Boundary Issues: Clarifying New Orleans's Murky Edges

Ari Kelman

At first there were just tiny ridges flanking the river, barely perceptible piles of Big Muddy's mud. Then, over millennia, they grew as the Mississippi River deposited layers of soil during flood seasons. It happened like this: Before the advent of modern flood control technologies, when the swollen river spread from its channel each spring, the unconstrained torrent slackened. Without a current carrying it, suspended material sank. The heaviest sediment dropped closest to the river, with lighter silt falling farther away. So the Mississippi built its banks, earthen ramps descending gradually from its shores. We know these accretions as the river's natural levees.[1]

Eventually, the levees became useful for people, because of both local topography and continental geography. Native Americans knew the riverbanks as the highest, driest ground in the flat, damp delta. They shared their knowledge with the Europeans who settled Louisiana. For the latter, the Mississippi and its levee embodied the New World's promise. The river gathered the waters of thousands of smaller streams crisscrossing its valley, an expanse stretching from the Rockies' eastern face to the Alleghenies' western slope. More than fifteen thousand miles of navigable waterways make up the Mississippi system, a funnel whose spout would, it seemed, shunt trade inexorably toward the Gulf of Mexico. For boosters the Mississippi was God's signature carved into the valley; they saw in the turbid river images of empire. And the levee was more evidence of a divine plan: an elevated spot on which to build an entrepôt where produce gathered from the North American interior could arrive at market near the river mouth.[2]

Such visions of benign nature, working in concert with imperial aspirations, prompted the French to place New Orleans on a crescent-shaped stretch of the levee in 1718. Four years later, François Xavier Charlevoix, a Jesuit priest, visited. "Rome and Paris had not such considerable beginnings," he wrote, "were not built under such happy auspices, and their founders met not with those advantages on the Seine and the Tiber, which we have found on the Mississippi, in comparison of which, these two rivers are no more than

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I would like to thank Ed Linenthal, Clarence Mohr, and Larry Powell for the opportunity to contribute to this issue of the *Journal of American History.*

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[1] Charles 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; Roger T. Saucier, *Geomorphology and Quaternary Geologic History of the Lower Mississippi Valley* (Vicksburg, 1994), 136–41.

[2] Tristram R. Kidder, "Making the City Inevitable: Native Americans and the Geography of New Orleans," in *Transforming New Orleans and Its Environs: Centuries of Change,* ed. Craig E. Colten (Pittsburgh, 2000), 9–21; Christopher Morris, "Impenetrable but Easy: The French Transformation of the Lower Mississippi Valley and the Founding of New Orleans," *ibid.*, 22–42.

The Mississippi River drains an area extending from Montana to New York and from Alberta, Canada, to the Gulf of Mexico. The river was New Orleans's benefactor: It created the sediment levees on which the city was built and directed trade there. But its flooding threatened residents from the eighteenth century onward. *Courtesy Special Collections Division, Tulane University.*

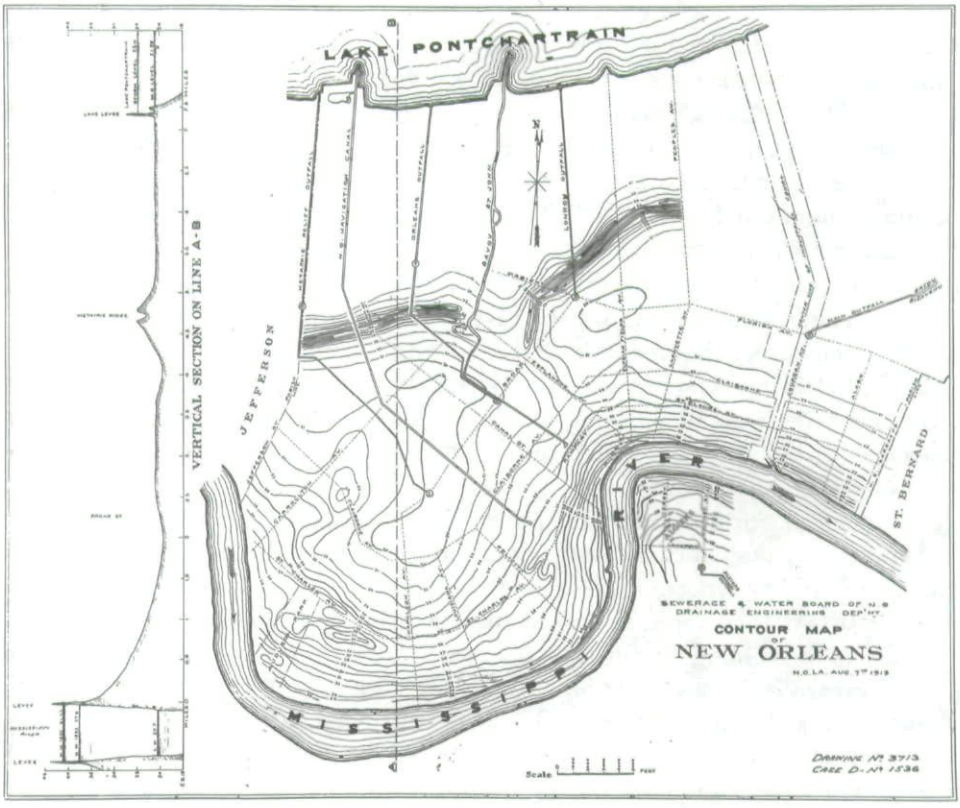
brooks." Geography was destiny. The river would inevitably make New Orleans great. But not even faith in environmental determinism allowed Charlevoix to overlook grim features of the local scene: "Imagine to yourself two hundred persons, who have been sent out to build a city, and who have settled on the banks of a great river, thinking upon nothing but putting themselves under cover from the injuries of the weather." So from the first, New Orleans had a strained relationship with its environs, which seemed at once to guarantee and to cloud its future.[3]

Geographers sum up this tension as a disparity between "site" (the particular land a city occupies) and "situation" (a more abstract measure of a metropolitan area's advantages relative to other places). New Orleans, in this formulation, was (and, to some extent, still is) blessed with a near-perfect situation. As Charlevoix noted, its location, when compared with the locations of other cities, is among the finest imaginable. The French built New Orleans on the east bank of the continent's greatest river, near its outlet, in an era before technologies began circumventing the vagaries of geography. Without railroads, cars, or planes annihilating space, the rivers of the Mississippi system were the region's principal commercial highways, leaving New Orleans in command of a vast hinterland. Just downstream from the city lay the Gulf of Mexico, which provided access to the Atlantic world of trade. River traffic was the city's economic lifeblood.[4]

If New Orleans's situation is remarkably good, its site may be equally bad. The city was built on sediment, the long ramp of the Mississippi's levee. The highest ground is found

[3] François Xavier Charlevoix, *Journal of a Voyage to North America,* vol. II, ed. and trans. Louise Phelps Kellogg (Chicago, 1923), 258, 272.

[4] Peirce F. Lewis, *New Orleans: The Making of an Urban Landscape* (Cambridge, Mass., 1976), 17.



This 1919 contour map shows the deep bowl that New Orleans occupies. The lowest point sits at the city's geographic center. The cross-section at the left of the map runs from the Mississippi River, point A, at the bottom of the map, to Lake Pontchartrain, point B, at the top. *Courtesy Special Collections Division, Tulane University.*

along the river frontage. From there the land slopes down—roughly fifteen feet over a distance of about one and a half miles—until it craters at the city's rear, where much of the ground is below sea level. Through the start of the twentieth century, a cypress wetland, known locally as the backswamp, stretched from there to the shore of Lake Pontchartrain, several soggy miles away, where the terrain climbs to the peak of the lake's levee. New Orleans, then, is a bowl ringed by bodies of water, which stare down into town like voyeurs. And because the city is surrounded by levees and sits on a high water table, there is no natural drainage, a hazard in a place that averages nearly sixty inches of rain annually.[5] The delta, finally, is a fertile disease environment; some of the nation's deadliest epidemics have prostrated New Orleans. If Charlevoix worried over the fate of two hundred colonists seeking shelter from inclement weather in 1722, who can now forget images of thousands of New Orleanians huddled in the Superdome, clinging to rooftops, or pleading for help following Hurricane Katrina in 2005, the latest chapter in the city's long disaster history?

The disjuncture between site and situation in New Orleans has always generated anxiety, much of it centered on the city's borders, especially the levees. Levees are supposed to form a boundary between the human and nonhuman worlds in New Orleans. On one

[5] Craig E. Colten, *An Unnatural Metropolis: Wresting New Orleans from Nature* (Baton Rouge, 2005), 1.

side of the river levee, for instance, the Mississippi roils by the metropolis it helped create. During flood seasons, especially, the river looms high above. Onlookers crane their necks and gaze over the levee at the Mississippi, their benefactor/antagonist. On the levee's other side sits New Orleans, designed as the very antithesis of wild nature: typically rectilinear, orderly, a beacon of progress. But the boundary between the city and its surroundings has never been stark. A tourist visiting New Orleans in 1859 captured the juxtaposition, sublime and terrifying: "it was a fearful sight to see the vast river, more than a mile wide, rising inch by inch until it reached the top of the levee, when hundreds of ships and steamers were floating far above the level of the streets—as high, indeed as the roofs of the houses in the back streets of town." Nature and culture mingle in New Orleans, an environmental borderland where site and situation collide.[6]

The city's residents have never been satisfied with this uncertain state of affairs. Theirs is a commercial metropolis, a for-profit concern. And commerce abhors chaos, preferring predictable markets. Moreover, wild nature is a dangerous neighbor. As a result, New Orleanians have struggled to reinforce the lines dividing their city from its environs. They have, in doing so, tried to overcome problems of site to realize the promise of situation. These efforts have often focused on the levee and date back to the earliest period of settlement. In 1719 New Orleans flooded, and engineers suggested augmenting the levee to keep the city dry. They hoped to confine the Mississippi to its channel, making the river more reliable by building it artificial banks. By 1727 laborers had constructed a mound, eighteen feet wide and three feet high, stretching for a mile fronting the city. But New Orleans still flooded, including in 1735, 1775, and 1783. Throughout the French and Spanish colonial periods, workers further improved the artificial levee. Shortly after the Louisiana Purchase in 1803, flood control works snaked downstream from Baton Rouge to just below New Orleans.[7]

And yet it still seemed possible that, rather than sweeping the city to greatness, the Mississippi might wash it away. Unwanted water sometimes seeped into New Orleans during flood seasons early in the American period, dimming the city's commercial prospects and threatening its citizens. The Conseil de Ville (city council) responded by regularizing levee improvements. The city would tax ships docked at the waterfront to help pay for the work and use enslaved African Americans for the backbreaking labor. Still the river would not be contained. On May 4, 1849, the levee broke fifteen miles upstream. The resulting flood submerged two hundred blocks of New Orleans and forced ten thousand people from their homes. For six weeks, low-lying parts of the city remained under water, totally obscuring New Orleans's already uncertain edge. Laborers sealed the breach only in mid-June, and water slowly receded from the city.[8]

The 1849 flood had far-reaching implications, ushering in an era of federally subsidized public works on the Mississippi. Congress passed the Swamp Land Act of 1850 and sponsored scientific surveys of the lower Mississippi undertaken by a U.S. Army engineer, A. A. Humphreys, and a civilian, Charles Ellet. Although the Swamp Land Act had little impact in New Orleans, the surveys reshaped the city's levee and landscape. Ellet filed

[6] T. L. Nichols, *Forty Years of American Life* (London, 1874), 132.

[7] Donald W. Davis, "Historical Perspective on Crevasses, Levees, and the Mississippi River," in *Transforming New Orleans and Its Environs*, ed. Colten, 84–106; Benjamin G. Humphreys, *Floods and Levees of the Mississippi River* (Washington, 1914), 19.

[8] George Washington Cable, *The Creoles of Louisiana* (New York, 1884), 276–84; Colten, *Unnatural Metropolis*, 26–27; Davis, "Historical Perspective on Crevasses, Levees, and the Mississippi River," 96–97.

first, in 1852. He suggested that human endeavors—upstream development and levees that climbed ever skyward—exacerbated the flood menace. Ellet offered a multitiered alternative: more levee improvements; building outlets or spillways to shunt floodwater from the river; and constructing massive reservoirs, artificial wetlands, to soak up excess rain before it ran off into the Mississippi. In highlighting the impact people had on their environment, Ellet's visionary conclusions prefigured George Perkins Marsh's findings in his 1864 book, *Man and Nature,* a core text for American conservationists.[9]

Andrew Atkinson Humphreys took longer than Ellet to publish. But when he did, in 1861, his work had greater sway, influencing generations of hydrologists, engineers, and politicians. *Report upon the Physics and Hydraulics of the Mississippi River,* written by Humphreys and H. L. Abbot, is a hybrid document: part scientific treatise, part broadside. It is deeply researched, richly detailed, and terribly wrong in its conclusions, which were spurred as much by Humphreys's ambitions as by his data. Humphreys hated Ellet for threatening the standing of military engineers. *Physics and Hydraulics* consequently undermines nearly all of Ellet's insights, summarily dismissing outlets and reservoirs before arguing that only "an organized levee system [can] be depended upon for the protection against floods in the Mississippi Valley." And when Humphreys became chief of the U.S. Army Corps of Engineers, he ascended to a position of authority where he could help craft an enduring policy known as "levees only."[10]

With federal agencies setting standards and absorbing two-thirds of construction costs, the city's levees reached new heights. The building boom, though, hit high gear when Progressive city-planning ideologies linked with industrial technologies. Beginning in 1890, when the city government formed the Orleans Levee Board, engineers believed they could rationalize the city's environment, finally clarifying where the messy natural world ended and the regulated spaces of urban life began. Under the aegis of the levee board, workers moved millions of cubic yards of earth to the waterfront. New levees rose at least three feet higher than in any previous flood; at the crown they were four to ten feet across, at the base six to seven times as wide. These massive public works, emblems of state power, dwarfed any flood control efforts previously undertaken in the city. New Orleans began to resemble a village barricaded against an impending invasion.[11]

But even as New Orleanians struggled to remake the levee, another boundary proved as irksome. The backswamp confined the city to a thin strip of the Mississippi's levee: the sliver by the river. For New Orleanians this was a problem twice over. First, because

[9] John M. Barry, *Rising Tide: The Great Mississippi Flood of 1927 and How It Changed America* (New York, 1997), 36–91; Charles Ellet, *Report on the Overflows of the Delta of the Mississippi,* 32 Cong., 1 sess., 1852, S. Exec. Doc. 20, pp. 27–36; Charles Ellet, *The Mississippi and Ohio Rivers: Containing Plans for the Protection of the Delta from Inundation; and Investigations of the Practicability and Cost of Improving the Navigation of the Ohio and Other Rivers by Means of Reservoirs, with an Appendix, on the Bars at the Mouths of the Mississippi* (Philadelphia, 1853), 132–34; George Perkins Marsh, *Man and Nature; or, Physical Geography as Modified by Human Action* (New York, 1864).

[10] Barry, *Rising Tide,* 36–91; A. A. Humphreys and H. L. Abbot, *Report upon the Physics and Hydraulics of the Mississippi River; Upon the Protection of the Alluvial Region Against Overflow; and Upon the Deepening of the Mouths: Based Upon Surveys and Investigations Made Under the Acts of Congress Directing the Topographical and Hydrographical Survey of the Delta of the Mississippi River, with such Investigations as Might Lead to Determine the Most Practical Plan for Securing it from Inundation, and the Best Mode of Deepening the Channels at the Mouths of the River* (Washington, 1876), 155, 162, 173, 176, and esp. 192; 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 (Jan. 1985), 1–33.

[11] Board of Commissioners, Orleans Levee District, *Act No. 93 of 1890 Creating the Orleans Levee District, and Subsequent Acts* (New Orleans, 1907). For the levees' growth, see the successive volumes of the *Report of the Board of State Engineers,* 1892–1926.

Pedestrians walk the crown of New Orleans's artificial levee, c. 1899. By the late 1890s, such levees—embodying engineers' efforts to clarify the boundary between untamed nature and the rational city—had grown as tall as nearby houses. *Courtesy Historic New Orleans Collection,* accession no. 1974.25.17.243.

their city could not grow, except longer. And second, because they viewed the swamp not just as a hindrance, but as a danger, a source of disease. Starting in the Spanish era, New Orleanians had tried in vain to drain the wetlands' "deadly contents." Then, as yellow fever nearly decimated the city in 1853, it became known as a "wet graveyard," prompting more futile drainage initiatives. As late as 1887, with rival cities, such as Memphis, Tennessee, embracing sanitary reform, Charles Dudley Warner visited New Orleans on assignment for *Harper's.* He was stunned by "gutters green with slime . . . canals in which the cat became the companion of the crawfish, and the vegetable in decay sought in vain a current to oblivion." New Orleans had become a joke, a city stuck in the mud.[12]

Civic leaders, buoyed by a heady combination of Progressive optimism and New South boosterism, hoped to redeem the city's reputation by reclaiming its wetlands. They promised that with improved artificial levees standing sentinel at the front door and the backswamp gone from the rear, New Orleans could grow while staying dry and healthy. To do so, the city needed a "scientific system of drainage." The climate abetted the reform impulse when a storm dumped more than a billion gallons of rain on New Orleans on August 13, 1894. Lacking adequate drainage, New Orleans's bowl filled with water. There were "high tides" throughout town, and "regattas could have been rowed on Canal Street." Just six months later, members of the New Orleans Advisory Board on Drainage

[12] *New Orleans Daily Picayune,* Sept. 14, 1853; B. Dowler, "On the Necropolis of New Orleans," *New Orleans Medical and Surgical Journal,* 7 (Nov. 1850), 277; Charles Dudley Warner, "New Orleans," *Harper's New Monthly Magazine,* 24 (Jan. 1887), 186.

presented detailed findings about how the city could expand off the high ground of the natural levee and spread out without flooding, even during downpours.[13]

The board called for improved street gutters. The gutters would flow into branch drains. The branch drains would lead into larger main drains. The main drains would travel into a network of canals, some as much as forty feet across. The canals then would lead to a central outflow channel and would be gravity fed. The channel would be sited on the lowest point in the city to take advantage of the natural slope leading into it. In this way, the city's topography, declining away from the high ground on the river and lake levees, would impel the drainage inside the new system. And pumping stations located strategically along the system's length would maintain a powerful current for the drainage within, until a final set of huge pumps raised the contents over the artificial levee and into a bayou that ultimately would drain into a nearby lake.[14]

In some respects, there was nothing new about the drainage board's suggestions. New Orleans needed to domesticate its landscapes, to secure the border between itself and its surroundings by ensuring that water would remain where people wanted it: either outside the levees or within the neatly delineated confines of the drainage system. Once more New Orleans would improve its site to capitalize on its situation. But the method for accomplishing this was both new and ironic. The city would build an artificial river system in its midst: brooks (gutters) linked to tributaries (branch drains) feeding larger tributaries (main drains) joining still bigger tributaries (branch canals) of a trunk stream (the main channel) flowing into a major body of water (a nearby lake). The key difference between a natural river system and the proposed artificial one resulted from the city's concave shape. River systems must follow the earth's layout; Newtonian physics promises that water flows downhill. New Orleans's drainage system, by contrast, would employ artifice to control nature, using pumps to overcome the inconvenience of gravity and the misfortune of the city's slope.

After protracted wrangling over funding, including an election in which women, ostensibly keeping house on a municipal scale, voted in New Orleans for the first time, construction began in 1900. Each year after that, the city advanced and the backswamp retreated. By 1909 forty miles of canals crossed New Orleans, and even the acid-tongued New Orleans–born author George Washington Cable marveled that "the curtains of swamp forest are totally gone. Their sites are drained dry and covered with miles of gardened homes." Then, in 1913, A. Baldwin Wood invented the screw pumps bearing his name—many still operate—allowing the drainage works to suck up still more wetlands. A rise in assessed property narrated the system's growth and the swamp's decline: in 1890 the tax rolls of New Orleans listed $132 million worth of property; by 1914 that number had nearly doubled. The same year, triumphant sanitarians noted that the death rate had plummeted, from 27 per 1,000 at the turn of the century to below 20 per 1,000.[15]

[13] Citizens' Drainage and Paving Association, *Address from the Executive Committee of the Citizens' Drainage and Paving Ass'n to the People of the City of New Orleans: The Drainage Ordinance* (New Orleans, 1889), 1; *New Orleans Daily Picayune,* Aug. 14, 1894, p. 3. New Orleans Advisory Board on Drainage, *Report on the Drainage of the City of New Orleans, by the Advisory Board* (New Orleans, 1895), 11, 15, 17, 34, 48–51, 71–72.

[14] The report was vague about where to put key parts of the drainage system, and various possibilities were discussed. New Orleans Advisory Board on Drainage, *Report on the Drainage of . . . New Orleans,* 23–38.

[15] George Washington Cable, "New Orleans Revisited," *Book News Monthly,* 27 (April 1909), 560; Martin Behrman, *New Orleans: A History of Three Great Public Utilities* (New Orleans, 1914), 5. For the growth of the drainage system, see *Semi-Annual Report of the Sewerage and Water Board of New Orleans,* 1900–1916.

Observers celebrated the city's scientific management of space, manifest in both the huge levees and the drained districts where new homes sprouted like kudzu. One correspondent exclaimed, "it is a transformation from medieval conditions to the standards of the twentieth century." Louisiana's state engineer, Henry Brown Richardson, boasted: "Risk can be reduced to almost any extent." "It is only a matter of labor and cost to build levees . . . that will remain impregnable against any flood." Reformers and technocrats had seemingly cleaned up the city's muddy border with nature. Because of their good work, New Orleans would be safer, prettier, and more consistently open for business.[16]

It was a pipe dream, of course, born of misplaced faith in technology and willful forgetting. The levees, designed to eliminate overflows, often made things worse—as Charles Ellet had realized half a century before. With development in the Mississippi Valley ongoing and artificial banks confining more runoff inside the channel, the river set new high-water marks in 1912, 1913, and 1922. But in each of those years the Mississippi carried less water than it had in earlier, lower flood seasons. New Orleans remained dry. But the city was in more danger. At the same time, the drainage system exacerbated threats it had supposedly eliminated. Wetlands, including the backswamp, though long reviled as wasted land or worse, had actually served as huge sponges—again, as Ellet had noted. Without wetlands absorbing seasonal rains, and with more paved surface area in the city each year creating more runoff, New Orleans increasingly relied on its drainage system to remove excess water. If the pumps stopped, the city would fill.[17]

Across the twentieth century, New Orleanians, surrounded by levees, beholden to drainage technologies, lived in a prison of their own making. But few people realized the danger because the city's borders with nature appeared more secure than ever. The levee hid the river. And the urban wetlands were gone. Only during catastrophes were New Orleanians forced to reckon with the peril. During the 1927 flood, for instance, the city filled with rain after the drainage system failed. New Orleans responded by dynamiting the levee downstream, a spectacle designed to reassure onlookers that the city was safe, and building improved flood control mechanisms, including an upstream spillway. Next came Hurricane Betsy, which slammed into New Orleans in 1965. Betsy pushed a storm surge into Lake Pontchartrain, overtopping and breaching levees. It left low-lying parts of the city, including the Ninth Ward, under water for more than a week.[18]

In the years between those two disasters, the city struggled to maintain the illusion of safety. Engineers improved the drainage system, swallowing up the last of the urban swamps, and constructed miles of new levees and of straight-sided, more easily breached floodwalls. By midcentury it seemed New Orleans had finally sorted its spaces: the city here and nature there. Which allowed for another kind of segregation: racial and socioeconomic. New Orleans had been a cultural as well as an environmental borderland where rich and poor, white and nonwhite often lived side by side—if not by choice, then by necessity. Bound to the sliver of the levee for two centuries, the city had offered little room for exclusive enclaves. By the 1960s, though, elevated freeways connected the city with suburbs, many of which had been built on drained land. New Orleans stratified, with the poor of all races and people of color of all classes often occupying lowlands in

[16] Frank Putnam, "New Orleans in Transition," *New England Magazine,* 36 (April 1907), 234; *Report of the Board of State Engineers from April 20, 1896, to April 20, 1898* (Baton Rouge, 1898), 119.

[17] Barry, *Rising Tide,* 157–66; Colten, *Unnatural Metropolis,* 32–46, 82–107.

[18] Barry, *Rising Tide,* 188–92, 228–57; Colten, *Unnatural Metropolis,* 145–46.

the city while many middle-class whites, who could afford to do so, fled town for new developments in surrounding suburbs.[19]

Then came Katrina, whose apocalyptic particulars are both well known and too complicated to be entirely knowable: high winds, another storm surge, failing levees, muddy floodwater stagnating for weeks, and no clear line between the city and its surroundings. And yet some members of the committees charged with planning New Orleans's recovery still ignore the warnings written into the city's disaster history. It now appears New Orleans will try again to engineer itself out of harm's way, once more attempting to improve its levees and drainage system. The various committees seem captivated by the notion that it is possible to separate the city from its surroundings, a myth that will not die, no matter how many of New Orleans's residents do.

[19] Brookings Institution Metropolitan Policy Program, "New Orleans after the Storm: Lessons from the Past, a Plan for the Future," Oct. 2005, http://www.brookings.edu/mediaarchive/pubs/metro/pubs/20051012_NewOrleans.pdf; Colten, *Unnatural Metropolis,* 149–61.