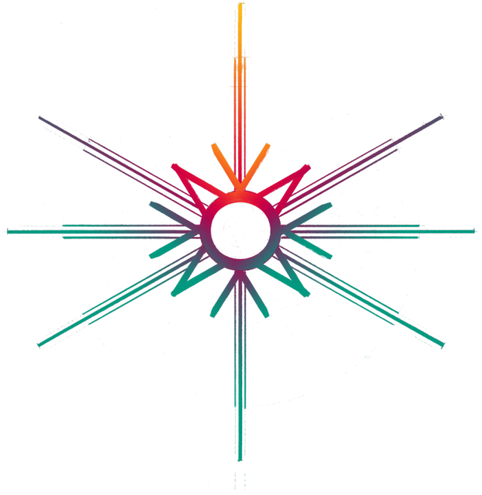

Reveries of a walk:
Architectonics and an Attunement to Nature

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Architectonics and an Attunement to Nature

By: Aeric Gunnels

Thesis submitted to the faculty of the
Virginia Polytechnic Institute and State
University in partial fulfillment of the
requirements for the degree of
Master of Architecture

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May 8th, 2018
Blacksburg,
Virginia

Keywords: Organic architec-
ture, Biomimicry, Dendriform,
Telluric, Rammed earth

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Aeric Gunnels

ABSTRACT

Architecture has been primarily ocularcentric for the last century. This thesis proposes a more sensible approach to architecture. A multisensory experience that gives the user a deeper response to the building. Architecture can activate and engage multiple senses through the revelation of nature such as: wind, light, and shadow.

Architecture has the power to reveal the essence of nature and natural phenomena. It can also become a catalyst to help us understand nature and attain a deeper connection with it and ourselves. Through derived forms and attention to details, architects can capture the essence of nature without direct imitation.

Architecture has always had the power to reveal. The architect must choose what is revealed. This thesis is an exploration into the idea of architecture as a revelation of nature in a specific climate, location, and context to allow the user to become more attuned to nature. Architecture can allow the users to explore and discover nature in a way that was previously ignored or overlooked, or perhaps it can reveal a phenomenon for the first time.

Architecture can reveal nature through: orientation, material choices, form, function, openings, details, and spacing. Allowing natural phenomena to be a part of the design process creates a building attuned to nature. These revelations can occur with careful consideration to components, conditions, and details such as: wind, light, shadow, and structure. In order to achieve these, special consideration must be give to the tectonic and stereotomic construction.

Dedication:

This Thesis is dedicated to my mother and father who have helped me follow my dreams and have always been supportive. To my grandparents for being supportive, kind, and loving. To my Fiancé for always cheering me up, encouraging me, and

Acknowledgments:

To Jim, Kevin, and Scott for advising me and imparting wisdom that I will carry with me throughout my career. Thank you for allowing me to explore my ideas and philosophies of architecture.

To my studio friends for encouraging me, being friendly, and supporting me, special thanks to studio D.

To Brian Morgen and Shubham Chuhadia for their support and for their sympathy in bearing this burden.

To all the print lab faculty and staff.

Table of Contents

I followed a road to the hills of the Appalachian mountains and there I found a small plot of land, quiet and serene. As soon as I arrived, I felt as though something was watching me. I climbed to the top of a small hill and turned to find a perfect view of the mountains. It was a monumental presence and it overshadowed me.

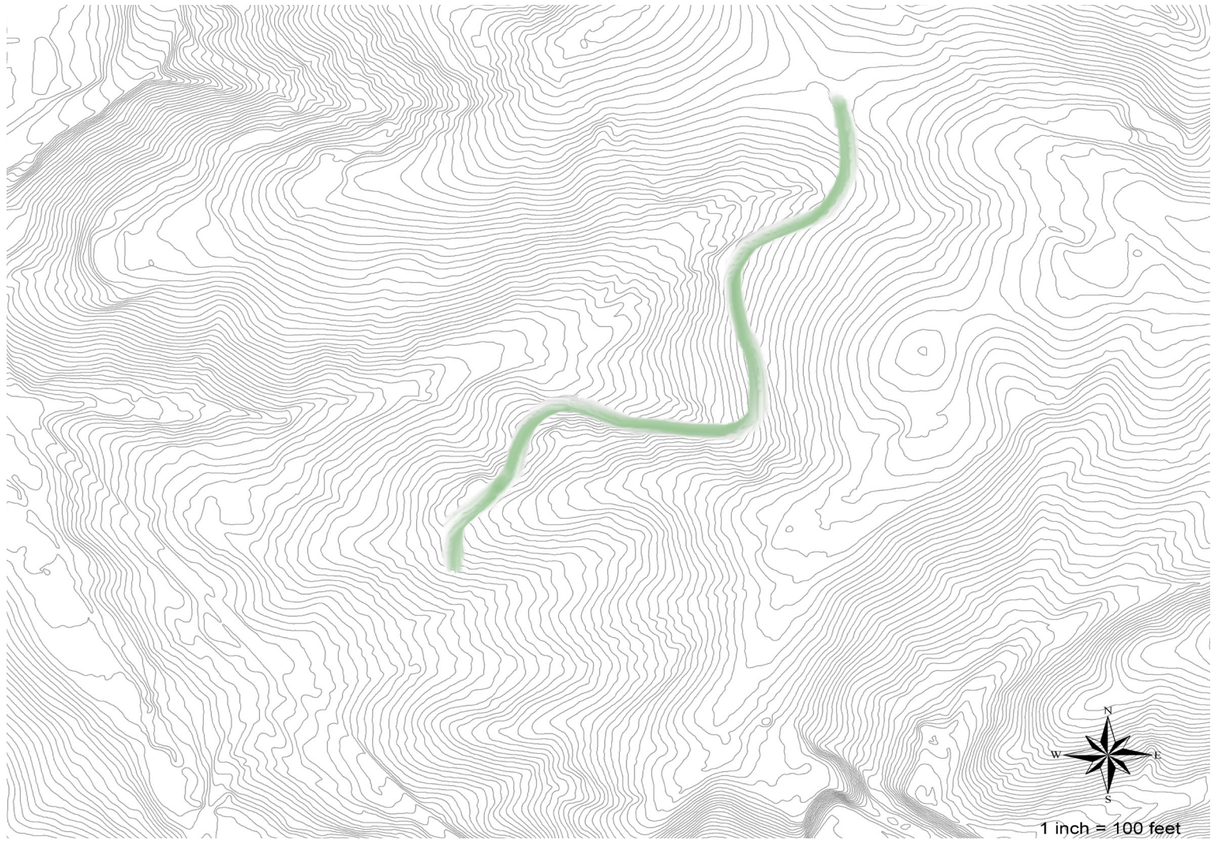
I walked through the meadow where the grass and weeds stood just tall enough to gently brush my hand, as if they were reaching for me. As I continued through the shallow sloping hills, I found an outcropping of rocks protruding from the hill. There the rocks sat settled and stoic in the hill with dreams of transcending their earthly roots and soaring into the sky. After all, every rock aspires to become a mountain. I knelt and considered the rock. What I saw were muted colors, stratification, shadows, an impenetrable, and enduring essence. My thoughts soon began to compare the rocks to the soil that enveloped them and a revelation occurred to me about how they were only disassociated by time.

I wandered into a grove of trees near the middle of the plot where I took refuge from the wind at the base of one of the trees. I admired the verticality of the trunk, the spread and intertwining of the branches, and the exquisite nature of the tree itself. The autumn sun warmed my face as the mystical light seemed to descend gracefully through the canopy.

I heard a faint buzzing and popping noise in the distance. I followed the sound and noticed a wasp nest. Curiosity surrounded me regarding its structure and growth. An apparent logic of a higher, divine order and geometry were present. Study revealed nature's dedication to the hexagon.

As the sun began to retreat behind the mountains, I found myself back where I had begun this journey. I climbed the small hill where I had seen the mountains and watched the sunset. For what was just a moment, it seemed as though I existed outside of time as none seemed to have passed. This moment consumed me and became the singular focus of my being. I felt at peace as if everything around me was in attunement. A divine thread that was woven in a pattern that connected the sun that warmed my face to the soil beneath my feet. As the sun imperceptibly sank behind the mountains and renounced the day, it was leaving behind a painting in flux that was suitable only for God - too sublime for man. I thought of how this day would never come again and how my experience could never be replicated, for all nature is temporal and in eternal flux. The paradoxical similitude of the temporal and the eternal. Lost in the reverie of my journey I thought, "This, this is architecture." To emulate the divine and all that is Godly. To seek out what is perfect and from it derive a man made form.

This thesis is an architectural exploration into the conditions and discoveries of that journey.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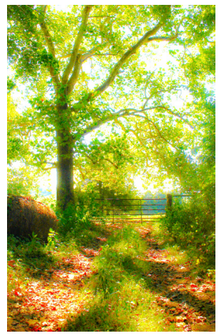
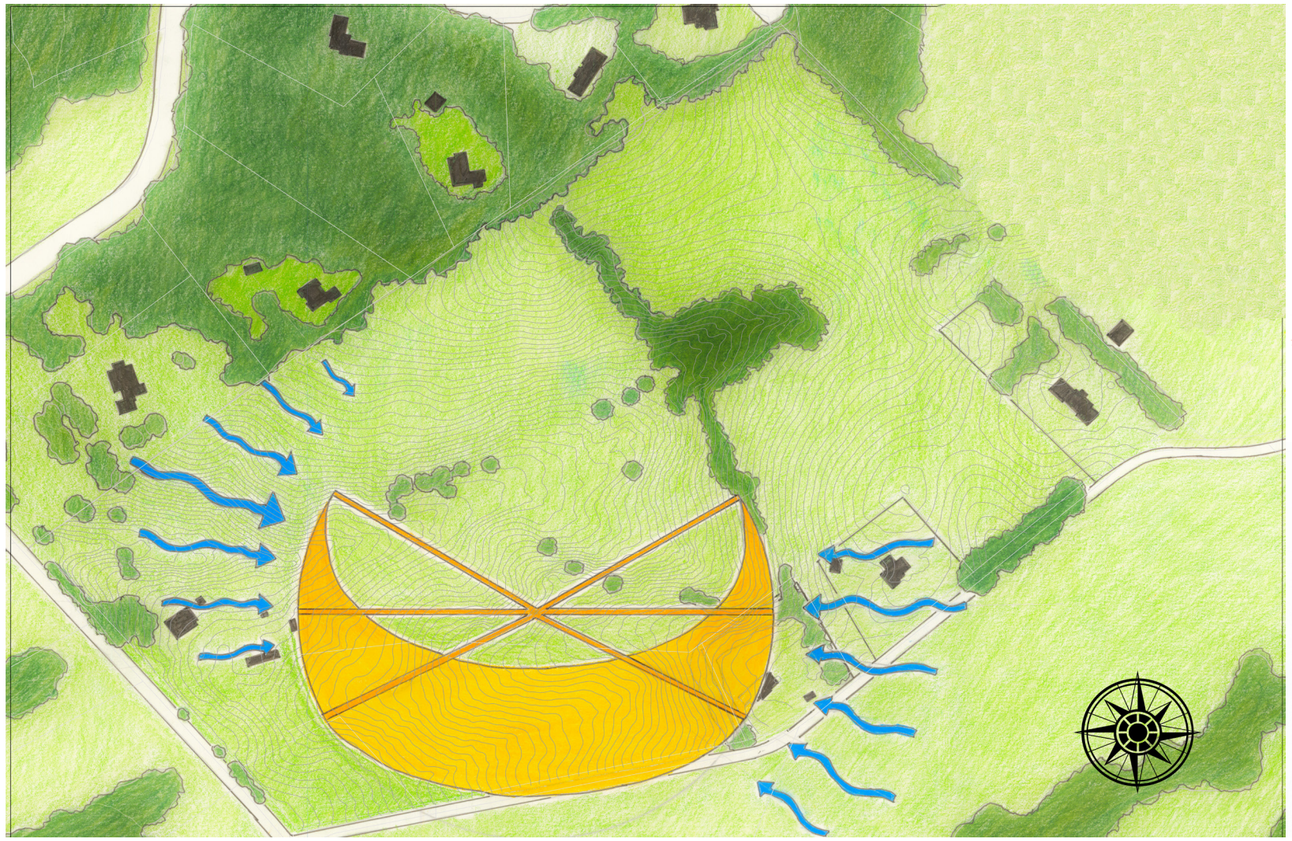
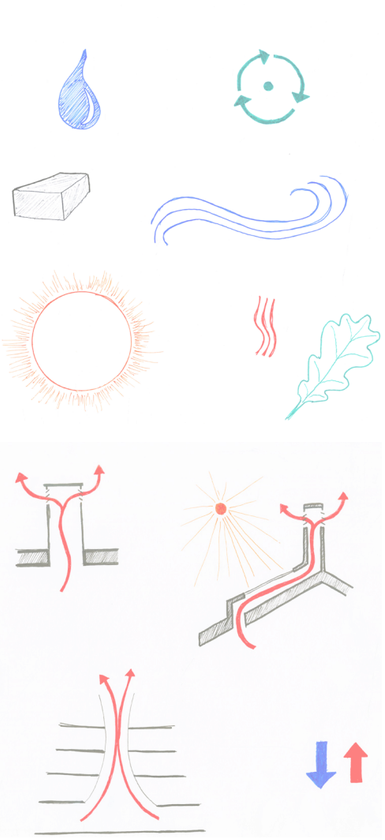
1 inch = 100 feet



Climate Analysis

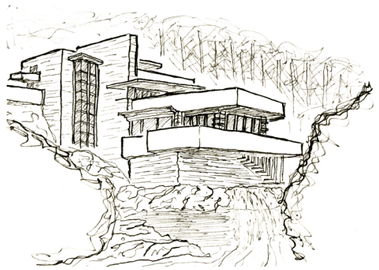


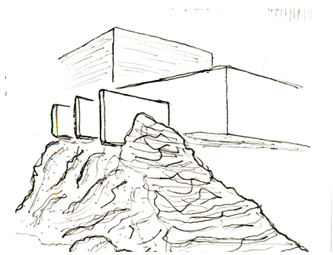


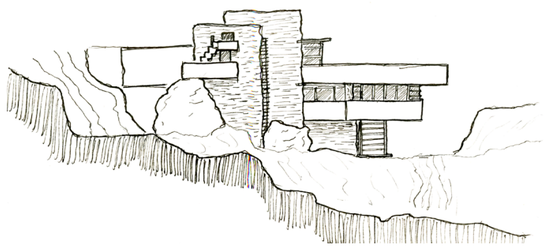
The idea of this project was to take advantage of natural phenomenon, to reveal nature, and to mitigate energy consumption. The project began by using data gathered from climate consultant, local weather patterns, and ArcGIS. These tools informed me on the climatic context of the site such as: temperature, wind speed and direction, earth berming potential, and the sun path. It also gave a basis for length, height, and building orientation. The walls were given several large doors to allow cross ventilation, and the chimney has two built in vertical chases to allow for stack ventilation. The sun path was analyzed to allow the building to face the sunset. Three windows were designed with these angles to frame the solstices and the equinox. The eaves of the roof were designed to shade during the summer and allow solar heat gain during the winter months. The building was set into a small sloping hill so the rear of the building could take advantage of the stable geothermal temperature.

Fallingwater

Frank Lloyd Wright







Fallingwater is a prime example of organic architecture. The house sits above a waterfall and carries characteristics and features of the site, geology, and the waterfall itself. It is a gold standard for capturing the essence of organic and diminishing the boundary between interior and exterior. In this case, the essence is derived from the geology and its cantilevering, the movement of the waterfall, the sloping hillside, the verticality of the trees, and the weight of the rocks. The house seems to grow from the site and has a sense that it has always belonged. These ideas helped me explore an architecture that is sensitive to its site, surroundings, context, climate, and natural phenomenon.

- Natural local materials
- Diminishing the barriers
- Allowing the light to come into the space
- Relationship to the site
- Protection against elements
- Proportional to the human body
- Derived from nature
- Simplicity
- Form generated from unfolding
- “Growing” out of the site

Wayfarers Chapel

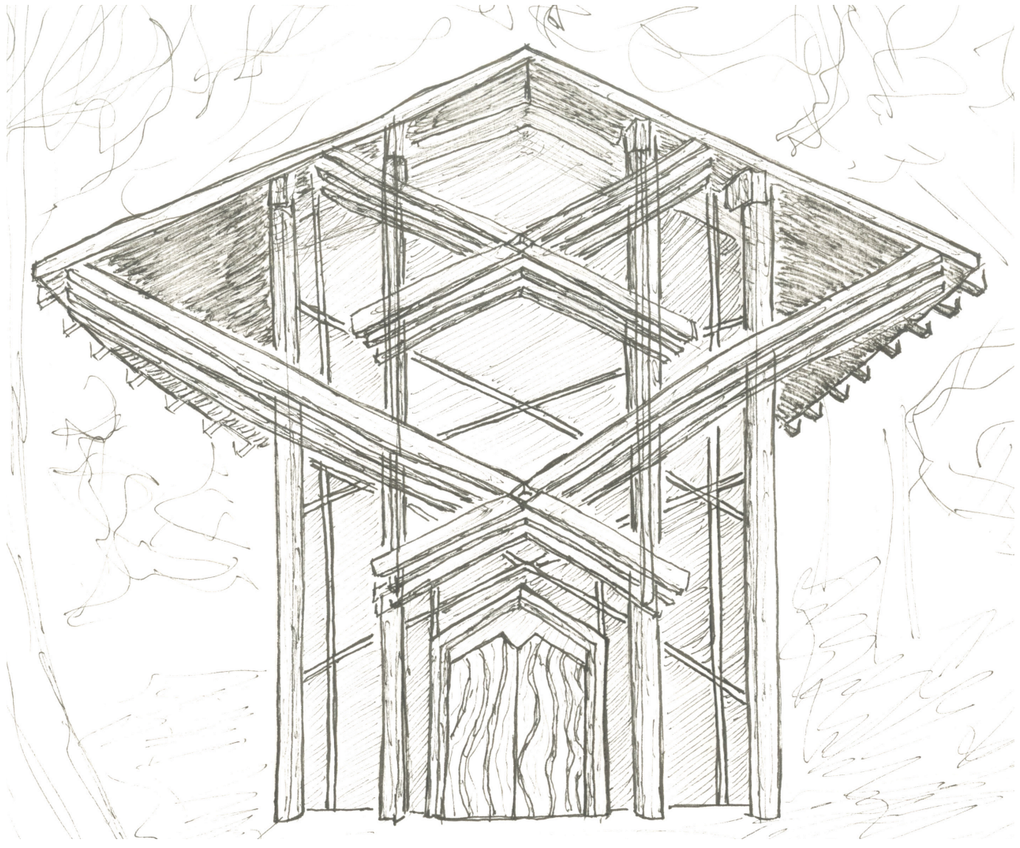
Lloyd Wright

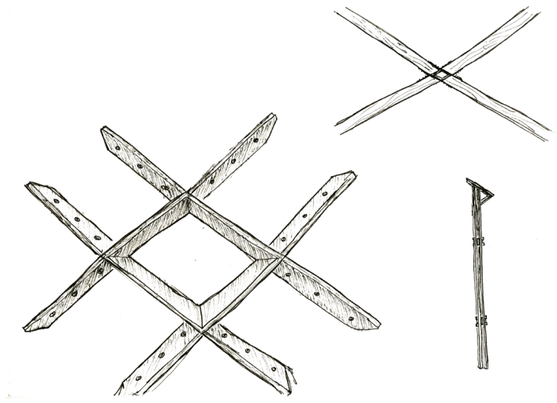
The wayfarers chapel is an excellent example of an attunement to nature. The scale of the building, the high ceilings, and roof structure give an impression of sitting in a forest. The glass walls and roof also allow the natural forest to come into the building. The gluelam beams with their natural angles seem to mimic the trunk and branches of the trees surrounding the building. The chapel is set into the hill with a rock base to indicate depth and weight. The large circle in the main window helps to affirm the nature and architecture around it.

- Natural Materials (Wood, Stone)
- 30/60/90 degree angles
- Vegetation
- Transparency/Translucency
- Earth Berming
- Diminishing the barrier
- Proportional to human scale

Thorncrown Chapel

E. Fay Jones





- Mimicing nature
- Verticality
- Natural angles
- Glass openings
- Stone walls
- Diminishing boundaries
- Wood beams
- Thin profile

Thorncrown chapel is another great example of organic architecture. The verticality of the columns and structure give a rise to the interior of the building. Allowing a small opening in the ceiling, the light gets filtered down through the structure and across the beams. The building is set directly into a forest. This project also has glass walls that diminish the boundary between the interior and exterior. The project takes advantage of natural angles and nature materials.

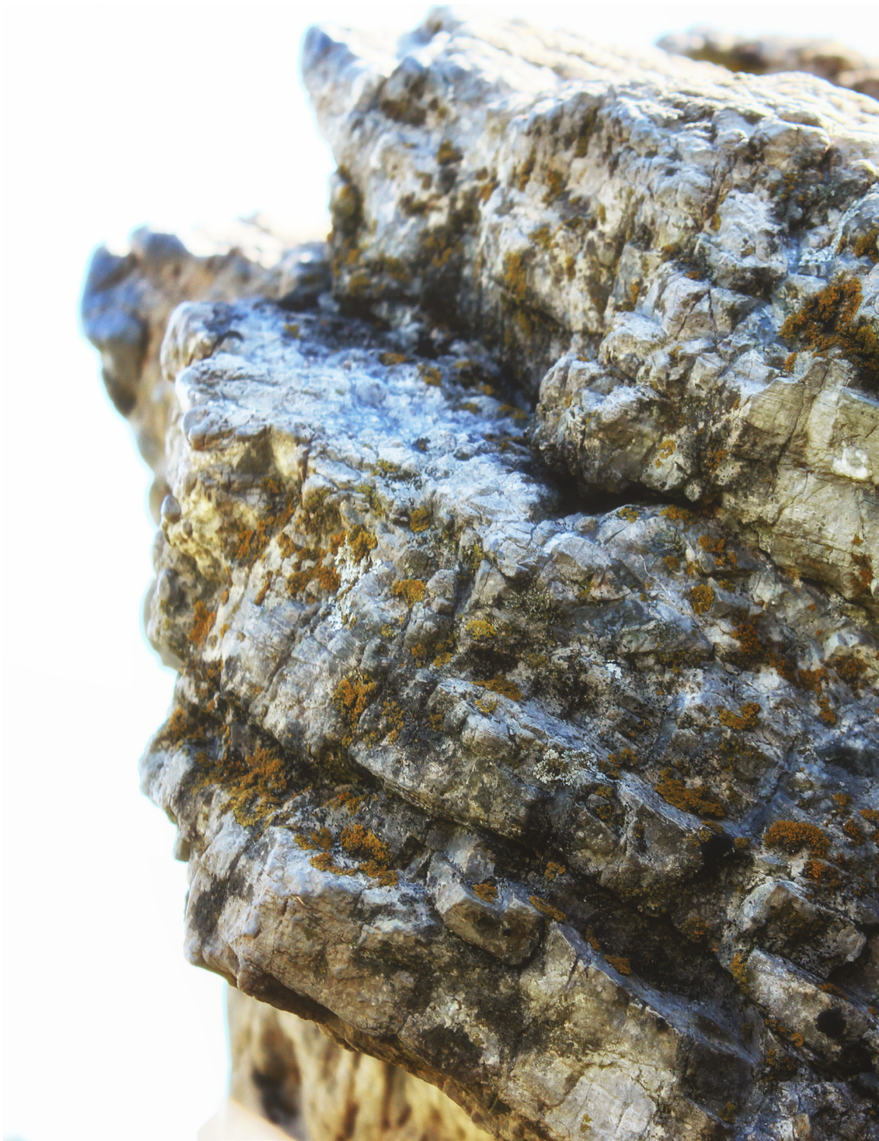
The Outcrop

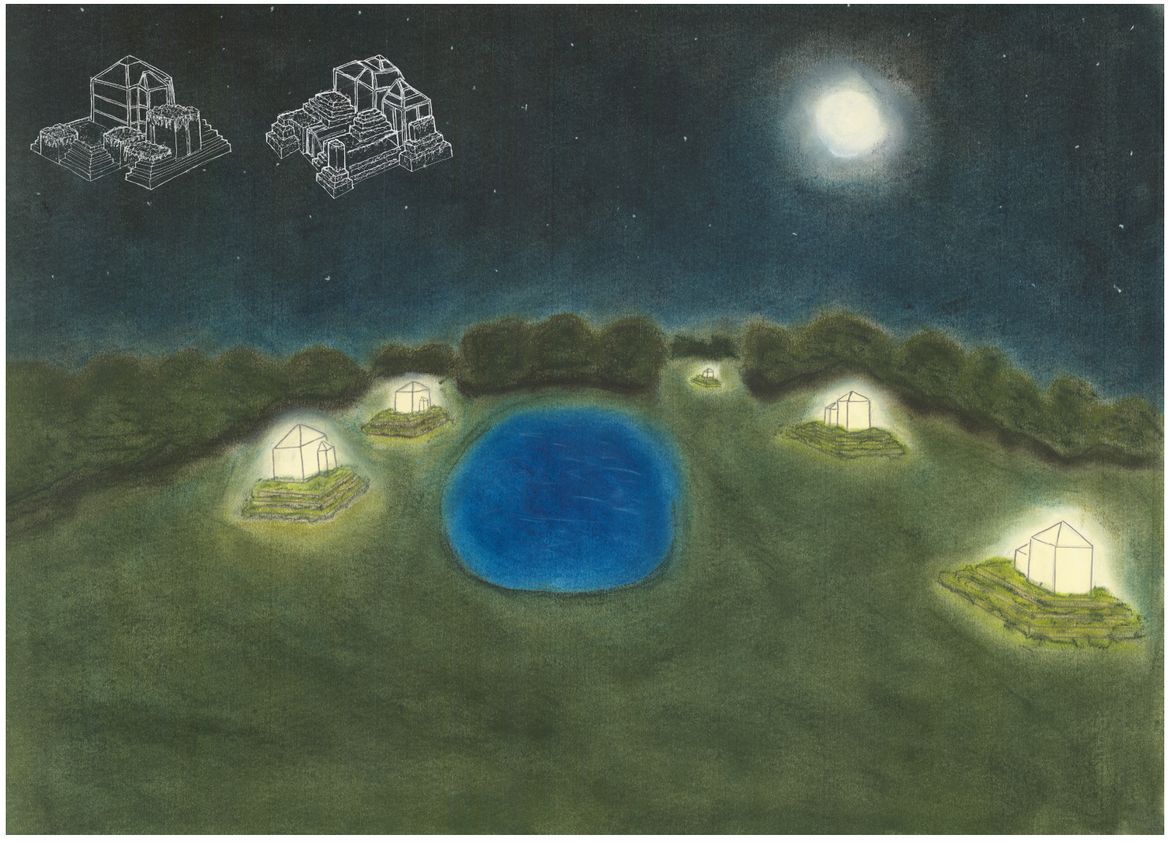
"As I continued through the shallow sloping hills, I found an outcropping of rocks protruding from the hill. There the rocks sat settled and stoic in the hill with dreams of transcending their earthly roots and soaring into the sky. After all, every rock aspires to become a mountain. I knelt and considered the rock. What I saw were muted colors, stratification, shadows, an impenetrable, and enduring essence. My thoughts soon began to compare the rocks to the soil that enveloped it and a revelation occurred to me about how they were only disassociated by time."

The geologic condition of the site lead to an exploration of walls and refuge. The project is trying to capture the enduring essence of the geology as well as allowing the walls to rise from the soil. The enduring essence of the rocks have a quality of timelessness, strength, and presence. This part of the journey is about creating a stereotomic structure that gives the impression of timelessness, strength, and weight.

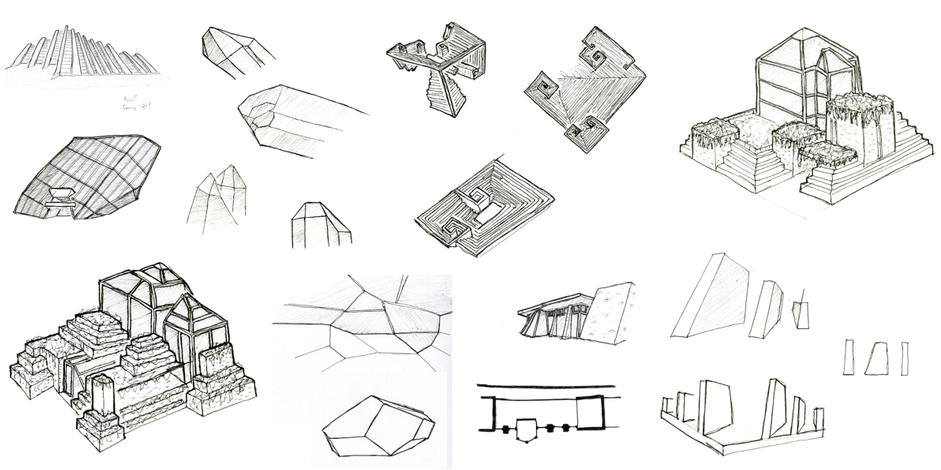
The stereotomic aspect of the project involves creating massive walls that have been carved out to create space between. The walls are meant to leave an impression of excavation of the ground and forming from the soil.

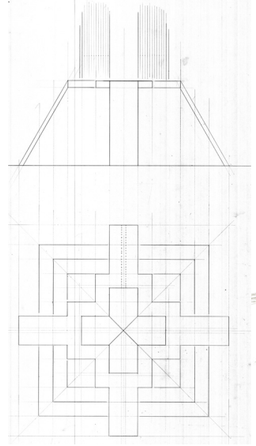
Rammed earth was best material choice considering the following: it is from the site, it has qualities of both stone and soil, carries a unique color and texture, has a high thermal mass, and great hygroscopic properties. The question still remained about the thickness, heights of the walls, and the details between the stereotomic and tectonic construction. The detailing and connections between the two became and important aspect of the project.

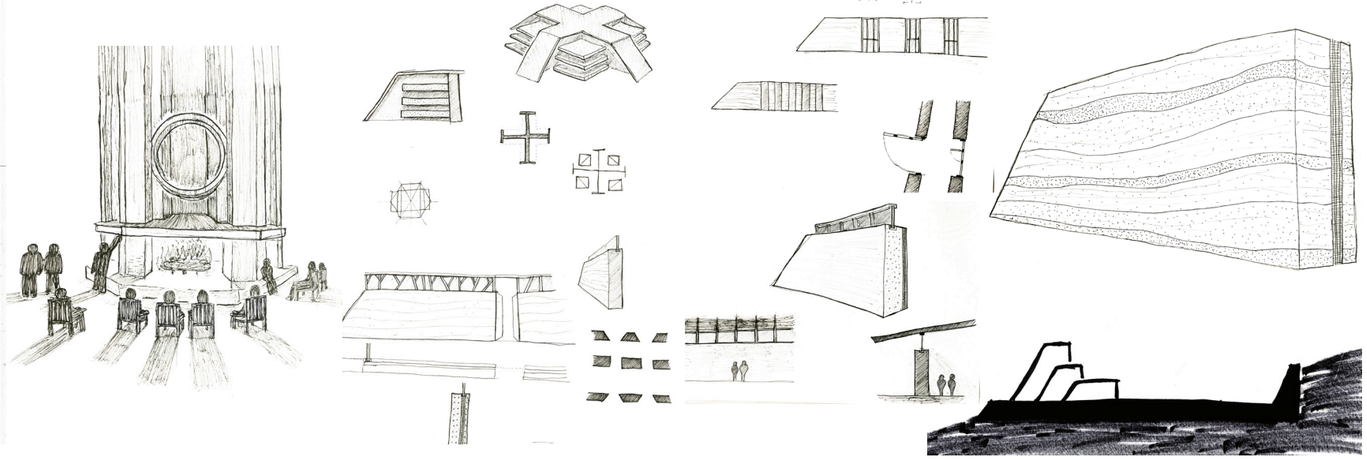


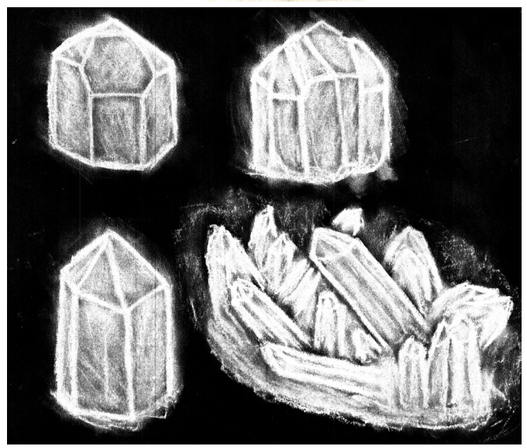


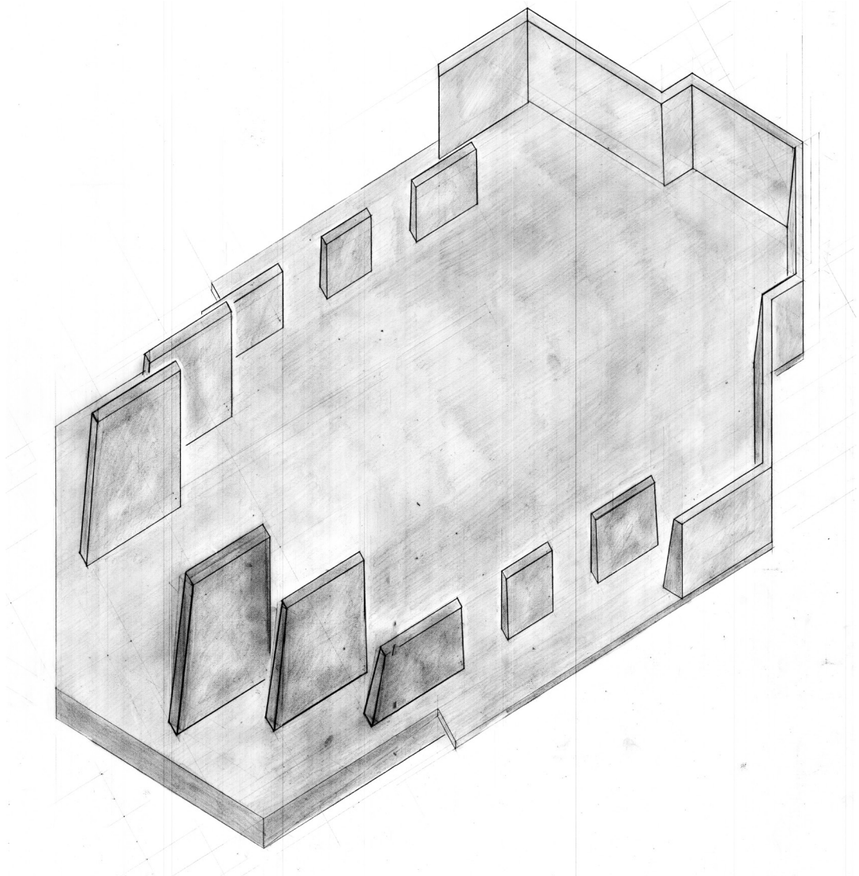
Early in the project, I had a dream about my site. In the dream, there were large, heavy stepped structures with crystals protruding from them. The crystals were lit from within and appeared to be inhabited. My subconscious mind was dwelling on the telluric and the geology of the site.
I wondered if there was a way to bring this dream into the project...

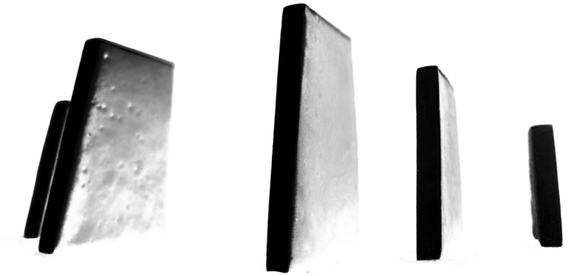


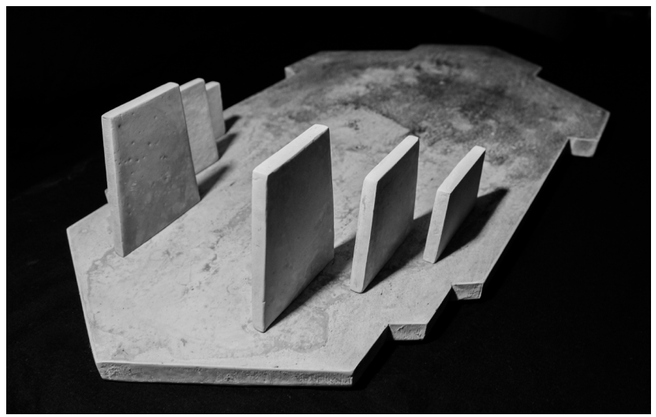






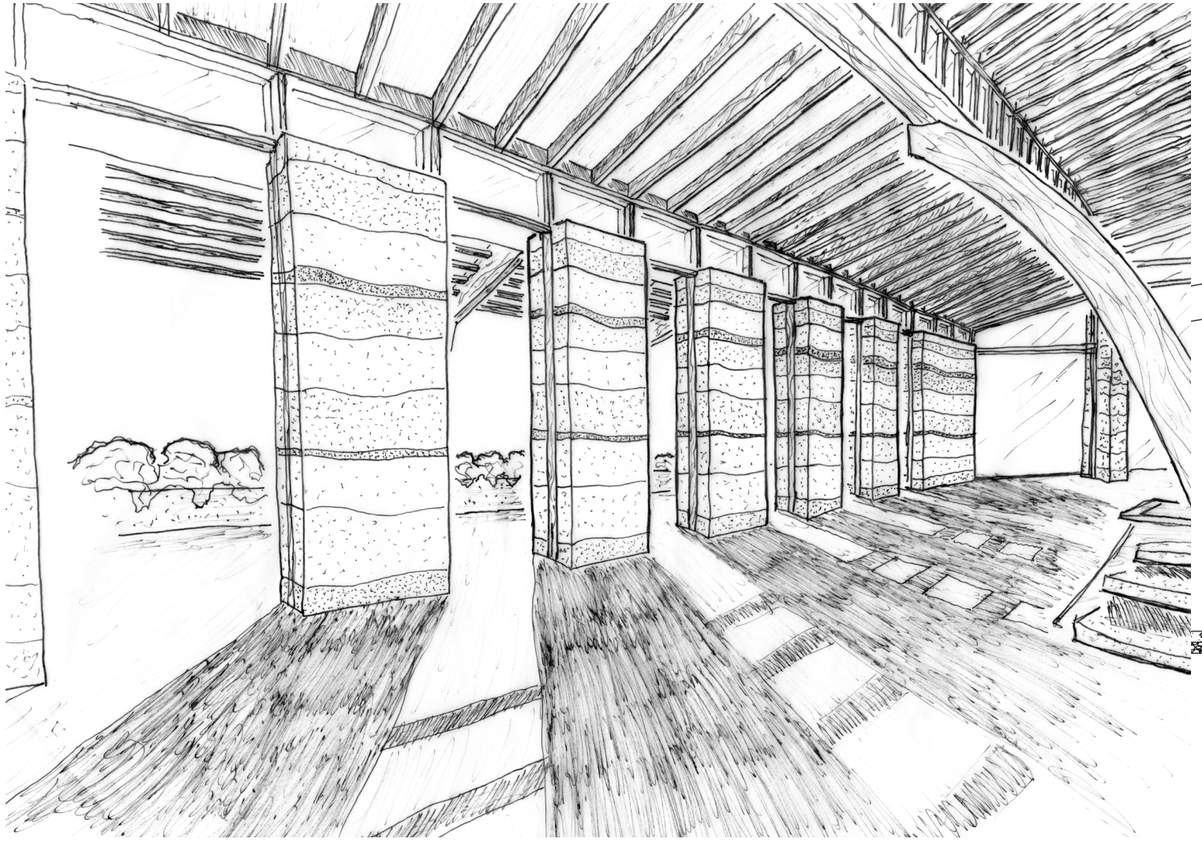


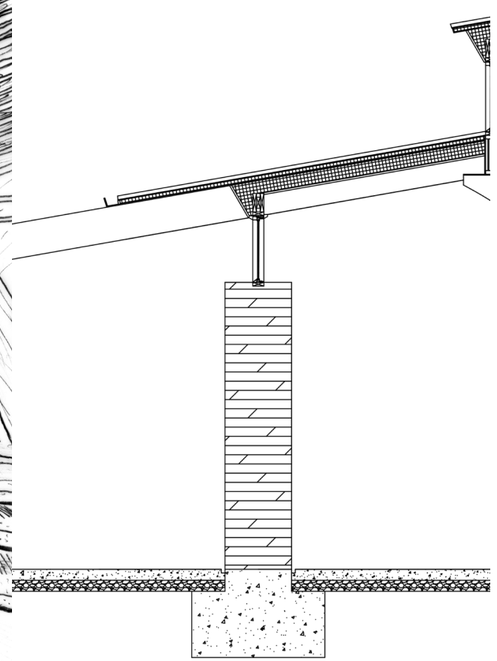




The exploration began with the idea of the rock. I started with some quick pastel drawings to understand the structure, nature, and qualities of the geology. Those drawings led into sketches to derive a form from the geologic conditions. As the ideas developed, I began to explore in graphite drawings, models, and photography. These studies are attempting to capture the thickness, height, material, and proportion appropriate to the project. The thickness of the walls began an important part of the exploration. The thought of inhabiting the wall became an important condition.

Rammed earth is a unique and extraordinary material. In most cases, the soil used for the walls are excavated from the site and can be modified with other types of soil and color. These features give each rammed earth project its own geologic language. The way the soil is compacted to form the wall can also determine its character. Variations in height and undulation can be achieved. In the image above, I have tried to capture the way I envisioned the coloration, striation, and texture of the wall.



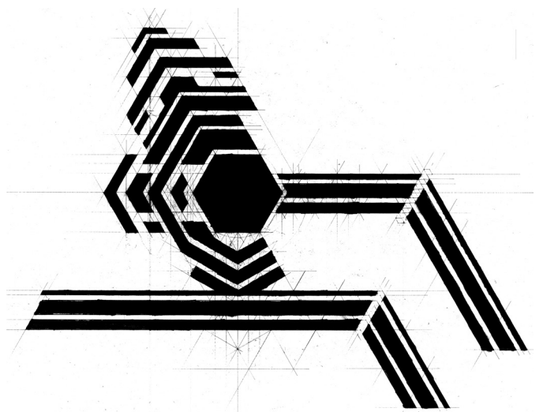


The threshold of the building becomes a multisensory journey to awake the body. As you enter the building, for a moment, you inhabit the three foot thick, massive rammed earth wall. A slight coolness of the material gently brushes your skin as you pass through the threshold. Your eyes caress the character and the quality of the stone without any physical contact. You notice the variation of color, the perfect imperfections of the construction, the pits and pockets of the walls. Upon further inspection, you notice the slight gap in the floor before it reaches the wall, as if the wall continued down through the floor further into the ground. Upon reaching the inside space, the cold, shaded rammed earth gives a cooling relief from the hot sun. There is a slight breeze permeating through the openings of the wall where you entered, and it is gently flowing across you.

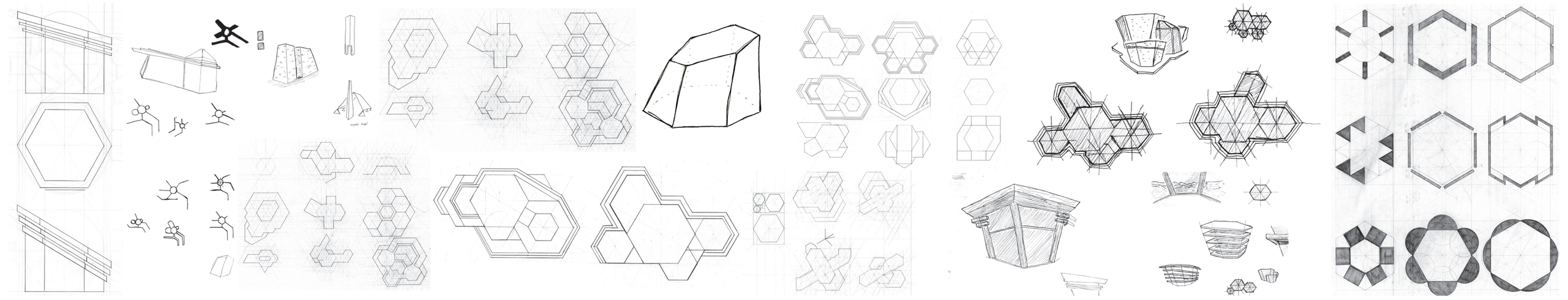
The Nest

"I heard a faint buzzing and popping noise in the distance. I followed the sound and noticed a wasp nest. Curiosity surrounded me regarding its structure and growth. An apparent logic of a higher, divine order and geometry were present. Study revealed natures dedication to the hexagon."

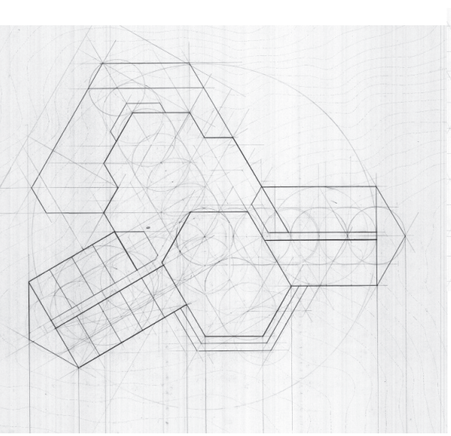
This part of the journey became and exploration into the geometric qualities of the hexagon and its use throughout nature. The hexagon became the generator for the floorplan of the building. I created a grid based on the hexagon using circular and triangular graphic construction methods. The geometric construction was allowed to "grow" as if it were an organic system being influenced by the site, the spatial concerns, and climatic concerns. The site was on a small sloping hill and the plan was allowed to extrude down the hill towards the sunset and vista, while the rear of the building was bermed into the earth. The spatial concerns were about giving the interior a wide, central room with the walls pushed to the outside. The climatic concerns were allowing the wind to permeate through the building, berming the rear, and to allow thermal mass for solar heat gain. The hexagon proved to be the perfect generator for the concerns influencing the plan. Extruding the plan in the east and west direction allowed for more southern exposure, while allowing an edge to point westward to the sunset. It also allowed the eastern side of the building to have more surface area to capture more geothermal energy from the earth-bermed walls. The final plan reminds me of a snowflake arm that has separated from its core and been gently petrified on the site.

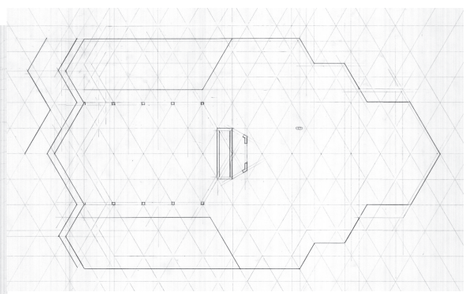


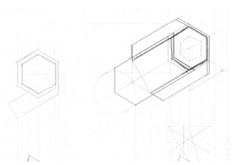
This pastel was an attempt to discover what is constructed versus what is organic. It led to a discovery that there isn't a definitive line between the two. Organic systems are always constructed by an underline set of rules similar to that which man constructs. This means that if Natures system and rules can be discovered and understood, then they can be applied to architecture.

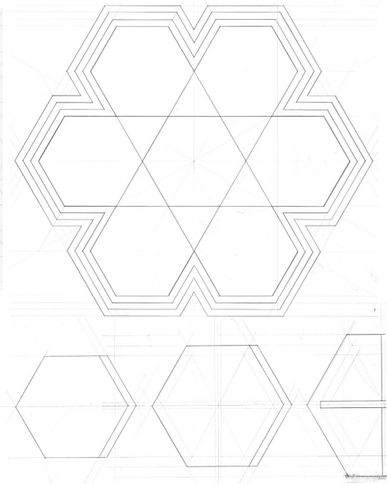


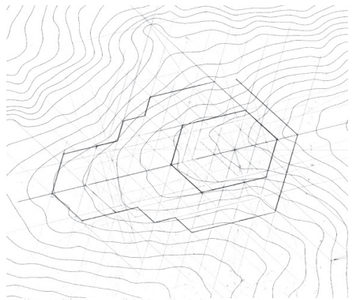
To understand geometry, you have to find the rules and basis on which it is created. This section is based on extruding the hexagon as if it were organic. The models begin to show a three dimensional approach to the hexagon as a geometric volume.

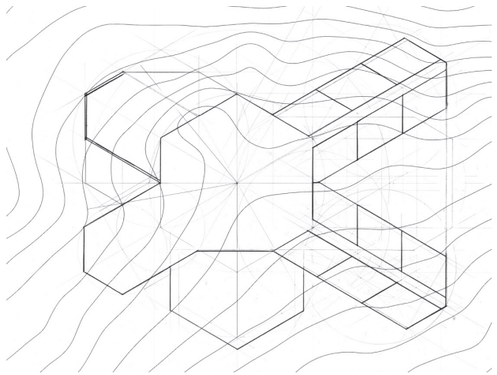


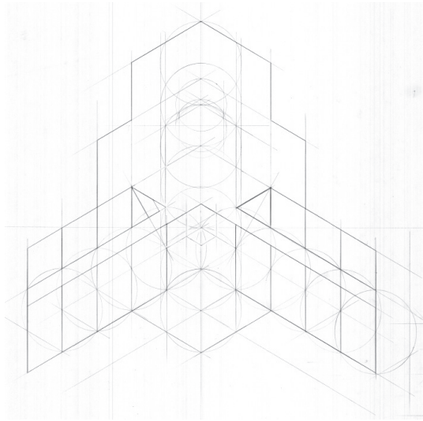




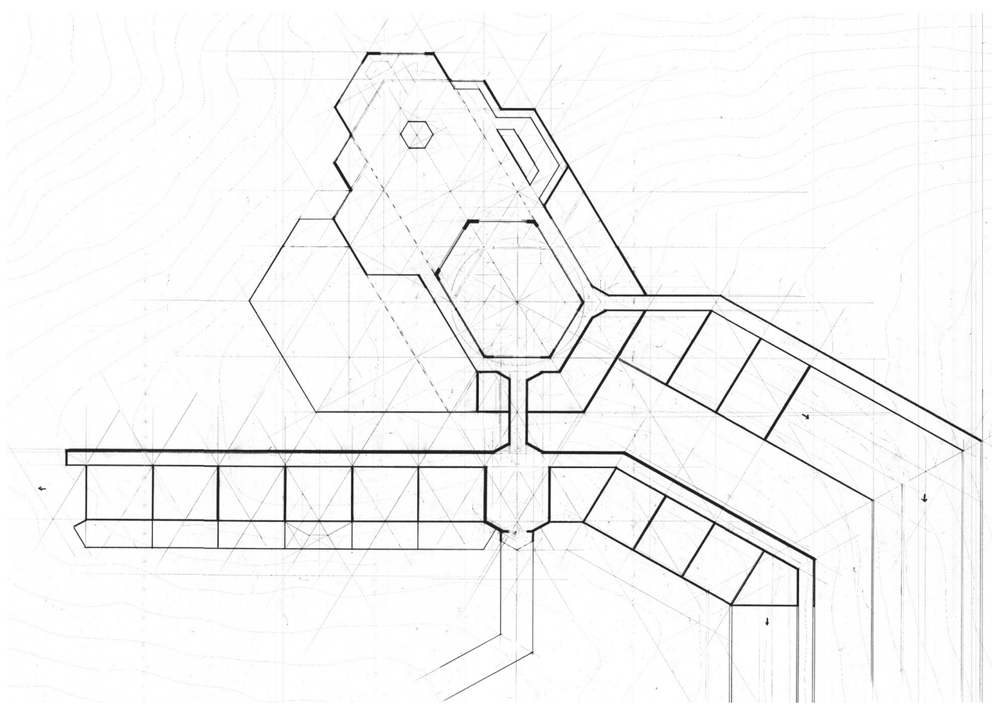


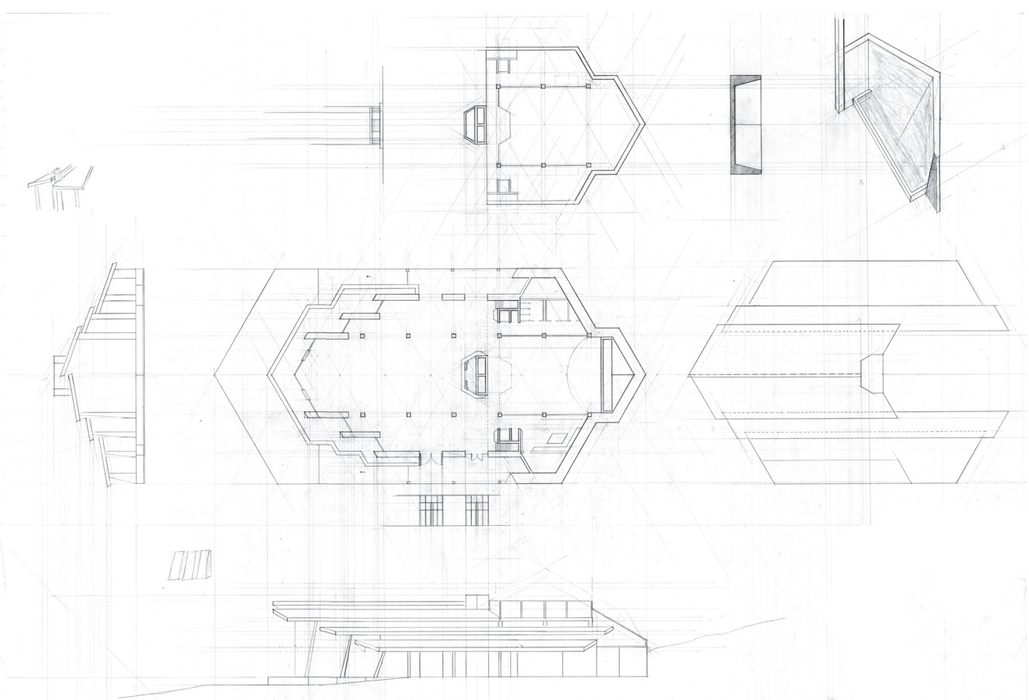






This section is allowing the plan to be further articulated by the geometry. Allowing a geometric base and applying rules for growth, the plans became more refined. Through these rules and the geometry, the plan could develop with different characteristics the same way nature would create an organic being with different characteristics.





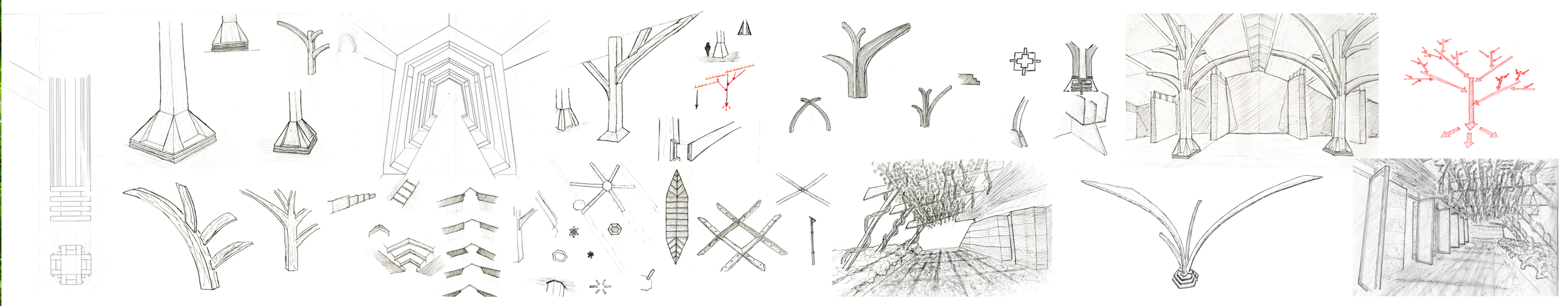
The Grove

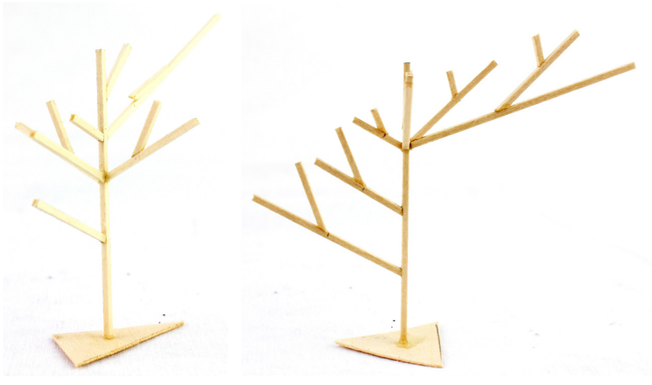
"I wandered into a grove of trees near the middle of the plot where I took refuge from the wind at the base of one of the trees. I admired the verticality of the trunk, the spread and intertwining of the branches, and the exquisite nature of the tree itself. The autumn sun warmed my face as the mystical light seemed to descend gracefully through the canopy."

This part of the journey sparked an exploration into columns and capturing the essence of dendriform. Dendriform means to have a tree-like form. Architecture can capture the essence of objects, such as a tree, through an abstract of interpreted form. The challenges with this idea is avoiding imitation and maintaining the structural integrity of a building. Architecture can be synthesized from the essence of a natural form, then deriving a man made form that reflects the idea without direct imitation. There are unlimited ways that architecture can show Nature through an abstracted form. This thesis is an example of one possibility of that form.

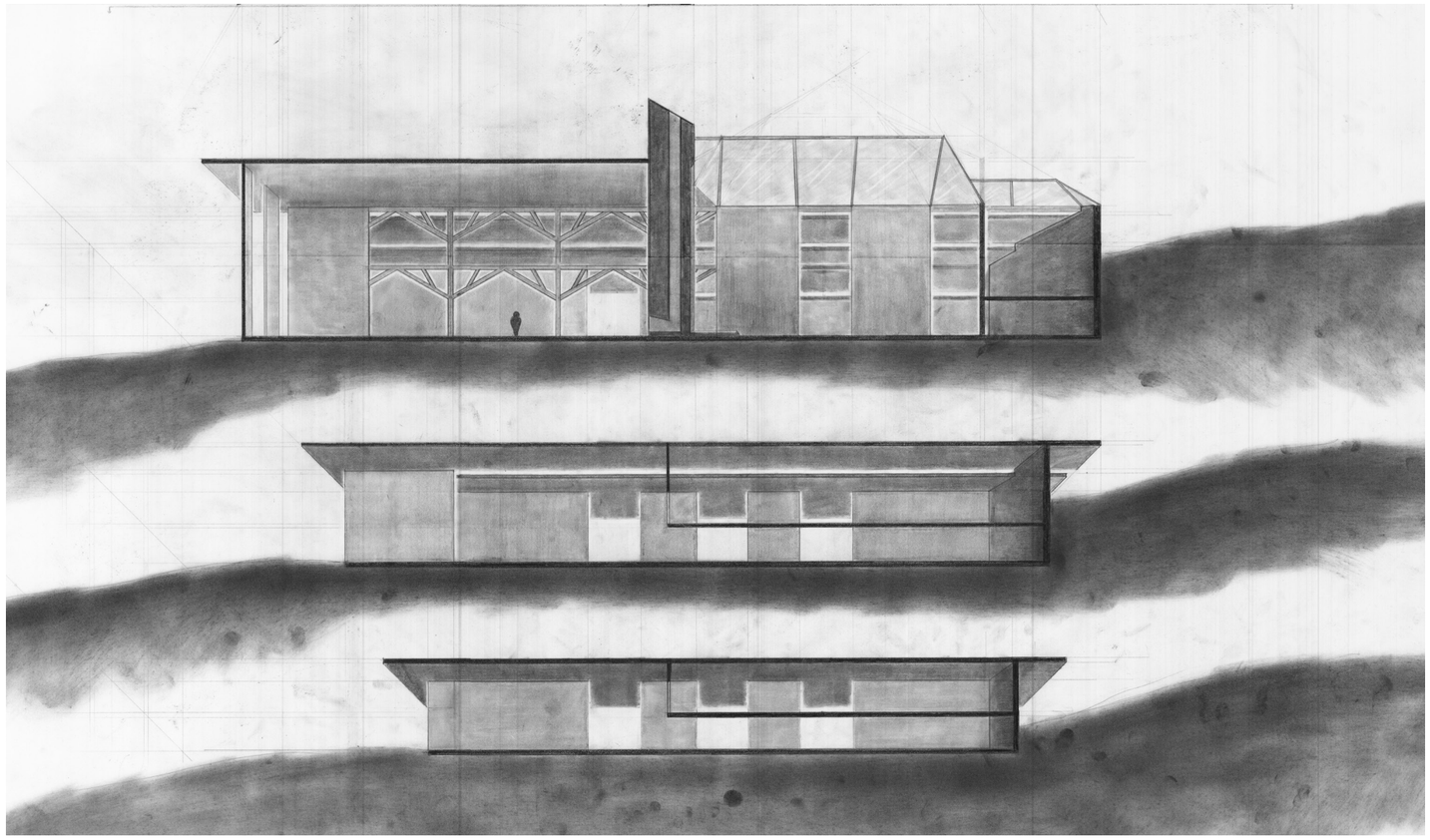
The tectonic is a combination of components that are put together to become one entity. As a tree grows it develops more parts that it adds to the whole. These parts are all within the inherent design and growth pattern of the tree. This is similar in the way a building adds pieces to create the final structure. The idea of the tectonic and the essence of the dendriform harmonize as a desired product and a construction method. In the final design, the columns, the roof, and the base of the column all become abstracted from the forest around them. The building takes on a man made form that is in harmony with the environment surrounding it. The tectonic dendriform and the forest become analagous, but varied by the hand of man and the systems of Nature.

As the thesis became more refined, the columns themselves took on a more organic form as the inherent geometry of the space became what defined the dendriform. Two special conditions were created as a result of this which will be explored later in this book: one being where the columns cross in the center and two where the column meets the ground.

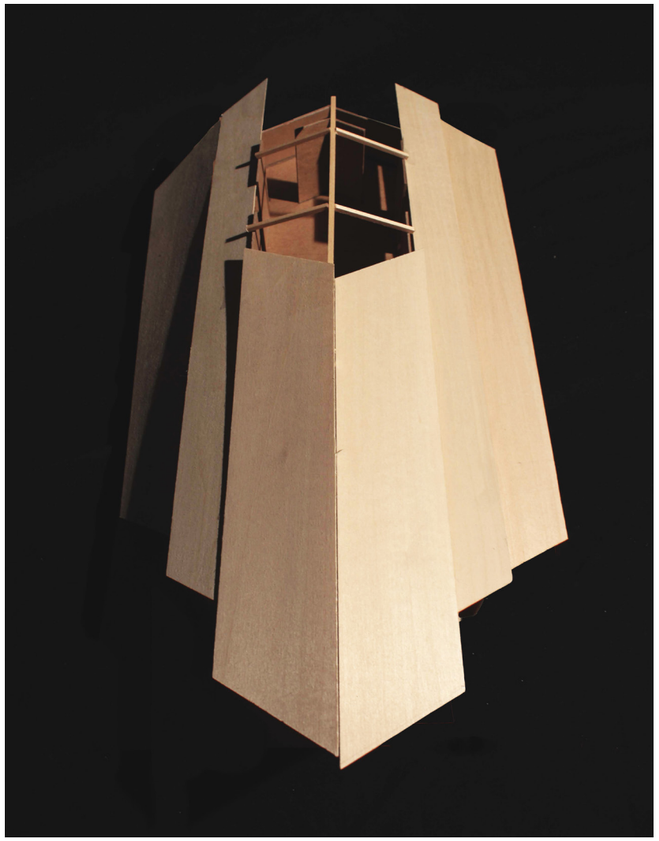


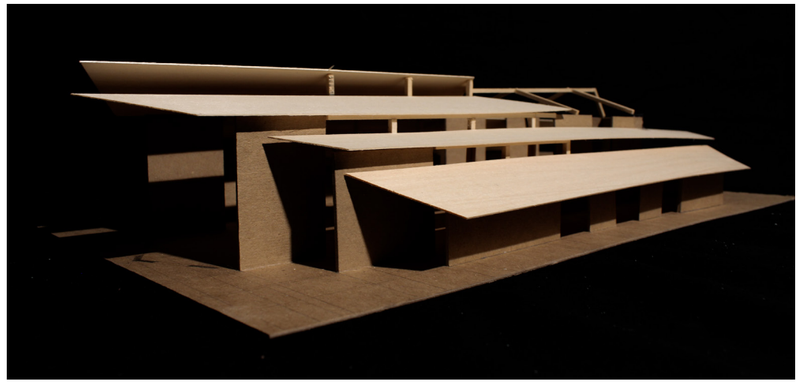


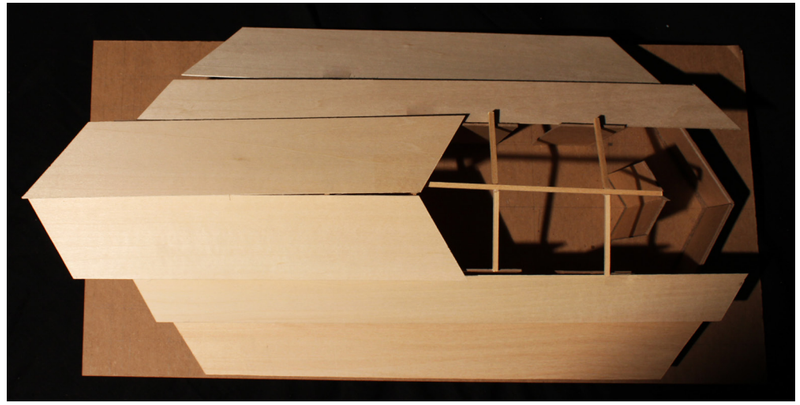
The sketches above show the journey to finding one abstraction of dendriform. The column continually takes on a more abstract form. The models below show the canopy structure and diagrammatic column models. A few important discoveries from this exploration are: material choices, conditions between two materials, transitional materials, structure and form, and where two of the same materials meet.



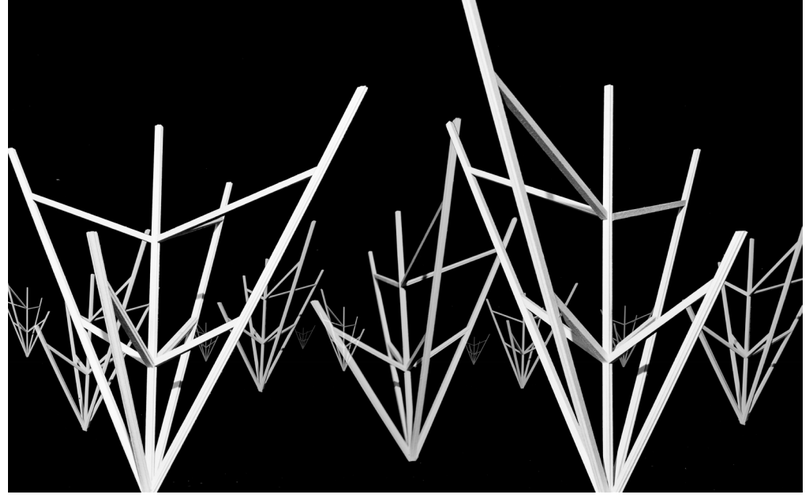
An early section revealing a basic column structure and the buildings relationship to the hill. It's important to gain differing perspectives on a projects so that refinement can take place.

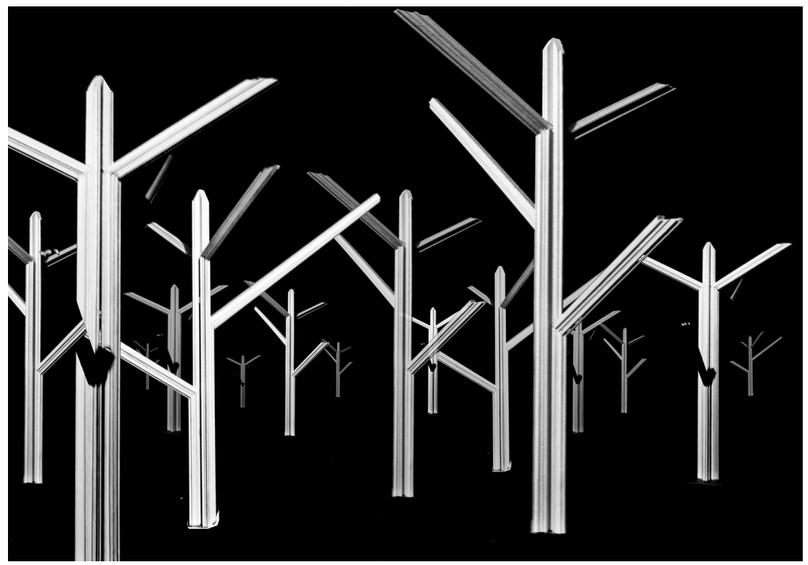


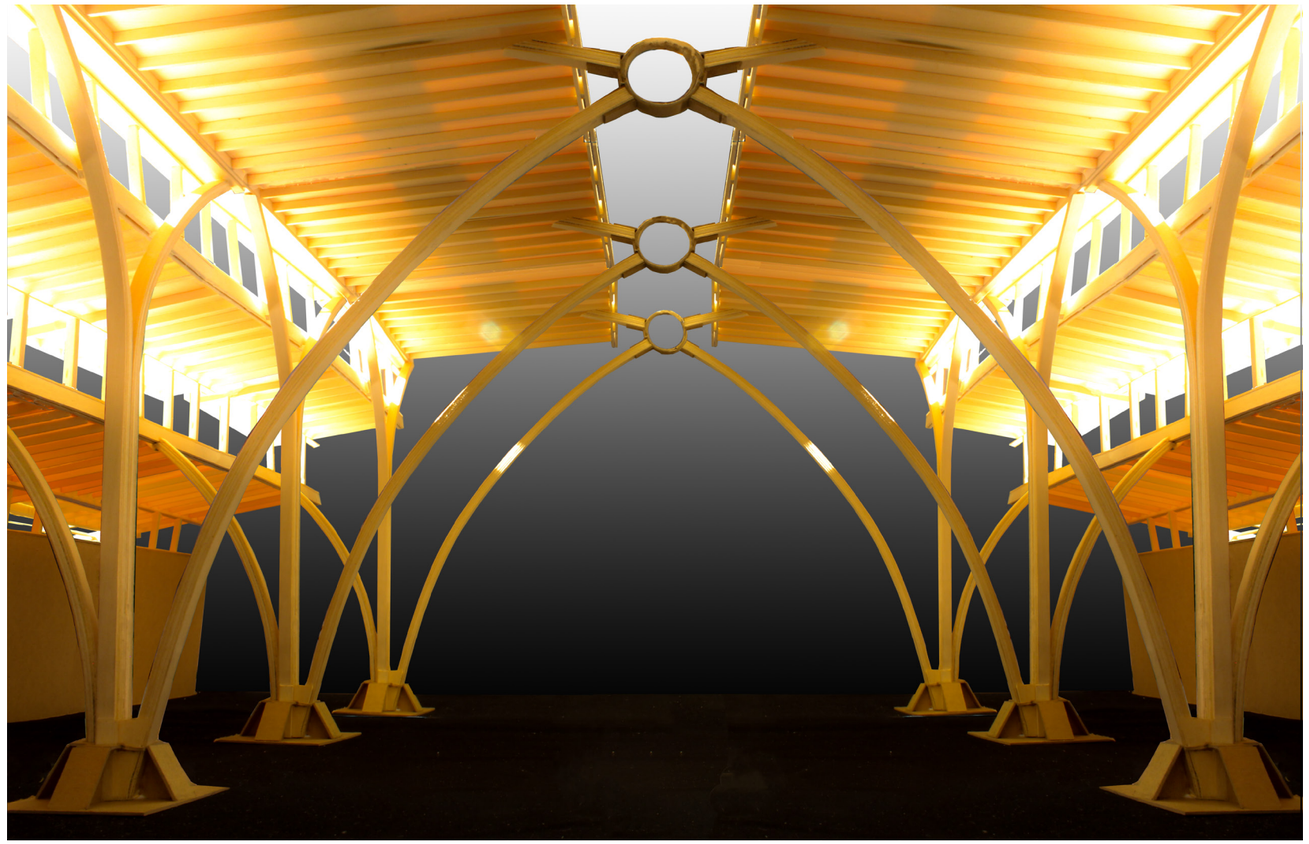




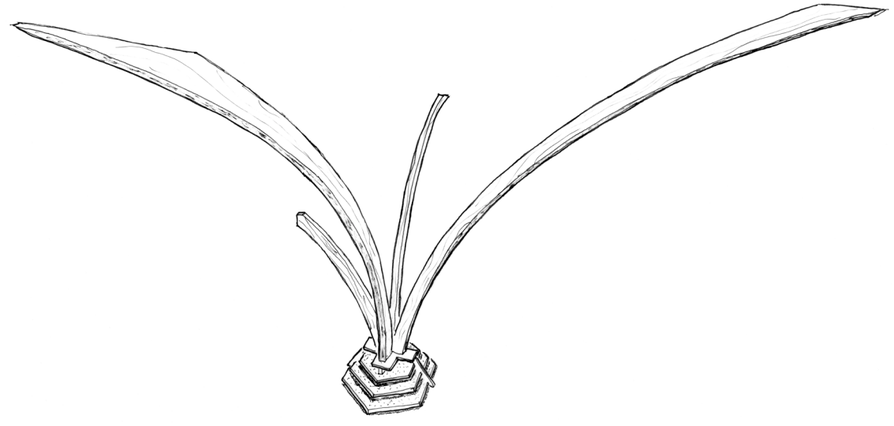
An early model of the canopy of the building. This model shows a relatively simple structure that was refined later in the project. The striations of the roof start to resemble the layers of a forest canopy.

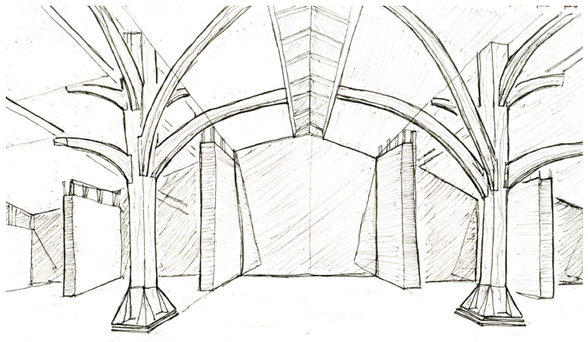


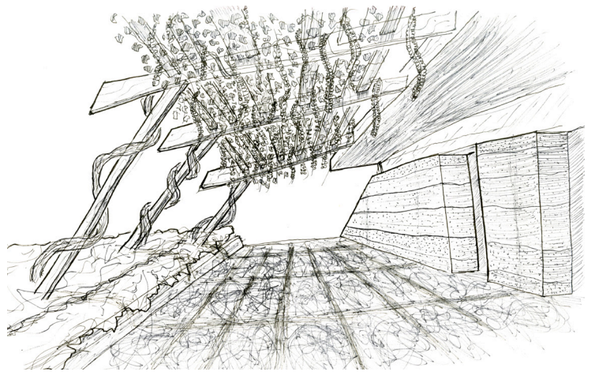


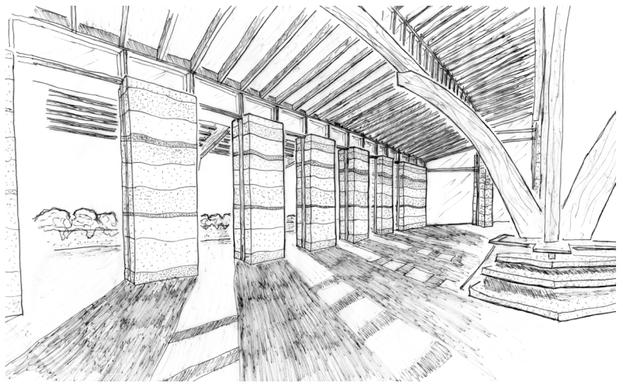


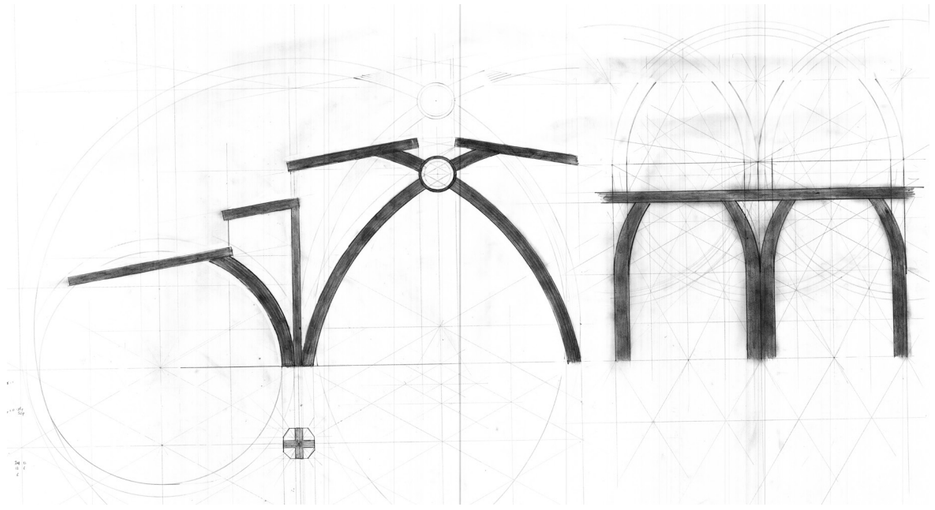
A large model, a camera, and Photoshop allowed me to experience the inside of the structure for the first time. Upon completion, the columns themselves were out of proportion and needed to be thicker. The base of the column also needed to be more refined.

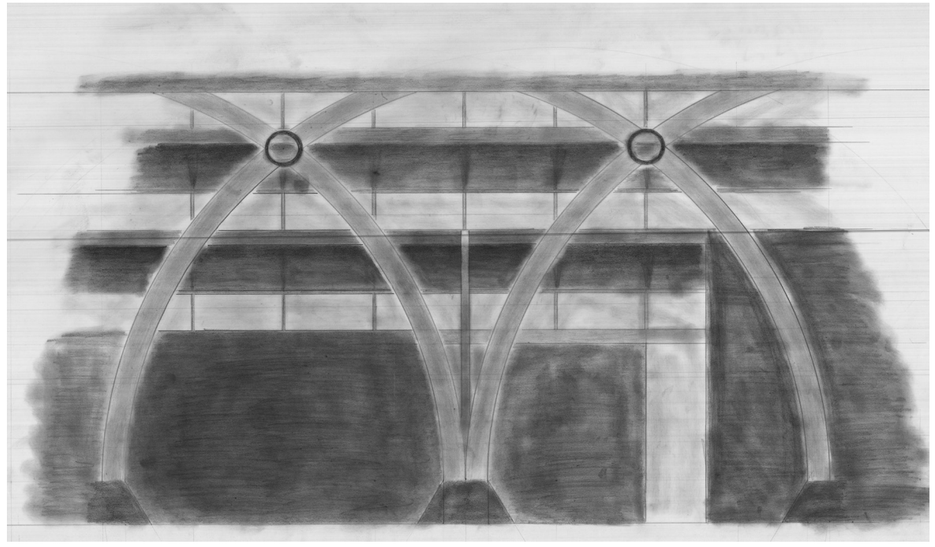


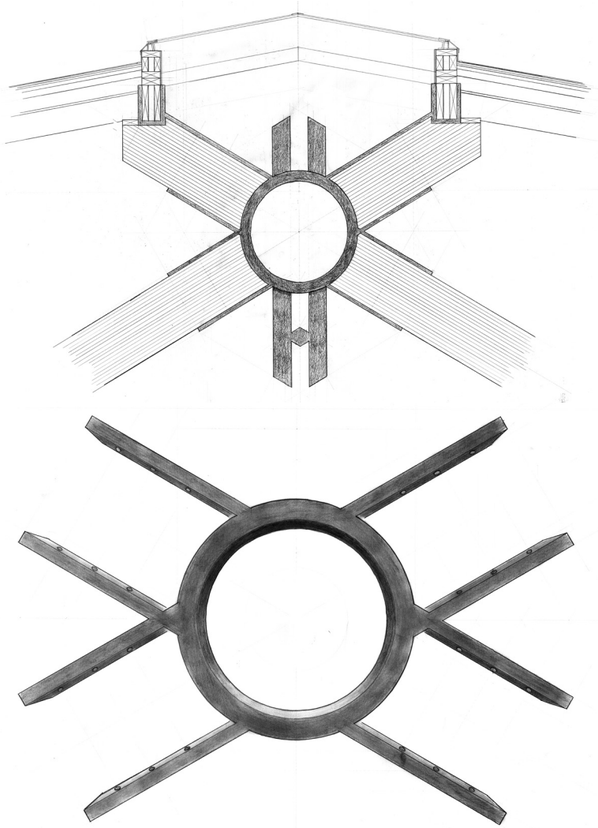




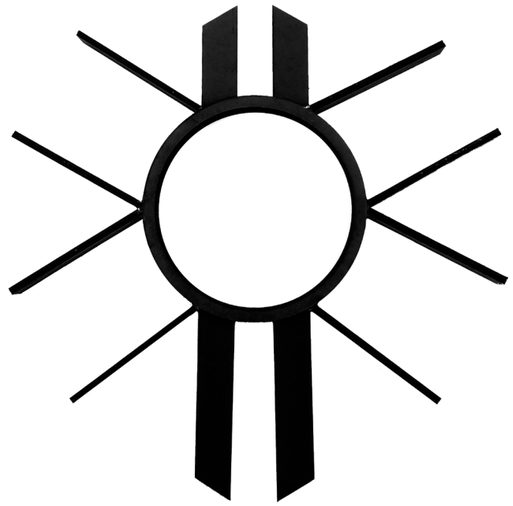








This condition in the architecture was a prime example of two things. The first, being a tectonic question about how materials meet and the evoloution of detailing. The second, creating a symbol to illuminate part of the objectives of the building. The circle was chosen as a reflection of the sun and its eternal cycle. Even the smallest detail in a building should speak to the larger ideas behind it. A natural holistic approach, similar to nature, should be taken in architecture where each piece has its own beauty and is also part of the whole.



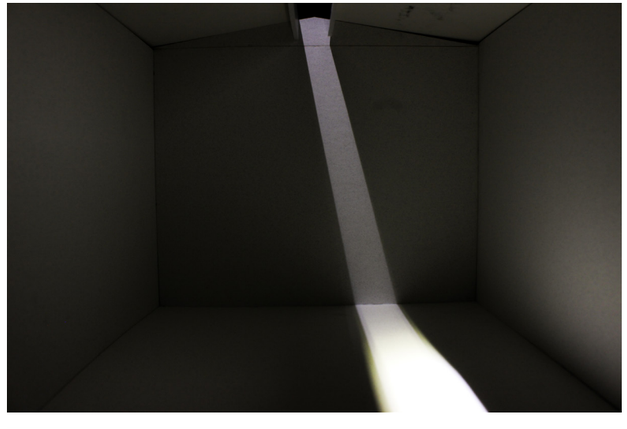
As you travel further into the building you notice the vertical variation of the space. The large columns seem to sprout and ascend gracefully from their heavy rammed earth base. They hold a wide roof that floats above the space and whose structural members appear like branches. The clerestory windows and the skylight allow a narrow beam of light to fall through the space where it rests upon the cold concrete floor.

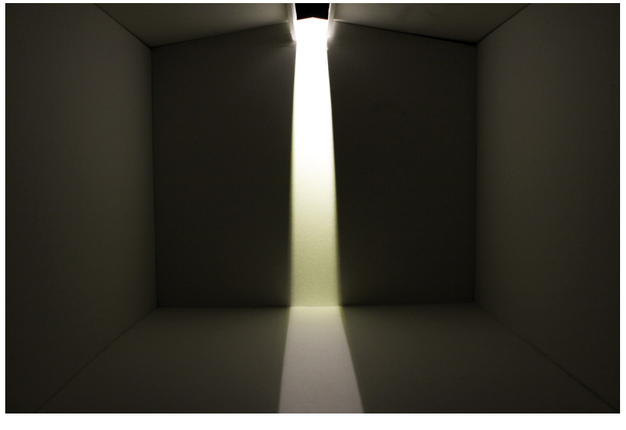
The Vista

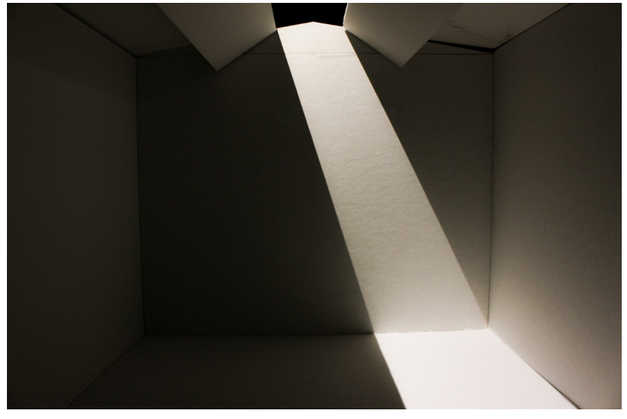
"As the sun began to retreat behind the mountains, I found myself back where I had begun this journey. I climbed the small hill where I had seen the mountains and watched the sunset. For what was just a moment, it seemed as though I existed outside of time as none seemed to have passed. This moment consumed me and became the singular focus of my being. I felt at peace as if everything around me was in attunement. A divine thread that was woven in a pattern that connected the sun that warmed my face to the soil beneath my feet. As the sun imperceptibly sank behind the mountains and renounced the day it was leaving behind a painting in flux that was suitable only for God and too sublime for man."

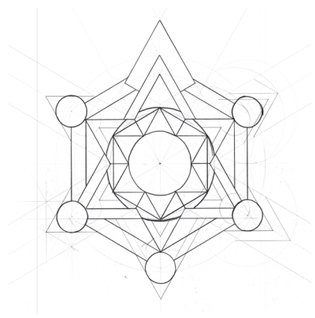
Architecture has the power to reveal nature and natural phenomena. These phenomena allow the user to have a richer, multi-sensory experience that helps bridge the gap between architecture and nature. These experiences can reignite the affinity that man once held for nature. This section of the thesis was an exploration to see if architecture could allow the user to understand something about the world and universe around them. Part of the site selection was based on finding a view, or vista, that I could bring into the building. The orientation of the building became important as soon as these ideas became apparent. Allowing nature to shape and control how the building evolves and grows is an important consideration in this exploration. If architecture allows nature to help shape the building, then the two become more attuned to each other. This attunement will bring about harmony, unity, and a mutualistic relationship.

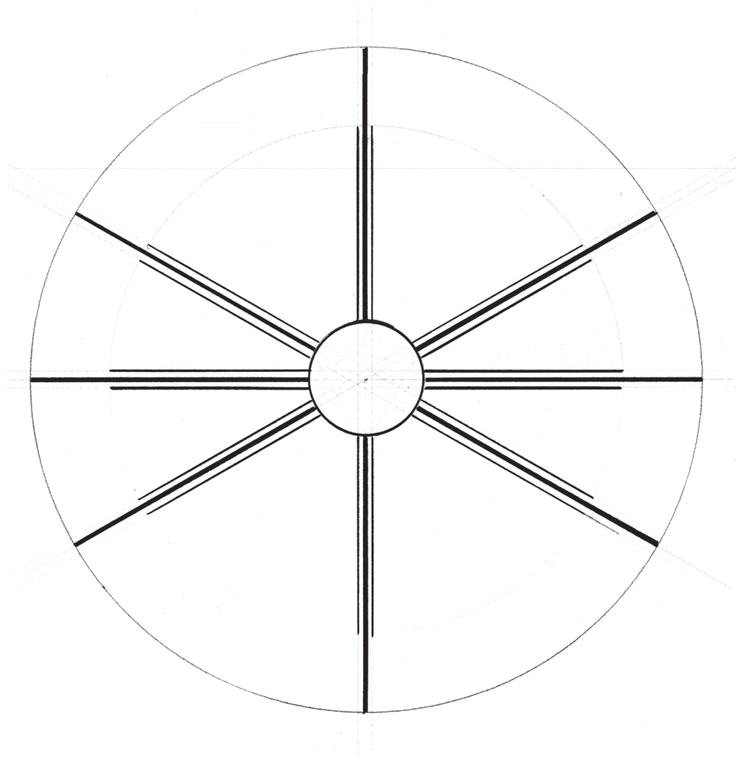
The project was influenced by environmental factors such as: earth berming potential, views, the sun path, wind direction, solar heat gain potential, and separation from other buildings. Taking into consideration all of these factors allows the building to reveal natural phenomena. The first phenomenon was bringing the sunset down to the human scale and diminishing the distance between the two. The second was to create a pattern in the floor so that it hinted at the cyclical nature of the sun and seasons. This pattern will coincides with the solstices and equinox. The third was to place openings in a strategic location to take advantage of the wind. The clerestory windows and the skylight were adjusted to create shading in the summer and allow the sun into the building in the winter.



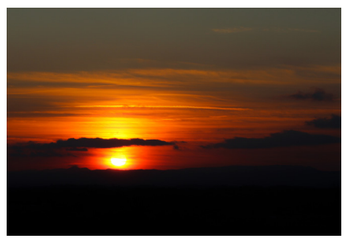


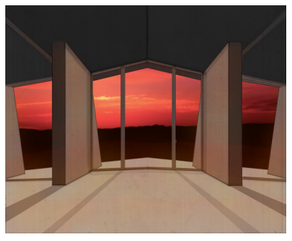


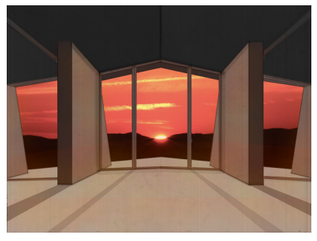


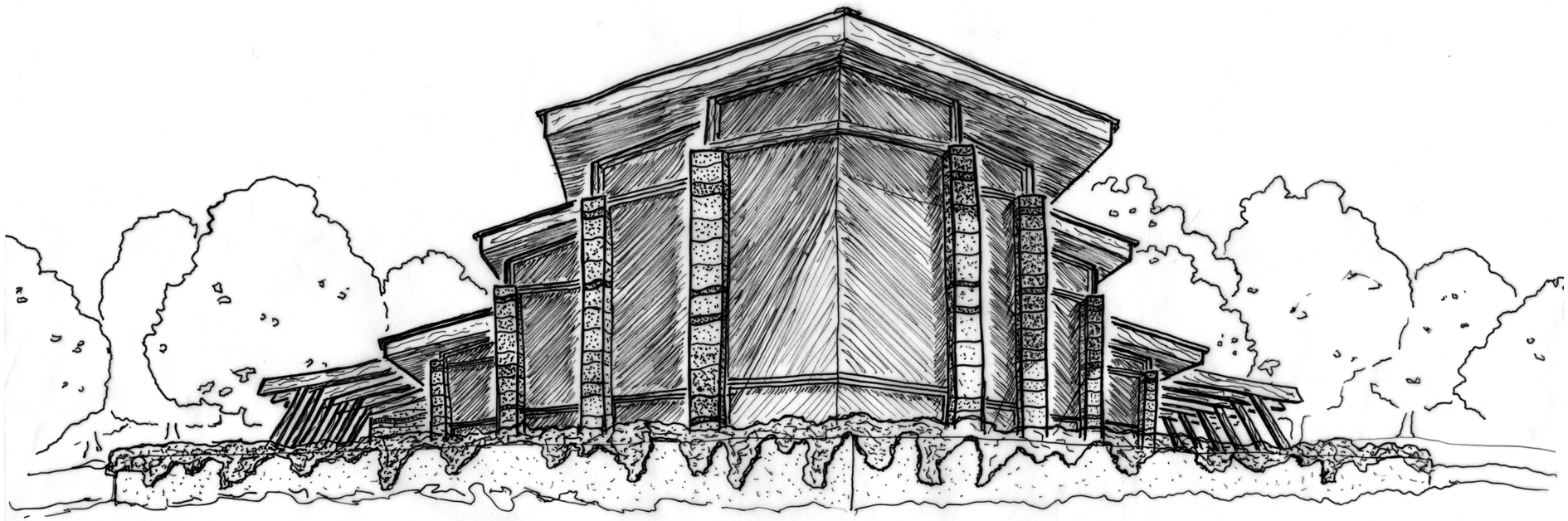


This page includes explorations on the views of the building, shadows, and the engraving on the floor to mark the suns path.

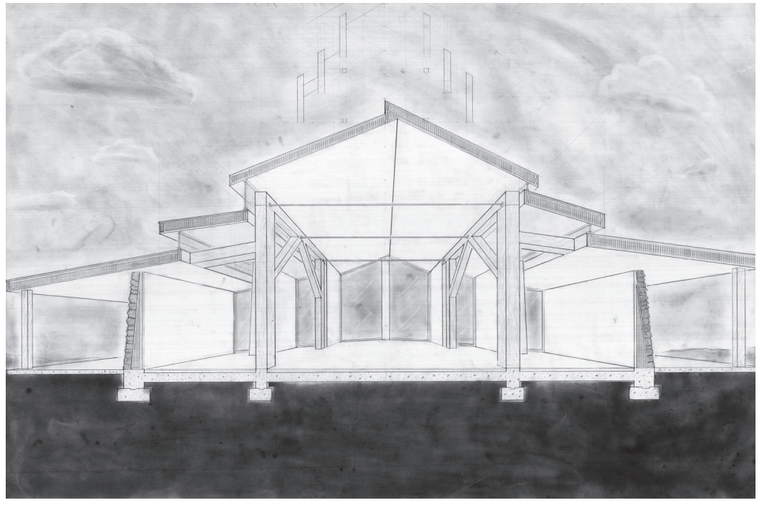


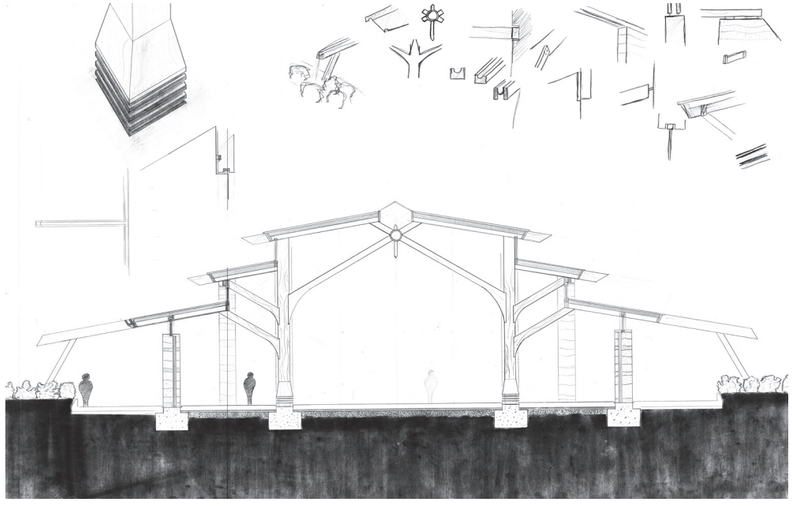


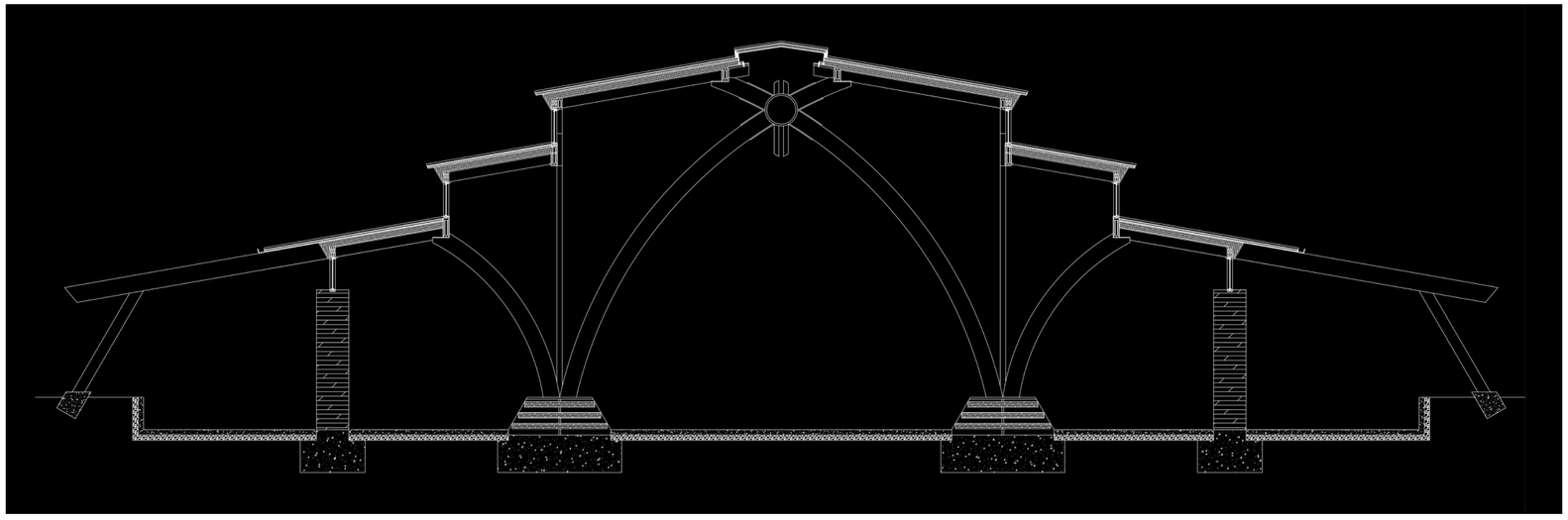


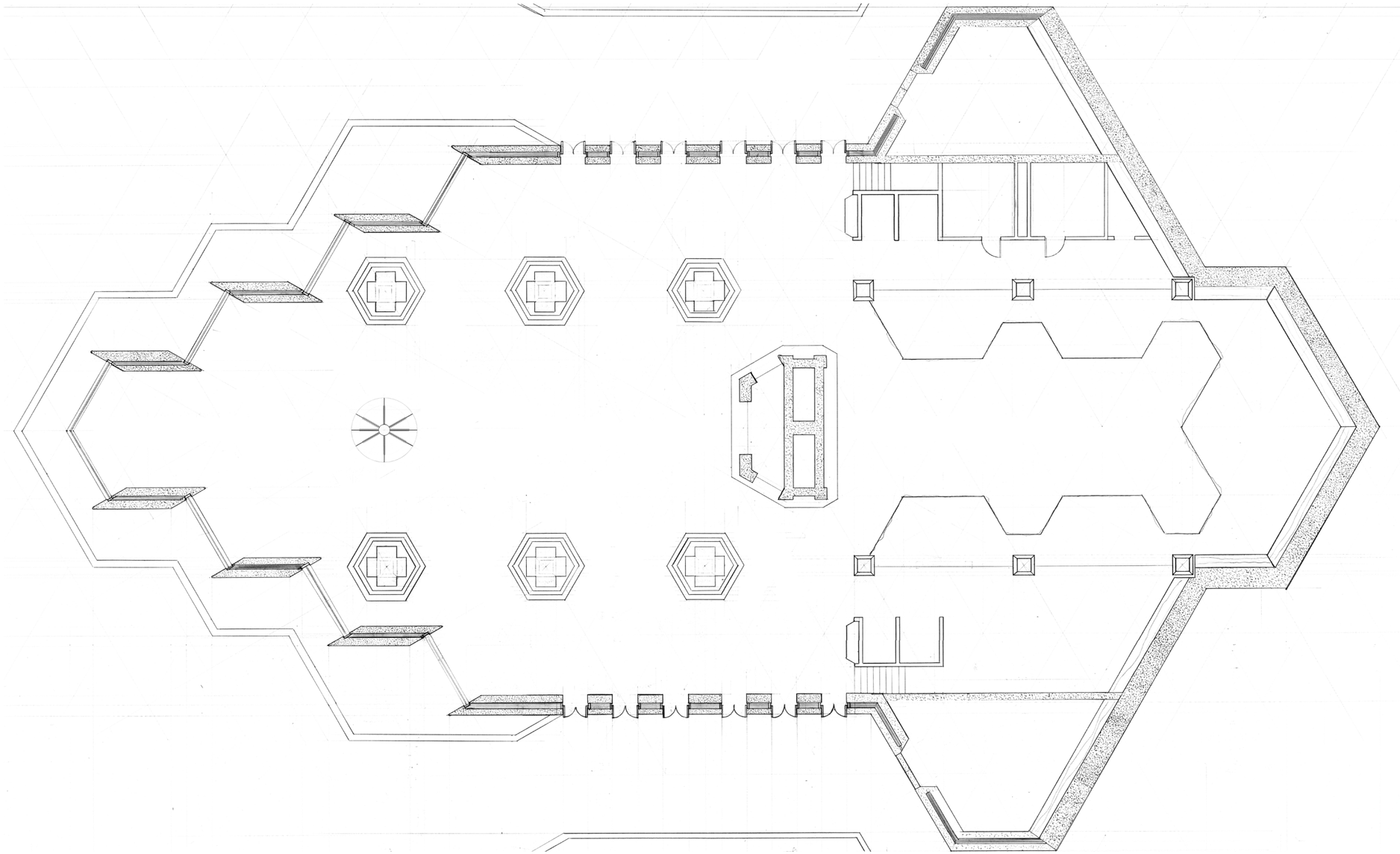


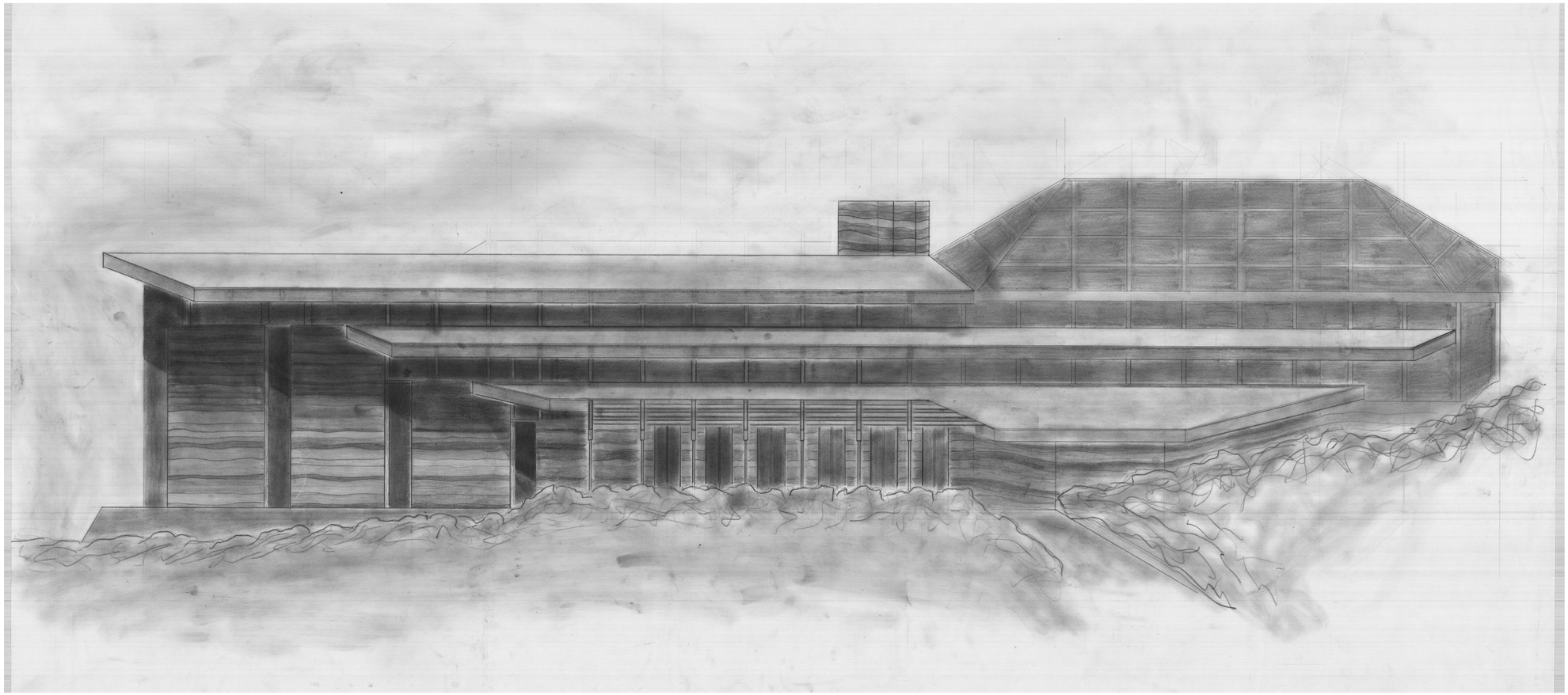
Nature designs systems that fit perfectly together. The natural world is based upon a holistic approach. Nature incorporates various elements together to achieve a single homogenous entity. This section of the thesis is and exploration of what the final building could be. Synthesizing the ideas and essences and creating a building that demonstrates all the ideas previously mentioned. The final building is about combining the stereotomic with the tectonic, the telluric with the dendriform, incorporating the views and sunset, attuning a building to nature, allowing the wind into the building when appropriate, capturing the heat from the sun, and allowing geothermal temperature regulation. The challenge was to incorporate all these things while still allowing the building to be functional. This section includes digital renders, pen renders, color pencil drawings, autoCAD, and graphite drawings to explore the synthesis of these ideas.

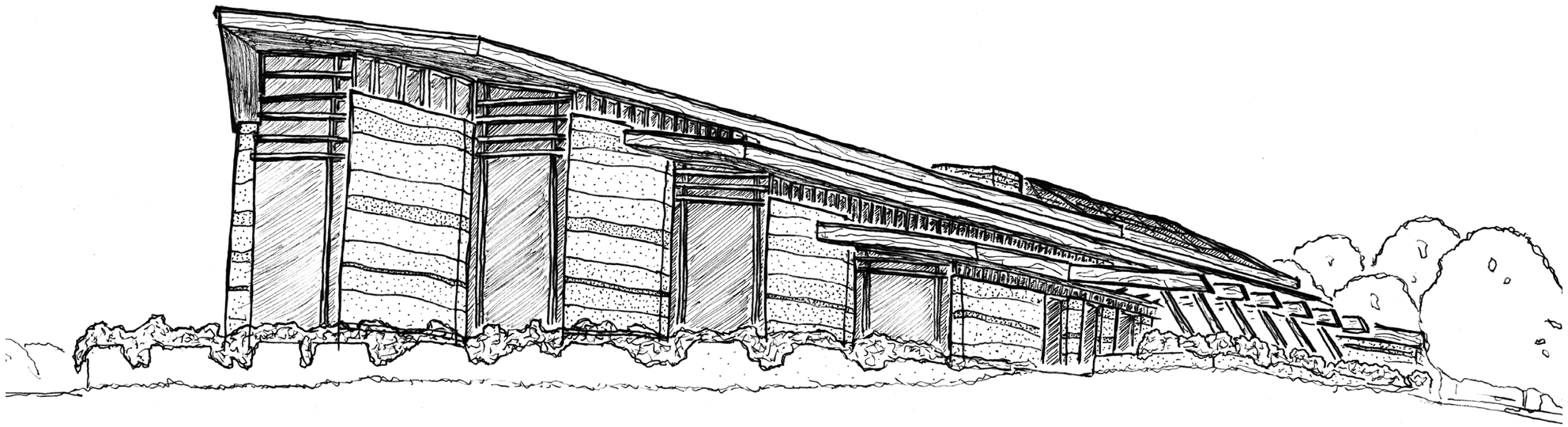


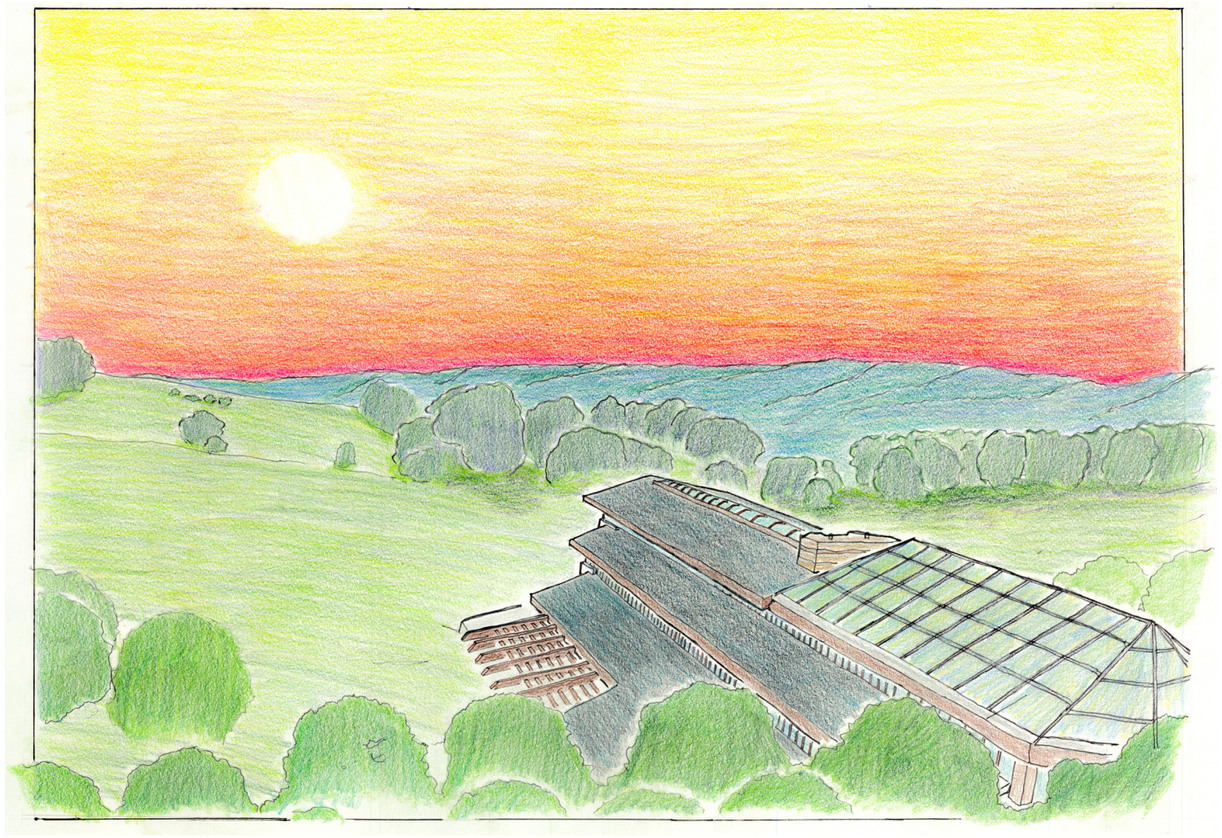


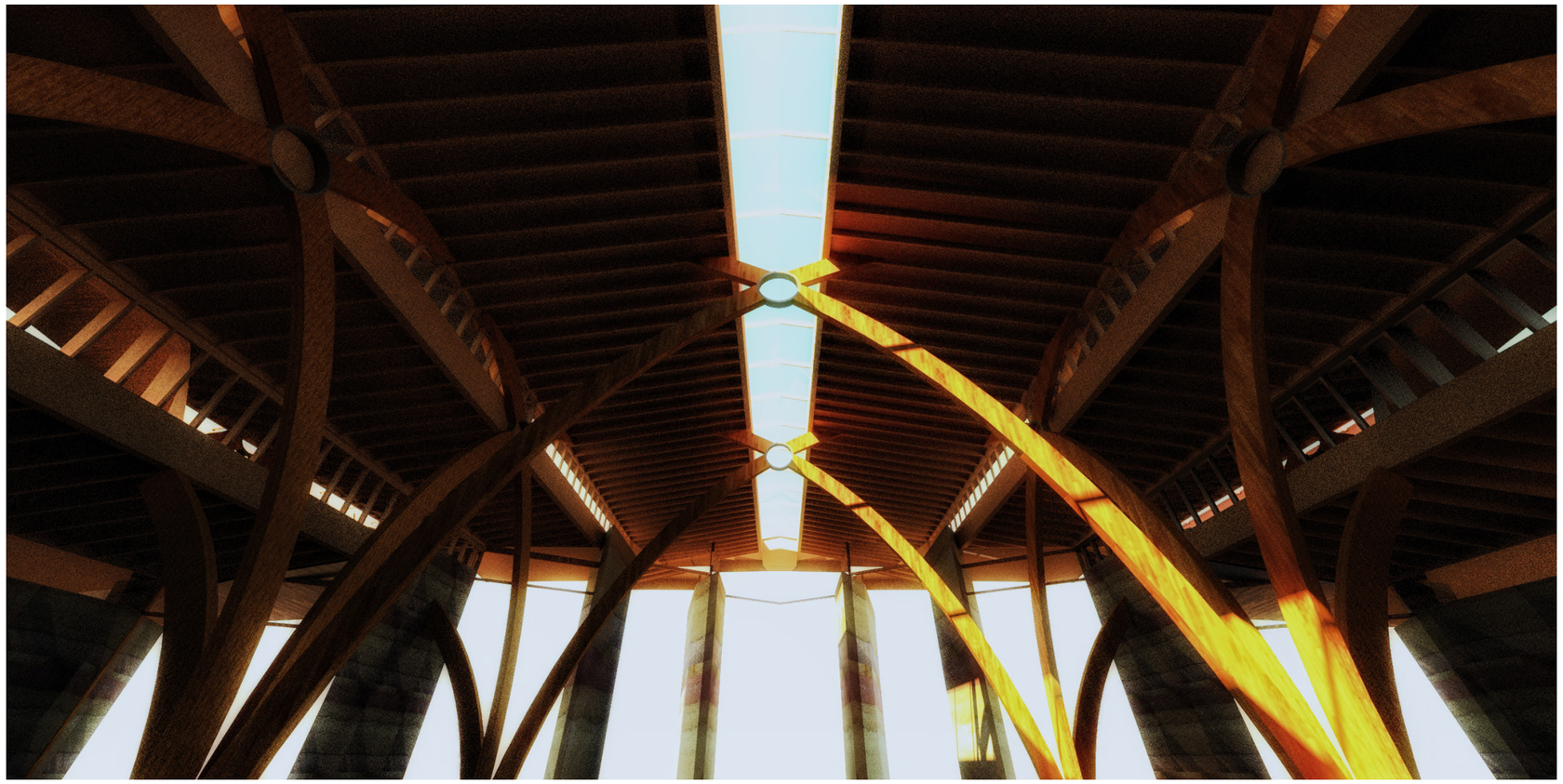


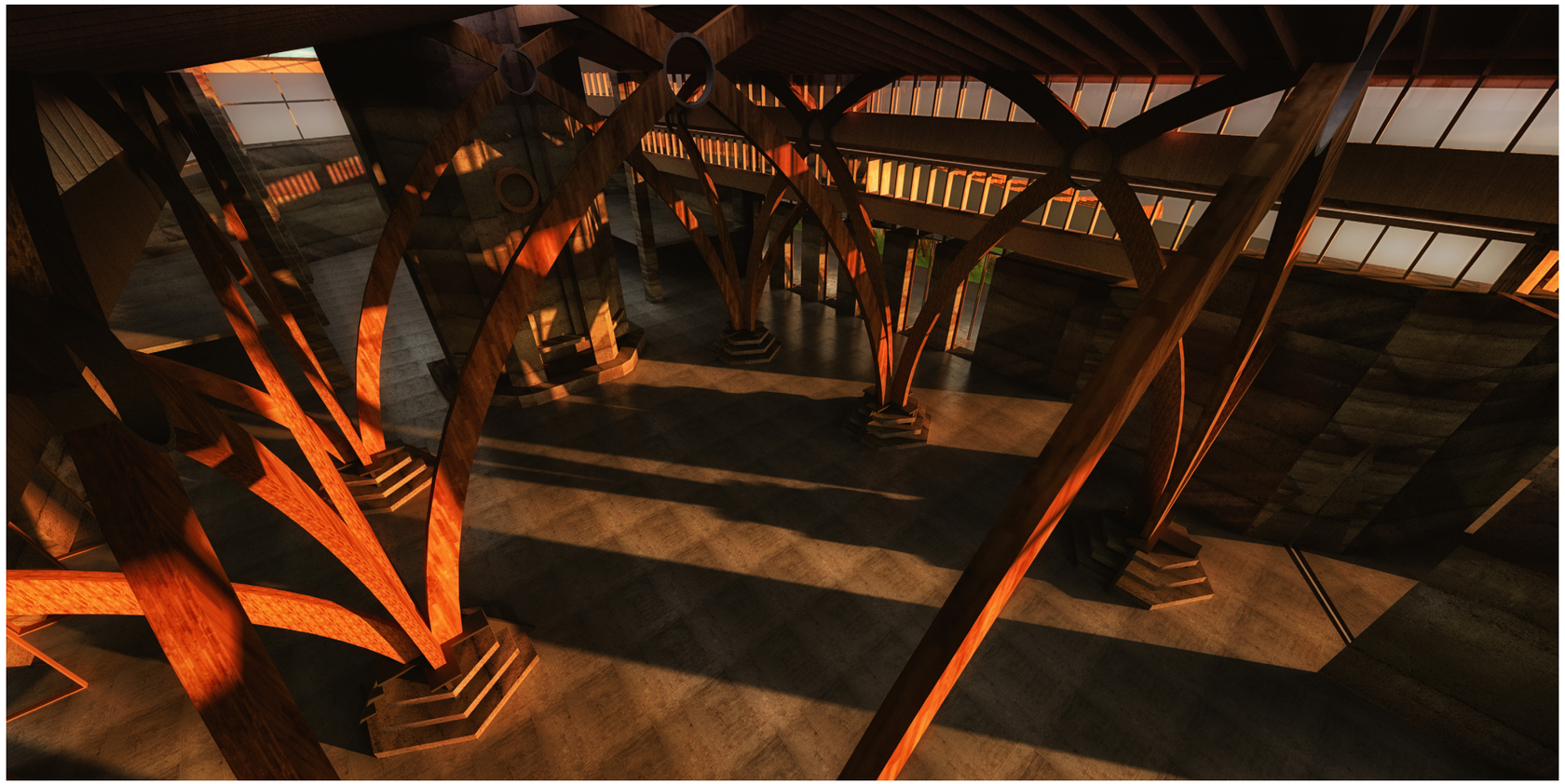


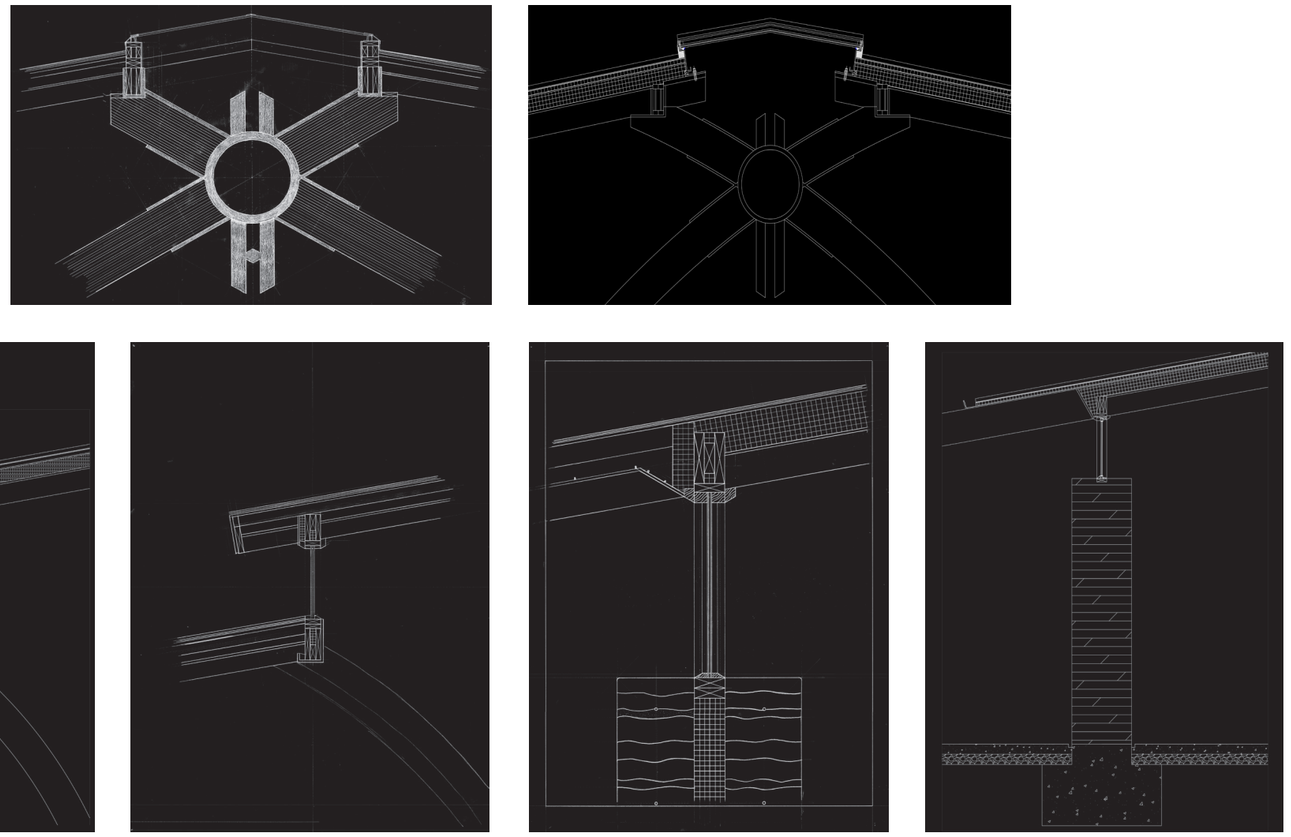




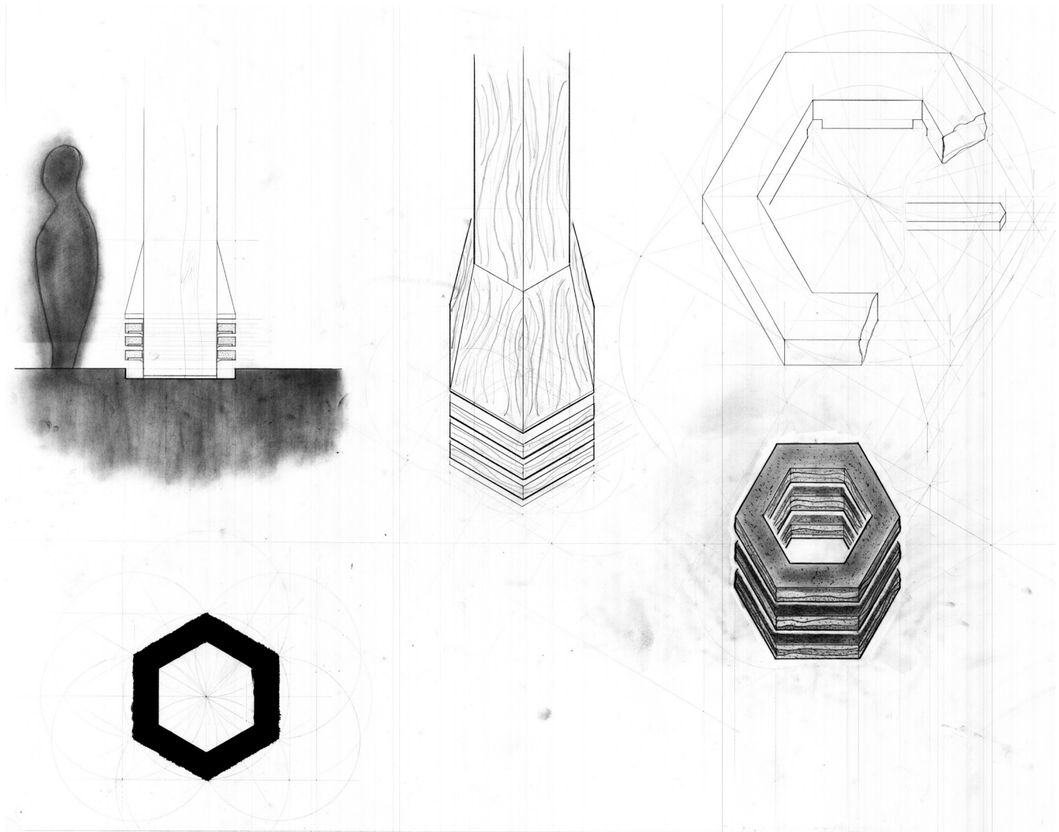


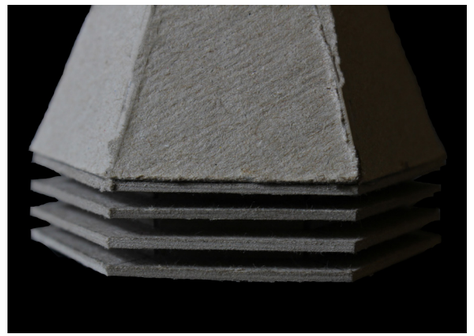




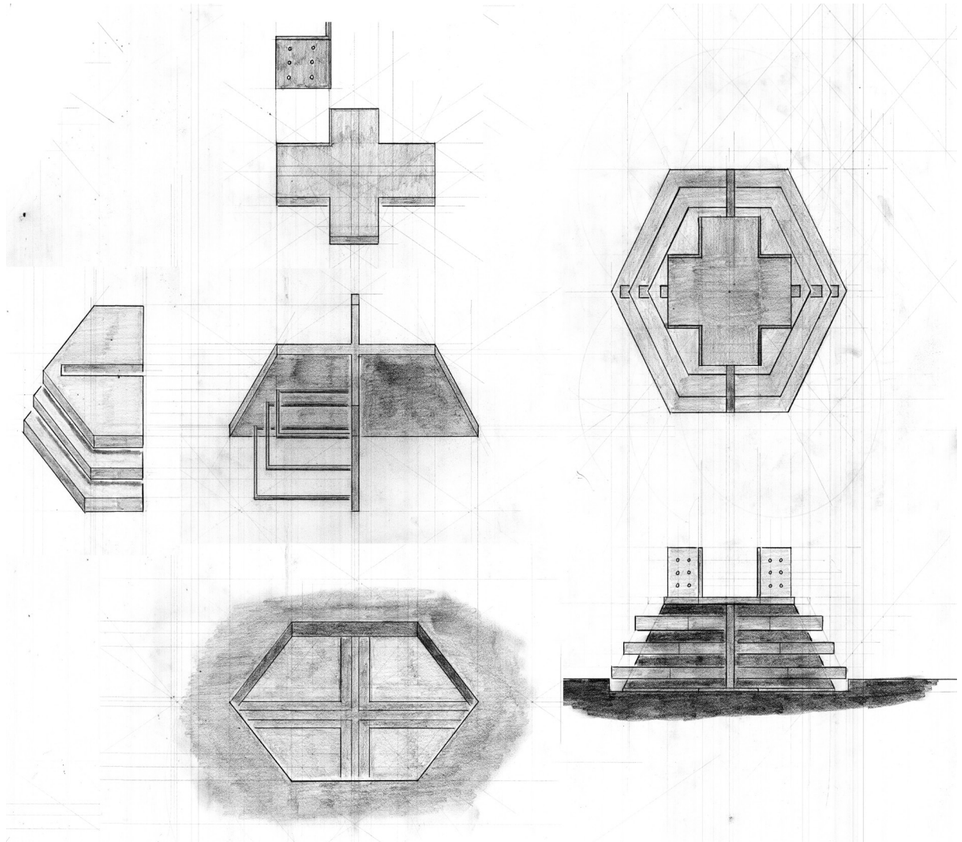


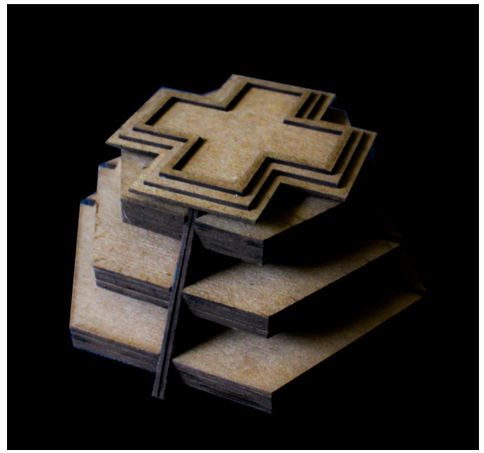
Architectonic conditions of the tectonic and stereotomic and
their appropriate detailing.

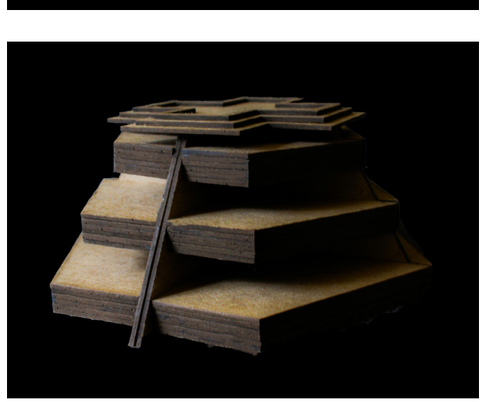




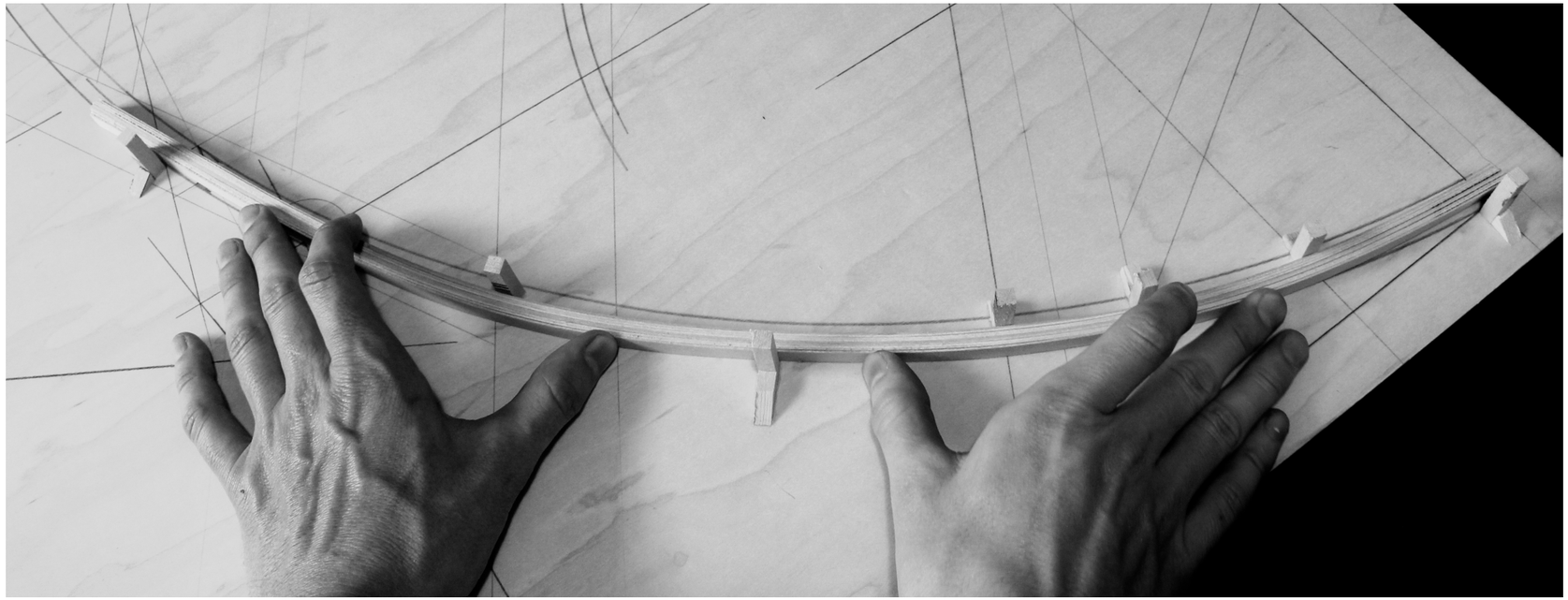
The base of the column became analogous to the base of a tree. Considering the condition between the tectonic and the stereotomic, this was an important detail. The base was refined as the column was refined, and each speaking to the other.







The final design for the base was hexagonal stepped rammed earth plates with a webbed steel support. This design shows a transition between what is of the ground and what is organic. When I began this exploration, I had a thought about the relationship of the soil to the tree. As the roots take in nutrients from the soil, when do they pass from telluric to organic? When the leaves from the trees fall in the autumn, when do they pass from organic to telluric? The base of the column then becomes a coalescing of the organic and the telluric.



Throughout this thesis, one of the main discoveries was that of process and various media. This multifaceted approach allowed me to find the architecture within the processes. The media and material of the process translated into the building. Realizing that form and material can be independent from each other was an important discovery. Modeling and drawing in a way that represents the idea rather than the product was also important. Certain types of media are more capable of expressing the idea and the form such as the pastels of the sunset, or the curved bent glulam column, or the heavy graphite drawings of an elevation. Certain media and approaches can open up unfamiliar possibilities, and potential discoveries, to the mind and to the project.

References

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Jim Jones
Kevin Jones
Scott Gartner

Architecture, Books, and Study:

Ralph Waldo Emerson
Jósean Figueroa
Lisa Heschong
Alan Hess
E. Fay Jones
Juhani Pallasmaa
David Pearson
Jean-Jacques Rousseau
Carlo Scarpa
Henry David Thoreau
James Turrell
Malcolm Wells
Lloyd Wright
Frank Lloyd Wright

All drawings and photographs by
author unless otherwise noted

Conclusion

"I thought of how this day would never come again and how my experience could never be replicated, for all nature is temporal and in eternal flux. The paradoxical similitude of the temporal and the eternal. Lost in the reverie of my journey I thought, "This, this is architecture." To emulate the divine and all that is Godly. To seek out what is perfect and from it derive a man made form."

Architecture is a powerful tool created by man, but it must be wielded responsibly. Architecture has the power to control our thoughts, emotions, memories, actions, and even our destinies. This thesis is a proposition to bring back mans affinity for nature and to help reestablish a mutualistic relationship. If architecture can reveal the beauty and importance of nature, then perhaps it will be revered once again. If architecture could incorporate a sliver of that beauty then it can also become beautiful. This type of architecture can illuminate the world around us that has long been neglected and forgotten. All men aspire to attain the knowledge of the divine because of its perfection. Men are destined to be stewards of nature, but don't always follow that path.

The study of nature is a life long pursuit. Through the study of nature, architecture can come closer to that which is divine. Translating the complexities and designs of the divine can help us better understand what it means to be human. It seems simple enough to mimic the form of a tree or rock, but to abstract the form and create something new based on the rules given can open architecture to beautiful and infinite possibilities. This thesis was not only an exploration of architecture but an exploration of myself and seeing how I work, coming up with solutions, and pursuing that which interests me. Architecture is ultimately a fragment of the architect that creates it. This architecture speaks about the character and qualities of my soul.