Man-made New Orleans: Some Interactions between the Physical and Esthetic Environments

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ABSTRACT.—The relations between the physical environment and esthetic dimensions of the New Orleans cultural landscape are examined. The esthetic characteristics associated with New Orleans urban morphology are examined with respect to possible constraints by the physical environment. Salient townscape features such as street grid system, surface-drainage network, and spatial features of selected residential neighborhoods provide instances that demonstrate the varying levels of physical environmental impingement upon the esthetic landscape.

Because of its close, if not abject, dependence upon local building materials and local qualities of site, the city epitomizes the surrounding country and gives a special character to the natural setting. At no moment in its existence is the divorce between the man-made environment and the earth complete.

—LEWIS MUMFORD, *in The Culture of Cities*

THE NEW ORLEANS urban complex stands upon what has been termed the flattest, lowest, and geologically youngest site of any major city in the United States (fig. 1). The site has been above sea level for roughly a thousand years, while the most significant human landscape modification has transpired roughly within the past two centuries.

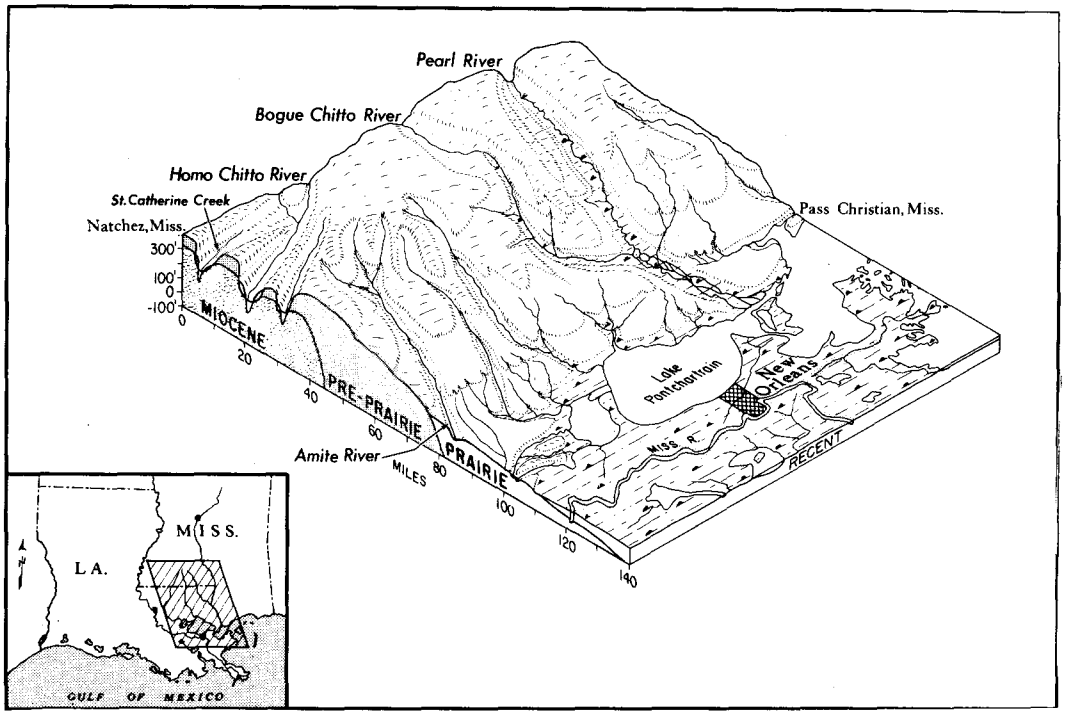
The growing demands for space to accommodate the population of one of the world's major ports have transmogrified the physical landscape of New Orleans so fundamentally that the designation — man-made — applies not only to buildings, roads, and other components of the cultural landscape, but also to the undulations of the land surface itself. Indeed, the processes of site preparation and maintenance (that is, from extreme meteorologic or hydrologic events) have built a virtual walled city that is primarily below sea level, and portions of which, in geological terms at least, are subsiding rapidly.

The visual or esthetic landscape is compounded of the disparate elements of the physical and human scene, and it becomes chaotic and illegible in certain locales as a result of the uneasy symbiosis of man and nature. Especially the street grid, drainage system, and spatial structure of certain residential neighborhoods give visual evidence of the inextricably interwoven physical and human landscapes.

ASPECTS OF THE PHYSICAL MILIEU

New Orleans' global importance as a port followed from its geographical location on the lower deltaic plain of North America's premier river. The "Isle of Orleans" depicted by the eighteenth century cartographer Delisle is reality when one considers that marshlands flank the city's eastern and western edges, and the banks of Lake Pontchartrain on the north and the Mississippi to the south are permanent, though dynamic, physical boundaries. The characteristics of the land surface have long confounded potential residents as well as visitors, as an eighteenth century account affirmed:

Figure 1.—Block diagram illustrating geologic structure and geomorphology of New Orleans region in southeastern Louisiana. Courtesy Dr. Sherwood M. Gagliano.



At high tide, the river flows through the streets. The subsoil is swampy... Dikes have to be built along the river, and houses can be constructed only on piles. Those living in the city... feel as if they were living on an island in the middle of a mud puddle. *(Regional Planning Commission 1969)*

The alluvial ridges or levees built by the Mississippi River's overbank flow at high stages provided the highest ground, although they stood no more than 10 or 15 feet above sea level. In addition to the natural levees, less extensive former beach ridges were deposited above the generally sea-level fresh (some brackish) water marshes, while thickets of cypress dominated the swamps. Much of this area, most of the present urban region, is thus below sea level, thereby accounting for the popular concept of a bowl-shaped base on which New Orleans is situated.

The former beach ridges, called Metairie and Gentilly ridges, (also called Metairie Bayou and Bayou Sauvage (figs. 2 and 3) provided the road surfaces, west and east respectively, giving first overland contact to the town of New Orleans.

IMPACT OF HUMAN MODIFICATION OF THE LANDSCAPE

The locale of New Orleans proved attractive for the aboriginal Amerinds who occupied the region for more than 2,000 years. The Europeans realized, as early as 1699, the strategic value of the Bayou St. John portage route between the Mississippi and Lake Pontchartrain. The natural levees were a stable and partially dry foundation for the original settlement's nucleus. Thus the French Quarter is situated on some of the highest ground in the region.

Yet from the very beginnings, the concern for flood control, or protection, by walled dikes was paramount. In 1722, the engineer La Tour urged the

Figure 2.—Regional geomorphology of New Orleans in the Pontchartrain Basin vicinity. From Saucier 1963.

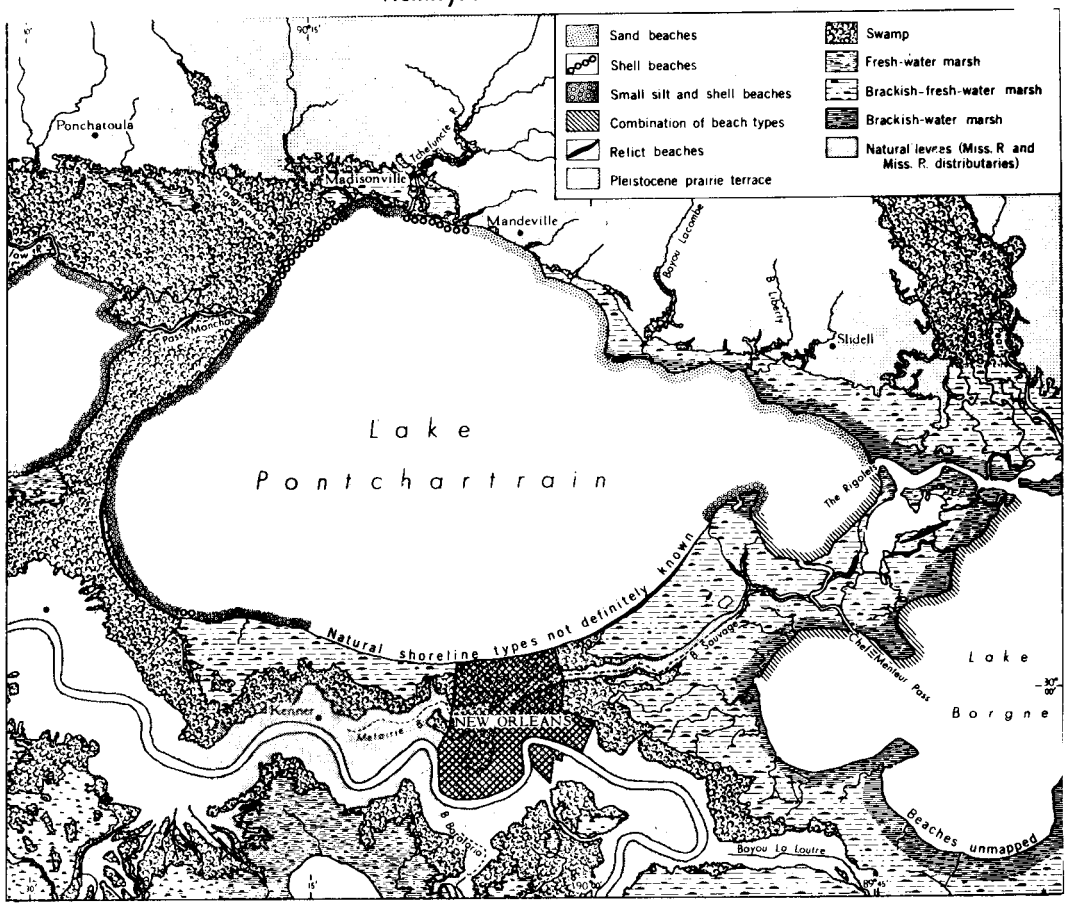
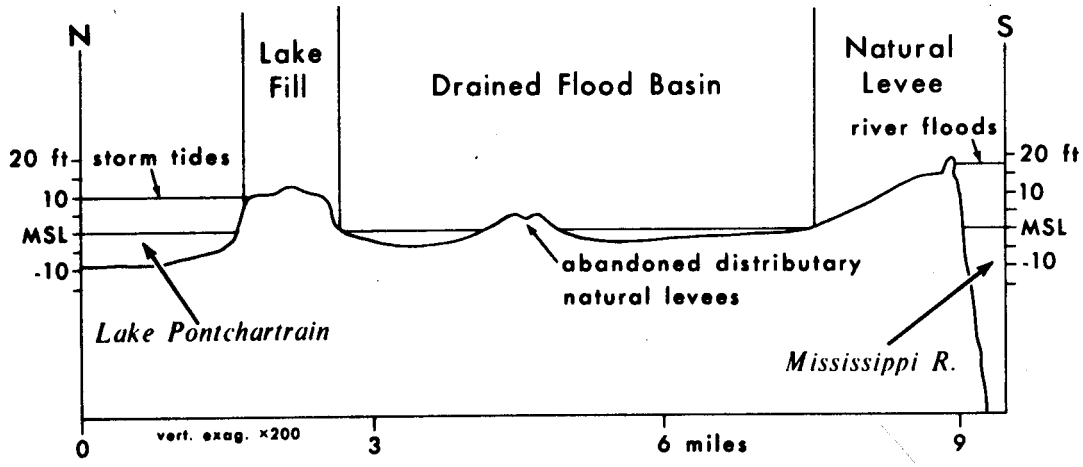


Figure 3.—Typical north-south profile through city of New Orleans. Courtesy Dr. Sherwood M. Gagliano.

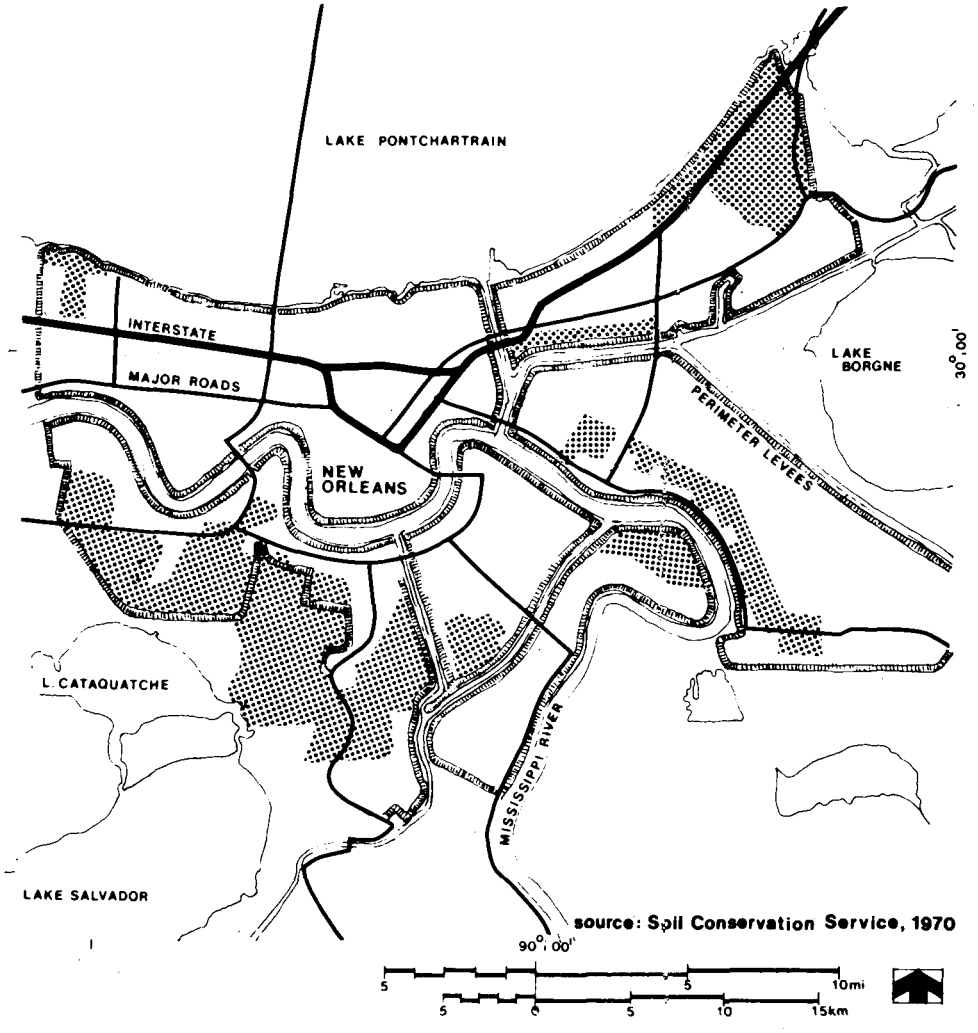


construction of higher and wider dikes than those already being built. And nineteenth century maps clearly depict the correspondence of urban morphology and the higher ground of the natural levees. A Mississippi River Commission report in 1896 indicated that at least half of the land inside the present-day city limits remained swamp and marshland. The nineteenth century saw cycles of levee building and subsequent destruction by major floods.

At present, the Army Corps of Engineers builds the levees in the New Orleans area, and local or parish agencies retain the responsibility for their maintenance. The system consists of levees on both banks of the Mississippi, averaging 25 feet (7.6 m) above sea level. Thus New Orleans' site is likened to a high-rimmed saucer. The levees may keep the river from entering the city, but they have also served to retain whatever water may enter.

The city averages more than 60 inches (150 cm.) of precipitation yearly; and disposal of excess water was one of the historic urban woes in New Orleans (*Jennings 1972*). It was only in 1917, upon the employment of the electric

Figure 4.—Areas surveyed by Soil Conservation Service, 1970, showing soils potentially unsuitable for urban construction. Courtesy Dr. Dan W. Earle.



screw-type pump, that the swamps and marshes were drained and the city's fringe could advance in subsequent decades through the mid-city district and towards the lakeshore. As recently as the late 1920s, the Lake Pontchartrain shore was, with few exceptions, a swampy isolated expanse with permanent settlements consisting mainly of ramshackle fishing camps (*Filipich and Taylor 1971*). The east and west roads out of New Orleans, on Gentilly and Metairie ridges respectively, contained the preponderance of suburban population. As recently as 1940 New Orleans had, among major American cities, one of the lowest ratios of population residing outside the city limits (*Gilmore 1944*). Since the urban region's population has nearly doubled in the span from 1940 to the present, the main era of extensive wetlands drainage to facilitate residential construction has occurred recently (fig. 4).

LOCAL VISUAL QUALITIES AND THE NEW ORLEANS ESTHETIC LANDSCAPE

Tourism is commonly cited as the second leading industry of the New Orleans economy. Certainly the widely held city image of an uncommonly scenic and distinctively old-world townscape is a part of the lure that attracts large numbers to visit New Orleans annually. The obvious attractions are the French Quarter and the ante-bellum residential Garden District. It may not be readily apparent that these neighborhoods stand on some of the higher ground in the city. Nor is one palpably below sea level in certain adjacent areas.

Reading the local landscape is further complicated by the commonplace realization that the French Quarter's cracked and disjointed sidewalks, an occasional tilted house, or sagging fences in the Garden District are conditions to be expected in historic areas and are hardly unique to New Orleans. Relatively few tourists expend the effort to view any of the dozens of other local neighborhoods or suburban outliers of New Orleans. It is therefore possible, and even easy, to miss the subtle but nonetheless prevalent visual clues and tangible landmarks that epitomize the problems of construction on an unstable foundation.

The New Orleans esthetic landscape is a product of the structures and spaces man has superimposed on a physical base, and yet the very base itself has become a man-made object that gives an overtly distinctive appearance to large sections of the urban region. The intricate interrelation between man's modification of the physical environment and its reciprocal impact on structures and general surface characteristics can be illustrated by a consideration of street patterns, drainage systems, and land subsidence in selected portions of New Orleans.

STREET GRID

The distinctive overall feature of the road pattern of New Orleans as seen from the air or map view is the fan-like layout of streets on that lobe of land enclosed by the crescent bend of the Mississippi River. Adjusted to the configuration of early land-ownership boundaries, the configuration is not a direct response to physical conditions. The more common rectangular or checkerboard street pattern, with roads intersecting at right angles, is characteristic of most of the rest of the New Orleans region and suburbs, except where developers have built winding roads and cul-de-sacs in recent subdivisions.

Spatial or directional orientation is a persistent malaise affecting lifelong New Orleanians as well as tourists. Though this affliction may be understandable in the vicinity of extended curvilinear roads and triangular blocks in the fan-shaped Uptown and Garden District, it is apparently just as common for the presumably more logically

arranged rectangular districts. These latter patterns now largely occupy the former open spaces between the network of drainage canals that turned them into dry land.

A popular solution to the complexities of local geography is location fixing with reference to the Mississippi River and Lake Pontchartrain. The location of a residence, for example, is either "riverside" or "lakeside" of, for example, the main interstate highway that bisects much of the urban area (fig. 4). Another local practice to simplify direction giving is the use of the terms "above" and "below" for distinguishing points on either side of a given boundary (particularly streets), generally with reference to the central business district. In the context of a city with considerable sub-sealevel land, this particular local trait is potentially confusing, indicating to outsiders that New Orleanians possess some remarkable perceptual acumen and are intimately aware of the nuances of local topographic undulations. This is most assuredly not true, and "above" and "below" are strictly horizontal references and not elevation indicators.

Passengers in a vehicle or pedestrians who turn off the major commercial and connecting thoroughfares notice the predominantly narrow streets in most of the older neighborhoods. Although narrow streets are hardly a unique New Orleans trait, their prevalence underscores, along with the typically long and narrow lots, that space has been at a premium in this city.

The condition of the road surfaces reflect the stresses of overlaying a differentially sagging foundation. Off the main traffic arteries, warped, cracked, caved, and potholed road surfaces are common. Yet roads often mark the neighborhood's highest local relief. And in areas lacking some variety of curbing, clam shell and deeply indented mud shoulders further contribute to an overall impression of disarray and instability.

WATER-REMOVAL STYSTEM: CANALS AND DRAINAGE

Street orientation in New Orleans exhibits a strong general correspondence with the drainage network. And since the network provides daily removal in the basin as well as affording drainage for heavy storms and flood occurrences, it is a crucial to the continuance of urban utilization of the site. By 1970 the Parish of Orleans alone boasted 1,400 miles of drainage canals and the 13 pumping stations, probably the greatest aggregation of low-lift pumps assembled anywhere in an equal area (*Carter 1969*), with an aggregate capacity of 17.5 billion gallons (65 million liters) per day.

Canals range in size, some being as much as 80 feet (24.5 m) wide. Features of this magnitude are indeed prominent landmarks and boundaries in the visual landscape. The open canals also assault the olfactory senses when flow is slight, giving false credence to the occasionally published misstatement that New Orleans employs open sewers.

Canals are perhaps less obvious in the older sections of the city, where many were covered, than in the more recent subdivisions, where housing construction followed close upon canalization and covered canals are an unaffordable luxury.

It is terribly easy to underestimate the extent of the New Orleans region's drainage system based on direct observation, but the impact of the system is more profound than keeping excess water from the streets and forming barriers to the flow of traffic. The continued action of the drainage process is fundamental to the gradual lowering of the land surface itself (*Gagliano 1973*). This process, which requires expensive maintenance of the flood-protection landform complex, and

the gradual moving and tilting of structures built on the surface of a differentially undulating topography, is among the chief features of the New Orleans esthetic landscape.

LAND SUBSIDENCE: THE CHANGING NEW ORLEANS SCENE

The phenomenon of land subsidence is among the paramount physical processes impacting on urban expansion in the New Orleans metropolitan region. It has been succinctly defined by Saucier (*1963*) as the relative lowering of the land surface with respect to sea level. More recently Earle (*1975*) has pointed out that the term is often invoked with reference to tectonic occurrences over a larger region whereas "settlement" usually refers to a less extensive area and the changing compaction of soil. The term "lowering" is employed in regards to road, building, levee, or other compression of underlying soil. The popular equivalent of "subsidence" is "sinking".

Land subsidence is a global nuisance and many cases have been closely observed and documented. This phenomenon has occurred in London, England; Osaka, Japan; Lake Maracaibo, Venezuela; and Mexico City to name a few notable examples. In Mexico City an exposed well casing in the Plaza de la Republica, originally flush with the surface, was measured at 23 feet (9 m) above the present after about 60 years of use (*Fox 1965, Legget 1973*).

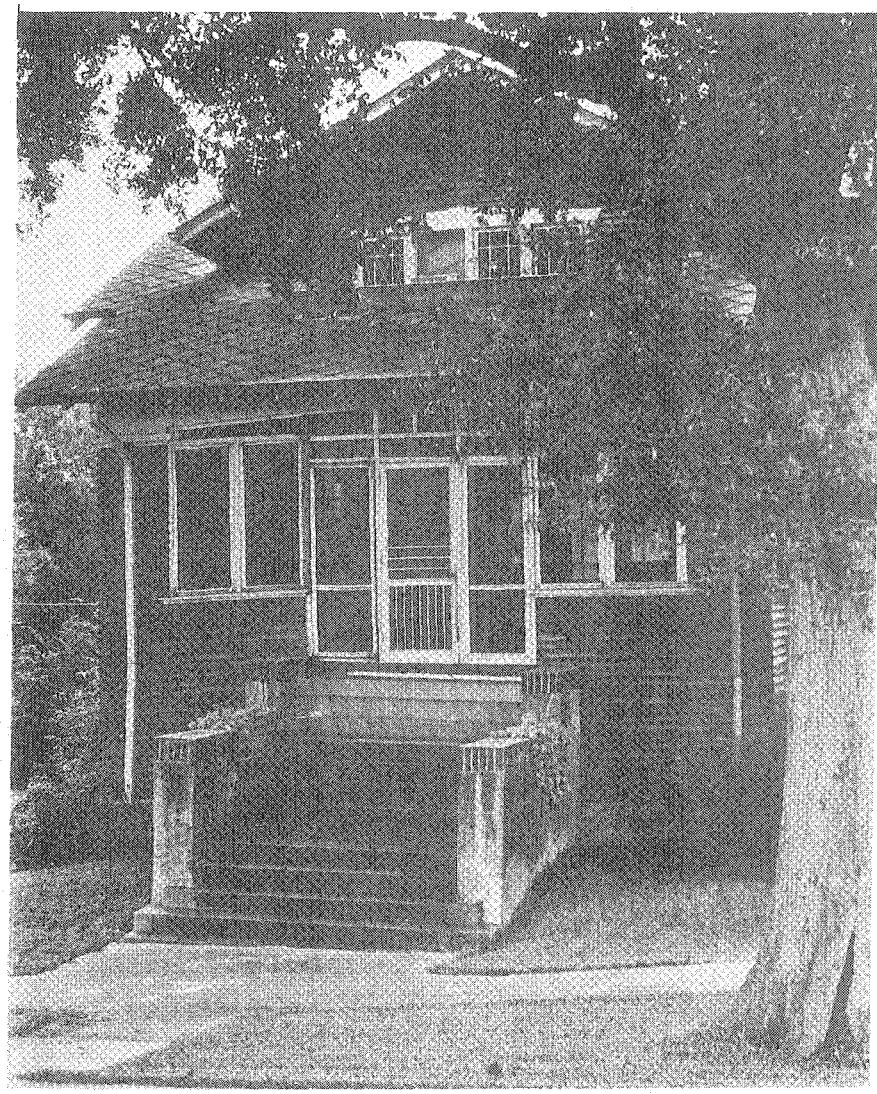
In the United States, land subsidence is by no means uncommon. Owing, perhaps, to the somewhat less extreme nature of land subsidence, New Orleans is not mentioned in most of the standard subsidence literature, although the extent of the local problem is visibly apparent throughout the metropolitan area and especially in a few noteworthy neighborhoods. In the drained wetland regions such as New Orleans, the complexity of organic soils makes it difficult to relate subsidence to a single cause. The major factors impinging on land subsidence rates in New Orleans are: dehydration and shrinking of the deposits; oxidation of organic substances; the drop in the local water table; and excavation for sewers and water lines. Some local soil types may contain 4 to 12 feet of compressible organics, and the water content of humus may be 400 to 700 percent of dry weight (*Soil Conservation Service 1970, fig. 5*). A series of level surveys in the organic soils of the Florida Everglades measured an 8-foot (2.5-m) drop in surface over a span of 50 years of regular measurement (*Stephens and Speir 1970*).

Land subsidence in the New Orleans metropolitan area is prevalent in virtually all neighborhoods, but a few districts in particular epitomize the problematic extremes of this phenomenon. Cracks, broken, and undulating sidewalks; tilted houses and other structures; inclined tree trunks and utility poles; and undulating lawns, and other open-space surfaces are virtually ubiquitous manifestations of the semi-fluid regional substrate.

The older neighborhoods may be relatively less affected, yet in the established districts of Carrollton, Mid City, or Lakeview, each with sub-sealevel areas, scarcely one block exists without numerous visual symptoms of subsidence (fig. 5). In the highest and oldest portions of New Orleans, numerous structures have lasted for many decades with negligible tilt or settlement.

For this reason, foundation support by pilings or caissons are not mandatory for construction in the metropolitan region. On the other hand, the largest structures such as the 60-storied One Shell Square Building or Louisiana Superdome have had steel or concrete pilings extended beneath their foundations to between 100 and 150 feet (31 to 45 m). Most residential construction, employs log pilings about 40 to 50 feet (12 to 15 m) in length, which is generally sufficient to ensure structural

Figure 5.—Residence in 6300 block, West End Boulevard in Lakeview section, New Orleans. Note undulating sidewalk as well as cracked and tilted stairway.



stability in most locations in the region. But since the necessary drainage system tends to lower the previously higher water table, followed by oxidation and compaction, most of the urban complex experiences the effects of subsidence (*Gagliano 1973*). On the formerly sea-level drained marshland on the eastern and western suburban fringes of New Orleans, two subdivisions stand in mute testimony to the extreme and dramatic impact of land subsidence in the region.

LAND SUBSIDENCE: EPITOME DISTRICTS

Village Del'Est is a subdivision in the eastern part of the city of New Orleans, built in an area long avoided for urbanization because of its marshy foundation. The Harold Park section is located in the municipality of Kenner, immediately north of New Orleans International Airport and was built as the population of New Orleans' western suburban fringe expanded during the

past 20 years. In the span of time since they have been completed—and there are still vacant lots in both areas—these districts have provided some of the most striking examples of physically and visually blighted portions of the New Orleans area. Tilted structures exposed foundation slabs, cracked walls, driveways and sidewalks, and leaning fences and utility poles are among the most vivid visual impressions of both of the subdivisions; and few blocks in either one has two adjoining houses without one of these problems.

Few industrious residents have been able to maintain the original appearance of their premises, and many have long since stopped trying. Buying loads of fill soil to bring up levels to original is a prevalent practice in suburban as well as older New Orleans districts, but one truck-load would hardly suffice in Village Del'Est or Harold Park. One section in Kenner experienced sinking of as much as 1 foot in a month's time (*Aquanotes 1975*). The expense of filling large tracts has led developers to disregard realistic estimates of potential subsidence on the drained wetlands underlying these and other subdivisions. In one segment of the Village Del-Est, one 760-acre (308-ha.) plot was filled with 630,000 cubic yards (481,666 m^3) of material to raise the surface 6 inches (15.2 cm) above the original level. To add another vertical foot would have cost the developer $3,030 per acre (*Earle 1975*). It is thus understandable why the developer estimated that potential subsidence would be 6 inches to 1 foot!

In Harold Park, Kenner, as well as in other locations, some developers reduced their cash outlays by eliminating the foundation pilings. The result is several blocks of moderately to severely tilted houses. The corner of Arkansas and 32nd streets provides one striking

Figure 6.—Residence at corner of Arkansas and 32nd Streets, Harold Park subdivision in Kenner.

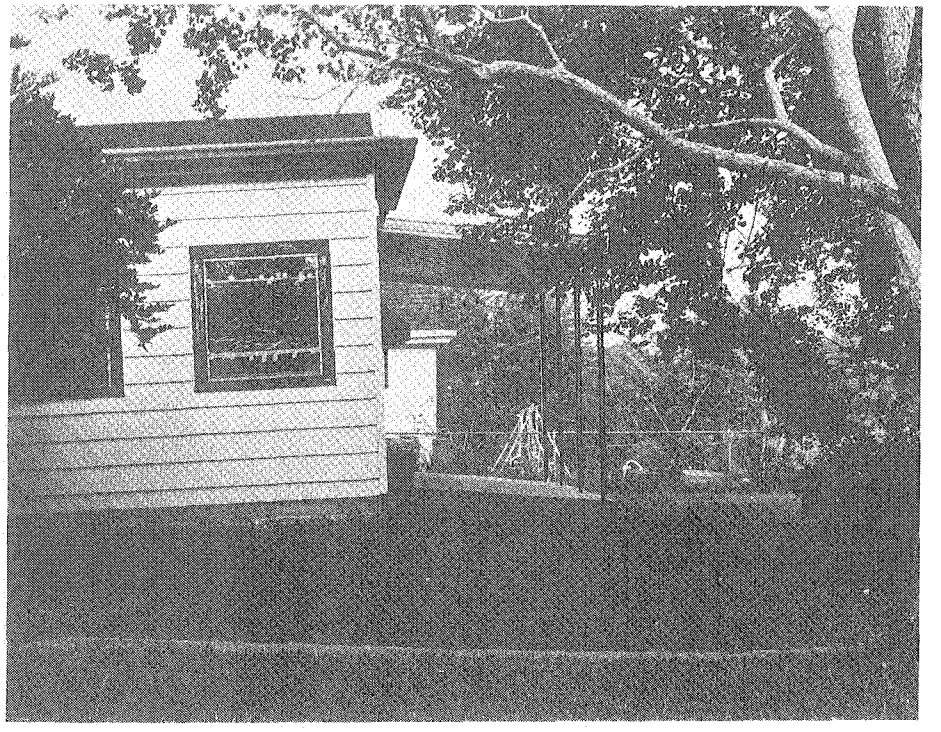


Figure 7.—Residence at 4211 Williams Boulevard, Kenner. Support pilings appear to be stilts. Note incline of unsupported concrete pad.

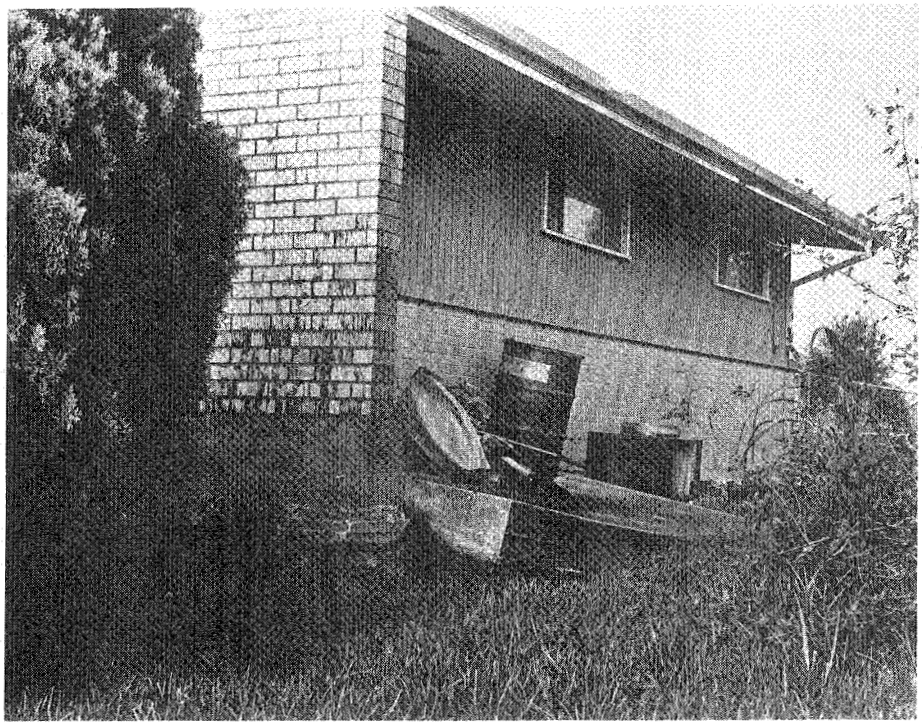


Figure 8.—Residence in 3200 block of Colorado Street, Harold Park subdivision, Kenner.

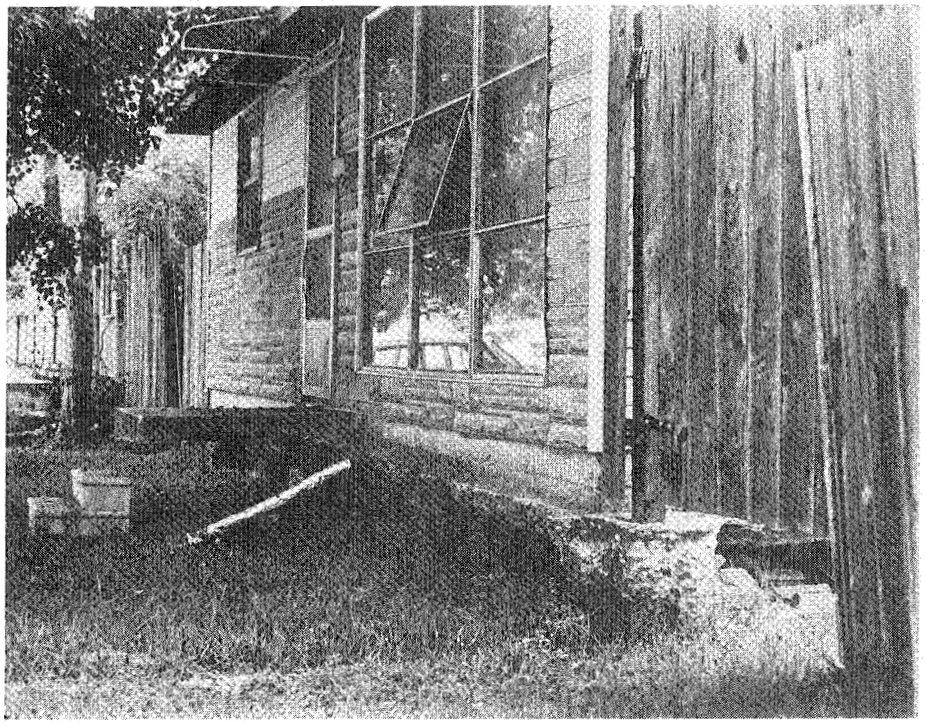
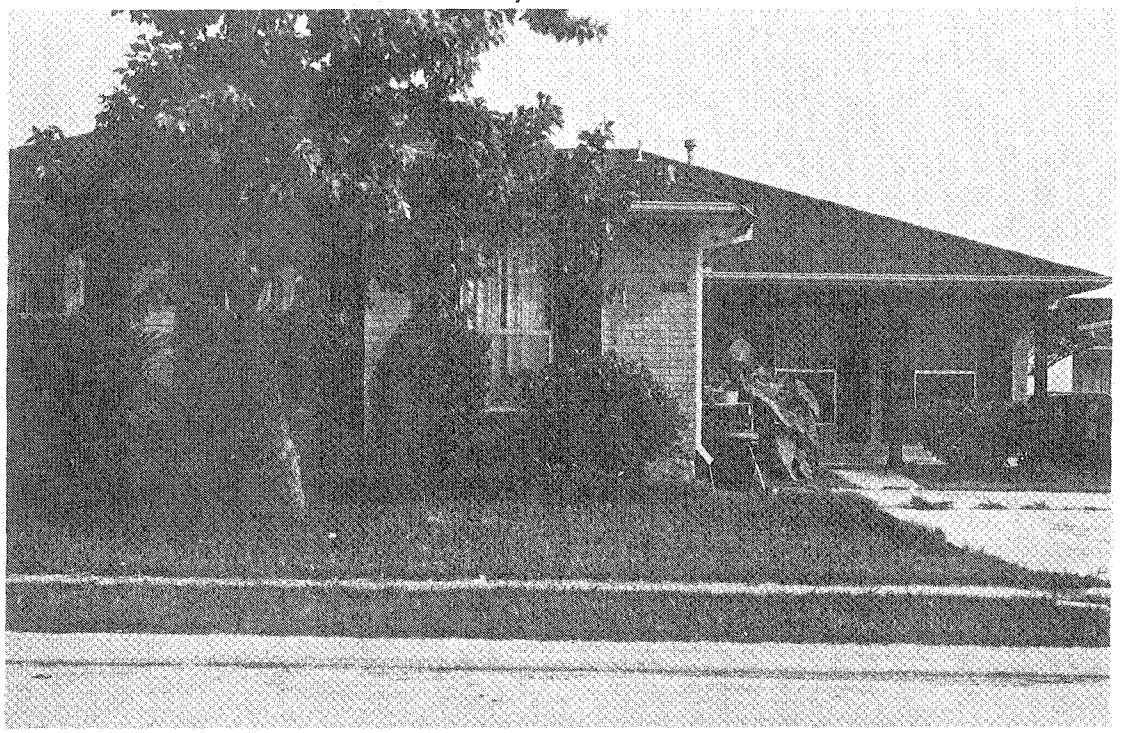


Figure 9.—Residence in 13000 block of N. Nemours, Village Del'Est subdivision, New Orleans. Ornamental plantings obscure exposed foundation bottom directly behind tree.



visual example of structural movement and damage (fig. 6). Even many of the buildings supported by pilings have been affected to the extent that undersides of foundations and even the pilings are above present ground level, giving the appearance of low-level stilt houses (figs. 7 and 8). Some Village Del'Est homes have undergone the same forces, the subfoundation space providing den or nesting sites for domestic animals and wildlife from adjacent marshlands (*Carrier 1975*).

Adroit placement of foilage is sometimes successful in masking the extent of subsidence (fig. 9), although some residents have decided to remove larger shrubbery and trees when soil-creep moved root systems and trunks toward the foundation hole. Piles of earth fill are among the most pervasive of visual landscape characteristics in Village Del'Est. Along many streets, such as N. Lemans, scattered piles of earth fill have formed a hodge-podge of domal and conical hillocks, many at least partially overgrown with tufts of weeds and grass, while some have become overgrown and entirely incorporated into the lawns. The billowy undulations and the welter of unkempt yards, devastated foundations, fences and sidewalks (figs. 10 and 11) combine to invest the esthetic landscape with a chaotic and blighted guise starkly contrasting in extremes with the subdivision's original and intended appearance.

In Village Del'Est, as elsewhere, esthetic environment manifests itself in financial considerations. In Village Del'Est, the average expense per year was calculated to be $120 for about two-thirds of the residents; nearly one-third had expenses in excess of that figure, and some 5 percent of homeowners in the tract reported annual costs of over

Figure 10.—Warped and cracked sidewalk on corner of E. Lemans and Dwyer Streets, Village Del-Est subdivision, New Orleans.

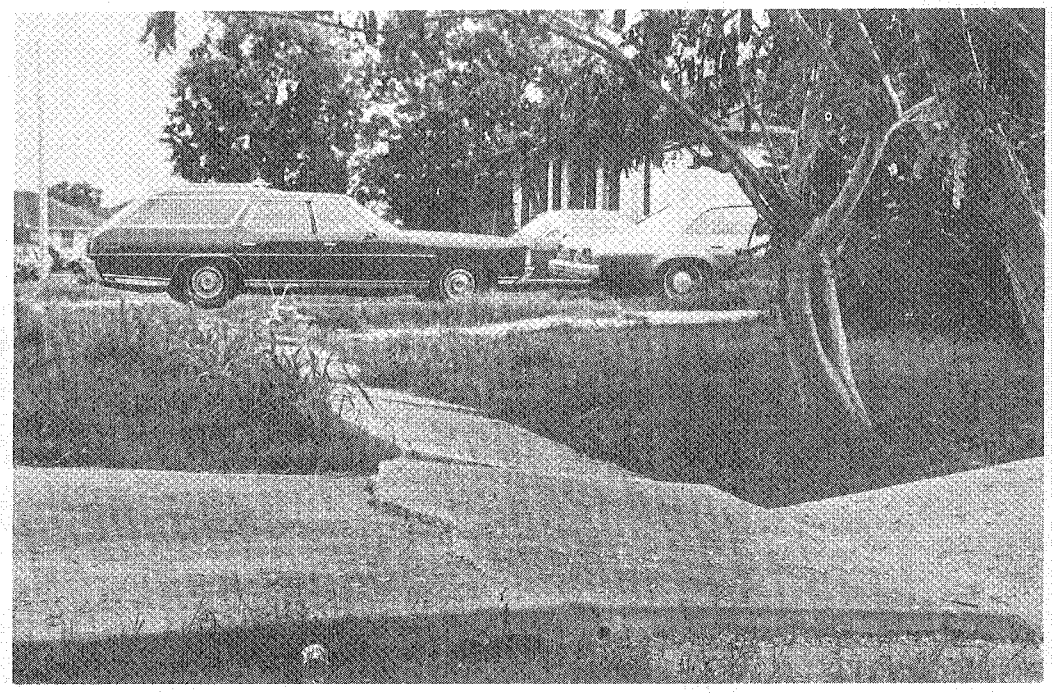


Figure 11.—Residence at 4309 Williams Boulevard, Kenner, with advanced tilting and cracking of low brick wall.

$600. One house experienced settlement of more than 11 inches (27.9 cm) in a 6-month span owing to a water-table change after adjacent construction. Shoring repairs on this property were estimated at $5,000, while other owners have paid between $1,200 and $6,000 for such work. Despite hopes of appreciation of about 2 percent per year, some have experienced a depreciation of as much as 25 percent in less than a decade (*Earle 1975, Carrier 1975, Aquanotes 1975*). In both the Village Del'Est and Harold Park subdivisions, the plethora of FOR SALE signs, added to the variety of other visual cues, is a further indication of consumer dissatisfaction with these problematic areas.

SUMMARY

The New Orleans esthetic landscape is the product of a melange of disparate influences, among which street-pattern orientation, drainage network, and especially topographic fluctuations resulting from land subsidence are most striking visually. While some districts provide more extreme and obvious cases of physical-esthetic interactions, these influences are nevertheless general throughout the entire urbanized region. Except for the most blatant and severe sorts of disruption, New Orleans residents seem to have implicitly accepted the gradual but perceptible change in form of their shared plot of ground as yet another part of the local ambience. The man-induced transformation of the New Orleans landscape has modified physical processes that are changing the surface configuration of the ground. This dynamic, almost fluid, nature of the land base is one of the paramount determinants of those visual qualities that constitute the New Orleans esthetic environment.

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