlest influences, the mighty current is swayed and directed completely obedient to his will. There is no instance, indeed, in the world where such a vast volume of water is placed under such absolute and permanent control by the engineer."⁶¹ After centuries of unpredictability, South Pass remained consistently deep enough for steel-hulled vessels to enter and exit the river. And by transforming the landscape at the river mouth, Eads offered onlookers a symbol of the seemingly limitless power of human ingenuity and technology. The effect was not lost on observers: Port Eads and the jetties made empire seem plausible again in the city.

A Grand Exposition

By the time Eads completed the jetties, railroads crossed the country, Alexander Graham Bell had developed a working telephone, fantastic inventions had begun pouring from Thomas Edison's lab, and the Roeblings had almost finished the Brooklyn Bridge. The nation rode a wave of unprecedented scientific and technological advance, and to many observers the jetties signified the power of engineers to overcome environmental obstacles. In that moment it seemed that "nature" was knowable and pliant, a tool in the hands of innovators armed with inspiration, data, and technology to reshape the continent. Writers at the *New York Tribune*, for instance, marveled at the transformed landscape at South Pass: "genius, persistence and practical skill have seldom won so great a triumph over the forces of nature."⁶² The jetties gave pause even to Mark Twain, a noted skeptic, who gushed that "Captain Eads, with his jetties, has done a work at the mouth of the Mississippi which seemed clearly impossible; so we do not feel full confidence now to prophesy against like impossibilities."⁶³ In Twain's words lay the jetties' meaning for many onlookers—the impossible had become possible, as engineers had demonstrated their apparent dominion over even the most intractable environmental problems. As for New Orleanians, Eads had not just redeemed South Pass, he had helped usher in a new era of massive engineering projects in the city.



Frank Hamilton Taylor, "Mississippi Jetties," from Harper's Weekly, March 2, 1878. Top Left to Right: Mattresses Partly Sunk, Hotel Port Eads, Driftwood; Middle Left to Right: Signal Station, Mattresses for the Jetties, Light House; Bottom: Port Eads As Seen from the Gulf. Historic New Orleans Collection.

Before New Orleanians considered the jetties' symbolism or lasting significance, though, they counted profits the reengineered river delivered to them. With valley traders shipping goods through the city again, markets revived, invigorated by regional produce and grain especially. In 1878, with the jetties open, the city received roughly four million bushels of grain, more than a ten-fold increase from 1876.⁶⁴ From 1879 to 1880, grain receipts in the city then increased by more than 110 percent, and the press reopened discussions of empire. The *Daily Picayune* guessed that "the entire grain product of the Northwest, beyond the Missouri, and much of that grown between the Mississippi and the Missouri, now controlled by Chicago, must find its way down the Mississippi to our city."⁶⁵ Such optimistic predictions appeared prescient, when an average of more than eleven million bushels of grain arrived each year between 1880 and 1883, prompting one tourist to remark that New Orleans "seemed like a city rising from the dead."⁶⁶ The jetties had performed another miracle: they had breathed life into an urban corpse.

With the valley's grain arriving at the city's port, thousands of trade vessels plotting courses for South Pass, and railroads traversing the Mississippi's banks, New Orleans's revitalized commercial community contemplated the best way to share the good news with the rest of the nation and world: because of the hard work of engineers working with new technologies their city was finally open for business again, back on track toward empire, having already left the bloody war in the distant past. In the winter of 1884-85, New Orleanians decided to host a world's fair, the so-called Industrial and Cotton Centennial Exposition, on a huge parcel of land today known as Audubon Park. The fairgrounds stood in the midst of the city's up-and-coming Uptown district, fronted on one side by the river, with St. Charles Avenue's long rows of stately mansions and live oaks, bedecked with Spanish moss, on the other.

In December 1884 the fair opened, comprised of landscapes designed to show that New Orleans was part of a "New South"—a land of racial harmony, industrial development, technological advance, removed from the discord of war.⁶⁷ To accomplish this complex goal, the fair, like others of the time, relied on a dizzying array of goods and services, art and architecture, agricultural produce and industrial output, high culture and pop kitsch. It boasted neo-classical buildings, ethnographic displays, colossal steam engines, temples made of soap, cathedrals crafted from cracker boxes, costumed pigs, anatomy exhibits drawn from Civil War battlefields, and towers of sugar cane.⁶⁸ But what may have been even more revealing was what was almost entirely

absent at the Cotton Exposition: cotton. Although the State of Louisiana offered a folksy exhibit of the staple, "an old man and woman and their dog, composed of ginned cotton," one visitor was stunned to see "the supremacy of King Cotton audaciously challenged here in the chief city of his dominions by the new State of Nebraska, which proclaims on an enormous screen in letters of golden ears, that 'Corn is King,' and shows a huge portrait of the rival sovereign formed of red and yellow kernels."⁶⁹

Throughout the fair, grain seemed ascendant, perhaps because event planners were reluctant to focus on cotton, the crop of the discredited past, favoring instead grain, the harvest of Eads's South Pass jetties. For New Orleanians, the fair offered a chance to showcase the city's suddenly bright future, and they blanched at the thought of appearing backward. Whereas cotton reeked of the antebellum era, of slavery and secession, grain smacked of progress, of the rising West and "nature" controlled by powerful artifice, such as the railroads and the jetties serving the city. Awash in profits for the first time in many years, New Orleans used the fair to celebrate its rejuvenated economy and the innovations upon which it rested. As Louisiana Governor S. D. McEnery explained, all credit for the exposition belonged to "the genius of Eads presiding over the Mississippi."⁷⁰ The presence of so much grain at the fair thus narrated New Orleans's rise from the ashes of war, the railroads' timely arrival at the waterfront, and the jetties' imposition of order and civilization on the river. In an era of boom and bust, the city's future seemed secure in 1884, as visitors sidled up to exhibits at the fair.

Although New Orleans's economic triumphs quickly proved ephemeral—even during the fair, railroads adjusted shipping costs to recapture grain from the river—the jetties' impact in the city was still to be felt for years to come.⁷¹ In the 1890s and 1900s, New Orleans, like many cities around the nation, embraced what historians have labeled the Progressive Era: a time of reform and calls for efficiency in government, commerce, and everyday life.⁷² In New Orleans these years were marked most of all by respect for and reliance on expertise, engineering know-how particularly, and constant clamor for technological innovation to render the local environs more predictable, just as the jetties had the Mississippi. With South Pass teaching observers that "there is no limit to American genius, enterprise and energy," New Orleanians demanded new engineering projects, as the city attempted to recast itself as a progressive New South urban center, liberated from constraints imposed by geology, climate, and topography—in short a metropolis able and committed to controlling "nature."⁷³ The most

pressing concern in New Orleans in these years, with the problem at the river mouth solved, was flooding, which ostensibly had hamstrung the city's development for years.

By the early twentieth century, flood control engineering in New Orleans had revealed one of the legacies of Eads's triumph while beginning to make the jetties project seem comparatively minor. The artificial levees lining the river, huge pens designed to contain the Mississippi's fury, quickly grew so tall and massive that the city resembled a walled medieval village, barricaded against invasion. Those levees were, in some ways, direct descendants of Eads's jetties. Because of his success at South Pass, in 1879 the federal government asked Eads, a devotee of levees, to become a founding member of the Mississippi River Commission (MRC), the agency most responsible for the rise of the artificial embankments along the lower river. (Infuriated by the civilian's success, Humphreys, also an advocate of levees, retired from the Corps just two days after Eads joined the MRC.⁷⁴ In 1880 and 1881, the MRC's annual reports reflected Eads's influence, suggesting that levees, like jetties, could deepen the river's channel, thus lowering flood heights.⁷⁵ The following year, the MRC stated unequivocally: "It is obvious that for secure protection of the valley from overflow there is necessary a system of levees high and strong enough to withstand the greatest flood. *No other means of protection is practicable or even possible.*"⁷⁶

In the 1890s and early 1900s, with a progressive passion for science, technology, and landscape rationalization providing the cultural context, the jetties at the river mouth serving as evidence that engineers could accomplish most anything they set their minds to, and the Eads-influenced MRC acting as a technical clearinghouse and underwriting two-thirds of construction costs, local interests revamped New Orleans's waterfront, relying on a "levees-only" approach to flood control. At the time, an officer in the Corps of Engineers explained the impulse girding the work: "What nature has failed to do, and what remains for man to accomplish in order to fit the Mississippi river to his wants and uses, is summed up in one word, control."⁷⁷ By 1920, enthralled by such sentiments, New Orleans had added more than 10 million cubic yards of earth to its levees.⁷⁸ Once elevated only three feet above the adjacent terrain, the levees towered over the city they ostensibly protected. In 1928, one long-time resident of New Orleans noted, "I would have to get on top of the roof of the very home where I lived as a boy to see over the levees," which, he suggested, had become "miniature mountains."⁷⁹

With the city attempting to engineer some of the lingering dynamism out of its deltaic environs, and, in the process, reinvent itself yet again, in time many New Orleanians built on the confidence that Eads's jetties had inspired in them. It was possible to control the non-human world, they believed, to impose capitalist desire on the landscape as never before in the nation's history. Although Eads had once tried to differentiate himself from Humphreys by claiming to be the river's savior, both men were advocates of a river controlled by powerful technology—whether jetties or a canal. The success of Eads's jetties, thus bred overconfidence among observers, around the nation and especially in New Orleans. Consequently, as flood-control engineers apparently overcame, or, more accurately, ignored environmental limits, many of the city's residents lost sight of the power of the non-human world, buying into a false and dangerous opposition of nature and culture. And why not? With the levees growing taller each year, many New Orleanians could not even find the Mississippi in their city any more. The river was hidden behind a massive barrier of earth and concrete, only available for viewing if observers scaled the huge artificial levee. In retrospect, the results, for environmental historians at least, were unsurprising.

The levees could never be "impregnable," despite the claims of overconfident and overzealous flood-control engineers.⁸⁰ In fact, the embankments were partly responsible for raising flood heights on the Mississippi with each passing year at the beginning of the twentieth century. So much so that, in 1927, New Orleanians became reacquainted with the river in a year of flooding so catastrophic that the city's residents began seriously questioning their faith in engineering and technology—if only for a time—eventually demanding that the levee just downstream from the city be dynamited to release the engorged stream. By then, though, it was too late to turn back. New Orleans's Faustian bargain, forged during Eads's time on the river, had been sealed. The city would not, indeed could not, exist without the help of massive engineering projects designed to render the environment predictable and hospitable to development. The levees were only to grow taller in the years following the 1927 flood, while new jetties were to open up another of the outlets at the river mouth. And these are just a few of the many stories of the significance and power of engineering in New Orleans, a city completely reliant on technology to insure its survival. The same could be said of much of the nation, a state of affairs that likely would please James Eads and Andrew Humphreys.

Notes

- ¹*New Orleans Daily Picayune*, February 18, 1869.
- ²*Ibid.*, March 17, 1869.
- ³House Ex. Doc. 6, Part 2, 50th Cong., 1st Sess., 213-15, 224.
- ⁴*Ibid.*, 227.
- ⁵*Ibid.*
- ⁶*Proceedings of the Commercial Convention Held in New Orleans, May 24th, 27th, 28th and 29th, 1869* (New Orleans, 1869), 9.
- ⁷George E. Waring and George Washington Cable, "History and Present Condition of New Orleans, Louisiana," in *Tenth Census, Report on the Social Condition of Cities* 19, Part 2 (Washington, 1887), 252.
- ⁸"New Orleans, Its Present Situation and Future Prospects," *The Commercial Review of the South and West* 2 (July 1846): 58.
- ⁹Act No. 67 of 1869, in *Jewell's Digest of the City Ordinances, Together with the Constitutional Provisions and Acts of the General Assembly, Relative to the Government of the City of New Orleans* (New Orleans, 1882), 495; Ordinance No. 799, N.S.—Article 70, in *Jewell's Digest of the City Ordinances, Together with the Constitutional Provisions and Acts of the General Assembly, Relative to the Government of the City of New Orleans* (New Orleans, 1887), 188; *New Orleans City Ordinances Relating to the New Orleans, Jackson and Great Northern Railroad Co.; New Orleans, St. Louis, and Chicago Railroad Co.; Chicago, St. Louis, and New Orleans Railroad Co., and to the New Orleans Belt Co. from May 17th, 1852 to August 15th, 1881* (New Orleans, 1881), 8.
- ¹⁰*Proceedings of the Commercial Convention...*, 43.
- ¹¹Edward Ayers, *The Promise of the New South* (Oxford, 1992), 3-25; William Cronon, *Nature's Metropolis: Chicago and the Great West* (New York, 1991), 64-84; David Nye, *American Technological Sublime* (Cambridge, MA, 1994), 62-96; Wolfgang Schivelbusch, *The Railway Journey* (1977; reprint, Berkeley, 1986), 35-43, 55, 91-96.
- ¹²*New Orleans Daily Picayune*, March 16, 1869.
- ¹³E.L. Corthell, *A History of the Jetties at the Mouth of the Mississippi River* (New York, 1881), 15.
- ¹⁴Charles R. Kolb and Jack R. Van Lopik, "Depositional Environments of the Mississippi River Deltaic Plain," in *Deltas in their Geologic Framework*, ed. Martha Lou Shirley (Houston, 1969), 17.
- ¹⁵"Instructions to de la Tour, November 8, 1719," in Pierre Margry, *Decouvertes et Etablissements des Francais dans L'Ouest et dans le Sud de L'Amerique Septentrionale* (Paris, 1879-88), 5:612.
- ¹⁶Senate Doc. 451, 29th Cong., 1st Sess., 8; House Ex. Doc. 16, 33rd Cong., 1st Sess., 10; House Ex. Doc. 139, 35th Cong., 1st Sess., 14, 71; House Ex. Doc. 5, 36th Cong., 2nd Sess., 87; House Ex. Doc. 97, 39th Cong., 1st Sess., 2; House Ex. Doc. 6, Part 2, 50th Cong., 1st Sess., 212; *New Orleans Daily Picayune*, February 6, 1859.
- ¹⁷Henry H. Humphreys, *Andrew Atkinson Humphreys, A Biography* (Philadelphia, 1924), 28-56.
- ¹⁸Edwin Layton, "Mirror Image Twins: The Communities of Science and Technology in Nineteenth Century America," *Technology and Culture* 12 (October 1971): 576-679; Raymond H. Merritt, *Engineering in American Society, 1850-1875* (Lexington, KY, 1969), 6-58; Martin Reuss, "Andrew A. Humphreys and the Development of Hydraulic Engineering: Politics and Technology in the Corps of Engineers, 1850-1950," *Technology and Culture* 26 (January 1985): 2, 6, 15, 17, 24; Todd Shallat, *Structures in the Stream: Water, Science, and the Rise of the U.S. Army Corps of Engineers* (Austin, 1994), 45, 99-112.
- ¹⁹Robert Dorman, *A Word for Nature: Four Pioneering Environmental Advocates, 1845-1913* (Chapel Hill, 1998), 5-42; David Lowenthal, *George Perkins Marsh, Prophet of Conservation* (Seattle, 2000), 17.
- ²⁰Charles Ellet, *The Mississippi and Ohio Rivers* (Philadelphia, 1853), 132.
- ²¹Senate Ex. Doc. 20, 32nd Cong., 1st Sess., 27-36.
- ²²A. A. Humphreys and H. L. Abbot, *Report Upon the Physics and Hydraulics of the Mississippi River* (Washington, 1867), 30.
- ²³Donald Worster, *Nature's Economy: A History of Ecological Ideas* (1977; reprint, Cambridge, 1994), 114-77.
- ²⁴Edwin T. Layton, Jr., *The Revolt of the Engineers* (Baltimore, 1986), 55-60.
- ²⁵*Addresses and Papers of James B. Eads*, ed. Estill McHenry (St. Louis, 1884), vii.
- ²⁶Florence Dorsey, *Road to the Sea* (New York, 1947), 8, 12; E. W. Gould, *Fifty Years on the Mississippi, or, Gould's History of River Navigation* (Saint Louis, 1889), 214.
- ²⁷Dorsey, *Road to the Sea*, 15.

²⁸Ibid., 19.

²⁹John Barry, *Rising Tide: The Great Mississippi Flood of 1927 and How It Changed America* (New York, 1996), 22-30; Dorsey, *Road to the Sea*, 29-36; John A. Kouwenhoven, "James Buchanan Eads: The Engineer as Entrepreneur," in *Technology in America*, ed. Carroll Pursell (Cambridge, MA, 1990), 81.

³⁰Calvin M. Woodward, *A History of the St. Louis Bridge* (St. Louis, 1881), 7-31.

³¹Ibid., 36-92.

³²*New Orleans Daily Picayune*, March 22, 1871.

³³Ibid., March 22, 1873.

³⁴Corthell, *History of the Jetties*, 24; *New Orleans Daily Picayune*, May 6, 10, 1873.

³⁵*St. Louis Missouri Republican*, May 25, June 5, 1874; William Taussig, "Personal Recollections of General Grant," *Missouri Historical Society Publication* 2 (1903): 11; Woodward, *History of the St. Louis Bridge*, 270; House Ex. Doc. 194, 43rd Cong., 1st Sess., 2.

³⁶*New Orleans Daily Picayune*, April 2, 4, 1874.

³⁷Extracts from Reports upon Fort St. Philip Canal and Construction of Jetties for Improvement of the Mouths of the Mississippi; Being Appendix R (In Part) of the Annual Report of the Chief of Engineers for 1874, in Corthell, *History of the Jetties*, 243, 247.

³⁸James Eads to Senator Carl Schurz, January 24, 1874, in *Addresses and Papers of James B. Eads*, 130; James Eads to William Windom, Chair of the Senate Committee on Transportation Routes to the Seaboard, March 15, 1874, in *Addresses and Papers of James B. Eads*, 131.

³⁹House Ex. Doc. 220, 43rd Cong., 1st Sess., 3.

⁴⁰Business Men of New Orleans to James Eads, March 18, 1874, in *Addresses and Papers of James B. Eads*, 146.

⁴¹Transcription in Corthell, *History of the Jetties*, 40.

⁴²Review of the Report of General Humphreys, Chief of Engineers, USA, May 29, 1874, in *Addresses and Papers of James B. Eads*, 156; Chief of Engineers' Arguments Refuted by His Own Testimony, in Ibid., 183.

⁴³Correspondence with Business Men of New Orleans, April 6, 1874, in Ibid., 153-54.

⁴⁴Corthell, *History of the Jetties*, 47-49; House Ex. Doc. 25, 43rd Cong., 1st Sess., 1; House Ex. Doc. 114, 43rd Cong., 2nd Sess., 2; Transcript of the Report of the Board of Engineers Relating to Improvement of the Mouth of the Mississippi River by Jetties; Being Appendix S (in part) of the Annual Report of the Chief of Engineers for 1875, in Corthell, *History of the Jetties*, 251.

⁴⁵Response to Welcome Address of the Mayor of St. Louis at the Banquet Given at the Southern Hotel, March 23, 1875, in Honor of the Passage by Congress of the Jetty Act to Improve the Mouth of the Mississippi, in *Addresses and Papers of James B. Eads*, 48.

⁴⁶Francis Trollope, *Domestic Manners of the Americans* (London, 1832), 2.

⁴⁷Corthell, *History of the Jetties*, 69.

⁴⁸Ibid., 68.

⁴⁹*New Orleans Daily Picayune*, May 12, 1875.

⁵⁰Corthell, *History of the Jetties*, 75.

⁵¹Ibid., 96; *New Orleans Daily Picayune*, March 6, 1876.

⁵²Ibid., April 28, 1876.

⁵³Corthell, *History of the Jetties*, 97.

⁵⁴*New Orleans Daily Picayune*, April 28, 1876.

⁵⁵*New Orleans Democrat*, May 6, 1874.

⁵⁶Corthell, *History of the Jetties*, 108-9.

⁵⁷Ibid., 375.

⁵⁸James Eads to Alphonso Taft, Secretary of War, May 23, 1876, in *Addresses and Papers of James B. Eads*, 207; James Eads to W.S. Holman, Chairman of the House Committee on Appropriations, January 29, 1877, in Ibid., 242; James Eads to G.W. McCrary, Secretary of War, May 7, 1878, in Ibid., 252; Review by Jas. B. Eads of the Letter of Gen. A.A. Humphreys, Chief of U.S. Engineers, May 1, 1878 to Hon. E.W. Robertson, Chairman House Committee on Levees and Improvement of the

Mississippi, June 1, 1878, in *Ibid.*, 256; Review by James B. Eads, of the Report of the Board of the U.S. Engineers Appointed under the Act of Congress Approved June 19, A.D. 1878, in *Ibid.*, 280; Corthell, *History of the Jetties*, 142, 156, 186, 212, 297.

⁵⁹*Ibid.*, 210.

⁶⁰*New Orleans Daily Picayune*, May 2, 27, 1877.

⁶¹Corthell, *History of the Jetties*, 184-85.

⁶²*New York Tribune*, July 15, 1879.

⁶³Mark Twain, *Life on the Mississippi* (1883; reprint, New York, 1991), 182.

⁶⁴House Ex. Doc. 6, Part 2, 50th Cong., 1st Sess., 163.

⁶⁵*New Orleans Daily Picayune*, May 20, 1881.

⁶⁶House Ex. Doc. 6, Part 2, 50th Cong., 1st Sess., 163; Laurence Oliphant, *Episodes in a Life of Adventure, or Moss from a Rolling Stone* (Edinburgh, 1887), 112.

⁶⁷Ayers, *Promise of the New South*, ix; Harry Grady, *The New South* (New York, 1890), 146; *New Orleans Daily Picayune*, December 17, 1884; C. Vann Woodward, *Origins of the New South* (Baton Rouge, 1951), ix.

⁶⁸Henry McElderry, *Description of Selected Specimens from the Medical and Surgical Sections of the Army Medical Museum* (New Orleans, 1884-85), 11-15, 17; C. J. Barrow, *Report of the U.S. Commissioner, and a List of the Collective Exhibit of the State of Louisiana, at the World's Industrial and Cotton Centennial Exposition* (New Orleans, 1885), 11; Edward C. Bruce, "The New Orleans Exposition," *Lippincott's Magazine of Popular Literature and Science* 35 (April 1885), 417; Donald Clive Hardy, "The World's Industrial and Cotton Exposition," (MA Thesis, Tulane University, 1964), 37; Robert W. Rydell, *All the World's a Fair* (Chicago, 1984), 73-98; Eugene Smalley, "In and Out of the New Orleans Exposition," *Century Magazine* 30 (June 1885), 185-87.

⁶⁹First quote from, A. de G. de Fonblanque, "Report by Consul Fonblanque on the World's Cotton Centennial Exhibition at New Orleans," in *Reports by Her Majesty's Diplomatic and Consular Officers Abroad on Subjects of Commercial and General Interest* (London, 1885), 2:36-37; second quote from, Eugene V. Smalley, "The New Orleans Exposition" *Century Magazine* 30 (May 1885), 14.

⁷⁰Herbert S. Fairhall, *The World's Industrial and Cotton Centennial Exposition* (Iowa City, 1885), 20.

⁷¹House Ex. Doc. 6, Part 2, 50th Cong., 1st Sess., 163.

⁷²John Buenker, John Burnham, and Robert Crunden, *Progressivism* (Rochester, VT, 1977), 3-29, 71-103; William M. Deacon, *Martin Behrman Administration Biography* (New Orleans, 1917), 47-55; Daniel Rodgers, "In Search of Progressivism," *Reviews in American History* 10 (December 1982), 113-32.

⁷³Fairhall, *Cotton Centennial Exposition*, 20.

⁷⁴Barry, *Rising Tide*, 89.

⁷⁵James B. Eads, *Minority Report of the Mississippi River Commission* (Washington, 1882), 1, 5, 7; Senate Ex. Doc. 58, 46th Cong., 2nd Sess., 14; Senate Ex. Doc. 10, 47th Cong., 1st Sess., 11.

⁷⁶House Ex. Doc. 37, 48th Cong., 1st Sess., 19. Italics added for emphasis.

⁷⁷Smith S. Leach, "The Mississippi River—What It Needs and Why It Needs It," in *Riparian Lands of the Mississippi River, Past—Present—Prospective*, ed. Frank H. Tompkins (New Orleans, 1901), 94.

⁷⁸*Report of the Board of State Engineers from April 20, 1890, to April 20, 1892* (Baton Rouge, 1892), 8; *Report of the Board of State Engineers from April 20, 1892, to April 20, 1894* (Baton Rouge, 1894), 21; *Report of the Board of State Engineers from April 20, 1896, to April 20, 1898* (Baton Rouge, 1898), 66, 119; *Report of the Board of State Engineers from April 20, 1908, to April 20, 1910* (New Orleans, 1910), 127; *Report of the Board of State Engineers from April 20, 1910, to April 20, 1912* (New Orleans, 1912), 107-12; *Report of the Board of State Engineers from April 20, 1912, to April 20, 1914* (New Orleans, 1914), 131-33; *Report of the Board of State Engineers from April 20, 1914, to April 20, 1916* (New Orleans, 1916), 48; *Report of the Board of State Engineers from April 20, 1916, to April 20, 1918* (New Orleans, 1918), 103.

⁷⁹*Hearings Before the Committee on Flood Control, House of Representatives, 70th Congress, First Session on the Control of Destructive Flood Waters of the United States, November 7, 1927 to November 22, 1927, Part 1* (Washington, 1927), 255.

⁸⁰*Report of the Board of State Engineers from April 20, 1896, to April 20, 1898*, 119.

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