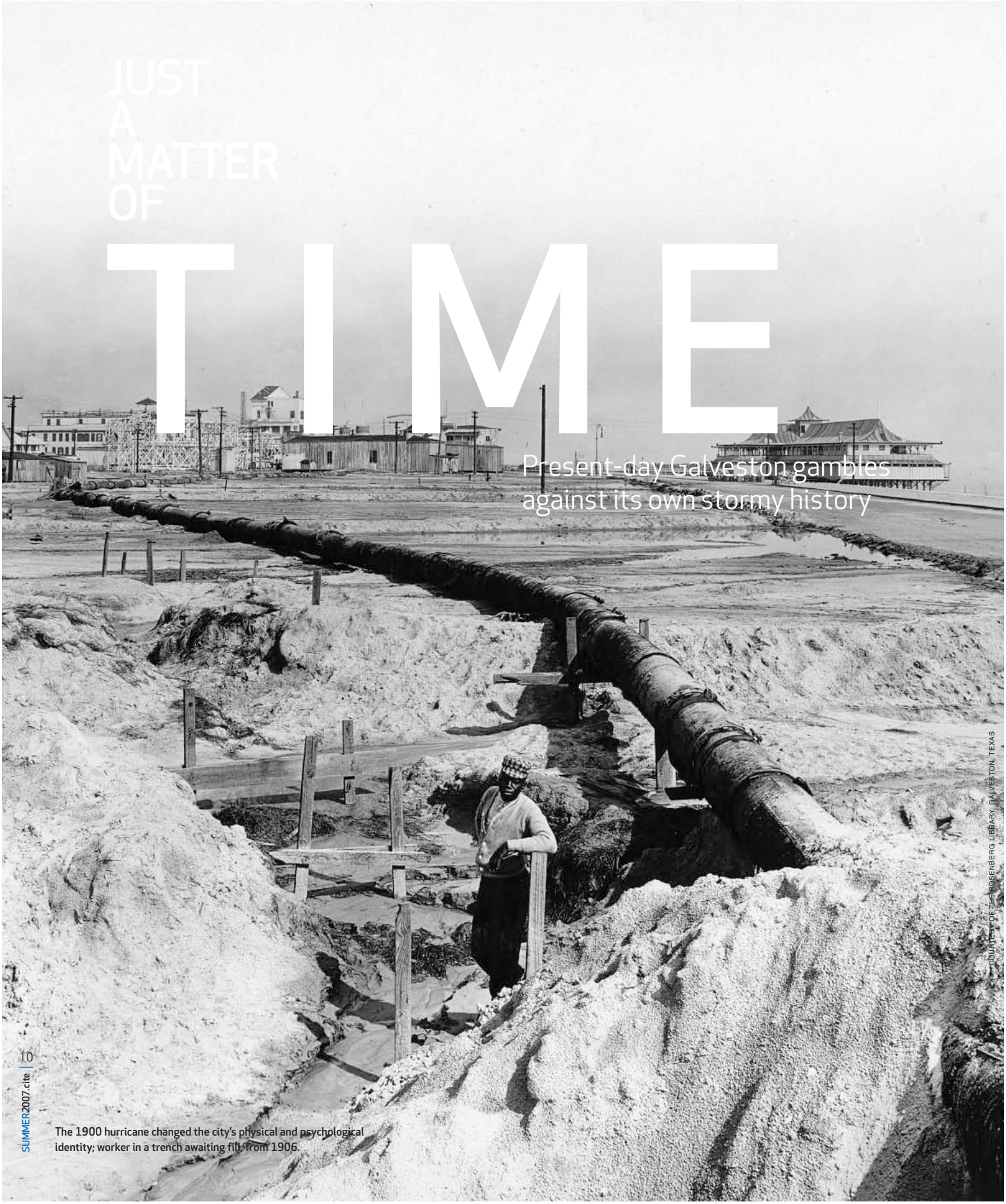
JUST A MATTER OF TIME

Present-day Galveston gambles against its own stormy history



COURTESY OF THE ROSENBERG LIBRARY, GALVESTON, TEXAS

The 1900 hurricane changed the city's physical and psychological identity; worker in a trench awaiting fill from 1906.

by **Tom Curtis**

I'VE LIVED HALF MY LIFE IN A CITY THAT SHOULDN'T BE HERE. Despite its jasmine-and-oleander-scented semi-tropical charm and its climate-adapted Victorian architecture, Galveston has one irremediable flaw: 168 years ago, it was incorporated on the shifting sands of a barrier island. The natural order of things, as coastal geologists explain, is for these slightly elevated sandbars to continuously roll over from seaward to leeward as every gust, from gentle breezes to hurricane-force winds, blows sand inland; inexorably eroding the beaches, meanwhile, are hydrologic processes ranging from daily tides and seasonal thundershowers to leviathan storm surges. These same forces rebuild the beaches and dunes farther inland, facilitating the measured migration of barrier islands towards the mainland.

Because they are in constant (if slow) motion, barrier islands are inhospitable places to site cities, or even beach houses. As the Gospel of St. Matthew recaps the age-old wisdom, only fools build houses on sand. Nature tried to teach Galveston this lesson more than a century ago, when a monster hurricane—today classified as a Category 4 on the Saffir-Simpson storm intensity scale—blindsided the island city.

On September 7, 1900, Galveston was a fast-growing metropolis of nearly 38,000 people. Perched on the northeastern edge of Galveston Island off the Upper Texas Coast, the state's fourth-largest city was a thriving port, resort, and banking and commercial center. It aspired to become the Manhattan of the Gulf, and on that day, its ambition seemed attainable. But Galveston was a disaster of biblical proportions waiting to happen. In the first decade of the 21st century, some fear that it still is.

About 8 p.m. on September 8, the eye of the then-approaching hurricane passed directly over the city—the highest ground of which was only 8.7 feet above the Gulf. The accompanying storm surge was measured at 15 feet and 20 feet at two different city locations. That surge drowned most of the 6,000 to 8,000 people in Galveston whom the hurricane is estimated to have killed. (Another 2,000 to 4,000 are thought to have drowned on the mainland.) Property damage totaled more than $17 million (in 1900 dollars); 3,600 houses and other structures in Galveston were destroyed. Overnight, Galveston earned an

unwanted distinction, dashing its aspirations for national stature and branding it with an unhappy epithet that clings to it to this day: site of the deadliest natural disaster in North American history.

The conventional scientific wisdom in 1900 was that the shallow water off Galveston's beaches would break up destructive waves and thus limit flooding. Today's weather scientists know that the height of the storm surge—the dome of water, up to 50 miles wide, that is swept ashore near where the hurricane's eye makes landfall—is inversely correlated with the water's depth, meaning that it is greatly enhanced by the shallowness of the Gulf off Galveston—a major reason for Galveston's continued vulnerability.

Both Erik Larson's 1999 best-seller *Isaac's Storm: A Man, a Time, and the Deadliest Hurricane in History* and an earlier book, John Edward Weems's *A Weekend in September*, first published in 1957, offer vivid depictions of the 1900 Storm's night of terror. Both eloquently chronicle the devastation spawned by the hurricane and detail the long and grisly aftermath. The two also discuss construction of Galveston's protective (if beach-destroying) 10-mile-long, 17-foot-high seawall, the initial phase of which was completed by the U.S. Army Corps of Engineers in 1904. They also describe the engineering feat of raising the city's grade, which gradually slopes downward from the seawall, thus draining rainwater and seawater northeast toward Galveston Bay.

But the two authors strongly differ about Galveston's subsequent safety. Larson cautions that as the 21st century approached, "meteorologists still considered Galveston one of the most likely targets for the next great hurricane disaster." Weems, on the other hand, writes reassuringly that the "massive seawall and tireless grade-raising, which still continues, make Galveston one of the best protected cities on any coast." Weems's assumption rests largely on reports of Galveston's experience with another Category 4 hurricane, said to have been nearly equal in intensity to the 1900 Storm. It went inland 50 miles southwest of the city, pummeling Galveston's beachfront with a 12-foot storm surge. The new 17-foot seawall held: Only about 50 people died on the island, and property damage reportedly totaled $5 to $8 million (1915 dollars).

"Certainly, in contrast to 1900, the city emerged relatively unscathed in 1915, and civic leaders were quick to publicize this fact to the world," independent researcher Stan Blazyk notes in his well-documented 2000 book, *A Century of Galveston Weather: People and the Elements on a Barrier Island*. He adds, "Unfortunately, this has led to a tendency to view Galveston as safe or protected from major hurricanes by the seawall, and nothing could be further from the truth. Property damage from the 1915 storm would be catastrophic by today's standards."

The odds of a catastrophe happening do seem daunting. On average, hurricanes strike the Texas coast every two and a half years. During the 20th century, 14 such "tropical cyclones" have come ashore on or near Galveston Island. Moreover, Galveston has been battered by a major hurricane—Category 3 or greater—about once every 20 years since 1900. True, fewer than 100 Galvestonians died in all the storms during the century following 1900. But there is reason to fear that this hopeful trend may be reversed in the 21st century.

Larson cautions that as the 21st century approached, "meteorologists still considered **Galveston** one of the most likely targets for the **next great hurricane disaster**."

The most recent major hurricanes afflicting Galveston were Carla, in September 1961, and Alicia, in August 1983. Carla, a Category 4 that ultimately made landfall 130 miles southwest of Galveston, killed six Galvestonians, flooded most of the city, and caused $18 million in local property damage, including destruction wrought by several tornadoes it spawned. Radar images of its monster spiral encompassing nearly the entire Gulf were terrifyingly displayed on TV screens for days before it went inland. Carla likely would have killed more people if an estimated 50,000 panicked Galvestonians hadn't fled inland ahead of the mammoth, slow-moving storm.

As the number of people living on or near the coast has mushroomed, two realities have emerged. One: Because hurricane forecasting is imperfect, people in risky locations like Galveston Island must evacuate well before it's certain they need to. Those who wait until they know for sure may not be able to get out, because rising water may obstruct escape routes or gridlocked traffic may ensnare them. Two: Galvestonians and other coastal residents often are heavily influenced in their hurricane-evacuation decision making process by their experience during the last storm.

For instance, in early August 1980, many Galvestonians and other coastal residents fled inland to escape from Hurricane Allen—then an extremely dangerous Category 5 with sustained winds clocked at 190 miles per hour. Many Allen refugees found themselves stalled on jammed freeways and later cursed weather forecasters when the storm veered south, weakened to a Category 3, and made landfall on open ranch land north of Brownsville.

That memory was still fresh in mid-August 1983, when fast-developing Hurricane Alicia struck. Barely a tenth of Galveston's population is estimated to have fled Alicia, the eye of which ultimately crossed the island's western tip. A low Category 3 at landfall, Alicia killed no one in Galveston but nevertheless ranked as the most expensive hurricane on record at that time, with more than $500 million in property damage on Galveston Island, including extensive damage to half the houses on the West End beyond the protection of the seawall and a total of $2 billion in damage throughout the region. Alicia's eye later passed over southwest Houston, and the storm uprooted trees all over town and stripped the glass skins off downtown office towers.

The next storm to threaten Galveston appeared in late September 2005. Ranked a Category 5 while swirling in the Gulf, Rita was among the most intense tropical cyclones ever observed in the Gulf, with sustained winds of 180 miles per hour gusting to 235 miles per hour. Rita arrived three weeks after Hurricane Katrina had mauled the Mississippi and Louisiana coasts. The accompanying breach of the rickety levees in New Orleans, and the chaotic federal, state, and local response, resulted in widely televised scenes illustrating a breakdown of civil society. When hurricane forecasters placed Galveston in Rita's path, the mayor ordered a mandatory evacuation. Most residents readily complied. Unfortunately, a regional plan for orderly, staged hurricane evacuations that called for the 800,000 to 1,000,000 coastal residents in the surge zones of Brazoria, Chambers, Galveston, Harris, Liberty, and Matagorda Counties to leave the area first went by the board: Thanks to the "Katrina effect," an estimated 1.5 million to 2.5 million people, many of them Houstonians who didn't need to leave, flooded onto freeways and arterial roads, turning typically three-to-five-hour trips to San Antonio, Bryan–College Station, Austin, or Dallas into hellish 24-to-36-hour ordeals. Rita, like Allen earlier, shrank to a Category 3 before landfall. While in the Gulf it took an abrupt right turn, finally barreling into the

St. Patrick's church raised for fill, from 1907.

COURTESY OF THE ROSENBERG LIBRARY, GALVESTON, TEXAS

Texas-Louisiana border. Reportedly 130 people died in the Rita evacuation, while just seven were killed by the storm itself. Despite promising better transportation planning for the next major hurricane, the 2006 report of the Houston-Galveston Area Council (HGAC) Evacuation and Response Task Force concedes: "The evacuation of the Houston-Galveston area before a Category 3 or greater hurricane presents an almost insoluble logistical problem."

With an average of one major storm striking Galveston every 20 years, the 24-year gap since Alicia suggests that Galveston today is overdue for a direct hit. And if the past is prologue, many Galvestonians, recalling their "unnecessary" flight from Rita, may decide to take their chances on the island. Even if residents merely temporize, delaying departure could prove deadly. "Rita gave us a lot of warning and drew a bead on our part of the state very early," notes Alan L. Clark, HGAC's director of transportation planning. "It provided much more lead time than we could expect from a hurricane that developed more quickly and moved inland faster." If such a storm also included drenching rains, this combination could result in thousands being stuck in traffic as waters rise, inundating vehicles and drowning their occupants.

Meteorologist Jeff Linder, a knowledgeable young staffer with the Harris County Flood Control District, describes the dangers facing those remaining in Galveston when a Category 4 or 5 hurricane strikes: A storm surge of 17 feet or greater at the coast (with destructive wave action above that) will demolish all structures within four city blocks behind the seawall, he warns. That's possible because, even as the sea level in the Gulf rises incrementally, Galveston has subsided more than two feet in the past century, meaning that the seawall is now effectively less than 15 feet high.

Beyond the seawall, West Galveston Island—22 miles of open beaches and undeveloped pastures half a century ago—is now chockablock with vacation homes and businesses. These properties are worth in the aggregate more than $1.6 billion, according to the Galveston County Central Appraisal District—four times the value of all the taxable property behind the seawall. The development of West Galveston Island, including its bay houses (some with networks of canals that during hurricane storm surges and backwashes could split the island in two) wouldn't have been possible without government programs such as federal flood insurance and the Texas Windstorm Insurance Association. These subsidized programs protect homeowners and mortgage bankers by having taxpayers elsewhere bail out those who choose to build or buy in vulnerable locations—or those who lend money to those who do. They also help support the overheated development now under way on Galveston's East Beach, where among other projects a new highrise condo has appeared and 2,000 pastel-colored homes comprising the New Urbanist development Beachtown are in the works.

As for the breakneck development on the western two-thirds of the island beyond the seawall, in May 2007 Galveston's city government declined to embrace land-use curbs suggested by the University of Texas's Bureau of Economic Geology that would have created buffer zones shielding beach foredunes, new wetlands, and a protective central ridge—all of which might spare the island from being sliced into two or more pieces by the next big storm. Instead, civic authorities decided to let west islanders read the study, pay their taxes, and take their chances: "If they want to live on the edge and risk losing it all," City Manager Steve LeBlanc told the *Galveston County Daily News*, "that's their decision."

The next Category 3, 4, or 5 storm may demonstrate whether the Galveston building codes and planning and zoning regulations enacted since Alicia are adequate. Meteorologist Linder shows two before-and-after-Hurricane-Rita slides featuring the community of Holly Beach, Louisiana, population 300. The initial scene reveals an assemblage of prosperous-looking vacation and retirement homes, with the first row of houses on the beach and, behind the vegetation line, three or four additional rows of similar residences with neatly tended yards. The post-Rita slide shows the same beach scene swept clean of everything but cement slabs where houses used to be.