

ABSTRACT

Title of Document: THE INVISIBLE: RE-ENVISIONING THE
NIGHTSCAPE

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The purpose of this thesis is to develop an awareness of the disappearing natural resource of dark skies through the design of a project that fosters this awareness. The goal of the research is to re-envision how we as humans conventionally experience the nightscape and to forge a new meaningful human connection to darkness. By addressing and understanding the experience and value of dark skies, architecture can better be used as a tool for observation, creating a deeper appreciation of experience and phenomena. To accomplish these goals, this thesis proposes creating a place that will enhance our thoughts and perceptions about darkness. This thesis project explores the human connection to the night sky and darkness by using architecture as the lens and device for understanding the synchronicity between phenomena, perception and time.

THE IN/VISIBLE: RE-ENVISIONING THE NIGHTSCAPE

By

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00 – Introduction

“The sky is the one visual constant in all our lives, a complex backdrop to our every venture, thought, and emotion. Yet we tend to think of it as invisible – an absence, not a substance.”¹

- Diane Ackerman

There is an inherent personal uneasiness with a diminished sense of security in encountering darkness. As our cities and suburbs have become brighter and a 24/7 lifestyle is becoming the norm, our dark skies are disappearing. Along with it this has far reaching negative implications for our ecological and cultural futures, and for the lost power and meaning of darkness. As humans of the 21st century where schedules, meeting times, and the rush to be on time controls our lives, we don't necessarily understand what it means to live in time. Night used to be a time designated for reflection and contemplation, but since recently night is losing its power and meaning. Since the beginning of man, we have always looked towards the sky. But today, we have lit up our night and flooded the mystery associated with darkness with light.

Ever since the existence of fire, humans have found the necessity and urge to light up ones surroundings, which in turn lights up the night sky. The once powerful, yet subtle source of light produced by fire has since developed into an urban electrical glow. Many view the loss of our dark skies as the

¹ Ackerman, Diane. *A Natural History of the Senses*. New York: Random House, Inc. 1990

outcome of change and progress. So, if lighting up the night sky has been seen as a technological and social progression, then what is wrong with lighting up the night sky? In short, we have failed to see the negative human and ecological implications light pollution has caused to the natural rhythms of the universe, and although subtle, we are paying the price now.

The night sky is accessible to everyone by simply the act of looking up. But like many things, it is disappearing out of our vision and many of us have failed to recognize and acknowledge this disappearance. But why is this? Well, instead of looking up we are looking at our cell phones and computer screens and daily tasks. We rarely take the time to look up at one another who may walk passed us, sit across from us or even next to us.

The underlying problem my thesis seeks to address is the disappearance of the natural resource of dark skies and the diminished understanding and power of darkness. We have lost the inherent sense of balance within our universe, between nature and man and day and night. In fact, eighty percent of children will never see a sky dark enough to view the Milky Way.² This staggering percentage is a result of people confining themselves to the “benefits” of artificial light. It wouldn’t be fair to present this argument without acknowledging some of the benefits of artificial light. Artificial light of course enables a nighttime lifestyle to exist that probably would not exist without light exposure. Architecturally speaking, light has the potential to activate architecture during those dark hours of the night. Finally,

² Bogard, Paul. 2013. *The End of Night: Searching for Natural Darkness in an Age of Artificial Light*. New York, NY, Brown and Company. 268.

there is something fascinating and picturesque to see a city skyline lit up with light at night. But are these uses of artificial light necessary? There is such a thing as too much artificial light and too much exposure to it. Without exposure to the wonders of the night sky, creativity, imagination and questioning remain bound within the confines of daylight, and an artificially lit world.

This thesis will be used to establish the inherent human connection to the night sky, by understanding the synchronicity between phenomena, perception, and time; using architecture as the lens and device. It will create a destination that will challenge our thoughts on perception and time as it relates to the ever-changing night sky. It will resist the oversimplified myth that light is safe and dark is dangerous.

01 – Role of Darkness

To go in the dark with a light is to know the light.

*To know the dark, go dark. Go without sight,
and find that the dark, too, blooms and sings,
and is traveled by dark feet and dark wings.*

- *Wendell Berry*

Understanding the multitude of roles darkness and night upholds is the first step in re-envisioning how we as humans experience the nightscape.

Darkness as we understand it today most often holds a negative or “dark” connotation. What is misunderstood is that darkness is an essential aspect of a cyclic phenomena. The cycle of lightness and darkness is a natural rhythm that is a necessity for other natural cycles and rhythms to occur. These known rhythms have been observed, questioned, and accepted since the earliest of times. These rhythms have not only inspired scientific and poetic connections, but have also been deeply embedded into humans as well as the natural environment.

01.01 – Human Connection

Human connection in relation to darkness is divided into two transects: positive perceptions and negative perceptions. The majority of humans have a negative perception of darkness. The term brings about a societal uneasiness derived by misconceptions of darkness, such as

fear, insecurity and the unknown. What we fail to recognize is that the cycle of light and dark is synchronized with our circadian rhythms. Our circadian rhythm is our biological clock and melatonin production cannot happen when exposed to artificial light. This is why darkness is a part of human nature and our existence.

Night has the ability to make us feel vulnerable. This vulnerability stems from a diminished sense of sight, darkness, and fear. So, is fear completely irrational and unnecessary? Paul Bogard states that, “The reasons –rational, even – that we have feared the dark of night are many: threats from wild animals, attacks from robbers or highwaymen, deadly terrain, and especially fire”.³ Similar to Bogard’s thoughts, I too think that fear of the dark and the unknown is at times rational. But this fear is mostly associated with our insecurities and uneasiness from the lack of being in the dark. The mind has the ability to transform and take hold of our thoughts, actions and emotions. It is the mind that controls this fear of night. I imagine it is difficult for us to accept and feel safe in darkness when we have become accustomed to such high levels of light during all hours of a day, especially the nighttime hours.⁴ Due to this fear of darkness, we have been lighting up our night with an increasing amount of electricity in order to subside that fear with safety. Bogard states that, “Lights can help make us safer, but real safety

³ Bogard, Paul. 2013. *The End of Night: Searching for Natural Darkness in an Age of Artificial Light*. New York, NY, Brown and Company. 80.

⁴ Bogard, Paul. 2013. *The End of Night: Searching for Natural Darkness in an Age of Artificial Light*. New York, NY, Brown and Company. 72.

comes from being aware of our surroundings, making good choices and not using our natural fear of the dark as an excuse to overlook our nights”⁵ It is the act of human presence and the eyes that actually keep areas safe, not the light. The light only has the ability to assist in safety.

As a result of thinking that light is the main component of creating safety, light pollution and waste is an increasing issue for the developed and developing world. It has been estimated that the “European Union spends 1.7 billion Euros a year on wasted exterior lighting. In the United States, the figure is a similar \$2.2 billion”.⁶ So, how and why is it that humans do not see and consider this as an immediate issue? Bogard states that, “The growth of light pollution is fast but not fast enough to make people take action. So it is fast, and in one generation you see a lot of difference. But one year to another there is not a lot of difference, and people who are born now are used to this sky and they don’t know what they have lost”.⁷ Without knowing what we have the ability to see in the dark, we will never know what we have lost in light.

⁵ Bogard, Paul. 2013. *The End of Night: Searching for Natural Darkness in an Age of Artificial Light*. New York, NY, Brown and Company. 87.

⁶ Bogard, Paul. 2013. *The End of Night: Searching for Natural Darkness in an Age of Artificial Light*. New York, NY, Brown and Company. 228.

⁷ Bogard, Paul. 2013. *The End of Night: Searching for Natural Darkness in an Age of Artificial Light*. New York, NY, Brown and Company. 219.

01.02 – Poetic Connection

“It’s a thought I have again and again. How fascinating would it be to see certain old buildings, towers and churches, for example, not plastered with floodlights but touched only by the moonlight, by starlight, or even just flames?”⁸

- Paul Bogard

Human curiosity has always been connected with trying to understand and comprehend the expanse of the universe. The simplicity and abstraction between man and the universe creates a moment of reflection and the sublime. This experience in the past has been documented through words, phrases, verses and visuals. The essence of an experience can be portrayed within a device like poetry. Poetry doesn’t literally have to be a poem, but it could also be the poetics of a place, a landscape or memory. The above quotation by Paul Bogard is a literary phrase describing the poetics of a place. These poetics describe the vision of a place where the architecture and environment is basked by the natural light of the universe, establishing a sensitivity created by the natural light and shadows of night. Just as different qualities of language evoke different feelings and emotions, different qualities of a space or environment also evoke different feelings and emotions. For example, visiting the International Dark Sky Park evokes

⁸ Bogard, Paul. 2013. *The End of Night: Searching for Natural Darkness in an Age of Artificial Light*. New York, NY, Brown and Company. 224.

different atmospheres and qualities during the day rather than at night. These atmospheres and qualities are created by the poetics of the place.

The more literal poetic connection to night and darkness is also connected to actual literary poetry. After searching through several books, internet websites, and song lyrics to find poems celebrating the night and searching for darkness, I came across the poem “Twinkle, Twinkle, Little Star” written by Jane Taylor in 1806.

*Twinkle, twinkle, little star,
How I wonder what you are!
Up above the world so high,
Like a diamond in the sky.*

*When the blazing sun is gone,
When he nothing shines upon,
Then you show your little light,
Twinkle, twinkle, all the night.*

*Then the traveler in the dark
Thanks you for your tiny spark,
How could he see where to go,
If you did not twinkle so?*

*In the dark blue sky you keep,
Often through my curtains peep
For you never shut your eye,
Till the sun is in the sky.*

As your bright and tiny spark

*Lights the traveler in the dark,
Though I know not what you are,
Twinkle, twinkle, little star.*

I failed to recognize that this poem was the same song that I sang along to as a child every night before bed. As children, we would often sing along without understanding what the words actually meant. Now, after reading the extent of the poem and gaining a sensitivity to the importance of the night sky and darkness, the poetics of the language created has a new meaning and increased importance to me.

01.03 – Scientific Connection

The science of astronomy explores celestial objects outside the atmospheres of human habitation and reach. It involves the act of observing in relation to astrophysics. This is one of the few sciences where amateurs can make significant contributions to the development of astronomy through observation and discovery. The advancement of this scientific connection transcends from purely observational by the naked-eye to enhanced by the telescope and documented and recorded by photography.

01.04 – Ecological Connection

“Humans are animals as well, and there’s no reason to give ourselves any higher level in the ranking than everything else. And so when light/dark cycles mess up seasonal patterns of trees or breeding cycles

*of amphibians, which I think is quite well established, there's no reason to think it's not doing the same to us"*⁹

- Steven Lockley (2011)

The ecological connection to darkness is one that we often misunderstand or neglect. Rarely do we envision or directly see the effects that light pollution has on our ecosystems. On this matter, Pere Horts states that, "Many animals have sensory perception systems that have slowly adapted to the conditions of darkness of night life and they experience serious distortions when light is introduced in their dark environment."¹⁰ As humans of the Earth, we are unaware of the prolonged and necessary duration of night. "Already, some two-thirds of Americans and Europeans no longer experience real night – that is, real darkness – and nearly all of us live in areas considered polluted by light."¹¹ According to Paul Bogard, light pollution impacts five key areas of wildlife: orientation, predation, competition, reproduction, and circadian rhythms.¹²

⁹ Bogard, Paul. 2013. *The End of Night: Searching for Natural Darkness in an Age of Artificial Light*. New York, NY, Brown and Company.

¹⁰ Horts, Pere. *The Importance of Protecting the Night Sky*. 4

¹¹ Bogard, Paul. 2013. *The End of Night: Searching for Natural Darkness in an Age of Artificial Light*. New York, NY, Brown and Company. 9.

¹² Bogard, Paul. 2013. *The End of Night: Searching for Natural Darkness in an Age of Artificial Light*. New York, NY, Brown and Company. 132.

02 – Precedent Case Studies

One of the first steps I took was looking for a set of precedents that would advance my understanding and my insights for re-envisioning how we might inhabit the nightscape. I looked at a broad range of precedents, but narrowed the selection down to four precedents. The precedents range from an ancient temple, to a naked-eye observatory and an astronomical observatory.

Choosing these select three have exposed me to understanding the different “lenses” individuals or groups of people use in order to perceive and experience phenomena. While the Kielder Observatory precedent involves a combination between a scientific lens and a mythological lens, the Roden Crater project uses a situational lens to perceive phenomena. These specific lenses are discussed further in the paper.

02.01 – Pantheon

The first precedent I analyzed is the Pantheon, built in Rome around 126 AD. It was built by Apollodorus of Damascus and was part of the larger plan of the Campus Martius. The Pantheon is a temple that was dedicated to the ancient gods and is best known for the opening or oculus at the top of its dome. I chose this precedent for how long and significant an example it has been and specifically for that aperture created. The oculus creates both a lens and a filter (Fig. 02.01a).

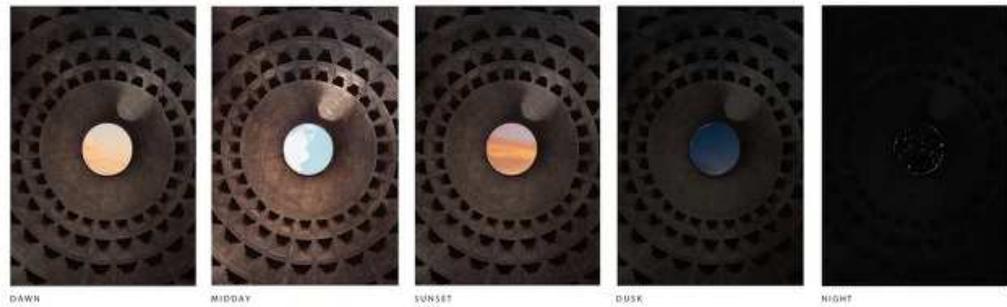


Fig. 02.01.a

My findings within this precedent pertain to light quality, materiality and light, and the interplay of natural phenomena. First, the play of indirect and direct light within the space is of great importance. The equinoxes and solstices reveal themselves in the architecture through a beam of light that shines directly within a designated niche in the building (Fig. 02.01.b). What reveals itself is the poetic aspect of light carving into the architecture.

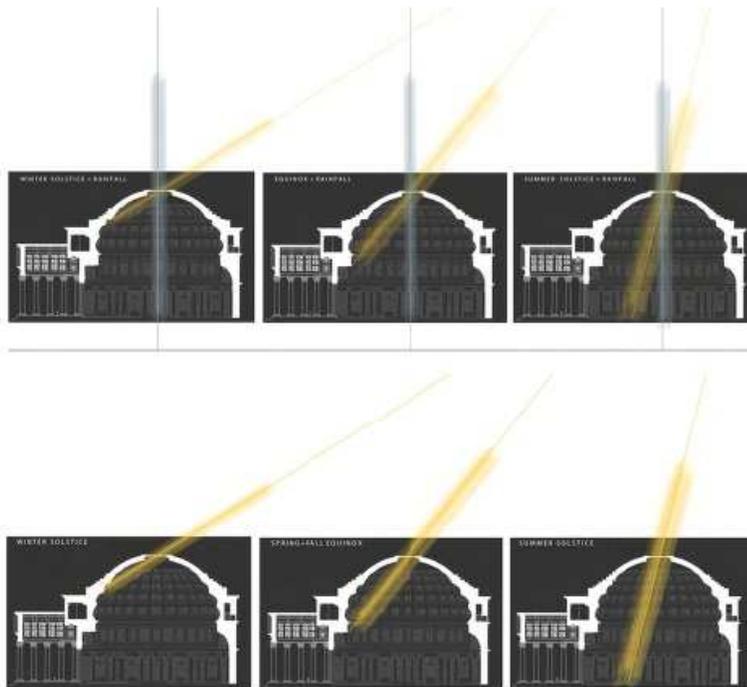


Fig. 02.01.b

Not only does this direct light amplify the architecture, but the indirect light quality within the space changes from dawn, midday, sunset, dusk, and to night. (Fig 02.01.a). This leads to my second finding of materiality and light. Shadow and contrast are two elements that reveal themselves within the coffers of the dome. The play of light and dark within the coffers creates a balanced composition. Finally the third finding is the interplay of natural phenomena. Since the oculus is completely open, elements like rain and sunlight enter freely into the interior. When rain falls into the rotunda it actually transforms into a fine mist, rather than larger raindrops. This interplay of elements entering the space further enhances the experience of the space and confirms the act of the architecture as a filter and receiver of natural phenomena (Fig. 02.01.c)

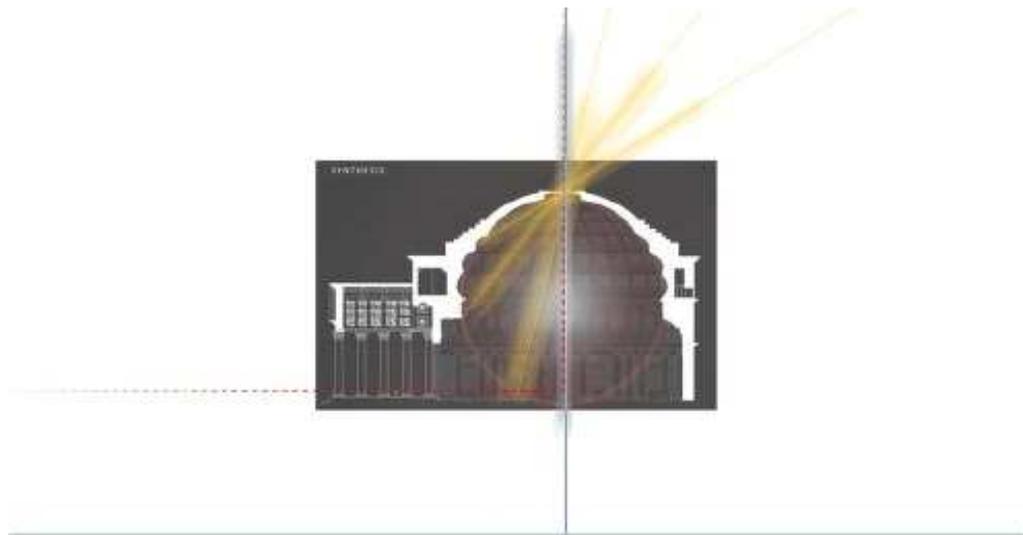


Fig. 02.01.c

02.02 – Roden Crater Project

The second precedent I analyzed is the Roden Crater project by James Turrell. This naked-eye observatory was first begun in the 1970s and is still a work in progress. What makes this project raw and authentic is that it is an extinct volcanic cinder cone located near Flagstaff, Arizona. This 400,000 year old cinder cone is being transformed into a work of art that humans can occupy and move around and within. James Turrell states about the project that "...I did not want the work to be a mark upon nature, but I wanted the work to be enfolded in nature in such a way that light from the sun, moon and stars empowered the spaces."¹³ I find this act of empowering architecture through the interactions of natural phenomena both poetically compelling and powerful.

Programmatically, this precedent is a naked-eye observatory that is about experiencing solar and celestial phenomena. Conceptually, this precedent is about perception, light, and abstraction. My finding within this precedent is that Turrell plays with our perception of how we move about a space, as well as our view of space. At times he flattens our depth perception and at other times he exaggerates our depth perception. The real question of this project yet to be discovered is uncovering what is architecturally creating these illusions? Similar to

¹³ Govan, Michael, Christine Y. Kim, Alison L. Greene, E C. Krupp, Florian Holzherr, and James Turrell. *James Turrell: A Retrospective*. Los Angeles: Los Angeles County Museum of Art, 2013.

the Pantheon, the construction of apertures is an integral aspect of the design, our experience, and the play of perception. It is through this process of abstracting and isolating the subject matter of the sky that achieves a greater experiential dimension.

02.03 – Kielder Observatory

The third precedent is the Kielder Observatory, designed by Charles Barclay Architects. It was built in 2008 and is located in a rural area in Northumberland, UK. Programmatically, this is an astronomical observatory for both amateurs and professionals. This was a competition-based design that was chosen for its re-invention of the observatory typology. For example, this is the first 'land pier' typology for an observatory.

Findings for this precedent, includes the importance of motion and movement systems. Time plays a factor in this precedent by the architecture adapting to the changing sky brought about by the change of time. Two spaces within the building, which hold the telescopes are isolated building forms that rotate and pivot as necessary for the act of observing and studying the night sky (Fig. 02.03.a).

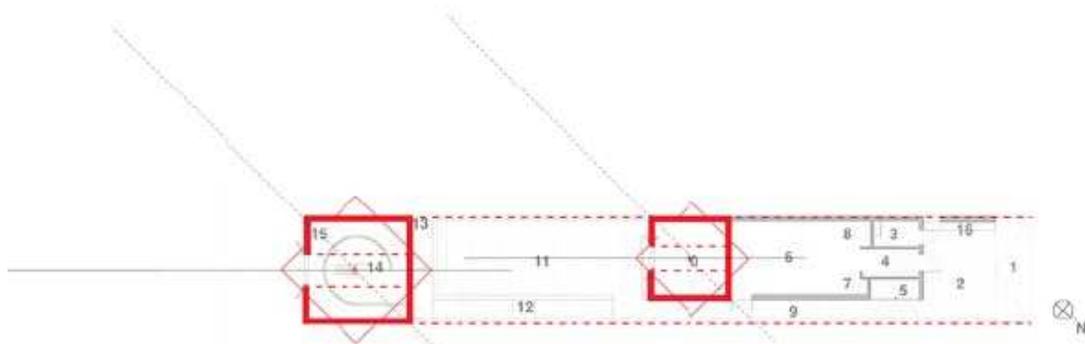


Fig. 02.03.a

The other movement system involves the occupants and users. The professionals and amateurs move throughout the public spaces together, but the professional astronomers enter into the rotating spaces, which act as end caps for the designated public night sky viewing area. This act of framing by the rotating architecture creates a spatial and visual frame of the night sky. (Fig. 02.03.b) The last finding of this precedent is the holistic approach of the design. The cohesive approach of all dimensions of earth, building, and sky creates a holistic experiential quality. Analyzing the section of the building, the architecture digs into the ground and then ramps up towards the sky. This allows for the user to experience the zone of being between the earth and sky.

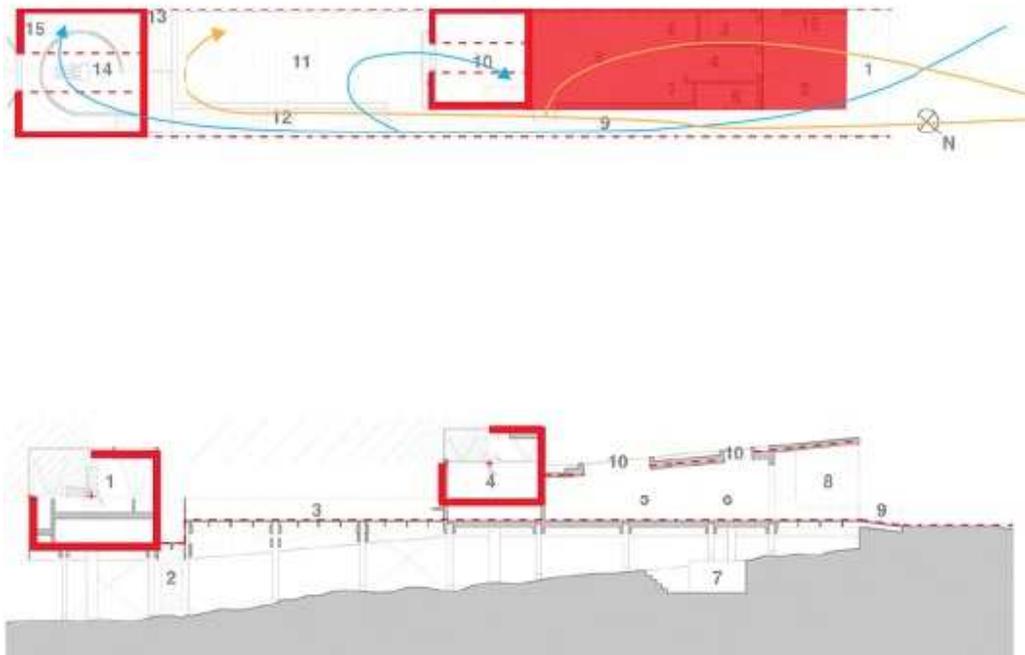


Fig. 02.03.b

03 – Vocabulary/Design Palette/Principles

The following vocabulary palette of principles will set up my design framework for the thesis. In order to carry through with the framework, I will define each principle within the palette. This will bring clarity to my motives and design decisions. Setting up this palette of defined principles will then be understood in terms of physical models, in order to understand these principles in a more tangible physical way.

03.01 – Device

A device is a mechanism, tool, or process. It is an instrument that provides the apparatus. The device within this thesis is the building or architectural element itself. The building as a device provides an apparatus for the lens (defined below). A device is an occupiable structure and is understood as the larger picture of the architecture. While defining this principle, I was influenced by William Herchel's great "40 foot reflector". This structure represents the principles of device and lens within my framework. The device of this example is the skeletal system and capsule surrounding the lens. While the lens itself is the mirror and aperture created. The device interacts with the user and natural phenomena and it receives.

In thinking about the integration of the device on my site, it is possible that more than one device exists. The intervention might consist of several devices, each with its own lens. The intervention might consist of one device with several lenses within that single device. The

intervention might also consist of a series of lenses interlaced through a group of connected devices.

03.02 – Lens

While the device is understood as the larger picture of the architecture, the lens provides the details and apertures within the building. The lens becomes a filter, receiver and viewer. The lens filters out the unnecessary. The lens receives the image, light and darkness. The lens also projects outwards, providing and framing a moment in time. In other words, the lens provides the focus. The lens really focuses in on what is only between the observer's eye and the celestial phenomena.

03.03 – Perception

“The daylight’s fade reveals the first stars, and suddenly there’s that every once-in-a-while realization: The stars are above us all the time, all day long, but we only get to see them at night.”¹⁴

- *Paul Bogard*

With darkness comes a visual deception of detail and form. Visually, textures seem to disappear, forms begin to blend together, and light recedes into shadow. With this visual deception, we gain another sense and our other senses become sharper and more acute. As Martin Heidegger noted, “ Even in the early stages of Greek

¹⁴ Bogard, Paul. 2013. *The End of Night: Searching for Natural Darkness in an Age of Artificial Light*. New York, NY, Brown and Company. 215.

philosophy, and not by accident, cognition was conceived in terms of the 'desire to see'." ¹⁵ As stated by Mette Ammod, " In our culture's search for truth, the eyes have been given primacy, for 'seeing is believing.'" (160) ¹⁶ This preferential treatment towards vision and clarity has bifurcated our understanding and need for the night sky. While we have provided lighting for seeing at night, we have also blinded an element of the nightscape: the night sky.

Why is it that many fail to recognize the value in darkness and the night sky? Sometimes it is necessary to remove oneself from our everyday civilization and society in order to gain perspective. In this case, to gain perspective of our place in the universe. Bogard states, "The fact that people are seeing something with their own eyes has incredible power – you can see photographs of Saturn a thousand times and be somewhat impressed, but see it for yourself and you don't soon forget." ¹⁷ A similar experience for me was my experience this summer of leaving my suburban/urban lifestyle and placing myself in the remoteness and solitude of northern Michigan. Even a short, temporary displacement from society changed my perception of the scale of the Universe and my place on Earth. Seeing the clarity of the night sky firsthand assisted in gaining this perspective. Our perceptions are not only determined by the physical properties of site,

¹⁵ Heidegger, Martin. *Being and Time*. Albany: State University of New York Press, 1996

¹⁶ Mori, Toshiko. *Immaterial/Ultramaterial: Architecture, Design and Materials*

¹⁷ Bogard, Paul. 2013. *The End of Night: Searching for Natural Darkness in an Age of Artificial Light*. New York, NY, Brown and Company. 31.

but our perceptions also rely upon the perceptual abilities of the human body. How our senses and perceptions interact allows for a more complete understanding of site.

With perception being one of the main principles of this thesis, I have started to create a vocabulary design palette pertaining to perception, which can be seen on the following page (fig.03.03.a). I have created a simple set of diagrams that begin to portray how we perceive things. I have taken the following set of words and dissected the essence of their meanings into a diagram: above, below, within, across, through, between, under, inside. These words describe our positionality in perceiving the world around us. Each of these words evokes a different feeling, a different meaning, and a different spatial condition. The first set of diagrams simply translates these words into two masses: a dark mass and a light mass. The second set of diagrams uses the same words and same positionality, but acknowledges the factor of distance between the two masses and also begins to think about the active surfaces of these masses. It is important to come up with this vocabulary palette, because it will contribute to my understanding as well as an outsider's understanding of perception.

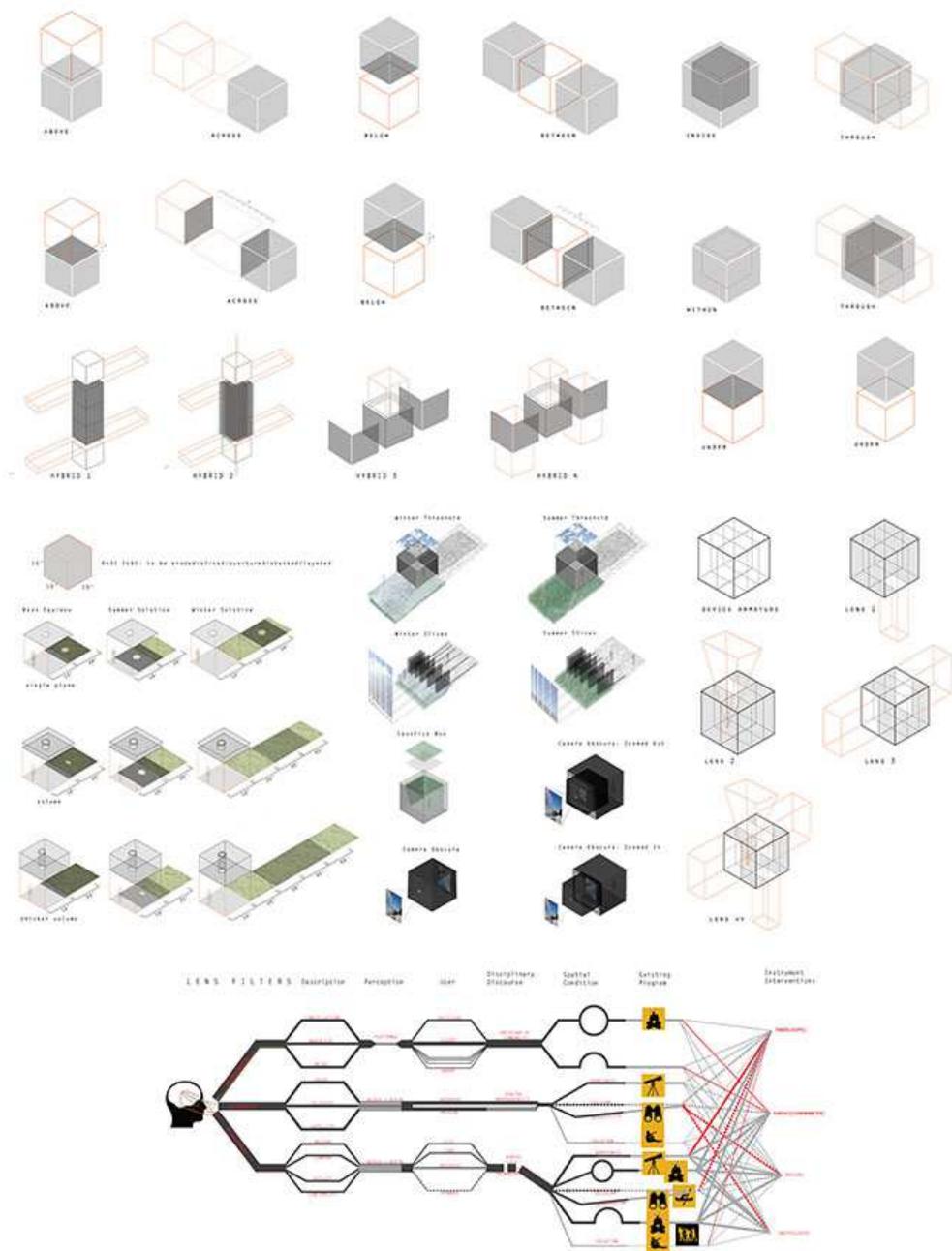


Fig. 03.03.a

03.04 – Time

“But when you visit this same place over and over, through spring and summer and fall in the morning, winter in late afternoon, you see the

motion in stillness, the animation, because you see it in a dance with the light and the clouds. It's alive, it moves in a different way. Similarly, I think it's a question of seeing the life in night itself"

- Rubin Naiman

The dimension of time is another principle embedded within the thesis. The passage of time and the cyclical phenomena of day into night and back into day is of importance in completely understanding the role of darkness. The movement of shadows across the ground, light streaming into a room and constellations moving across the sky are actually visual representations of the Earth's rotation. We tend to forget that it is the Earth that is the thing moving and rotating; the constant is the sun and the constellations.

Time and perception thrive off each other. Perception is highly influenced by time. Whether it is the time of the night, day, week, month, season, or year, perception is always influenced by time. When analyzing the site, the factor of time is important to consider. How does the wind come off the lake at different times of the day or year? Does the wind shift throughout the course of the seasons and how does the wind correlate with the noise level on the site? Based off assumptions, my guess is that noise level is highest during the daylight hours. The daylight evokes an increased human activity level and possible increased wind speeds, which leads to higher noise levels. At night,

human activity decreases and winds tend to subside and a stillness takes over, which leads to lower noise levels. But perhaps our perception of noise is more keen at night with a diminished sense of visual awareness.

It is almost important to look at the transition points of darkness and lightness. At what time does night turn into morning, dusk turn into night, etc? How does this change during the course of the year? Time requires an acute awareness of our changing surroundings, experiences, and senses. What we see and how we see is influenced by time as well as how we feel changes with time. This temporal dimension becomes a guiding principle in re-envisioning the nightscape.

04 – Site Identification

The site is located in Northern Michigan along what is known as a ‘Dark Sky Coast’. The 600 acre site is designated as an International Dark Sky Park, one of only thirteen in the world. A Dark Sky Park is a ‘park or other public land possessing exceptional starry skies and nocturnal habitat where light pollution is mitigated and natural darkness is valuable as an important educational, cultural, scenic, and natural resource’ (IDA).

04.01 – General Description

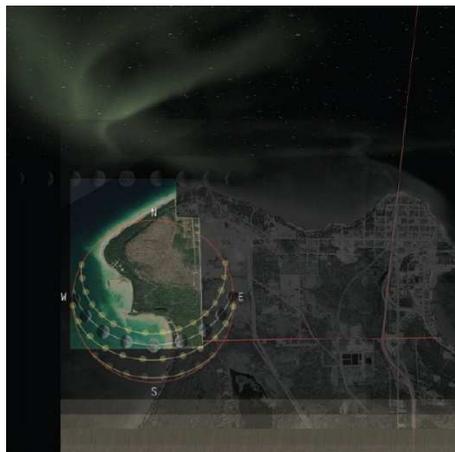


Fig. 04.01.a

There are several defining characteristics on the 600 acre site. It sits almost a mile off the main road. The narrow winding road within the acreage of the site breaks its way through the dense canopy of the forested area. There is a ridge located just north/west of the designated site. This topographical feature not only adds a level change on the site, but also contributes to the darkness of the sky at night. Since the site lies at the basin of the ridge and along the shore

of Lake Michigan, the ridge blocks out any light trespass from the neighboring tourist town of Mackinaw City.

The next site element is the presence of a large body of water, Lake Michigan. The body of water contributes to one's awareness of place. The body of water changes during the course of the seasons as well as over the course of a day. The water also acts as a mirror, reflecting sunlight during the day, darkness at night, and at times light from the moon of the night sky. This defining element of water sets this Dark Sky Park apart from the others. The dense forestland surrounding the site on three sides is occupied by hundreds of species of flora and fauna. The site is an important resting area for migrating birds moving across the Straits of Mackinac. Many raptors and neotropical birds use the site as part of their migratory movements.

04.02 – Past Conditions

In the 1950s, the site was privately owned by Roger McCormick. He had built a large home for which he called the Beach House as well as a second smaller home known as the Guest House. Based off assumptions it seems as though the architecture didn't respond to the night sky. He may have had a connection with the water, but there is no evidence of a connection with the night sky.

These structures were for private use until the mid 1990s. The land and buildings were given over to the County of Emmet, who currently owns the property and runs it as a public park. A conservation easement is ensured for the property so as to resist excessive building development and continue to provide a park for public recreation. The Beach and Guest House would be rented out to visitors, house night-sky observational opportunities and other community events.

04.03 – Current Conditions

Recently, the Beach House structure has been demolished, due to deteriorating structural conditions. The site is now an empty basin, surrounded by dense forests and an open vista onto Lake Michigan.

(Fig. 04.03.a)



Fig. 04.03.a

Since recreation and preservation is the principle value of the site, there are a series of interconnected trails dispersed within the

depths of the site. These are non-motorized and seasonal trails to be used all year round. The only motorized road, directly links the main road to the recently demolished Beach House and Guest House. This is a narrow, winding road that weaves in between the dense forest (Fig. 04.03.b).



Fig. 04.03.b



Fig. 04.03.c

05 – Site Analysis

I have started my approach to site analysis by finding the guiding structure of the site, the edge conditions, boundaries, movement systems, corridor paths, etc. Over the summer through multiple visits to the site, I observed the presence of both natural and artificial light and their effects on the site. I also continued to build upon the analysis already done to further deepen my understanding of perception and time within the site. (Fig 05.a)

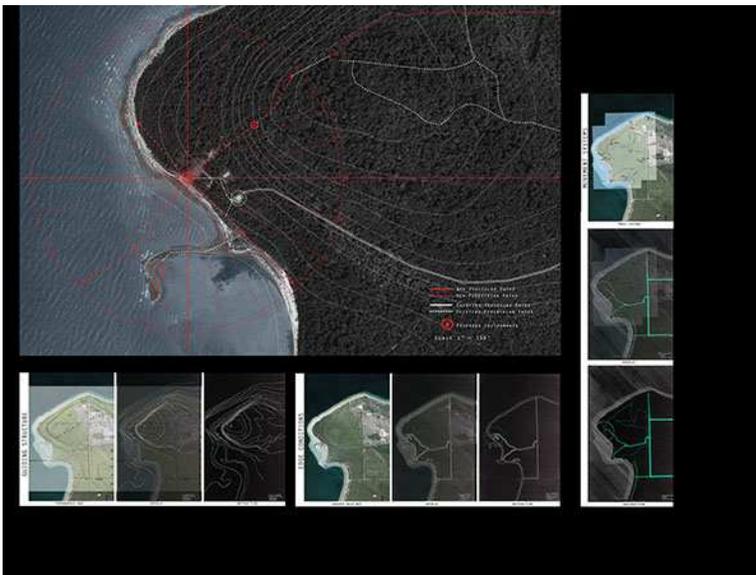


Fig. 05. a

05.01 – Site Visits and Experiences

I had the opportunity to spend a total of three weeks in Northern Michigan this past summer. I not only first-handily experienced the thesis site at the International Dark Sky Park, but I also spent time

elsewhere at my families cottage located 30 miles south. The cottage is located on an inland lake, isolated from major roads, highways, and city lights. To me it is a place of true solitude and wilderness. This is the place where as a child I experienced my first real night and began to learn about night through observation. I have been blessed as a child and now twenty-some year old to have this place to 'escape' to. A place where I can walk out the back door and immediately be immersed in the wilderness. From spending the morning hours hiking through the dense woods amongst the unknown, to spending the afternoon hours boating on the unsalted and clear freshwater of the lake. And finally, once night reveals itself, laying on the end of the dock that is hovered slightly above the water and watching the moon rise up over the eastern tree-lined horizon or watching the stars appear as the night gets darker and more stars begin to reveal themselves. Both places are centered around the water, nature, and the sky, but each site has different experiences, different situations, and different feelings, especially when observing the night sky.

05.02 – The Speculation

Spontaneously one night over the summer while spending a long weekend at the cottage, my mom and I decided to hop in the car to finally experience what this International Dark Sky Park was like at night. As I navigated and she drove, I began to be filled with excitement in anticipation of the unknown of what was to come. I

began to be filled with questions. Would we be the only people there? Would we be able to see where we were walking? Would we get lost? What would we come across? As we continued to drive north, the western horizon had the slightest red, orange hue of the setting sun. I had almost forgotten that it was just the summer solstice the weekend before, so even though it was 11pm the night sky was truly just beginning to get dark.

As we exited off the highway, anticipation built once again. After we exited we turned a sharp right down a county road. The last lights that I saw were those of the small town of Mackinaw City and the corner gas stations lit up sign. As we continued down the road, there were no street lights, only glimpses of light coming from a camping site and cabins located back off the road.

05.03 – The Arrival

As we continued driving a bit farther, I tell my mom to turn right at the bottom of the hill. As we made the turn, somehow this road was even darker than the previous. I tell my mom that we are approaching the entrance into the Dark Sky Park. We slow down and turn in, finally we had made it. The first thing we see is the park's care keeper's home. As we make our way passed, the road becomes even darker. We turn the radio off and roll the windows down a bit to get some fresh night air and to see if we can hear anything. The road is a narrow single lane

winding road embedded within the woods. At this point we definitely think we are the only people at the park.

We are now deep within the woods, surrounded by lush vegetation and only able to see glimpses and peaks of the night sky above through the moon roof of the car. I focus my attention back to the road and begin to notice headlights coming in our direction. Since it's only a single lane road, my mom pulls over to the right to let the car pass. As the car passes I try to catch a glimpse of who is in the car. The light from the dashboard reveals a silhouette of an older man, bundled in a coat and baseball cap. As we get to the last 1/8 of a mile on the road we begin to see more headlights and cars parked along the side of the road.

Much to our surprise, it seems as though we are not the only ones that decided to take a late night drive to the Dark Sky Park. We pass a sign on the left that says Dark Sky Viewing Area Parking, but we continue driving to try and find a more remote area to park. A little ways down we reach the end of the road, and we park around the gravel circle. A few other cars also had the same idea to park where we did.

05.04 – The Exploration

As we turn off the ignition to the car, and get out the headlights slowly dim away. It is now darker than ever before. I felt as though there was a black sheet all around me. I couldn't even see my mom who was standing three feet away from me. That three foot separation between us suddenly becomes more like two inches as we inch closer together

almost colliding. Since we both can't see, we decide to hold on to each other. Our motto was if one goes down, the other goes down with. The black sheet in front of our faces became more transparent as we continued walking and our eyes slowly adjusted.

We are now on what feels and sounds like a grassy open surface where I see my first open view of the night sky. I was in awe at the clarity, vividness and depth of the night sky. As we continue along, we begin to hear whispering voices, some people talking, laughing, etc. All of a sudden we dodge to the right, apparently we had almost stepped on a couple lying on a blanket in the grass gazing at the stars. I guess our eyes had not fully adjusted yet. We laugh it off and continue down the grassy slope, only to notice even more people. It was amazing to see the park occupied and enlivened by such a large group of people at night and enjoying the dark.

As we make our way down along the shoreline, we take a gravel path. It was remarkable how this natural white gravel surface assisted in our way-finding. As we make our way down the path, I am hardly paying attention to the night sky as my eyes are occupied with watching where I am walking and looking at the different groups of people off to the left and right of this path. Some are sitting on the ground, others in chairs, blankets. Some people are simply using the naked-eye and observing the night sky, while others are peering through a telescope or a camera lens.

As we make our way farther down, we see a campfire with people gathered around sitting on benches, standing, talking. This is the only source of light evident on the entire 500 acres of the park. The fire light allows for more detail of the surrounding area and of people faces. I can see people making s'mores, I can hear people laughing, and can even hear a crack of a beer can opening. This International Dark Sky Park isn't just about simply observing the night sky, but also appeared to be about socializing and gathering together under the night sky. As we pass the campfire site, we see flashes of light on the water. Since I had been here previously during the day, I remembered that there was an old pier that had a broken bottom and overgrown with vegetation. I began to realize that those flashes of light were people that were brave enough to venture out onto the overgrown and broken pier at night with their flashlights. I also wanted to take the venture out there, but with only wearing flip-flops, no flash-light in hand, and knowing the things we came across during the day hiking the overgrown pier, my mom was against the idea but agreed to go next time. I had wondered how many people were actually out there. Could have been one or it could have been as many as fifty.

05.05 – The Conversation

As we turned around and began to walk back in the direction of the car, we stopped and noticed how different it was to look at the night sky here than on the end of our dock on the inland lake. With this park

sitting on the shore of Lake Michigan, there appeared to be no end, no tree-lined horizon. The water and the sky seemed to blend as one. The stars and their light reflecting onto the water's surface. The result was not a direct mirror reflection, but more of a subtle glow upon the water. More stars appeared as my eye moved up from the blurred horizon line. I then looked to the south and pointed out the Milky Way to my mom. As we were standing there a man asks if we wanted to take a look at a double star with his telescope, without being able to see who this man was or what he even looked like we started up a conversation. I had asked him about his interest in the night sky and what he was doing all the way up here. He had revealed that he was a practicing lawyer from downstate Michigan and that astronomy was his hobby. He mentioned that he just enjoys going to these dark places and exploring the unknown in the sky. As I took a seat on the small portable bench he had brought with him, I looked through the lens to see what this double star was all about. I was astounded to see that the small dot in the sky I had been looking at with my naked-eye was the image I was seeing now. There was color and hue, shape, and levels of brightness. It was amazing what this instrument could do for my vision and seeing so many light years away. He directed me towards Saturn and Venus and many other things, and at this point I could really tell that this wasn't only a hobby of his, but experiencing darkness had meaning to him.

05.06 – The Departure

With my back towards the water as we were walking back towards the car, I took one last look behind me and at the sky above me. As we made our way back to the cottage, I began to think back on what I had experienced, seen, heard, smelled, and the man that I had talked with. The first thing I observed is that there were different types of people here. There were people alone, with their families, friends, significant others. It wasn't catered to a single group of people. This led to recalling what I had heard. Although I couldn't see people's faces or even tell their ages, I relied on my ears to form perceptions. I could hear English as the primary language, but within the English I had heard, there were different dialects and tones. I was able to point out the Michigan and Wisconsin accents, I also noticed several southern accents, etc. I also heard different languages. Based off the languages there were also people there from Poland, India, and China. I was amazed that this actually was an International Dark Sky Park with people visiting from all over the world to see with their own eyes the night sky. Through this experience of not being able to see people's faces only voices, the lack of visual assumptions allowed for me to trust what I had heard.

There also were several different groups of people that I noticed. The first are those that preferred to be in solitude or isolation while viewing the night sky, whether they were alone or with a group of people. They

were located farthest from the center of the dark sky viewing area. The second were those that were gathered around the center of the campfire, this was the more apparent social setting and gathering place. This was a place where you not only chatted with those that you were with, but also to those beside you. The third group of observers were the adventurers or curious ones. The ones that found themselves walking along the paths or the extra brave ones exploring the abandoned pier. The final group are the ones that wanted to be isolated but in a different way, through the use of an instrument or device. These are the amateur astronomers looking through telescopes or those amateur astro-photographers trying to freeze a moment of celestial phenomena into a single photograph.

06 – Design Approach

What does it mean to re-envision the nightscape? And what elements of the nightscape are to be re-envisioned? I approach the design aspect of this thesis by understanding that I am protecting and exhibiting the most essential element of the nightscape. That essential element I see to be is the star-filled sky. It is a resource that we have come to ignore and can unfortunately no longer see in many areas of the world. Through architecture, how can I provoke and re-instill the poetic act of viewing the night sky? And how will I explore darkness in my design process?

06.01 – Project Scope

“Beauty and mystery: intangible qualities we all know are valuable but don’t always know how to value. The beauty and mystery of night can be brought within reach.”

- Paul Bogard

My vision for this thesis is for it to be a project about awareness. I will explore how architecture can facilitate such an awareness. The night sky cannot be protected and saved by singular and solitary people venturing out into the wilderness, but rather by creating a place where diverse groups and ages of people can visit, stay, live, explore under the night sky. There is a feeling of community gathering together under the night sky. This sense of community is about appreciating together and also separate the dark sky experience.

The human mind is both fascinated and perplexed when trying to make sense of place and where we are. It has the desire to understand, but often times struggles with making sense of it. This is evident in large natural environments to

large scale building projects and in this case the night sky. By creating a series of spaces in the natural environment and within/under/beneath the night sky, the mind and user will better understand our sense of place in the dark sky park and in the universe.

The most raw and primal movement for observing the night sky is the act and motion of tilting your head back and seeing the universe in front of you. This simple movement has transgressed through centuries, but today we often forget what is above us at all times. We forget that the view of the universe is visible to us.

06.01.01 – Scale Introduction

It is important to keep in mind that the park is protected from excessive development. In accordance, a moderate scale project is appropriate, minimizing the destruction of the existing natural habitat. The ecological and natural habitat should play an integral role in the design decisions. The other factor to consider is that of mass. This could either be one device (building) comprised of a series of lenses. It could also be envisioned as a series of individual devices interconnected throughout the site, each with its own individual lens or way of observing. (Continued in Scale Exploration section).

After experiencing the Dark Sky Park and night and understanding how people use it, as well as gaining more insight into light pollution and the night sky I have developed more direction into the scale of this thesis. While I believe that in order to fully tackle the issue of the disappearing

natural resource of dark skies a larger, phased project and movement would need to occur. My thoughts with the thesis is that this would be the first phase of tackling the issue of disappearing dark skies. This is the phase that brings immediate awareness to the issue by creating a place where visitors and locals can observe and see first-hand a true dark sky. While the main subject of the thesis is that of dark skies, architecture will be used to assist and facilitate in bringing about the awareness. The boundaries of architecture and how space is created will be pushed to enhance our awareness of environments like these.

While this is my primary focus with the thesis, I believe that this first phase is part of a larger vision. The next phase would be to create a Dark Sky Community of the immediate surrounding area of the destination town of Mackinaw, with the Dark Sky Park being the nucleus of the community. This will gain even more attention to the issue of disappearing dark skies. This phase would enable others nationwide and worldwide to see how communities and towns still function and grow with decreased levels of light pollution. The third phase would be for this same idea to spread out to more populated urban/suburban areas that most of us are accustomed to and live in. While I don't necessarily envision for Dark Sky Parks to be created in these zones, I do envision that legislature or even individuals, homes, businesses, and cities to decrease the way they light up the night. It's not the vision to eliminate light, rather to be aware and understand how to light the night correctly. While this domino effect may be a large vision,

it is a vision that is completely attainable and would have immediate results of how we experience the night sky.

06.01.02 – A Destination

This place will serve as a destination point for visitors. It is a protected place that serves as a refuge from the effects of light pollution. It serves as an escape from the light polluted nodes from which we inhabit on a daily basis. It serves as a catalyst for returning to the poetic aspect of viewing the night sky. While this will serve as a destination point, the journey doesn't end upon arrival, rather the journey of experiencing the changing night sky dominates. Is this only a place for night sky viewing? No, while the main feature of this destination place is the anticipation of night, the cyclic phenomena of day into night is also to be experienced and amplified by the architecture created.

06.01.03 – A Mindset

This place will require or rather transform one's mindset and perception of darkness. The curiosity and day-dreaming quality of night sky viewing should be re-instilled within this place through the architecture and act of observing. In order to do this, the architecture will focus one's attention back up towards the sky. The building will act as the device and apparatus, comprised of a series of lenses, receivers and filters. I will explore how you can architexturalize certain objects used when viewing the night sky. These objects range from blankets, to chairs, campfires, telescopes, etc.

06.02 – Scale Explorations

The other factor to consider is that of mass in correlation with scale. There are five possible options to consider. Three of the options pertain to the local scale of the site, while the other two propose a more regional and global approach.

06.02.01 – Global Scale

First, is the global approach to scale. International Dark Sky Parks are highly valued designated areas that share a global existence. When I began my thesis research there were thirteen of these parks around the world, within the course of three months over this past semester two more Dark Sky Parks have been designated. This proves that awareness and concern is continuously growing. With this growing global perception of preserving dark skies, the scale of my thesis has the possibility to take a more global scale. The intervention, which began at one of the Dark Sky Parks in Michigan, could become a prototype or process that gets repeated and revised to the specific conditions at each park. While this probably will not be the approach to scale I choose, it is important to keep in mind that this intervention in Northern Michigan is already connected to a much broader global movement of perception.

06.02.02 – Regional Scale

A regional scale is the next possible approach to take. The regional scale involves looking at the coast of Lake Michigan in Northern Michigan. The coastline is an important aspect to the thesis and chosen site. But what happens if I broaden the lens of the site? What is the coastline and land

like across the bay to the south and west? What is the coastline and land like across the Straits of Mackinaw to the North? How does light trespass in those surrounding areas affect our perceptions of what we see and experience in the Dark Sky Park? While further investigation and research reveals that the areas to the south and west across the bay are also protected dark sky preserves, the area directly north and east is still unclear.

What is important to take away from this approach to an intervention are the regional influences to be learned from. Similar to the global approach, this regional approach could involve the intervention along the entire visible coastline. How can/is the night sky perceived across the bay to the west, across the Straits to the north? While I also do not see this being the approach to scale I choose, it is important to keep in mind both the physical and visual extents and influences of the site.

06.02.03 – Local Scale: 1

The next three approaches are more at the local level of the chosen site. The first is the idea of focusing on an intervention only in the designated dark sky viewing area. This is an area that is focused near the shoreline. Taking this approach has the opportunity to really focus on the intersection of water and land in correlation with its influences on our perceptions of phenomena. This option also would probably involve the least site disturbance, since the designated viewing area is already a primarily cleared lot of land. Although this approach to scale involves several pros,

the level of approach also proposes a few cons. Choosing such a hyper-focused area may limit the potential the rest of the park may have to offer in terms of perception of phenomena. Another con about choosing this approach is that it maybe poses a missed opportunity involving approach and creating an armature through the park. While the level of focus may help with exploring perception and phenomena in greater detail, it also may hinder the possibilities elsewhere on site.

06.02.04 – Local Scale: 2

The fourth option is the idea of looking at the entire park and placing interventions at designated points throughout. This idea decentralizes a specific area of focus and spreads the interventions out across the landscape. What this enables is a broader depth of possibilities. This also enables a type of inevitable interaction between user groups in the park. Placing interventions along the trail systems requires an interaction between users specifically there for the Dark Sky Park and those that are there only for the walking/hiking/biking trails. The cons to this approach are that the range of possibilities and conditions may be too broad.

Understanding phenomena may require that level of focus that this option does not allow. The other con to this site is that a lack of hierarchy seems to be absent. How would one be aware that there are a series of these across the park? Another con would be that the complete understanding of perception may not be understood unless the observer visited every

single intervention across the site. This option seems to feel too prescribed and lacking clarity.

06.02.05 – Local Scale: 3

The fifth and final option is a combination between the last two approaches. Where one option maybe provided too much focus and the other provided a lack of sequence, clarity, and hierarchy, this option takes the best of what the other two have to offer to create a scheme. This final option would be based off a hierarchy of perceptions. The option combines the area of the designated dark sky viewing area as the primary focus of intervention, with a select few secondary interventions elsewhere in the park. These secondary interventions could correlate with approach and arrival. The primary intervention(s) at the designated dark sky viewing area would act as the center or climax of the intervention. The cons to this option may be that it still is too broad even with hierarchy. Another con is that this may require more site disturbance in that it could possibly involve an intervention in an area unsuited for it. I think this is one of the stronger approaches to scale that involves an investigation of the layers of perception proposed throughout the park.

06.03 – Program Exploration Through Lenses

There are three possible programmatic dimensions of the design. The first dimension is that of time. This will be a place to observe the night sky, but will also become a place to watch this dimension of time and its reaction with architecture and the built environment. The second dimension is landscape. Landscape elements of the site will

contribute to the act of observing and the passage of time. The third dimension is that of a possible virtual dimension. Does this element of technology begin to sensitively creep its way into the project, furthering the observers understanding of the real-time effects of the disappearance of dark skies? While this third virtual dimension has been the least explored, it may begin to play off the principle of perception.

The above statements were my initial thoughts on how to approach program, but after developing my research and the understanding of my thesis I realized I needed to approach program through a series of lenses, knowing that the purpose of this thesis lends itself to observation of phenomena. I have laid out three lenses. Each lens represents a different perspective of observing and dealing with phenomena. Each lens also provides a different user involvement and spatial typology. My objectives are for these lenses to each eventually filter down to providing a program based on each set of parameters and influences the lens provides.

06.03.01 – Mythological + Narrative Lens

The first lens I have identified as ‘Mythological’. This lens can be described as the story-telling aspect of observing the night sky. This lens provides a knowledge about the constellations and their mythology.

Throughout history, humans have associated patterns and images in the sky with mythological figures and symbols. These patterns and images are gatherings of stars in what we call constellations.

Perception is the next category to analyze with this lens. Depth perception is flattened with this lens. The lens flattens the night sky into a single flat

canvas, where all stars appear at the same plane or on the same surface. The only differentiation between stars is seen by a brightness factor and on occasion a color factor. In reality the night sky is a three dimensional canvas, with depth, shape, and hierarchy. This lens as noted above involves observing the celestial phenomena with the naked-eye and through story-telling and constellations.

It is now important to consider the user group of this lens. This lens cannot simply be understood by the observer alone, some outside source of knowledge is needed in order to know the stories and in order to draw the imaginary line of the constellation out of the 6,000 visible stars in our sky. Due to the aspect of story-telling, this lens involves a gathering or group of people huddled around a central figure, whether that be the leader (storyteller) or a piece of information. There is a communal aspect to understanding and observing the celestial phenomena through this lens.

This then led me to connecting this lens to a disciplinary discourse. I began connecting the act of gathering and story-telling to the sociology of community and how we as humans create nodes of interaction with one another. We do this in order to learn from one another.

The other parameter to consider through this lens is the spatial typology that seems to form based off the previous parameters. When I think of a group of people (big or small) gathered around listening and observing something or someone else I think of an amphitheater or Greek theater.

The semi-circular form enables the act of gathering, centers its focus, and opens up to above.

After visiting the Dark Sky Park this summer, I began to notice a direct correlation between this lens and the group of people centered around the nucleus of the Dark Sky Park, the campfire area. The act of gathering together as a community, eating, drinking, talking, and laughing underneath the night sky was clearly evident.

06.03.02 – Scientific + Instrumental Lens

The second lens to look through is what I am calling the scientific lens. This lens can be used to gather quantitative knowledge through the use of technology. The scientific lens aims to understand the celestial phenomena through a precise lens and cone of vision. For example, the use of a telescope creates a small, yet precise and focused field of view. The telescope captures light from a distant object and brings it to a focus for the observer to see in greater detail. Another example are space-radars and satellites. These technologies gather information that is invisible to the human eye or ear and relay it through a magnified lens back to the observer.

This leads into the next category of perception. Where the mythological lens flattened the depth of perception by only creating a surface, the scientific lens revives the depth in perception and creates a multi-dimensional view and experience. The lens provides knowledge in understanding that the night sky and celestial phenomena isn't just a flat

canvas, rather it is dimensional and “spatial”. This lens also eliminates the opportunity for personal interpretation of experience and observations, as the information received through the lens are given facts and data.

It is now important to understand the user group involved with this lens.

User involvement involves only one user, that being the observer in correlation with the “machine” (telescope, radar, etc). This lens calls for an isolation from one’s surroundings and funneling out of any

unnecessary information. The path of focus between the observer’s eye and the celestial phenomena are the only influences of perception.

The disciplinary discourse that is applicable to this type of lens is digital morphogenesis. Digital morphogenesis is the process of shape development enabled through computation. I find a similarity between using telescopes, radar, and satellite to generate information with using technology and the computer to generate information and form. In both cases, what is being perceived is driven by computation and technology.

The other parameter to consider through this lens is the spatial typology that seems to form based off the previous parameters. The observer’s reliance on only the subject matter and the machine leads to a sense of introversion. The sense of isolation and introversion thus requires a form or space that is remote, inverted, or enclosed.

After my visit at the Dark Sky Park this summer, I found another correlation between this lens and the individuals scattered along the

shoreline with their telescopes and cameras. This lens and user group began to be associated with the man and his telescope I had come across as I was about to leave the Dark Sky Park. The man whose face that I could not see, but with my ears and his voice had to trust. This man, like several others along the shoreline, was isolating himself with his device and the sky. Although as experienced, every once in a while this user group branches out to converse with others and share their discoveries and insights.

06.03.03 – Situational + Circumstantial Lens

The third lens to look through is what I am calling the situational lens. This lens enables the observer to understand that each instance and each observation is different. This lens enables the observer(s) to measure and compare two or more observations. For example, the observer may go back to the exact same spot at the exact same time the following night, but experiences something different. Whether that difference is as simple as a cool breeze against the face or something greater like the appearance of the aurora borealis against the dark sky. This lens understands, accepts, and encourages the situational awareness of each experience and observation. Depth of perception is reinstated with this lens and contextual awareness contributes to the understanding of the phenomena around us.

The disciplinary discourse that is applicable to this type of lens is “Genius

Loci” and “Phenomenology”. This discourse pervades this lens through the understanding of spirit of place and the idea of self-reflection in that place or distinct atmosphere. This lens allows for the user to observe the celestial phenomena and understand that humans are part of a larger system that is sometimes unreachable or unattainable. This lens focuses on the poetics of inhabiting a space and the poetics of observing phenomena.

The user group is not limited to only the user themselves or a group of people. Rather the focus is on the individuals experience of place, whether that is our perception influenced by other people observing or by the factors of the site. The other parameter to consider through this lens is the spatial typology that forms through this lens. This is the lens that seems to be less prescribed and more difficult to give a type of space, because it relies on variation and the situation of each observation and experience.

This lens may require a combination of the other two spatial typologies or it may require some new spatial typology that has yet to be identified.

Reflecting on my visits to the Dark Sky Park this summer, I again found a correlation with this lens. The user group associated with this lens that I observed were the adventurers and the explorers. The one’s that wanted to push boundaries of where they could see the night sky. Also this user group were the one’s, like myself, that were walking along the paths and observing not only the night sky, but the environment around them (fig.06.03.03.a).

07 – Design Approach – Final

For the final design approach, I carefully recognized and analyzed three significant thresholds within the site itself. These thresholds then led to the development of the instruments themselves.

07.01 – Site Approach

This section will provide greater detail into the three site thresholds. The overall site plan approach will also be discussed.

07.01.01 – Threshold Identifications

The first site threshold is the land/water threshold. This threshold is where the water jetty is located. The water jetty is a thin strip of land that extends into Lake Michigan. At the end of the jetty is an old abandoned pier. This is a significant threshold condition that contributes to the uniqueness of the park. This threshold allows for users and observers to “walk onto the water” without actually being in the water itself. When standing on the jetty and looking up at the night sky, the observer is surrounded on all sides by water. This threshold triggered the idea of placing an instrument out on/within/above the water.

The second site threshold is the lawn threshold. This threshold is close to the shoreline, but extends up through part of the site. It is an open grassy, lawn area that is surrounded on three sides by a pine forest. The open end of the lawn provides a vista down to the shoreline and out on the water. This threshold also consists of a gentle slope from the top down to the shore. This threshold frames the observer’s view of the sky. The

dense forest around it also contributes and adds the darkness of the threshold. It is also important to note the history of this portion of the site. This threshold has seen considerable “rifting” by humans and nature since the time of its conception. This is the area where the previous building was located and since then the ground plane has been dug into, built up, dug into again, and finally flattened out. This “rift” has occurred by humans during construction, deconstruction, and reconstruction. The site threshold condition is also prone to snow drifts and ice build up. Since it is an open field condition, it contributes to the winds that come off Lake Michigan. During the colder months, this wind in combination with precipitation creates small snow ridges and rifts on the landscape.

The third site threshold is the ridge threshold. The ridge is one of the most significant edge conditions as well as guiding structures within the site. The ridge not only contributes to the darkness on the site by providing height and a backdrop to the back of the site, but it also acts as a shield to the light trespass of the neighboring tourist town of Mackinaw City. The ridge is also unique in that it divides two different ecological systems. The upper section of the ridge is composed of hardwoods, trees that lose their canopies during the colder months. The lower section of the ridge is composed of softwoods, trees that maintain their dense canopies throughout the year. This lower ecological system contributes to the darkness of the site.

07.01.02 – Constellation Paths

The overall site plan is composed of thesis site thresholds, as well as the instruments that occupy them. Although the thresholds and instruments act individually, it was important to me to think of how the site works as a whole and how the instruments could be connected by trails, paths, and a visual axis. The existing park consists of a series of trails for non-motorized sports. Using the existing infrastructure of the trails, I then extended, shortened, re-directed, and added new paths. The idea of constellations was then integrated into the planning, placement, and connections of all the instruments. Constellations are identifiable and navigational stories and images in the sky. In the past they were used to help navigate the seas and land during the age of exploration. They were also used to tell stories of myths. So, how can this important aspect of the celestial sphere be integrated into our experience of these instruments and thresholds? Can the constellations be a reflection of the sky onto the land that we walk and explore?

I have chosen to incorporate two constellations into the spatial experience and planning of the instruments. The first constellation is 'Aquarius'. This constellation is experienced on the water/land/jetty threshold, due to its connection to water. The main instrument that lies within this constellation is the occupiable water lock. Each star within the constellation represents a node/bench/guiding light/instrument. The invisible lines in which we use to connect the stars to each other is

represented by the path itself. This constellation experience allows us to physically connect to the idea and story behind the constellation. The experience also allows us to physically occupy the constellation representation on the land. The second constellation that I have chosen to incorporate is 'Cygnus'. This constellation is both visually and physically experienced on the water, land, and ridge. This specific constellation was chosen for two reasons. The first reason is that it contains one of the brightest stars in the sky. The second reason is that it is one of the most recognizable constellations in the sky to humans. For these reasons, I have placed the remainder instruments within this constellation. A significant aspect of this constellation is the straight axis that composes 50% of the constellation. This axis is both a physical and visual access within my interpretation. From the top of the ridge threshold and tower[scope] instrument, the observer can visually see this axis and can connect each instrument to each other. The other instruments that lie on this axis include the surface[chronometer] and the camera obscura, which is located out on the water. (fig. 07.02.a)

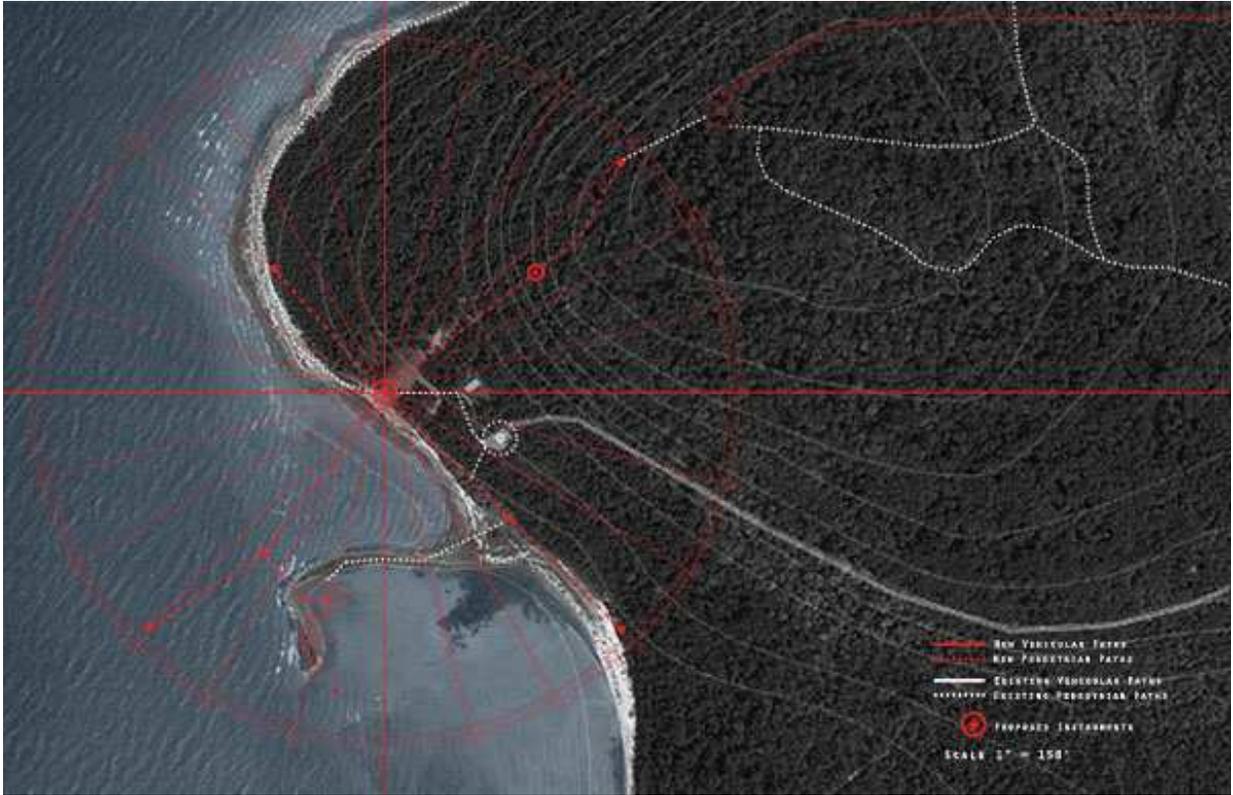


Fig. 07.01.02.a

07.02 – Instruments

The conception of the instruments are derived from the identification and analysis of the site thresholds. Each site threshold allows for a different experience of the night sky and darkness. These experiences range from a vertical experience up in the sky, to an experience within the depths of the water looking up into the sky. While I have created four different instruments, I have chosen to focus on two main instruments: the Surface [Chronometer] and the Tower [Scope].

07.02.01 – Camera Obscura

The first instrument is the creation of a camera obscura. The camera obscura is located on the water. The purpose of the camera obscura is to create an inward experience of the night sky and phenomena. A camera

obscura provides a distorted image of the night sky in which we might see with our naked-eye. The instrument is an occupiable box that displays an inverted image of the outside onto one of the interior walls of the box. The image or “light” enters through a small pinhole on the opposite side of where the image appears. So, how does this pertain to observing and experiencing the night sky? This instrument allows the user to observe the night sky in a visually and experientially different way. It also allows for interpretation, as things are not direct translations or representations, rather it becomes about a distortion to understand the essence of the night sky. So what is the image that is being distorted? This can be anything from the Northern Lights, to starlight, moonlight, or simply the ripple of the water’s surface. This instrument allows the observer to experience the temporariness of celestial phenomena as well as atmospheric phenomena.

07.02.02 – Water Locks

This second instrument is an occupiable water lock instrument. This instrument allows for the observer to ‘feel’ the depths of the water while viewing up through the instrument to the open sky. This instrument originates from the regional construction of shipping locks in the region. Shipping locks allow for boats and carriers to navigate through waterways that are at different depths. This idea of raising and lowering into and to the water’s surface is an experience that has the potential to create a deeper connection with the cosmos. A series of standing and sitting

platforms would be placed within the locks to allow for specific places to be stationary and view up through the water and to the night sky.

07.02.03 – Surface [Chronometer]

The third instrument is what is called a Surface [Chronometer]. This instrument is placed within the lawn threshold. This instrument originates from the idea of a blanket. A blanket is an object/material that people lie under/on/within/above when viewing the night sky. How can we ‘architexturalize’ the idea of a blanket? How can this become the instrument itself? These were questions that triggered the conception of the Surface [Chronometer] (fig. 07.02.03.a)

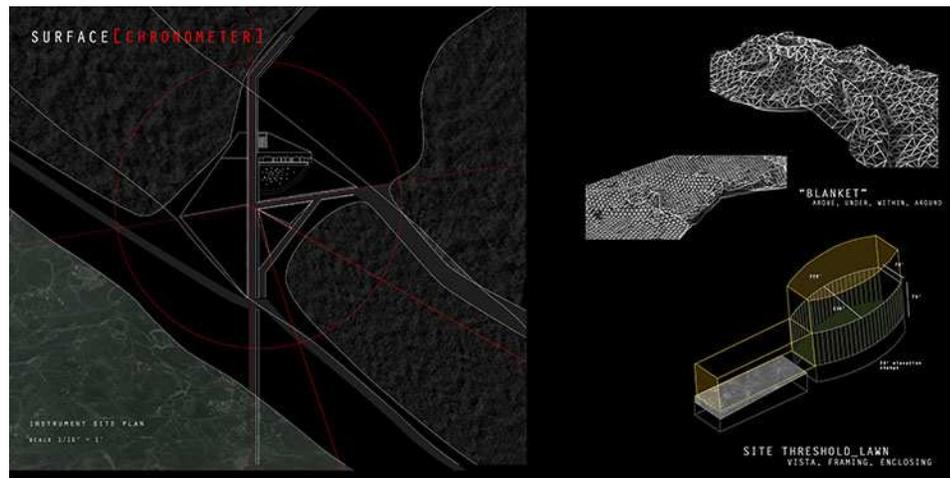


Fig. 07.02.03.a

The idea of the blanket then evolved into the idea of the re-alignment of our body to view the night sky and experience darkness. For this instrument, I explored the different positions from lying completely flat on

our backs, to slightly reclined, to a chair position, to standing against an angled wall, to standing straight up. The architecture and landscape that supports these positions direct our views to certain celestial events/places/phenomena within the sky.

The composition of the instrument itself resembles a 'rift' in the landscape. It is composed of different surfaces/placed at different angles that are associated with the rotation of the earth. For example, the earth rotates 15 degrees every hour. For one of the surfaces, it is angled 30 degree. Therefore, if a person were to sit there for two hours that user would be able to see the 'sky rotate' and change positions 30 degrees. The entire form is generated by the North Star. The North Star is the one constant star in the sky. It stays in the same position throughout the night and all year. Therefore, the instrument is 'sliced' in half with a ramp that is directed in the north-south axis. This can be seen through the below perspective (Fig.07.02.03.b)



Fig. 07.02.03.b

This instrument allows for people to interact with all of its surfaces. Going back to the idea of the blanket, it allows for exterior spaces to occur above, below, next to, within. It also allows for enclosed interior spaces to occur beneath surfaces. These interior spaces frame views from below, but can also be used during the daytime hours when sunlight penetrates the apertures and openings, creating shadows and patterns on the interior (fig. 07.02.03.c).



Fig. 07.02.03.c

Before arriving at this final design, the instrument went through a series of filters and iterations. I developed a matrix taxonomy that began to test and categorize different ways to approach form, circulation, tectonics, ways of observations, etc. The image below illustrates this process (fig.

07.02.03.d)

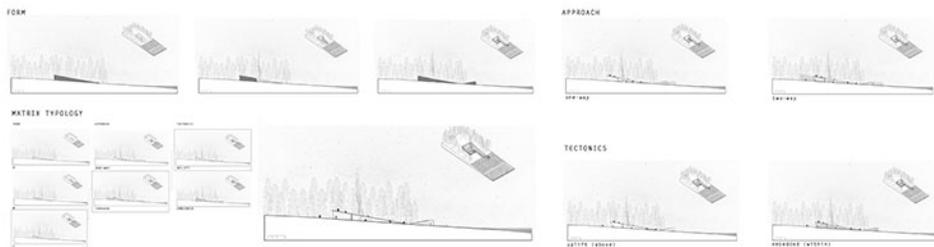


Fig. 07.02.03.d

07.02.04 – Tower [Scope]

The Tower [Scope] is the fourth and final instrument. This was the second instrument that I chose to focus on and develop. This instrument occupies the ridge threshold and lies right between the two ecological systems. This instrument allows for a vertical experience of observing the night sky and darkness. The instrument digs deep into the earth and reaches high up into the sky. The architecture of the instrument breaks down our understanding of the night sky and our place in the universe. Apertures, platforms, and circulation allow for more focused, smaller views of the night sky. The climax at the top allows for an unobstructed view of the sky/site/region. This instrument was inspired by the idea of a tree. Not by the way a tree looks, but by what it does and how it acts (fig.07.02.04.a).

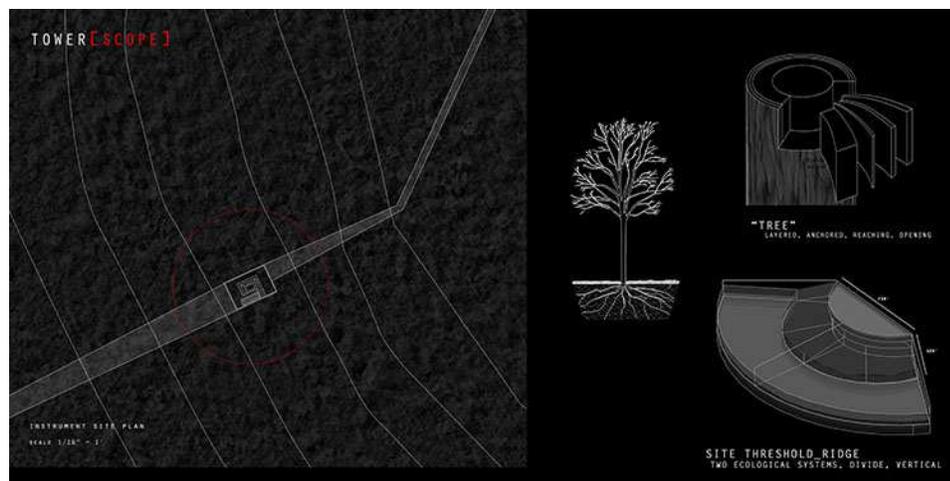


Fig. 07.02.04.a

For example, a tree's canopy unfolds and folds through the seasons, its canopy changes color over time, its roots anchor it to the ground, and the layers of the trunk allow for nutrients and water to filter through it. These

actions were then translated into the architecture of the tower. The design of a water well penetrates the interior of the tower, but also digs deep into the earth as can be seen in the image below (fig.07.02.04.b).

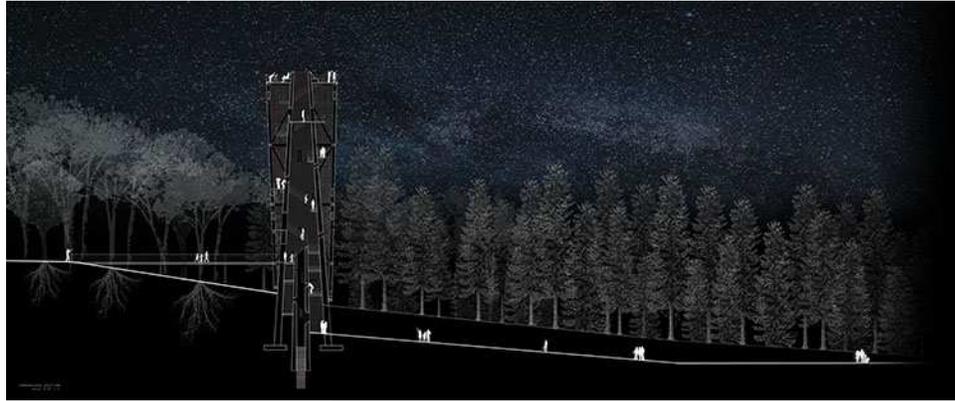


Fig. 07.02.04.b

The night sky would then be reflected off the water's surface deep in the earth. The core of the tower is composed of a concrete, load-bearing structure with an 'oculus' at the top. The outside shell is composed of perforated copper panels. As copper changes over time, the green patina will reflect the green of the surrounding landscape. The structural concept of this tower is that as the observer moves away from the center, the structure becomes more transparent and open to the surroundings. It is also important to note that apertures are created through each of these structural layers. The idea is that the observer moves in and out and is able to occupy each layer. After a series of directed views to the night sky, the observer makes their final approach up the final flight of stairs to the observation deck of the tower. This deck provides an unobstructed view and is the climatic experiential point of the instrument (fig. 07.02.04.c)



Fig. 07.02.04.c

Before arriving at this final design, the instrument went through a series of filters and iterations similar to the previous instrument. I developed a matrix taxonomy that began to test and categorize different ways to approach form, circulation, tectonics, ways of observations, etc. The images below illustrates this process (fig. 07.02.04.d) and (fig. 07.02.04.e)

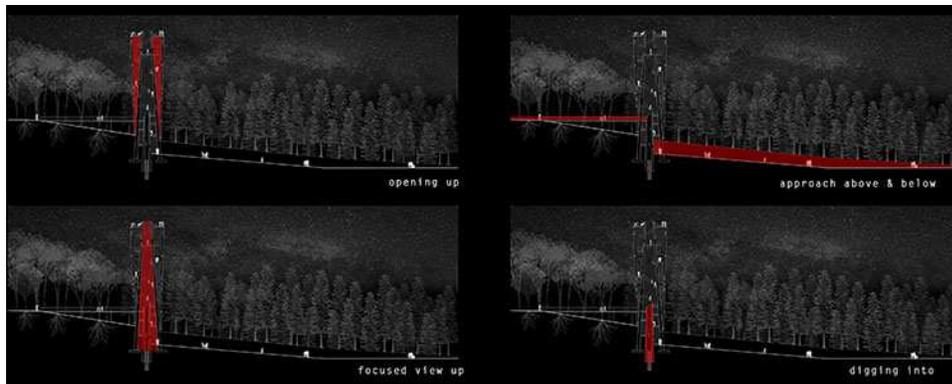


Fig. 07.02.04.d

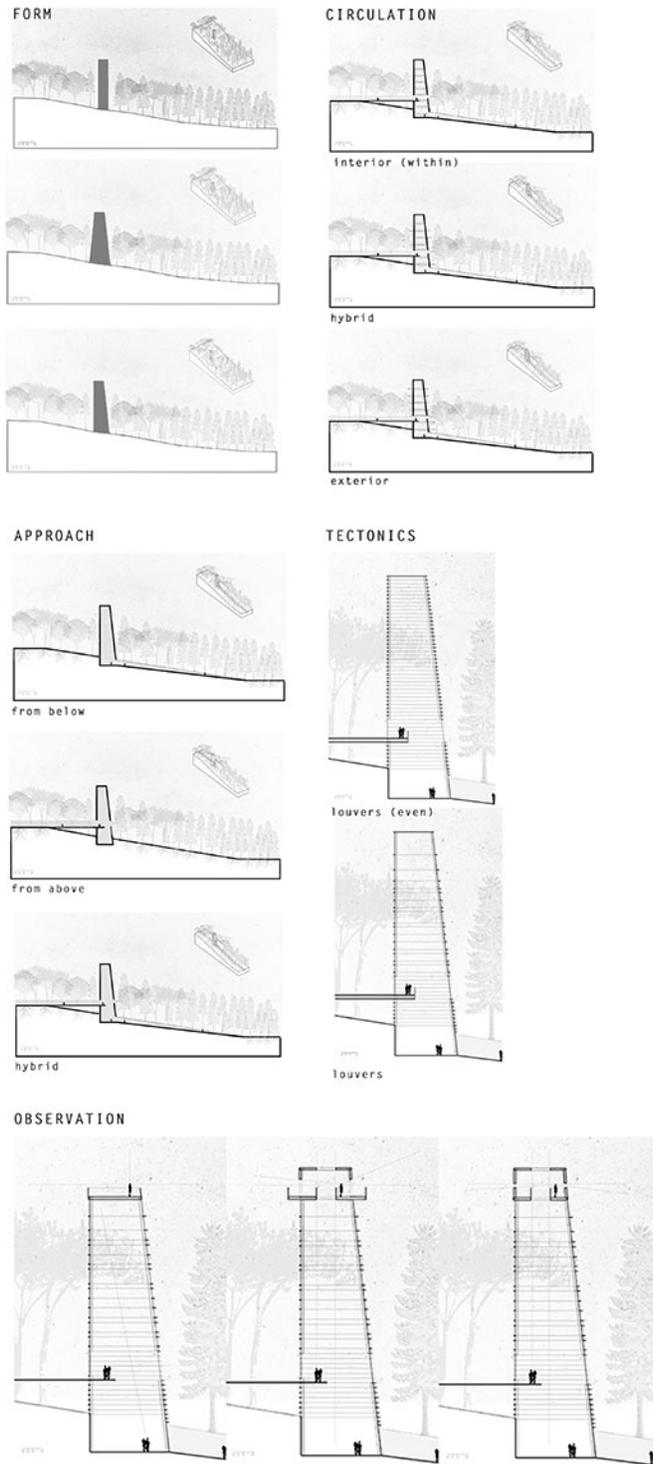


Fig. 07.02.04.e

08 – Conclusion

In conclusion, this thesis project explores the inherent human connection to the night sky and darkness by using architecture as the lens and device for understanding the synchronicity between phenomena, perception, and time. There are two questions that I have explored throughout this process. The first is why does architecture need to play a role in experiencing the night sky and darkness. The second is how does architecture play a role in experiencing the night sky and darkness. Architecture assists in our understanding of the night sky by acting a medium and creating a platform for understanding the night sky. It not only provides these characteristics, but architecture also enhances and reflects our understanding and perception of the night sky. Finally, how does architecture do this. Through my design research and analysis, I have discovered that by looking closely at the site conditions and thresholds in correlation with an architectural object/instrument, that this would provide a tool for better understanding our view and connection to the night sky and darkness.

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