

Hybrid Tectonic Nature: Terra Viscus

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Sometimes science and technology provide more than merely 'formal or structural paradigms for innovation'. In a few specific areas of the world, science and technology have directly altered the basis for understanding the physical, cultural, and phenomenological ground upon which architects build. In John McPhee's seminal book *The Control of Nature*, he states a very clear relationship between science, nature, and the built environment. In three case studies, including the Mississippi Watershed, he discusses mankind's superhuman efforts to manage extreme natures. As we attempt to teach and practice in the setting of one of these case studies, the Mississippi Watershed, we constantly witness this control and its resultants. In fact, the control of nature in southern Louisiana has created a new *hybrid* nature. A nature that scientific method has created and that has its own tectonic. John McPhee stated that

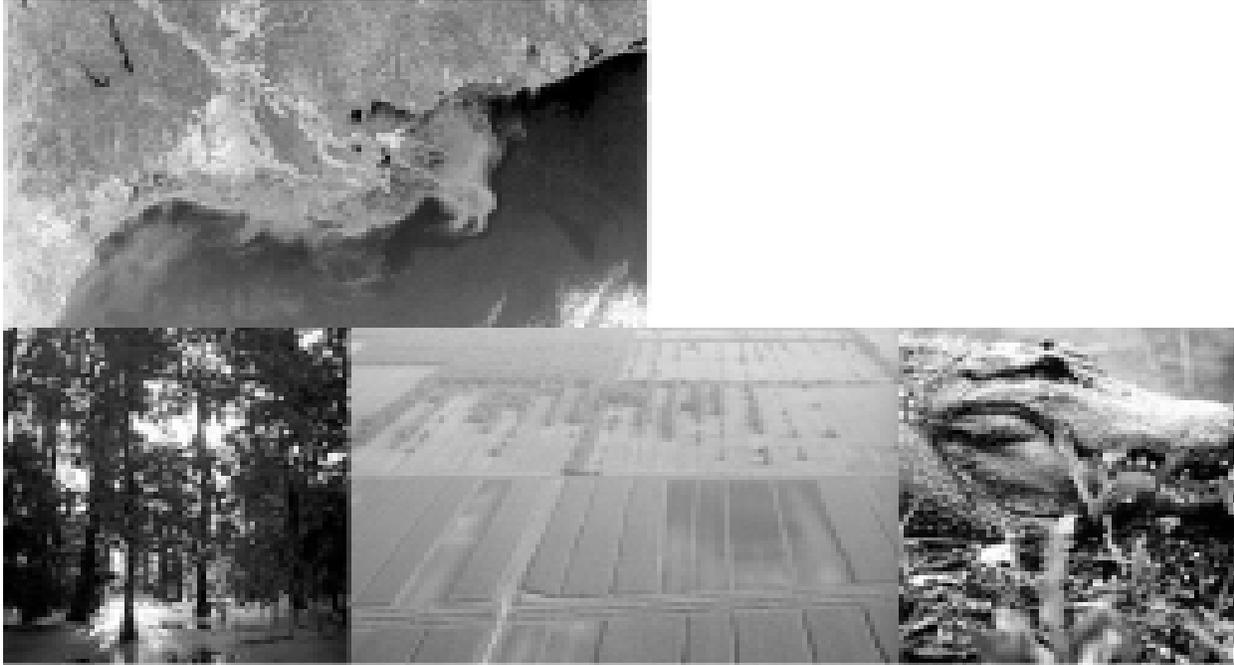
*Southern Louisiana exists in its present form because the Mississippi River has jumped here and there within an arc about two hundred miles wide, like a pianist playing with one hand-frequently and radically changing course, surging over the left or right bank to go off in utterly new directions.*¹

Southern Louisiana before 1928 did exist because of this geological act. However, its existence in its 'present form' has been substantially altered by a manmade infrastructure system applied to control nature. The control system's effect is so extensive one might rephrase McPhee's statement that the area exists today in spite of the Mississippi. Since 1928, this application of scientific reasoning over the unpredictable natural system has created the

unique hybrid nature of southern Louisiana today, a 'terra viscus'. The terra viscus is a super-saturated soil, one that is never completely solid or liquid, one that is never in stasis but in a continuous state of being made, and being removed.

This investigation acts as a prequel to a larger body of research: previously published papers discussing the relationship of the terra viscus to tourism and of the terra viscus to culture. This investigation will discuss the tectonic of the terra viscus. Southern Louisiana, like all landscapes, is an integrated system, each heterologous part working to make a larger whole. Unlike other landscapes however, the macro-scale natural system of the Mississippi Delta is overlaid with the manmade scientific system to control and predict the natural system. We assert that a new Hybrid Tectonic Nature has resulted.

**UNPREDICTABLE NATURAL SYSTEM +
MANMADE SCIENTIFIC CONTROL SYSTEM
= HYBRID TECTONIC NATURE = THE
TERRA VISCUS ⇒ CONTROL OF NATURE**



THE UNPREDICTABLE NATURAL SYSTEM

In order for man to establish settlement of an area, they must be able to accurately predict the major variables of the natural system. As we settled the coastal areas, we saw the predictable nature of the tides, and built above the highest tide known. In Southern Louisiana, there was very little predictability. Before Europeans came, the natives knew to settle only in the very small areas along either side of the natural escarpments at present day Lafayette and Baton Rouge. All areas between and south of these escarpments could change state from habitable dry land to wetlands to bodies of water depending on innumerable variables: including melting snow, rainfall, and sediment deposits from as far away as present day Minnesota.

The land now known as Louisiana was still emergent during the late Wisconsinian lowstand period 18,000 years ago during the latest large geological drop in sea levels. The Mississippi River existed as the termination of the continental watershed. As the sea level returned to close to its present state approximately 6,000 years ago, the delicate balance of the deltaic and subdeltaic regions upon the continental shelf was established. The region is neither continental shelf nor seabed. The constant silting and subsequent jumping movement of the Mississippi River between the natural

escarpments created land while the tidal and hurricane movements from the Gulf removed land through erosion. Even at the formative geological level, the area was unpredictable.

Today the area is simultaneously landlocked and waterborne within the Mississippi River, the Gulf, the Atchafalaya Basin, Lake Pontchartrain, and the numerous swamps, rivers, and bayous. The Mississippi River drains the run-off of approximately 40% of the United States.

*'We live in a state of apprehension; we live on the whims of the weather of over forty-two percent of the United States. We live with it twenty-four hours a day.'*² The ecology is caught between tropical and temperate. Tropical weather patterns continue to affect the land from the Gulf. The resultant brackish condition of sea and fresh water creates another level of unpredictability within the already nomadic liquid conditions.

These many layers of unpredictability have had many consequences including settlement patterns and the creation of unique social cultural systems. However, randomness is the curse of modernist scientific reason, so the applied system of control became the primary consequence.



+ THE MANMADE SCIENTIFIC CONTROL SYSTEM

*We are fighting Mother Nature...It's a battle we have to fight day by day, year by year; the health of our economy depends on it*³

Since its habitation by the French, flood control structures have been built in Southern Louisiana. Small earthen mounds around the original French settlement of New Orleans grew with increasing technology and size in an attempt to control an ever-increasing area with greater certainty. These acts developed into a U.S. government policy to rely solely on levees to control flooding and ensure a predictable dry land in the area. The policy was extremely controversial and many alternatives that worked more closely with the natural tendencies of the watershed were proposed. Nevertheless, the government remained firm in their singular policy of excluding randomness instead of integrating it, until disaster struck. The flood of 1927 often is called the worst flood in American history and The Flood Control Act of 1928 was enacted in reaction to the disaster. A natural system, that had existed for thousands of years, and had in fact created the land of the Delta itself, was deemed to be within the purview of control by a scientific system. The result of the legislation is our current floodway system, a system of coordinated levees, control structures, spillways, floodwalls, dredgers, and jetties. It is a system that demands constant upkeep and still is being constructed, repaired, and monitored 76 years later.

Today there are approximately 1,602 miles of levee in place on the main stem of the Mississippi River. A levee is an embankment for preventing flooding. It tectonically represents the natural high land that occurs along any moving body of water in a low-lying area. Today the levees are sophisticated engineered structures. They often consist of an

impermeable concrete core surrounded by an earthen material, such as dirt. Their banks are surface-coated with grass or some other matt like vegetation and below the waterline, the levees are lined with stone or concrete revetment facing. These surface treatments minimize the erosion caused by both the river's current and boat traffic.

Control structures divert the flow of water and adapt to unpredictable water levels upstream in order to parse clearly the flow into predictable and controlled channels. There are two major control structures at Simmesport and Morganza, Louisiana. The control structures are enormous concrete and steel gates that parse the River into two major conditions, the Mississippi channel and the Atchafalaya Basin. The Basin presently exists as a graveyard of past Mississippi Rivers: slow moving bayous and the Atchafalaya River. The Atchafalaya River channel, the largest historical channel, presently marks the logical direction of the River. It is a shorter distance to the Gulf, and is a wider area capable of carrying more water. The River wants to go to the Atchafalaya channel, but the diversion structure keeps most of the water in the Mississippi channel towards Baton Rouge and New Orleans. The percentage of water to each channel is both a scientific and political negotiation of safety, commerce, and ecology. We have chosen to trust the infrastructure and parse the watershed of almost half of the continent.

Spillways are manmade versions of the natural crevasses or pressure valves of the levy system. When the water in the levy reaches a point that might compromise the levy, a spillway is used as an adaptable breaking point. The Corps of Engineers designed Bonnet Carré Spillway as a valve between the Mississippi River and Lake Pontchartrain. Three hundred and fifty moveable

gates can release up to two million gallons of water per second of into Lake Pontchartrain. Except for extreme circumstances, it remains closed and acts as a levy, separating a natural relationship between the River, the Lake, and the Gulf.

The floodwalls along Tchoupitoulas Street in New Orleans replace the levy for a short distance and pretend that we can freely pass by car or foot between engineered dry and wetland. The massive concrete walls follow the path of the levy and the street and offer gates at major street crossings. Only at the threat of a flood do the gates close, no matter which side you are on. At Morgan City, the floodwalls create a continuous ring. The city sits within the already levied and designated path of the Atchafalaya Floodway. The floodwall acts as a medieval wall whose gates are open for commerce, but close automatically if the onslaught of run-off and silt threaten the deltaic area. If the control structures were to fail and the Mississippi were to take its logical course, the Atchafalaya Floodway would become the new River, and Morgan City would be an island in its path.

Within the control system there is a constant adjustment according to innumerable variables. One important variable is the correct velocity of water in order to scour the bottom. Naturally, the River would deposit silt from across the country in the

being shifted further out to sea as the river and dredgers deposit and move silt across the sea floor. Jetties are needed for the same reason. Acting like inverse and water bourn levies, they keep the tidal erosion from shifting the same silt back to up the river channel.

This enormous infrastructure acts each day to balance the innumerable variables between natural and manmade occupation. Now the only predictable conditions have been engineered specifically to remain that way. Each of these variables is under surveillance and must remain within a very small margin of error for the system to avoid a single break. The break in the system would mean a return of the unpredictable: a catastrophic failure. This failure, before science, was a natural condition and much more subtle and distant: a bending and fluid change, not a failure. Now because of scientific control systems, change means failure, a break, a loss of life and property and nature.

= HYBRID TECTONIC NATURE = "TERRA VISCUS" ⇒ THE CONTROL OF NATURE

Tectonic becomes the art of joinings. "Art" here is to be understood as encompassing tekne, and therefore indicates tectonic assemblage not only building parts but also objects, indeed of artworks in a narrower sense. With regard to



river channel as the water slowed close to the Gulf. The channel would eventually fill, jumping the River over the natural levy and into a newly created channel. Now the speed of the River must be increased in order for it to clean itself. Dredgers, like large-scale vacuum cleaners are employed to move silt out of the channel when needed. This is an occasional activity upriver, but a constant chore at the mouth of the river. The mouth itself constantly is

the ancient understanding of the word, tectonic tends toward the construction or making of an artisanal or artistic product. It depends much more upon the correct or incorrect applications of the artisanal rules, or the degree to which its usefulness has been achieved. Only to this extent does tectonic also involve judgment over art production. Here, however, lies the point of departure for the expanded clari-

*fication and application of the idea in more recent art history: as soon as an aesthetic perspective-and not a goal of utility-is defined that specifies the work and production of the tekton, then the analysis consigns the term "tectonic" to an aesthetic judgement.*⁴

If we are to read tectonics as a culture of the art and science of joining, then the hybrid condition of Southern Louisiana, a multi-leveled joining of natural and manmade systems, has created a new tectonic. It acts like any tectonic with primary, secondary, and tertiary forces. The hierarchy of the hybrid is not as clear or as easily described as the natural and manmade systems that create it. However, this unique tectonic nature has altered the basis for understanding the physical, cultural, and phenomenological ground upon which we must view our new site. In the Hybrid Tectonic Nature, we must address the fact that the relationship is no longer didactic, no longer manmade from natural systems, but a new system that is unique. The floodway system exerts control to such an extent that natural can be read as manmade. The natural system has reacted to and developed to such an extent that the system of control must be read as natural.

In Southern Louisiana, what is inside and what is outside this infrastructure is now unclear. We have walled in and made predictable the constantly variant. The clear tectonic of the natural relationship between the River and the adjacent Basin was one of shifting responsibility between carrying water to the Gulf, and offering an outlet when needed. That relationship was calcified by the diversion structures at Morganza and Simmesport. The Atchafalaya Basin, like the River, is now a finite area, allowed to continue as a distinct ecology, and clearly defined. The Corps of Engineers establishes its daily water/land content, determining a predictable shifting "terra viscus." It is as predictable as an exit sign on Interstate 10 that bridges it. Human occupation now knows where to find it, and they know where they can find relief from it. This calcification and predictability is complicated by the constant threat of the control system's failure, or the natural system's.

Another part of the tectonic of the hybrid is the eventual and inevitable complete loss of control. Even with continuous dredging of silt, the intended relationship of land to water never can be pre-

served. Eventually, the result will be a complete loss. Even within the system of controlled silting and removal, the natural cycle continues. We can now view the hybrid prediction of what land is being made and what is disappearing. Inside the control system, land is being made. Silting continues at a slower, but constant pace. Ironically, outside of the control system, without the constant supply of silting, land is disappearing. Because the land straddles the continental shelf, it constantly sinks into the Gulf. Where humans are expected to habitate, land is disappearing. In the areas walled off like an ecological zoo, where humans are expected to visit, land is being made, the water level is dropping, and the ecology is dying. This can be seen through the drastic loss of swamp and wetland areas within the Atchafalaya Floodway, and the increase of severe flooding in the new low-lying suburbs south of Baton Rouge. The scientifically designed system of control is destroying what it was intended to protect, and visa versa.

The same tectonically supportive relationship is seen at the coast. The tensile and compressive tendencies of the hybrid nature can be seen clearly from the air. At the mouth of the Mississippi, the continually defined mouth continues to move itself out into the Gulf. It is creating its own system of extending narrow peninsulas. At the coast of the Atchafalaya Basin, coastal erosion is no longer combated by the silt that the moving river once deposited. While we fight to remove silt in the river channel and at its mouth, 25-35 square miles of wetlands immediately adjacent disappear every year.

The levies have become some of the most recognizable natural landmarks in an otherwise very flat landscape. In New Orleans, the grass covering the engineered mounds are neatly mowed and have become an inadvertent city park. The protective infrastructure provides a natural respite for the dwellers in the city below sea level. In the rural areas, the levies have become pastures for livestock, the natural collection point for cultural activities, and the major geographic organizational marker. Before the Industrial Revolution, they also affected the dimensions of land grants. The levies created the wedge-shaped arpent measure as property lines were cast perpendicular to them and calculated to provide equal frontage on the River. These wedges still exist along the Southern Loui-

siana levies; now, they provide access and protect the chemical plants, instead of the plantations.

One can identify other characteristics of the hybrid tectonic nature at the spillways and the floodwalls. When the need arises to open the control structure at the Bonnet Carré spillway in order to prevent catastrophe, the community gathers on the levies to witness the event. They bring their pickups, drop their tailgates, and access their coolers while the River rushes to the lake instead of New Orleans. In Morgan City, the floodwalls serve as community billboards. Images of oil rigs and shrimp boats (community industries) and the name of the city are executed in bas-relief on the floodwalls. They also provide the backdrop for the annual Shrimp and Petroleum festival, which largely takes place between the floodwall and the river.

CONCLUSION

Through the concept of site and the principle of settlement, the environment becomes [on the contrary] the essence of architectural production. From this vantage point, new principles and methods can be seen for design, principles and methods that give precedence to the siting in a specific area. This is an act of knowledge of the context that comes out of its architectural modification.⁴

If we are to contribute to the built environment and cultural identity of southern Louisiana, it is necessary we understand the influential flux of the physical and psychological 'terra-viscus' condition. The condition is a hybrid, but a tectonic, understandable one. Our goal is to gain vantage on the multiple characteristics and their relationships for greater opportunities in our search for an appropriate contemporary architecture. John McPhee's book offered an invaluable starting point. We are attempting to clarify, to adapt, and to update the ideas presented to the condition as we as architects see it. We do not live, practice, and teach in an area where nature is controlled. The control was attempted, but a newer, more vibrant nature emerges.

The historic modernist faith in scientific solutions to perceived natural problems created this Hybrid Tectonic Nature. It is interesting that as science has advanced to explain more specifically the intricacies of the universe, it has provided one of the best foundations for understanding the complexities found in southern Louisiana. Basic chaos theories

have mathematically described the tectonic we explain here: a non repetitive, patterned tectonic of multiple and hierarchically understood variables.

These observations begin to dictate architectural approaches. One can never view southern Louisiana's landscape as in stasis. Any constructed contribution must find a means with which to attach and must also accept a temporal occupation. One must accept 'terra viscus' both physically and psychologically as a given and yet, at the same time, provide for continued occupation. Any constructed landscape will eventually become part of the hybrid, a threshold between nature and control. It must fight for its existence, and give in to the inevitable. The vantage of understanding the tectonic of the hybrid is a pre-requisite for the creation of contemporary architecture in this landscape.

NOTES:

1. John McPhee, *The Control of Nature* (New York: Farrar, Strauss, and Giroux, 1989), 5.
2. Ibid, 83.
3. Ibid.,7.
4. Adolf Heinrich Borbein, "Tektonik, zur Geschichte eines Begriffs der Arch%oologie," *Archiv f, r Begriffsgeschichte* 26, no.1 (1982)
5. Vittorio Gregotti, 'Lecture at New York Architectural League' *Section A.*, No. 1 (Feb/Mar 1983.)

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2. www.metrovision.org/table4-6.htm, /table4-90.htm
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6. www.jracademy.com/mlechner/archive1999/Leveefailures.html (levies)
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11. Lyle Saxon, *Old Louisiana* (Gretna, LA: Pelican Publishing Company. 1998).