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April M. Gray

University of Tennessee - Knoxville

Recommended Citation

To the Graduate Council:

I am submitting herewith a thesis written by April M. Gray entitled "Forces of Time: Nature, Perception, and the Spaces of Architecture." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Architecture, with a major in Architecture.

Scott Wheland Wall, Major Professor

We have read this thesis and recommend its acceptance:

Tracy Moir-McClean, Curtis E. Stewart

Accepted for the Council:

Dixie L. Thompson

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)
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We have read this thesis and recommend its acceptance:

Tracy Moir-McClean

Curtis E. Stewart

Acceptance for the Council:

Carolyn R. Hodges
Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)
FORCES OF TIME
NATURE, PERCEPTION, AND THE SPACES OF ARCHITECTURE

A Thesis
Presented for the
Master of Architecture
Degree
The University of Tennessee, Knoxville

APRIL M. GRAY
2009
DEDICATION

This thesis is dedicated to my family and friends who supported me during the course of my education in architecture school, for believing that I could achieve it even when I did not believe it about myself. I am forever grateful. Thank you.
ACKNOWLEDGMENTS

I wish to acknowledge Scott Wall, who believed in the thesis from its beginning and for visualizing that little bird building that little nest the same way that I did. Thank you.

Tracy Moir-McClean, thank you for your continuing support in developing and refining and translating and, at times, seeing the project with greater clarity than I did. Thank you for your genuine interest in my work and affirmation of its legitimacy.

Curtis Stewart, thank you for coming aboard the project and enlightening me as only a landscape architect could and for challenging my ideas and designs and for reinforcing that we have a responsibility to things that are greater than ourselves.

I wish to also acknowledge a number of others who were instrumental in my education, in general, and my thesis, in particular: Jon Coddington, my cheerleader, Adam Drisin, who inspired greater thinking, and Mark DeKay, who gave me the opportunity. I am grateful.

Finally, in memorium, I wish to acknowledge Dr. Marian Moffett, who forever changed the way I see architecture. I miss her zeal and humble spirit and hope that I can continue, even in a small way, in her legacy as a woman dedicated to the field of architecture, knowing that, to some, it is merely a building but, to others, the world.
ABSTRACT
The words of Octavio Paz, from his A Draft of Shadows, poetically describe the cycle of water in nature involving the erosion and weathering of stone by the force of water, further enhanced by the force of wind. This succession of events in nature is one of inter-dependency. It is also one of temporality: one element of nature perpetually affecting another, a temporality engaging elements either by impeding or by propelling.

The landscape embraces, as created or destroyed by these natural forces. So, too, does architecture. As a natural force, flooding intrudes upon the landscape and endangers architecture by filling the low-lying space with water, thus altering architectural space and the perception of that space, both quantitatively and qualitatively. Erosion is an offspring of moving water that occurs more subtly, more gradually, over a long period of time and alters the landscape by way of both addition and subtraction. As water immerses the land, it [the water] moves and moves sediment with it. While some land is sheared of its topsoil and stones are smoothed of their roughness (subtraction), other land is deposited with the richness of the sediment through the force of the water that carried it (addition). The photograph (Figure 1) of Ciudad Encantada (The Enchanted City) near Madrid, Spain, evokes a strong imagery of the consequence of the subtractive quality of erosion. One imagines that these boldly-cantilevered structures were once stoic with their uniform connection to the earth and connected to each other, forming ground at a higher plane. Water, however, was relentless over time and eroded the sandstone into a cavernous garden of stone pillars. Time and weather, as conjoined elements
of nature, act upon the material of architecture with an inevitable and implacable force.

Time and Man are the architects in partnership with nature. Architecture, therefore has an obligation, to not only its place, but also to respect these elements as co-designers. An architecture can be created that is both responsive and proactive to the dimension of time and the dynamic of nature over time.
THE WATER HOLLOWED THE STONE,
THE WIND DISPERSED THE WATER,
THE STONE STOPPED THE WIND.
WATER AND WIND AND STONE.

OCTAVIO PAZ, A DRAFT OF SHADOWS
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1 THESIS

Architecture and the natural world are interlocked by this factor of time. Nature, as the Paz poem suggests, is cyclical and renews itself. Plant matter decomposes and enriches the soil, in time, producing new plant life. Similarly, while architecture represents the era in which it was created, it also lasts into other generations and takes on new meanings in the context of those generations, meanings that make it part of the composition of a place. “On the one hand, architecture [is] drenched with time; on the other, it transcend[s] time” (Hines 1996, 5). Georg Simmel, in commenting on the ‘time’ of a building with regard to weathering, said that a building is exposed over time “creating the present form of a past life, not according to the contents or remnants of a past life but according to its past as such” (Simmel 1965, 265).

When water infiltrates a space, the threshold between landscape and architecture is compromised because of the change in the relationship between land and water. This condition is seen in Carlo Scarpa’s Quirini-Stampalia, as well as most Venetian buildings, revealing this merging of landscape and architecture. Here, Scarpa raised the level of the interior of the building to distinguish the portego, or canal entrance, from the entrance of the campo. The raised platforms of the ground floor reveal the original level of the ground floor, but also allow water to flow freely in the space, which is especially evident during high tide. Scarpa chose to respect such a relationship by permitting the water to flow but taking measures to counteract the corrosive nature of the water. To undermine the effects of water, humidity in particular, he designed a system of suspended light panels to facilitate airflow.
The feeling of security in one's experience of architecture is also compromised by this blurred relationship between landscape and the architecture. Reflexively, when a person is faced with a natural force, such as the rising of water—a situation that cannot be easily controlled—it undermines that person's sense of security and it is replaced with discomfort and disorientation. While water permeates and can make one uneasy in the portego of Quirini-Stampalia (Figure 2), Scarpa responds to this state of the space and to the state of mind. The stone gangway crossing the portego overlooks and witnesses the ebb and flow within that space. The bridge is in the space but not of the space. The user of the bridge takes on the role of a person 'on the outside looking in', which separates the experience from the potential insecurity of the experience.

While water can be aggressive by flooding, it is also more subtly powerful in eroding. This weathering force over time results in the slow dissolution of architecture. The image of Palladio's Palazzo Chiericati in Vicenza (Figure 3) shows this layered wearing of materials due to weathering. The cladding and the brick underneath have succumbed to the wind and water to which they have been exposed. Weathering testifies to architecture's dependence on time, wearing at the architecture's material finish, thus altering the materials that compose the building, both the aesthetic and the structural. Like stones worn smooth in a creek bed, architecture wears to new form over time. In Piranesi's engraving *Rovine d'antichi Edifizi* (or *Ravine of Ancient Building*), plate IV of Prima Parte, a structure in ruin is shown (Figure 4). The structure itself fails as an edifice but emerges as a work of art. The flooding of Rome over the
FIGURE 4: Piranesi's "Romine d'Antich Edifici" (Source: Piranesi; early architectural fantasies)
centuries and the subsequent erosion of the architecture compromise the material integrity of the building through gradual change over time, while constructing an ever-changing reality of the ruin. Someone once said, “finishing ends construction, weathering constructs finishes.” Architecture is ever in a state of changing completion until its own final destruction. Even at the collapse or razing of a building, that building is still perpetuating a cycle. For example, at Market Square in Knoxville, Tennessee, the void of a destroyed building remains as a reminder of the past existence of that building (Figure 5). In its place is a pocket park backed by the rear of the former Miller’s Department Store. A trompe l’oeil painted on the park side of the Miller’s Building reminds the occupant that a building once stood there. The buildings adjacent to the void still retain the cornice line that may have existed in the fallen building. Its remnants are renewed by another purpose, laid upon the physical and cultural foundations of its own past.

Architecture represents physical substance, which must be defined by time. Flooding and erosion, because of their ability to change materials in landscape and in architecture in the frame of lapsing time, simply reinforce Victor Hugo’s premise that books, the word, is more durable than architecture. The printed word represents the idea, which is not restricted by the limits of time. Natural forces play their roles in the temporality of architecture, and without remorse. They act according to their own nature; they do not know any other way. For architecture, time is not optional, but inevitable. It [architecture] must accept the reality that natural forces are inherently co-designers of the architecture. Architecture can and must adapt in
FIGURE 5: Pocket Park Tromp l'Oeil at Market Square, Knoxville, Tennessee (Source: Author)
such a way that it embraces the ineluctable, reductive, and constructive forces of nature. Such a premise, in turn, will produce an architecture that becomes resilient by the acceptance of the erosive qualities that are inherent in nature. Time will progressively alter the architecture through these forces.

In view of the influence of moving water on the design of architecture temporally, one must consider the reciprocal cyclical natures of architecture and of water. Architecture, as an inherently temporal entity, has a life span according to both material and culture. The materials chosen define the time-dependent durability of a building. Wood, with respect to its contemporary use and location, is considered to be more temporary than a material like stone. Choice of wood, however, also plays a role in the longevity of the building it composes. The stave churches in northern Europe are good examples of architecture in wood that are lasting. Teak and mahogany, for example, are hardwoods that traditionally have been used in the building of boats. This is because these woods are particularly resistant to water. Cypress, a wood prevalent in Louisiana's hardwood swamps (Figure 6), is a wood with similar qualities. Hardwoods gray and become smooth over time but also retain strength, to the point of petrifaction, thus becoming stone themselves. Some woods are not so lasting when exposed to comparable conditions. Stone, while considered to be a long lasting material, also wears smooth over time and hollows. Once again, the example of the sandstone sculpted by wind and water at Ciudad Encantada physically demonstrates the temporality of material form but also the continued existence of it. This
type of tolerance to nature is essential to maximizing the life span of a building.

Materiality in contemporary architecture is the progeny of technology and the age of the machine. Polished metals and seamless glass plates articulate today's buildings but do not articulate their own certain natural tendencies to come of age. In his book *The Eyes of the Skin*, Juhani Pallasmaa states that natural materials have an 'obligation to time', to express their ages, their origins, their histories, and their use by people. "All matter exists in a continuum of time; the patina of wear adds the enriching experience of time to the materials of construction" (Pallasmaa 1996, 21). Vernacular architecture provides many elegant examples of this critical idea. The unpretentious tobacco barn is scattered about the roadsides and fields across East Tennessee. The timber that composes it has weathered by time, air, and water. Yet, still, it carries on with its own task at hand: to
house and cure tobacco. The very structure of the open-air shed was designed to cure tobacco—rafters in vertical succession, venting at the top of the roof pitch, as shown in Figure 7. The eye recognizes that the barn has seen many years but is not obsolete because it still performs its duties.

One must consider the acceptance of nature in the lifespan of the building. The use of copper and its oxidation over time forms a rich patina and gracefully shows the consequence of time and weather. The roof of Palladio’s basilica in Vicenza (Figure 8) is an example of such material changes in copper. The metal is no longer shiny and orange, but green and matte, remembering its origin but professing an evolved identity.

The cycle of the flooding, whether it is seasonal or daily, should impact the decisions concerning this materiality and design of space. Mosten Mostafavi and David Leatherbarrow, in their book *On Weathering: The Life of Buildings In Time*, state:

> In constructing an architectural project the introduction and consideration of the time of weathering brings the project closer to a condition of actuality based on its potential transformations through time. This condition of actuality and potential for staining and fault complements the ideality of the project, making it both independent of the passage of time and caught up within it. Thought of in this way, weathering brings the virtual future of a building into dialogue with its actual present, as both are entangled in its past. (Mostafavi and Leatherbarrow 1997, 112)

By anticipating the inevitable physical change of the materials used in the construction of a building, one can
FIGURE 7: TOBACCO BARN, JEFFERSON COUNTY, TENNESSEE (Source: author)

FIGURE 8: ROOF, PALAZZO’S BASILICA IN VICENZA, ITALY (Source: The Basilica of Andrea Palladio)
design, not only to meet the needs of the present and respect the existence of the past, but also to welcome the future. This may be accomplished by building in a mechanism for change, whether it be through form or complimentary materials, as the building changes.

It is essential for each person to experience time in the building as it passes, rather than as a flattened image. Photographs, and even maps, while they are necessary implements of documentation and the understanding of history and geography, can deceive the eye by simplifying, reducing and abstracting, information and locking buildings and cities into specific limited and temporal frames. This does not reflect the true dynamic nature of both architecture and landscape. Pallasmaa says:

As time loses its duration and its echo in the primordial past, man loses his sense of self as a historical being, and is threatened by the ‘terror of time.’ Architecture emancipates us from the embrace of the present and allows us to experience the slow, healing flow of time. Buildings and cities are instruments and museums of time. They enable us to see and understand the passing of history and to participate in time cycles that surpass individual life. (Pallasmaa 1996, 36)

In this sense, mankind is reassured by this fundamental awareness that his actions are meaningful because they exist during his own temporal lifespan and endure beyond his time. Man creates a built legacy that affects the future identity of a place. Subsequent generations of people experience what their predecessors created through the intertwining of past, present, and future.
The *experience* of architecture and of landscape is paralyzed in a frame of time if not experienced through the duration of their respective lifecycles. If a person only walks the beach at high tide, for example, he cannot fully appreciate high tide because he has not experienced low tide. The ebb and flow change the space of the beach and the possibilities of the experience. The contemporary perception of time is “linear” and “disjunctive” due to the “temporal fragmentation of modern life”, says Steven Holl in *Questions of Perception* (Holl 1994, 74). The same is true of architecture. While new buildings offer a particular and limited perceptual experience, inevitably those buildings will change as a result of time and nature.

In building, time, through the elements of nature, is a fundamentally multi-sensory experience. Some believe that today’s culture has an “ocularcentric bias” (Pallasmaa 1996, 9). It is the olfactory sense (or sense of smell), in fact, that seems to connect the individual to specific personal memories and experiences; one can relate specific scents to particular instances in their own histories. Pallasmaa offers imagery of a pebble that connects time and the sense of touch. “The tactile sense connects us with time and tradition: through impressions of touch we shake the hands of countless generations. A pebble polished by waves is pleasurable to the hand, not only because of its shape, but because it expresses the slow process of its formation; a perfect pebble on the palm materializes duration; it is time turned into shape” (Pallasmaa 1996, 40). The human touch recognizes the importance of time and nature’s relentless effects on materials. This relationship is valuable because, when people can relate to an object, they also
signify that object. Signification allows people to attach a distinct meaning to an object, which, in a cyclical pattern, is further applied to similar objects in different situations, thus transferring meaning to those similar objects. When architecture is dematerialized and flattened with an “ocularcentric bias”, people cannot relate or place meaningful, multi-sensory significance on it and, therefore, cannot value the architecture. Time and nature join people to architecture and to its landscape. “Architecture enables us to perceive and understand the dialectics of permanence and change, to settle ourselves in the world, and to place ourselves in the continuum of culture” (Pallasmaa 1996, 50). Words and ideas, a la Victor Hugo, may be lasting, but they cannot replace the fundamental sensations of actual experience. In commenting on his design of Kiasma, the Museum of Contemporary Art in Helsinki, Steven Holl said: “[S]ince words are abstract and not concretized in space, material and direct sensory experience...words cannot substitute for authentic physical and sensory experience” (Holl 1994, 6-7). Kiasma intertwines light and coolness of form and materials to house such a sensory-guided experience (Figure 9). While an image of this museum can begin to inform one of this intention, it cannot fully disseminate its character without actual physical experience. The photograph informs but does not replace the experience because it involves more than just sight for true understanding.

Cyclical time, in the form of seasons and days, is a phenomenon that can further alter the perception of a building's materiality and spatial experiences, even extending beyond the walls of that building into the surrounding
landscape. Light and shadow are the determinants of these perceptions. Light allows for objects to be seen; shadow gives depth, definition, and life to the objects as they appear in the light. Both light and shadow vary over the course of seasons and over the course of a day. Summers bring sharper a sharper sun and shorter shadows. Winters dim the landscape and offer long shadows. During a daily cycle, light surrounds building by day but illuminates from within by night. In Marlon Blackwell’s Keenan TowerHouse, one can see that, twilight, the tower in its surrounding natural light gives the appearance of near solidity (Figure 10), though still ambiguous. By night, however, internal illumination reveals the true porosity in material (Figure 11). The tower further impacts the landscape by way of its powerful, impactful winter shadow (Figure 12).

These qualities of light and shadow can be harnessed in such a way to provocatively articulate architecture, so that the window renews its significance “as a mediator between
FIGURE 10: KEENAN TOWER HOUSE, DAY (Source: An Architecture of the Ozarks)

FIGURE 11: KEENAN TOWER HOUSE, NIGHT (Source: An Architecture of the Ozarks)

FIGURE 12: KEENAN TOWER HOUSE, WINTER SHADOW (Source: An Architecture of the Ozarks)
two worlds, between enclosed and open, interiority and exteriority, private and public, shadow and light” (Pallasmaa 1996, 47). Openings in a building represent much more than the mere absence of walls; they are provocateurs, engaging the senses. They serve as the isthmuses connecting worlds that are physical and those that are not. Openings create light and shadow in the confines of spaces, like in Kengo Kuma’s River Filter (Figure 13), but then allow for the building to be illuminated when the natural light is not available, creating new meanings for that building at different times for both the occupant and the outsider.

Architecture that is collectively responsive and congruous to its own time (its generation and its cycles) and its own natural setting can be an architecture that richly contributes to a man and to mankind.
2 SITE
THE CITY
The Tennessee Valley Authority (TVA) was established in 1933, as an integral part of the "New Deal", championed by President Franklin Roosevelt. Its primary purpose and continued focus was and persists to comprehensively "develop and manage the Tennessee River Basin" (Reidinger 1998, vii) and to "substantially reduce[ ] the magnitude and frequency of damage-producing floods in the [Tennessee] Valley" (Reidinger 1998, 34). TVA, however, states that neither its objective nor its ability is to forestall floods nor to bridle all floods in the Valley" (Reidinger 1998, 43).

The city of Chattanooga, in particular, quickly became a major priority in the design of the TVA reservoir system, given its orientation and geographical conditions along the Tennessee River. The River Basin is comprised of two fan-shaped basins with their narrow valley connection located in Chattanooga (Figure 14). March, 1867, marks the flood of record which saw floodwaters rise 28 feet above top of bank and "inundate[ ] most of the city" (Reidinger 1998, 34).

In 1940, Chickamauga Dam (Figure 15) was completed, as the "sixth in the series of mammoth structures built by the Tennessee Valley Authority for the people of the United States...helping to give to all of us human control of the watershed of the Tennessee River in order that it may serve in full the purposes of mankind" (Roosevelt 1940). It is the only dam in the Basin located within a city: Chattanooga. Even with the presence of this dam, there remains a "20 percent annual chance of minor flood damage and a 5 percent chance of substantial flood damage at Chattanooga" (Reidinger 1998, 34). This was tested in 1973 and again in 2003. Urban areas of Chattanooga, including the downtown core and Coolidge Park,
FIGURE 14: TVA REGION (Source: TVA/Author)

FIGURE 15: CHICKAMAUGA DAM (Source: author)
were inundated by the flooding of the Tennessee River, flooding caused by 12 inches of rain falling in a two-day period. This swelled the Tennessee by 17 feet in a single day. The crest, at 6 feet higher than flood stage, the greatest it had been since the beginning of TVA, excepting in 1973, in the same city. Randy Kerr, River Forecasting Manager for the Authority, stated, that while this particular flood of 2003 is generally considered to be a 100-year flood, flooding of this magnitude can happen again at any time, with the odds being at least one percent (TVA River Neighbors 2003, 5). The city continues to be the urban area at greatest risk of being engulfed by the waters of the Tennessee River.

THE ISLAND

Maclellan Island (Figure 16), originally known as Ross’s Landing Island, was gifted to the Chattanooga Audubon Society in 1954, by R.J. Macelllan, to be used as wildlife sanctuary. It is an island that is not inhabited by people but by wildlife of varying kinds. In particular, Great Blue Herons nest on this island year round. Their rookery is located on the upstream end of the 18.8-acre urban island. While Macelllan Island was once farmed, the vegetation is now comprised of a dense forest of hardwood trees, a colony of river cane along the northern edge of the island, and a small growth of wildflowers. Veterans Bridge crosses the island overhead, creating a rain shadow desert on the island below (Figure 17).

Given the status of the island as a wildlife sanctuary, man-made structures on the island are minimal. A boat dock and adjoining steps are at the downstream end as the primary location of access to the island. One enclosed,
FIGURE 16: MACLELLAN ISLAND (Source: author)

FIGURE 17: RAIN SHADOW DESERT, MACLELLAN ISLAND (Source: author)
primitive shelter (Figure 18) exists for the use of scouting groups who stay overnight on the island. Finally, an observation platform was constructed near the Great Blue Heron Rookery, enabling visitors to easily view the colony (Figure 19).

Madellan Island dissect the Tennessee River in Chattanooga in the shadows of the Hunter Museum of Art, which caps the 100-foot sandstone bluff on the south shore of the river (Figure 20). The north shore of the river is marked by the low-lying areas that define Coolidge Park, an area very much susceptible to flooding as experienced most recently in 2003.

The island is frequented by day visitors, most of whom reach the island by way of the water taxi, the only motorized boat permitted to dock there. Some, however, do arrive by canoe or kayak. Those who camp on the island tend to be scouting and school groups. At this time, access to the island is only marginally regulated, inconsistent with the stewardship of a wildlife sanctuary.

FIGURE 18: BLOCK SHELTER, MACELLAN ISLAND (Source: author)
FIGURE 19: OBSERVATION DECK, MACLELLAN ISLAND (Source: author)

FIGURE 20: HUNTER MUSEUM OF ART, CHATTANOOGA (Source: author)
3 PROGRAM

AT-LARGE

In support of the Sanctuary operated by the Audubon Society, the program is for the Tremont Research Reserve and Environmental Learning Center, which will include both permanent and temporary program.

PERMANENT PROGRAM

By nature, basic parts of the program are year-round and are to be seen as constants, constants allowed to evolve slowly yet still remain as fixtures to both the architecture and the island. In both articulation and program, this permanent portion of the architecture must transcend time linearly and reflect time cyclically.

Housed in this perennial program are the three necessities of life: food, water, and shelter. The material, concrete, is designed to sustain these elements. The food is embodied in the warming kitchen and pantry for storing and preparing food. The water is enveloped in the cistern, for storage of the rainwater catchment and distribution for basic use. These are protected by the concrete structure, also used to for shelter. The basic accommodations for shelter are the ledges located at the ground level of the building.

EPHEMERAL PROGRAM

The seasonally-transient elements of the program are dedicated to the residents associated with the sponsored program(s) of the season and others dedicated to the research and observation of the avian inhabitats, as permitted by the Audubon Society. As the programs are fleeting, the building must physically adapt to the needs of the programs that are in session while still sensitive to the
non-human residents. These spaces are ephemeral, like their occupants, changing seasonally to accommodate the needs of the island, the mission of the Audubon Society, and the contribution to communities to learn from the island, creating a mutualistic relationship between man and nature. The mere presence and absence of these programmatic elements from season to season reflects time in a cyclical manner. These elements must also be drenched with time through their articulation, materially and in form.

A gallery, and indoor/outdoor classroom, a dock, and easy connectivity from the building to the expanded island are necessary temporal elements of the building.

The AVIAN RESEARCHERS IN-RESIDENCE group of five will arrive and remain on Macellian Island through the Spring months to best capture the behaviors of the birds, waterfowl in particular. The Blue Herons helm the island with their rookery located at the eastern tip. As the deciduous trees they inhabit only have meager foliage at the beginning of spring and the birds are nesting, viewability is optimum. The Researchers will be able to observe the herons and other avian species and their effects on the flora and other animals on the island. Their primary focus will be the air, in the trees.

These researchers will have full use of the existing observation deck near the rookery and all other parts of the island. They will also require full use of the Lab, equipped with tables, shelving, cubicles, and space to project still images and video / live-feed captured by cameras installed near the heron nests.
SCOUTING GROUPS are part of the culture of the island, often camping there through the warmer months of the year. Their classroom is the outdoors. They will be provided with the simple shelter of the existing blockhouse, which is ward-like, accommodating up to 20 bunks. They also have full use of the island for primitive camping, particularly at the rain shadow desert under Veterans Bridge.

The ARTISTS IN-RESIDENCE are assigned to visit in the Fall, a dynamic time to be inspired by nature. Future visits may, however, be shifted to other seasons of the year. These Artists may use most any medium, whether it be paint, photography, sculpture, collage, or mixed.

The artists will use the lab space as their studio. A darkroom can be incorporated if a Photographer is in-residence is part of the program.

There will be WATER RESEARCHERS IN-RESIDENCE during the winter months and into March, which can be both a time of stagnation and a time of movement for the water. The researchers will be able to collect samples and test for industrial and agricultural run-off and determine the affects of any chemicals in the river on the species, both flora and fauna, that inhabit it. Flooding is also most likely to occur during these months, given the precipitation, opening of the dams up river, and the freshets in the Spring.

The researchers will use the Lab, needing tables and shelves, and cubicles. They will also make use of the easy access to the river at the ground level of the building.
4 PRECEDEMTS

THE NEST

Different species of birds adapt the construction of their nests to what suits them as far as their size and and climate and what is available to them in their respective environments. Generally speaking, there are six construction methods: sculpting, moulding, piling up, sticking together, interlocking, and weaving. The nests also have four zones, which vary from species to species: attachment, outer layer (decorative), structural, and lining.

The Great Blue Heron utilizes the piling up method of construction and attaches the nest in the crotch of the tree, up to 130 feet in elevation. Its nest sizes 25 - 40 inches in diameter and is articulated as a platform with layers. The structural layer materializes as large sticks. It is then lined with fine twigs and soft, green leaves. The Heron does not utilize the outer or decorative layer. This is seen in Figure 21. It is not uncommon for other bird species to overtake the nest of the Heron; osprey often do just that.

FIGURE 21: GREAT BLUE HERON NEST (Source: A Field Guide to Birds’ Nests)
As a perennial occupant of Macellan Island, the nest of the Great Blue Heron can be used to inform the design of human dwellings and further applied as a means to articulate the parameters for the design of the Blueway Research Reserve and Environmental Learning Center. Through form and structural zoning, construction methods and materials, use and occupancy, and location and orientation, the nest expresses a residence that is adaptable to its environment over time, yet still transcends time, and one that is seasonally subject to change according to these factors. This translates into an architecture that is organic, meeting the needs of the human dweller yet still retaining the meaning of the place, and also instrumental in defining the way its place is perceived by informing the human occupant.

NEW CALEDONIA
The nest example naturally concludes the use of wood slatting. This is seen in Renzo Piano’s Jean-Marie Tjibaou Cultural Centre (Figure 22) in New Caledonia, with the task of creating an homage to the native Kanak culture. Using traditional building materials and methods were essential to producing these huts, with a respect to the natural elements of wind, light, and vegetation. The slatting of the hut structures become agents for light and shadow to be significant characters of the spaces created. The designs for the huts, like those of birds’ nests, are ones that become absorbed into the place through their use of local materials and expressions of those materials, to be altered by nature over time. The wood will change colors, further emersing the buildings into their landscape, even further involved in the evolution of a people and of their place, sustaining time and generations.
FIGURE 22. Jean-Marie Tjibaou Cultural Centre, New Caledonia (Source: Spirit of Nature)
MOORE HONEYHOUSE

The nest of the bees, or hive (Figure 23), lends its influence to the design of Marlon Blackwell’s Moore Honey House (Figure 24). The complex, faceted-glass facade is compartmentalized like the beehive, though between plates of steel. Blackwell called the HoneyHouse a “volumetric response to the confluence of natural and rational processes.” The wall addresses a number of hive conditions, including transparency, translucency, and opacity, varying according to the season and time of day and the observer’s perspective (Figure 25). “The wall is both frame and edge— a frame that reorders the view, an edge that becomes the view.” The glass facade is only part of the whole HoneyHouse, defining the space yet also perfectly serving the intended purpose of storing and processing sourwood honey, also giving the owner proper display of her prize-winning product.
FIGURE 24: MOORE HONEYHOUSE, NORTH CAROLINA (Source: An Architecture of the Ozarks)

FIGURE 25: MOORE HONEYHOUSE AT TWILIGHT (Source: An Architecture of the Ozarks)
GRAIN STORAGE BUILDING

In vernacular architecture, there are many examples of nests. Barn-type structures gracing fields across the countryside provide insight into how to design nests for humans. The grain storage building, shown in Figure 26, delights the witness with the age it has seen, with the human interventions when the structure failed to serve its use. Corrugated metal patches, which have now also aged, cover the worn places on the structure. The wood has grayed. Shingles of wood on the roof are missing. Those that remain are stained by the presence of other materials. Now an abandoning, it no longer serves its original purpose but is integrally engaged into the landscape it helped create.

FIGURE 26: GRAIN STORAGE BUILDING, OTTER TAIL COUNTY, MINNESOTA (SOURCE: Abandonigs)
5 PROJECT

The design project is composed of six large plates. The Plates are graphic representations of the building designed by the author to materialize the elements embedded in the Thesis and to test the Thesis itself.

Plate 1, Nesting, graphically describes both the literal nesting practices of birds, including materiality, structure, and attachments. Further, examples of the nesting metaphor as seen in architecture are shown on this plate.

Plate 2, Locating, represents the existing conditions of the site, Maclellan Island, through diagrams, mapping, and photographic imagery.

Plate 3, Engaging, depicts the conceptual modelling and the site plan for the project designed.

Plate 4, Inhabiting, shows the ground and floor plan and the cross sections of the building.

Plate 5, Migrating, shows the Roof Plan and South Elevation of the Building.

Plate 6, Dwelling, diagrams the building and site parts which serve as components of the nesting metaphor. The first grouping of diagrams are compositely the REMNANTS. These are the parts of the building which must have permanence as they provide basic necessities: food, water, and shelter. Individually, they are the LEDGES AND OUTCROPS, which represent the very basic locations of nests. Architecturally, they are the horizontal, low-lying concrete pads on which some dwelling may occur. The
Outcrops are the footings, on which columns for nests above may be supported. The CISTERN, also part of the Remnants, is for water storage and represents life and is constructed as earthen vessels for rainwater and groundwater catchment. The WEDGE, the final component of the Remnants, is shelter, composed of concrete for permanence. The Wedge provides protection and shelter and houses an area for food preparation and storage.

The ephemeral elements are shown in the remaining diagrams. The DOCK AND PATH represent migration to and from the island. The DECK/PERCH provides elevation for the nests and is of wood frame construction, providing overhead shelter above the ledges. The COLONY/ROOKERY are nests encapsulating spaces on the perch and in the wedge. The BOWER is an arbor bridge, a caged path for extending the space of the nest. The STAIRS AND PLANKED WALKWAY provide further connectivity.

Finally, the NOMADIC ENCAMPMENTS allow for shelter with the greatest level of migratory freedom. They are tents and hammocks and tarps and, potently, the shelter of an All-Terrain Cabin, created from the simplicity of a steel freight container.

The project is further described by seven perspective sketches (Figures 27 - 33), and in model form, as shown photographically, of the Conceptual Model (Figures 34 - 37) and of the Building Model (Figures 38 - 46).
FIGURE 29: Perspective Sketch - Northwest view (Source: Author)
FIGURE 44: MKK1 East View (Source: Mansy Keop)


Paz, Octavio. *A Draft of Shadows*


VITA

April Gray, a native of east Tennessee, earned her undergraduate degree in Education from David Lipscomb University. After serving as an educator for three years, she began her pursuit of the Master of Architecture degree from the University of Tennessee.

Having completed the M.Arch, Ms. Gray will finish her requirements for the Intern Development Program and begin the Architectural Registration Examination for the State of Tennessee and become a licensed architect, endorsed by NCARB.