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Graduate Architecture Portfolio

Selected Works 2024

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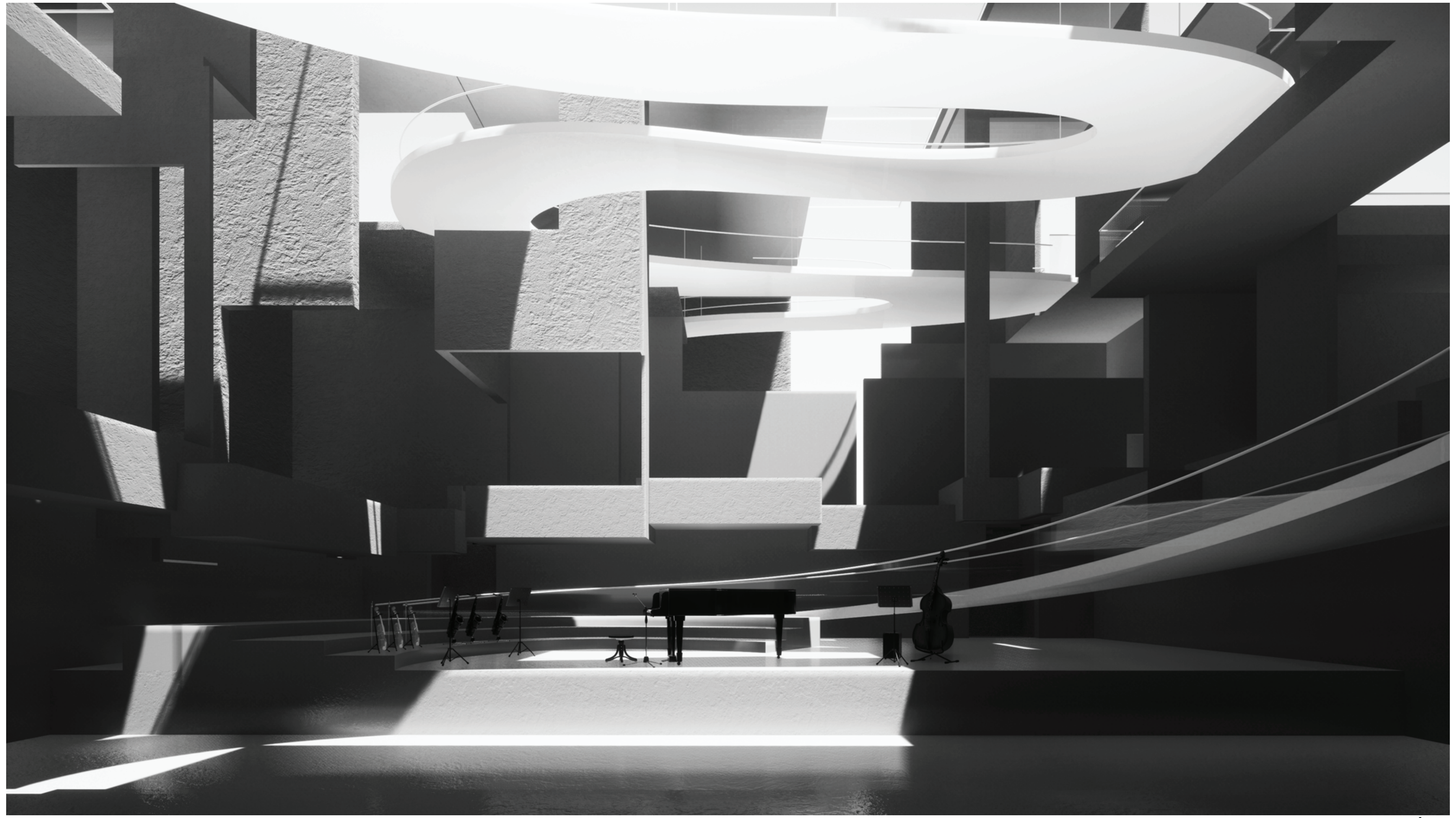
1. Locus Solus (2024)

an architectural interpretation of the musical notions of dissonance and consonance

https://youtu.be/VquEn-4Zsss

Auditorium B&W Render



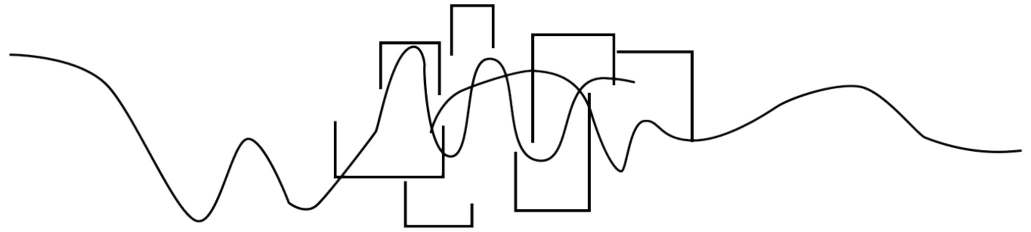
"Locus Solus (2024)" is an architectural endeavor inspired by Tomás Marco's musical composition of the same name. It interprets the interplay of consonance, dissonance, and rhythm through the language of curved and rectilinear structures, mirroring the releases and tensions within the music. Flow became an incredibly important element regarding the movements on and off the curved ramps. As visitors navigate the space, they traverse through moments of stability and discord, echoing the flow of musical motifs, ultimately culminating in a spatial experience that reflects the composition's dialogue between harmony and rhythm.

In the musical world, consonant and dissonant harmonies refer to moments in the music where more than one pitch is played at the same time, creating either a sense of stability and repose as a consonant harmony or a sense of impermanence and discord as a dissonant harmony. When the interaction between consonance and dissonance turns too intense, Marco inserts breaks, rhythmic monotoned piano notes, to disrupt and reset the balance. We've taken inspiration from this dialogue and translated it into a line language of curves and rectilinear structure, then from the diagrammatic into three-dimensional spatial language.

Co-existing, consonance and dissonance perform together and continuously exchange the notion of temporality. In spatial language, Locus Solus (2024) envisions the buildup and release of spatial impermanence through bodily movement on and off the two central curved ramps. Surrounding the curved ramp are boxed-shaped walls retaining the outer turns of the wave, connecting them in elevation, and creating circulation throughout the structure. As one walks on the curved ramps, one experiences permanence and smoothness, while the connection to the rectilinear spaces infers impermanence and detouring.

musical

consonance + dissonance
———
rhythm

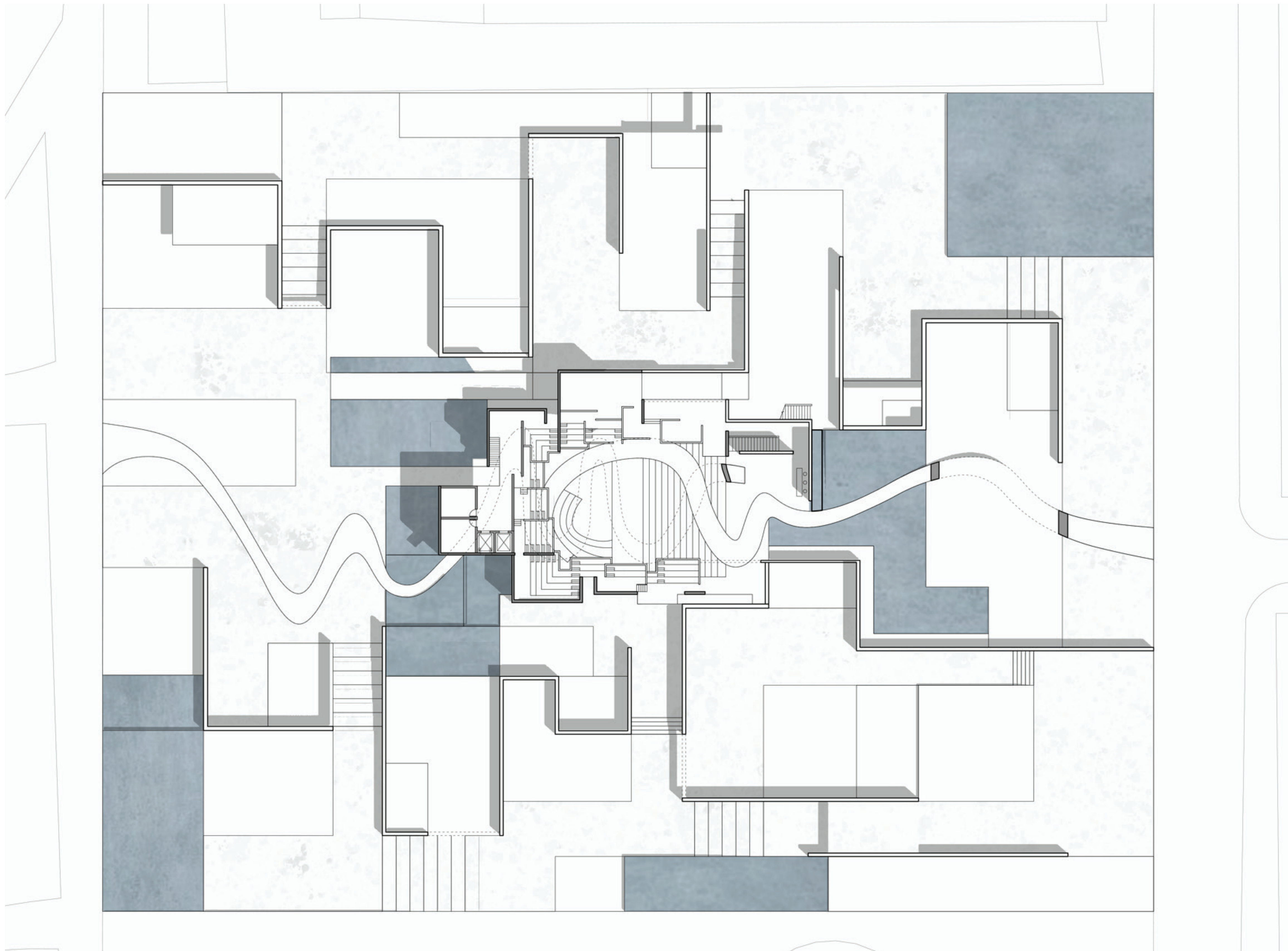


spatial

permanace (flow) + impermanance
———
balance

Midterm Stillshots of Physical 1:25 Model
Front Elevation

Midterm Stillshots of Physical 1:25 Model
Back Elevation



Site Plan + Ground Floor Plan Drawing

Second floor ramp

Building exit from site landscape

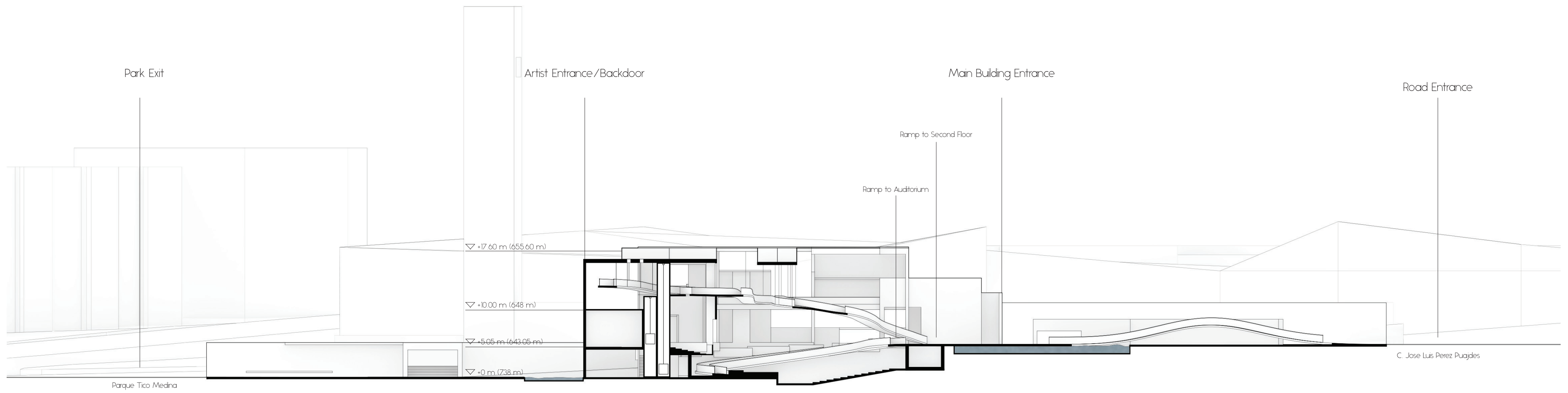
Building elevation from site landscape

The diagrammatic understanding of consonance and dissonance is translated in the section as well, opening up the ground and sky for three levels of space; one curved ramp diving down and the other rising up. The two ramps go through walls in different ways and each curved turn creates space of unique moments and heights with the rectangular walls and floors.

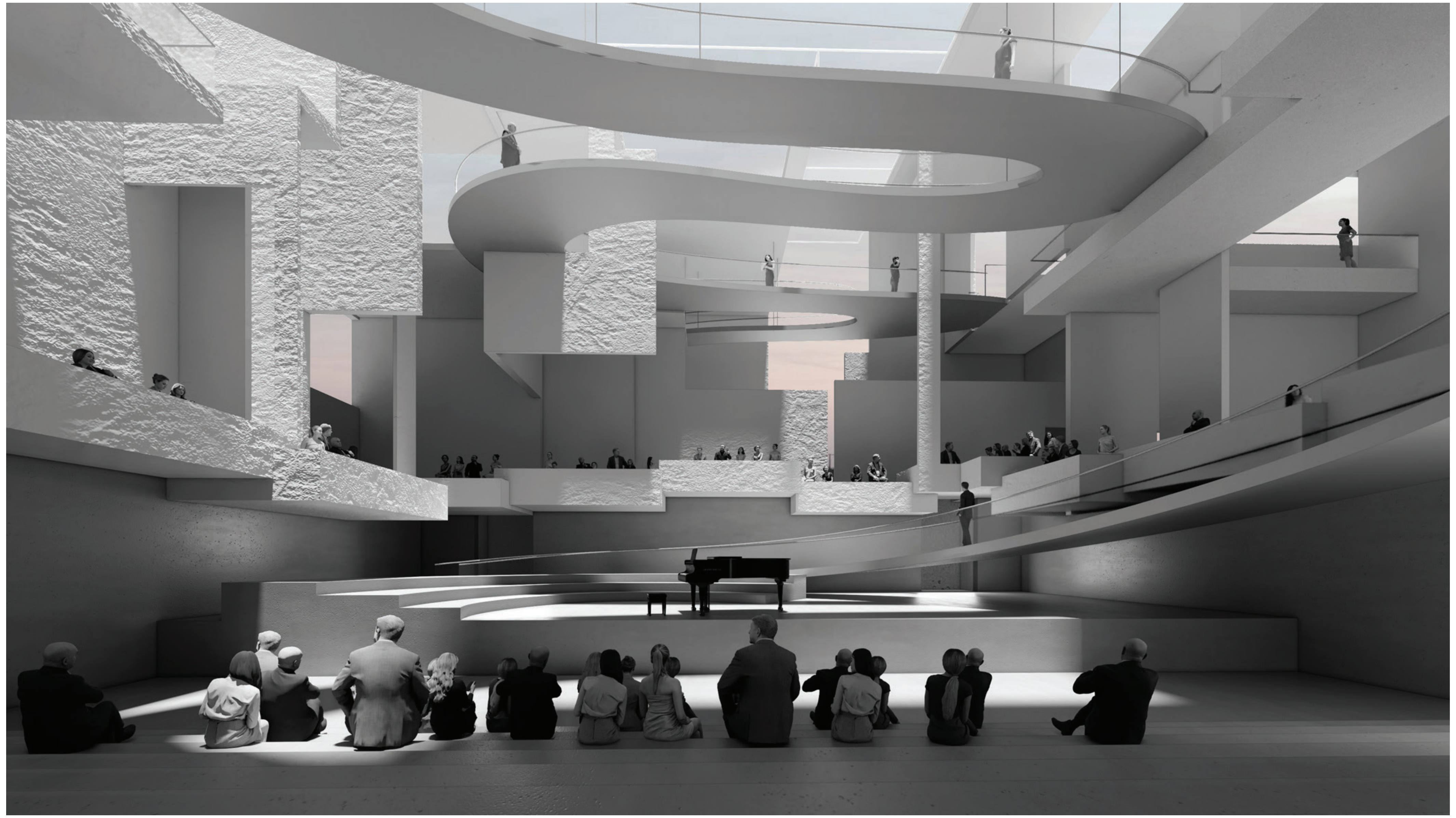
Like the rhythmic monotoned piano notes that interrupt intense musical interactions, the architectural circulation strategically navigates between smooth, permanent curves and detouring rectilinear spaces. Ultimately, Locus Solus (2024) intends to capture the essence of musical expression, translating it into a spatial experience that resonates with the intricate design of Tomas Marco's composition.v

Physical Model Stillshots 1:50

Site Section



Auditorium Render with People

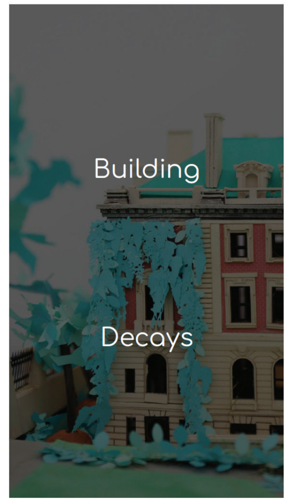


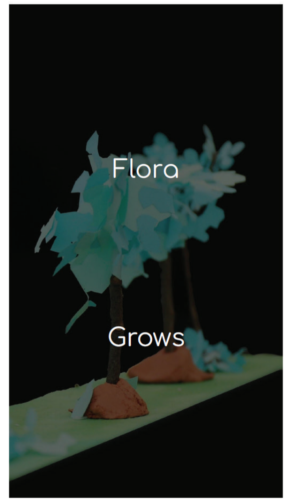
2. Carnegie Mansion (Artifact)

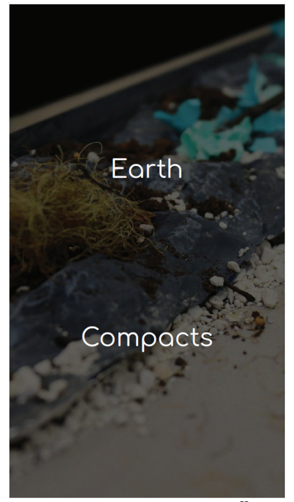
a project that visualizes the timescale of preservation and maintenance through object transformations

https://youtu.be/ts4wVKP3JTI

Transformation occurs infinitely when time is allowed to flow, therefore models portray a frozen moment reluctant to change. Focusing on the connection between how natural elements, such as weather and growth, could impact the surrounding built environment and how there is a distinct value of the preserved architecture and newly built environment, the project puts the model through a constructed time.

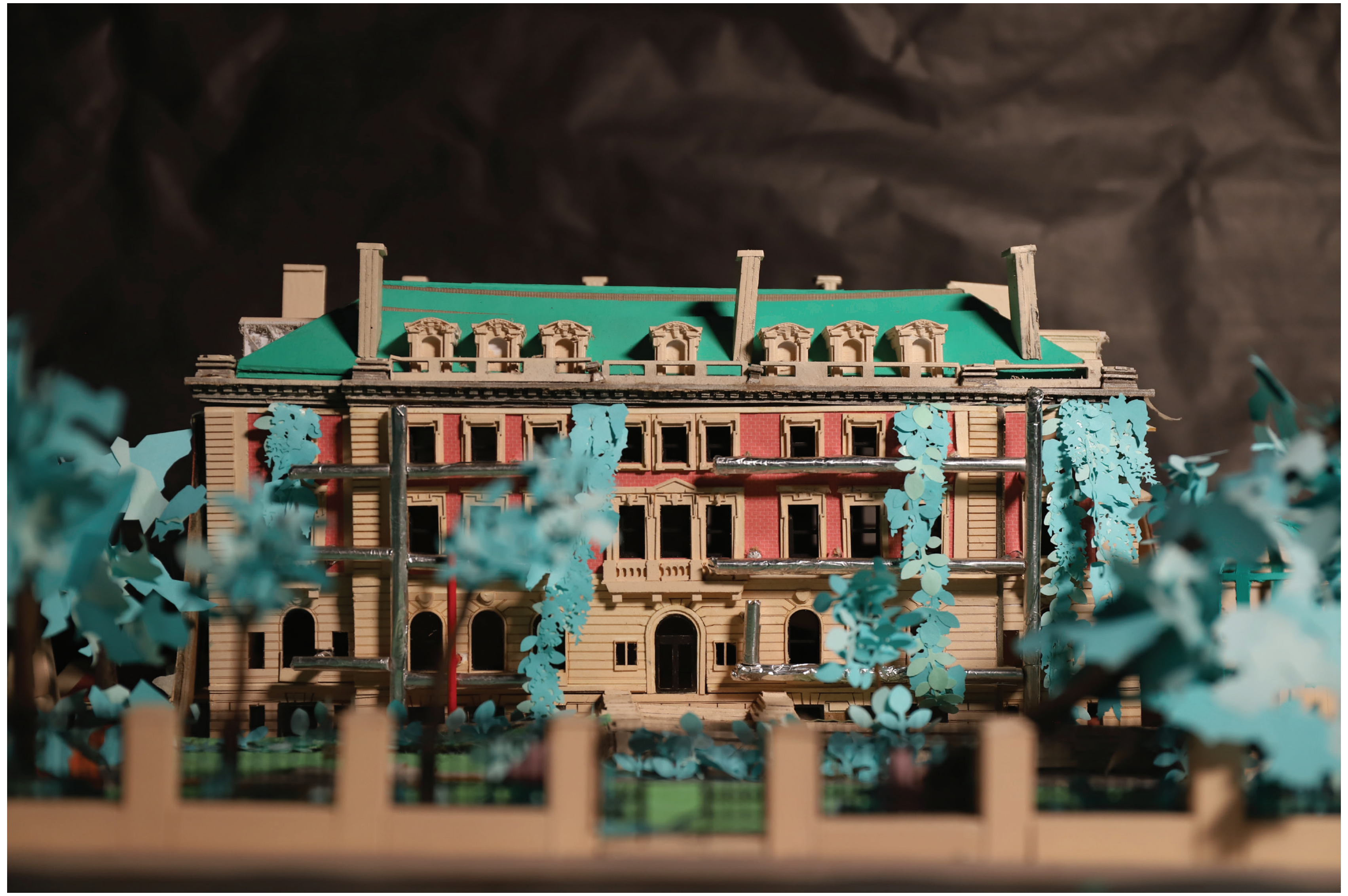






Carnegie Mansion: the decay

Of the infrastructural, the expression is made to bring out the infrastructure of the building to free out the interior.

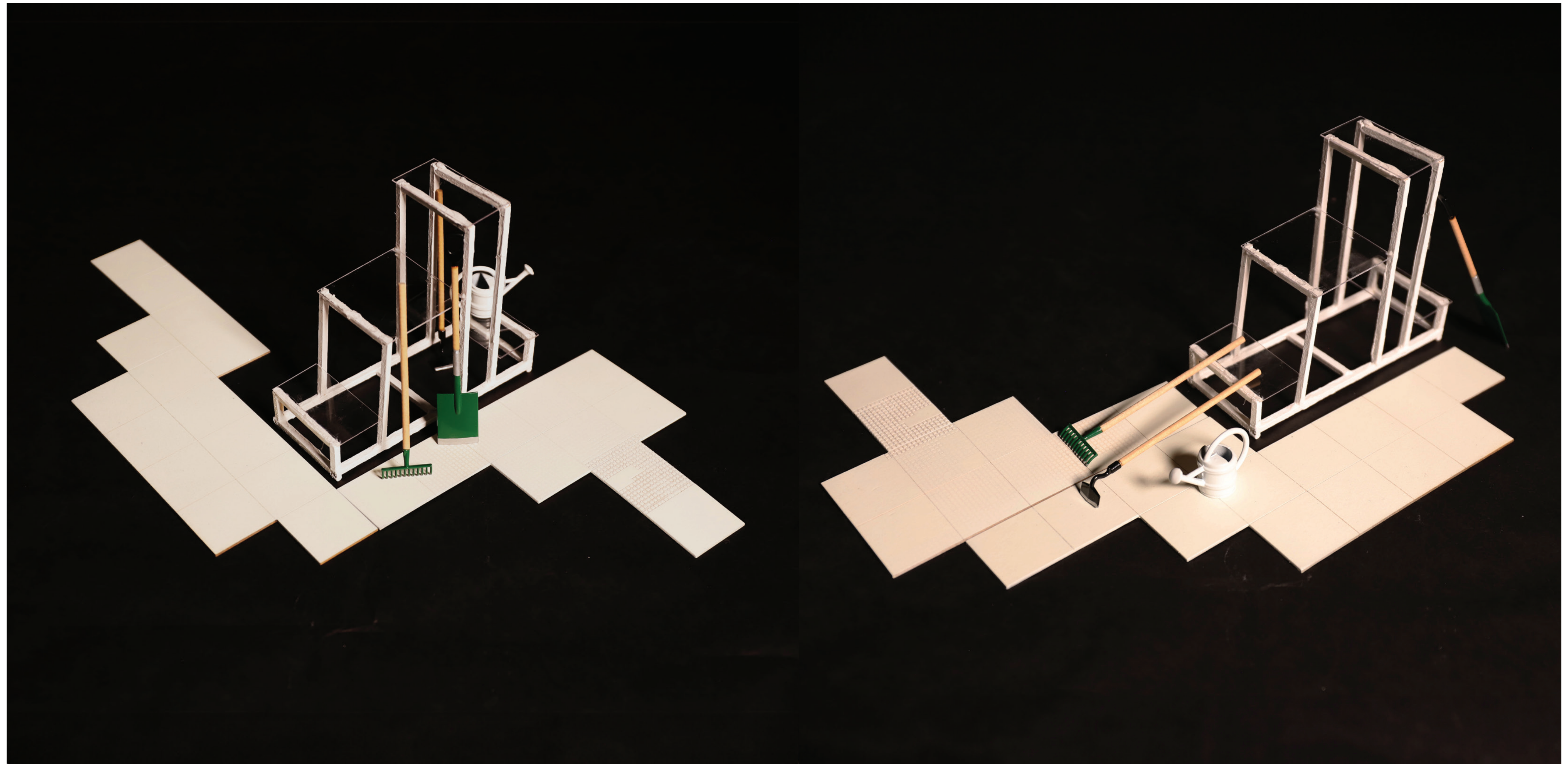


Due to the updated equipment, the floor in the Carnegie Mansion has been raised to allow air circulation and water management, taking away about 20-30% of the interior space. Exposing the 'guts' of a building is not a new practice, by allowing the equipment piping to behave exteriorly, the interior space is simplified. Space that originally belonged to human that were overtaken by technology and codes.

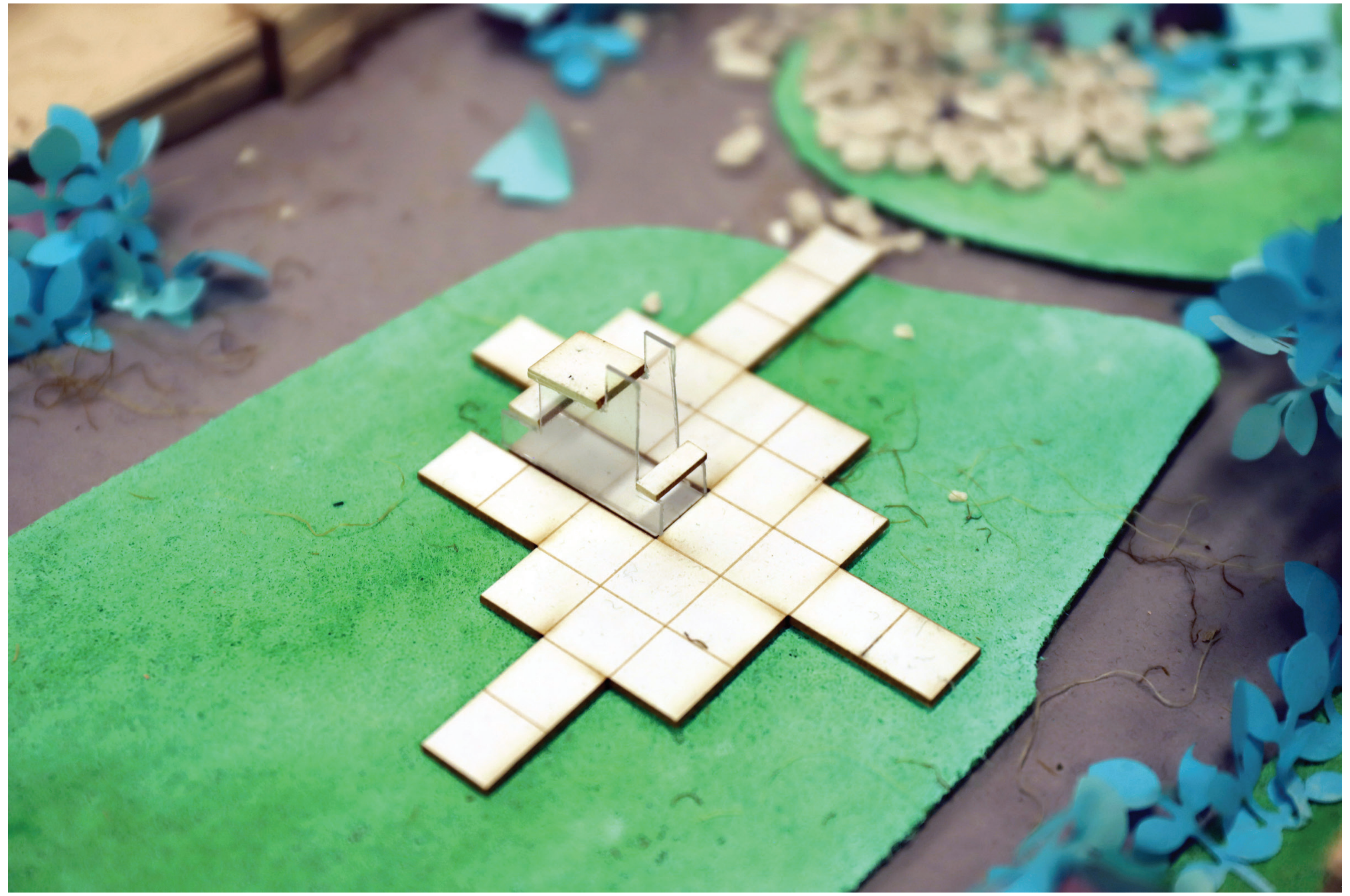
The additions and renovations that the artifact we know as Carnegie Mansion had undergone are displayed alongside the wisterias on the south facade, drawing a comparison between the temporality of wisterias against the pipes. By simplifying the interior, more space can be used for installations and a focused experience on the artifacts. More storage space is given back for the mansion's increasing collection and exterior access to the equipment means easier maintenance excursions.

Carnegie Mansion: the growth

Of the biological, a focus is placed on the expression of maintenance.

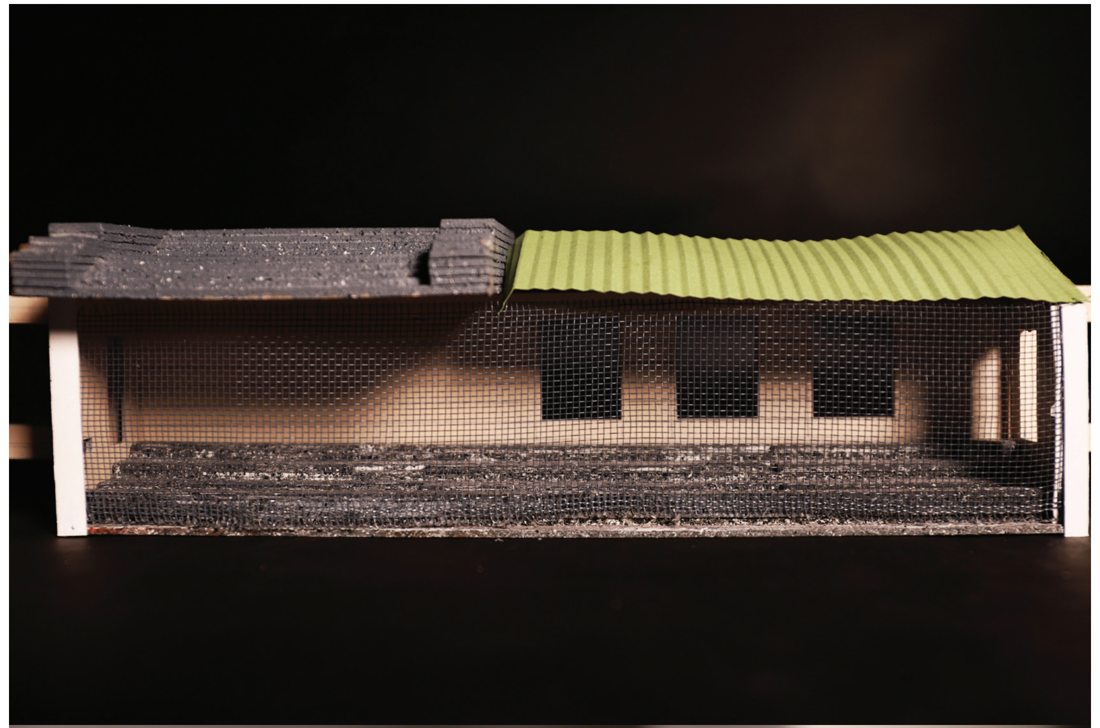


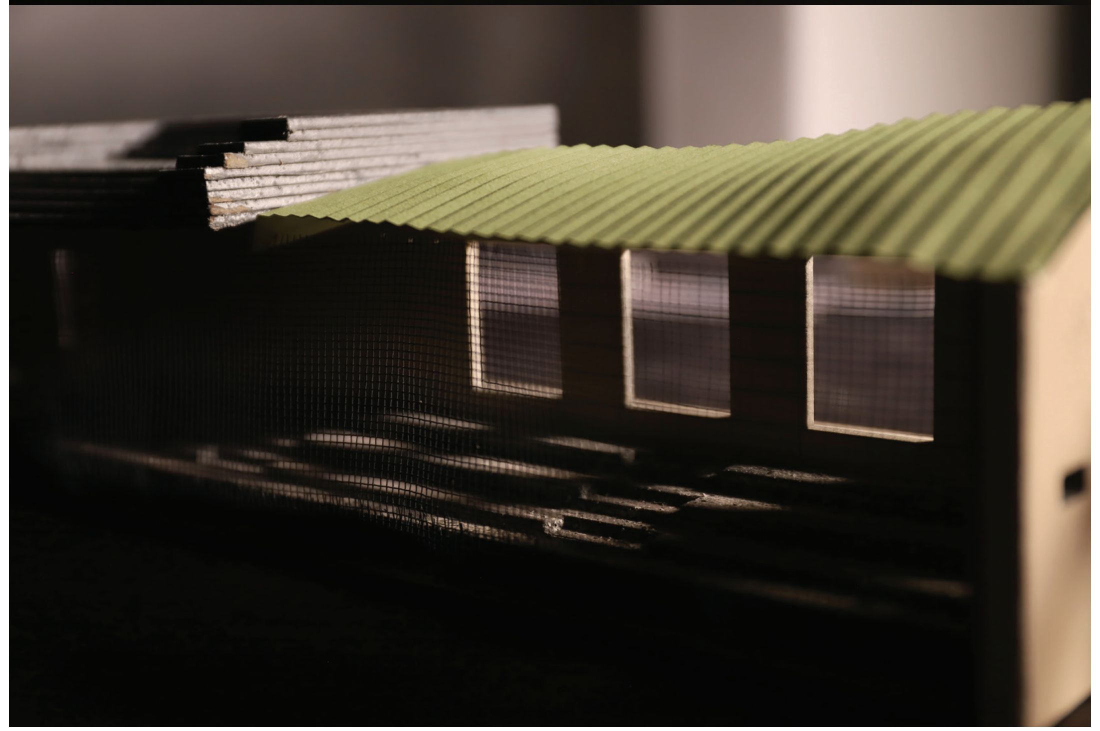
The Arthur Ross Terrace and Garden greets all museum visitors as they enter through the south entrance and serves as the first interaction between 'Museum' and people. Its appearance is of utmost importance and maintenance is done daily to maintain the serenity of the garden. These include clearing the paths, leaves, and trash, weekly trims of the bushes and grass, monthly fertilization of the soil, and seasonal pruning of the trees. All of which is done quietly, away from the visitor's eyes.



The architectural transformation envisions a movable structure that expresses the important role of gardening tools and the human preservation of natural aspects. Situated on four wheels, the structure is split into four spaces, a space for maintenance workers to rest, storage and display for smaller tools another for larger tools, and a central space for grating storage. If the garden is to be read as a homogeneous state prone to the universality of time, then the space established by the grating besets that continuity. The mobile structure then changes its location and grating pattern however it needs to maintain the garden and highlight its importance.

Of the geological, a threshold is created between the exterior south basement wall and the soil wall.

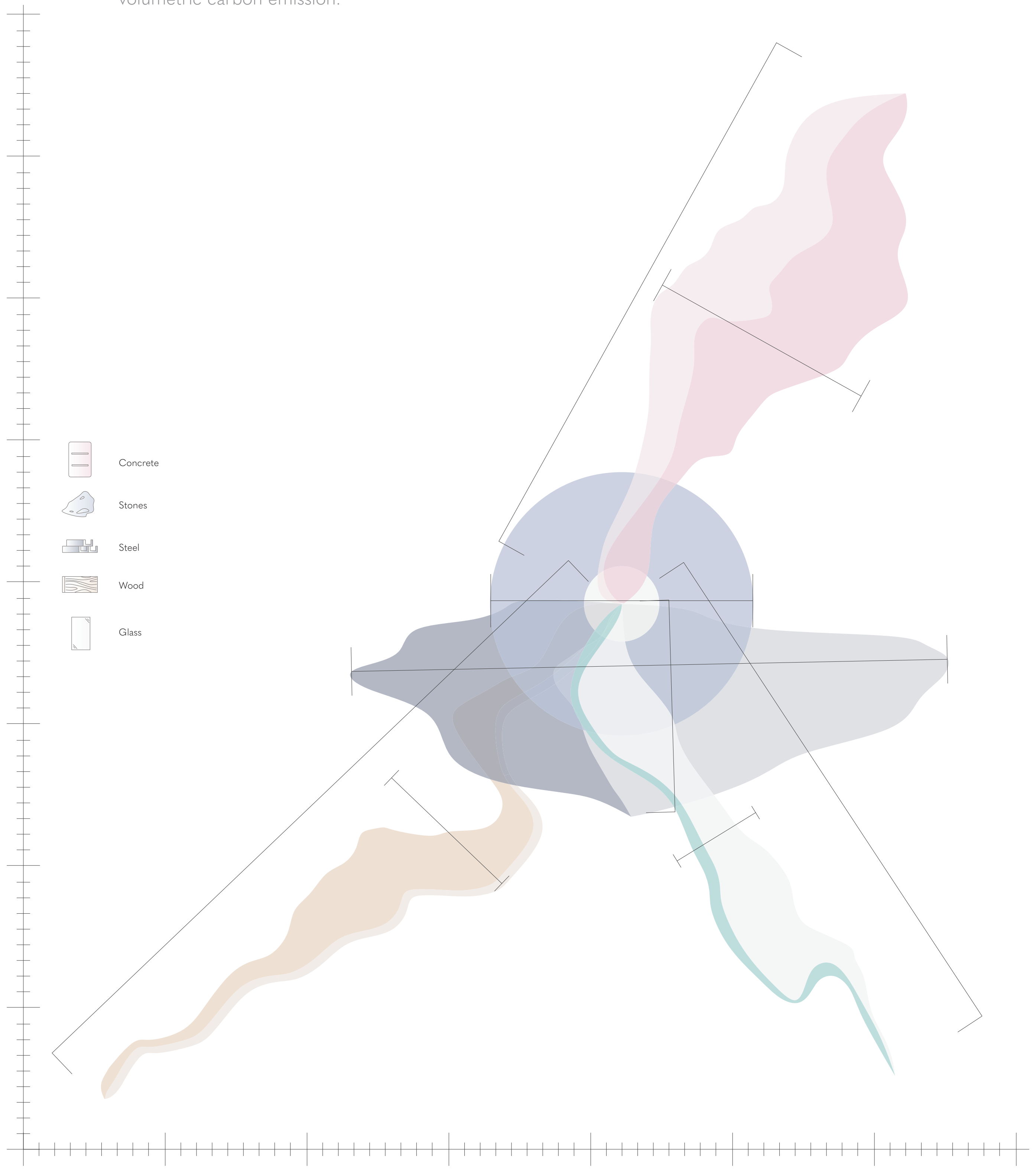




The transformation builds an exterior addition consisting of a meshed wall placed against the compacted soil adjacent to the basement windows. Here the visitors are faced with a much slower-paced nature. As time passes, components sieved through the mesh are collected at the bottom of the window, bringing in the waste or unwanted components as the exterior soil compresses.

Located in the basement, the exterior room also acts as the center point for excess rainwater. The northwest ramp and cascading seats all serve to direct water toward the soil wall, wetting the hardened soil, and taking away loose dirt and debris. In this space, an invisible course of nature, soil compression, is realized to the visitors.

Darker shade represents the material's volumetric mass. The lighter shade is the material's volumetric carbon emission.



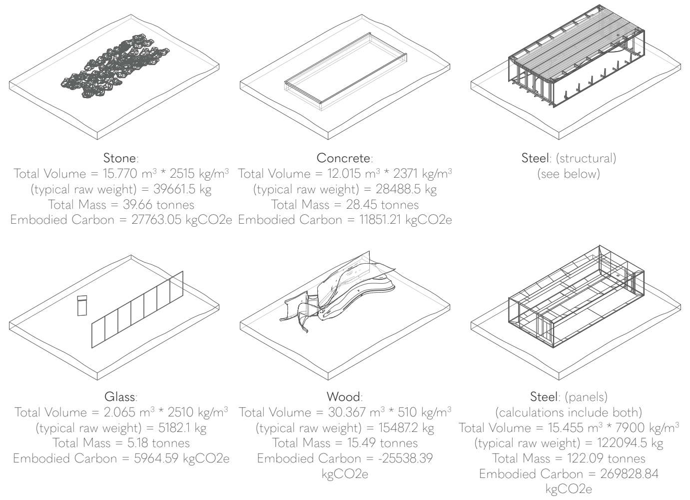
3. Construction Ecology of Tverrfjellhytta

an in-depth analysis of the building's built environment and material extraction

The Norwegian Wild Reindeer Pavilion, known as Tverrfjellhytta in Norwegian, was designed by Snøhetta as a structure for viewing that complements the unique landscape and diverse ecosystem of Norway's Dovrefjell National Park in Hjerkinn. Dovrefjell is home to Europe's final wild reindeer herd and is a natural home to various rare endemic plants and animals, such as musk oxen and arctic foxes. The pavilion functions as a refuge for visitors and students engaged in the educational programs of the Norwegian Wild Reindeer Foundation.

Snøhetta placed significant emphasis on the design's connection to materials and locality. Yet, how does the material selection for the project compare to the carbon emission rate per unit of mass or volume? The project aims to represent carbon emissions in a non-Euclidean manner and to alter its building materials to mitigate overall carbon emissions.

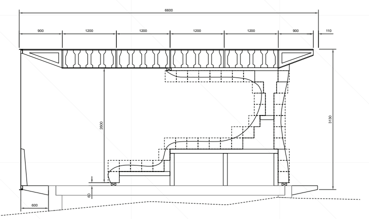
Tverrfjellhytta: the Material



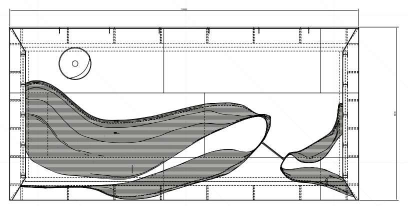
Tverrfjellhytta: the Cultural

Throughout history, Dovrefjell has been the symbol of something eternal, unchangeable and safe. The mountain's enriched history goes back to the Stone Ages and is the topic of many national legends, myths, and folktales. The founding oath of the Norwegian constitution states: 'United and true until Dovre falls!' Dovre also served as a large extraction location for iron, copper and zinc. At its peak, 450 people worked at the Tverrfjelletmines, so it served as an important workplace of those living in the region. The operations were ceased in 1993 when all resources have been taken. Now, below the range and the Tverrfjellhytta lies large halls of water.

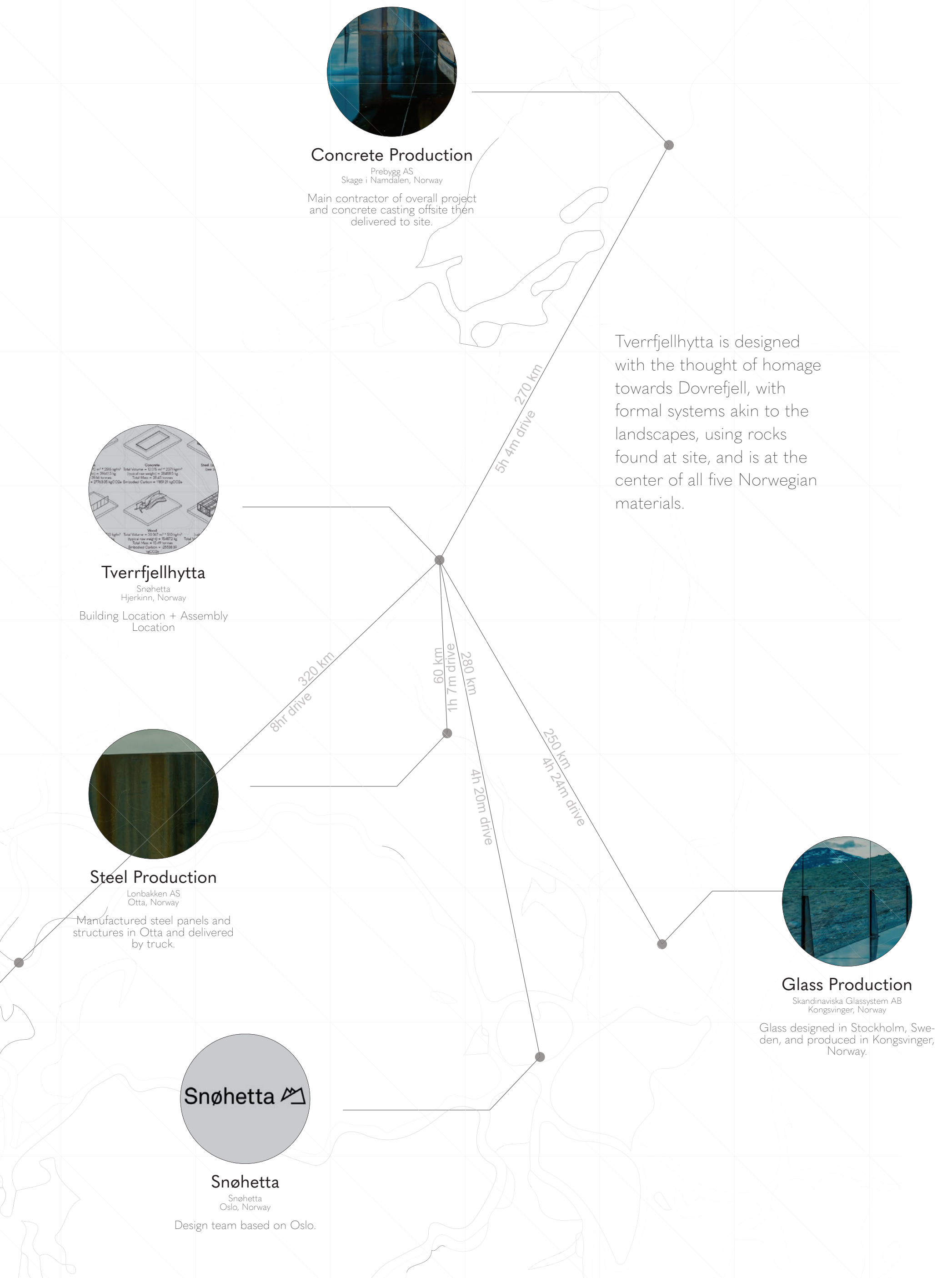
It proved crucial the history and natural aspects of Dovrefjell is to be seen within the design of the viewpoint structure. The wooden core is formally a solid rock or ice which had undergone ages of erosion by running water or wind. Its curvature reflects the landsacpe on which it stands.

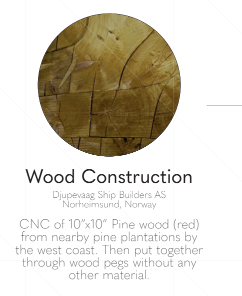


Short Section



Building Plan

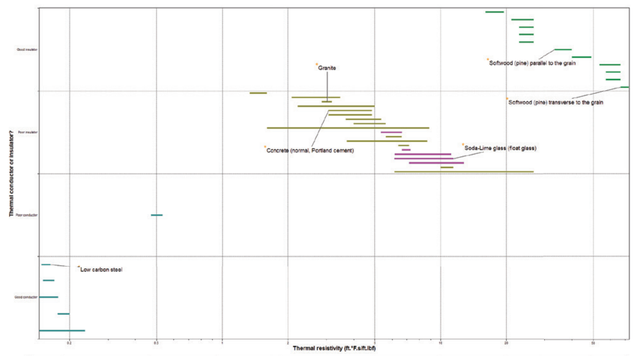


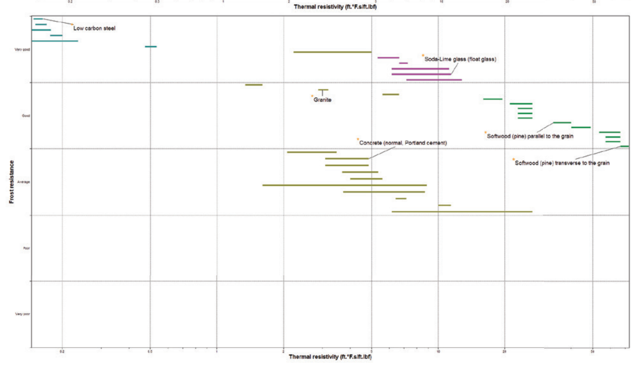


"[Dovrefjell] holds a unique place in Norwegian consciousness through a wide range of tales and myths connected to the mountains. It has a long history filled with travelers, hunting traditions, mining, and military activities..." - Snøhetta

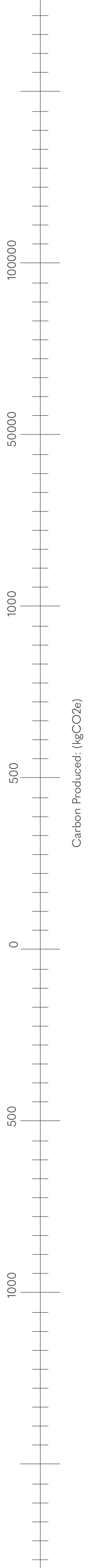
Tverrfjellhytta: the Properties

Thermal Properties: Tverrfjellhytta is located 1250 meters above sea level, overlooking the Dovre Mountain plateau. Combined with the natural climate of Scandanavia, the temperature yearround falls between 2°C in the winter and 18°C in the summer. The building as a shelter requires heavy thermal resistance as well as high specific heat capacities to withstand the cooling winters of Hjerkinn.





All selected materials seem to be relatively resistent to thermal changes, and boost strong frost resistance qualities. Wood, which makes up the core of the building is a good thermal insulator, but all other materials lack insulating properties.



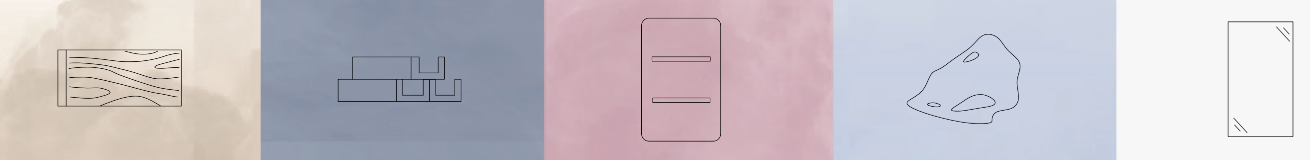
Wood: (Softwood)
Total Volume = 30.367 m³ * 510 kg/m³ (typical raw weight) = 15487.2 kg
Total Mass = 15.49 tonnes
Carbon: -1.414 - 0.847
Embodied Carbon = -21898.90 kgCO2e

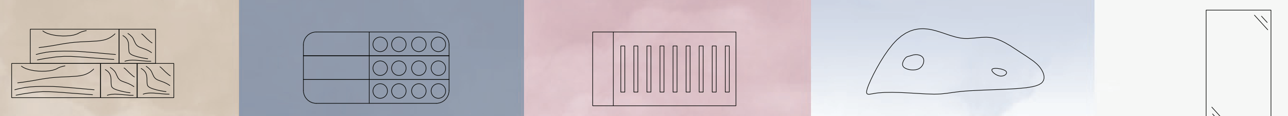
Steel: (Cast iron Steel)
Total Volume = 15.455 m³ * 7900 kg/m³ (typical raw weight) = 122094.5 kg
Total Mass = 122.09 tonnes
Carbon: 2.640 - 2.910
Embodied Carbon = 322329.48 kgCO2e

Concrete: (Reinforced Cement)
Total Volume = 12.015 m³ * 2371 kg/m³ (typical raw weight) = 28488.5 kg
Total Mass = 28.45 tonnes
Carbon: 0.121 - 0.442
Embodied Carbon = 3442.45 kgCO2e

Stone: (Granite)
Total Volume = 15.770 m³ * 2515 kg/m³ (typical raw weight) = 39661.5 kg
Total Mass = 39.66 tonnes
Carbon: 0.700 - 0.701
Embodied Carbon = 2776.35 kgCO2e

Glass: (Solid Glass)
Total Volume = 2.065 m³ * 2510 kg/m³ (typical raw weight) = 5182.1 kg
Total Mass = 5.18 tonnes
Carbon: 0.758 - 1.440
Embodied Carbon = 596.45 kgCO2e





Wood: (Dovrefjell Local Pine)
Total Volume = 30.367 m³ * 510 kg/m³ (typical raw weight) = 15487.2 kg
Total Mass = 15.49 tonnes
Carbon: -1.649 - 0.366
Embodied Carbon = -25538.39 kgCO2e

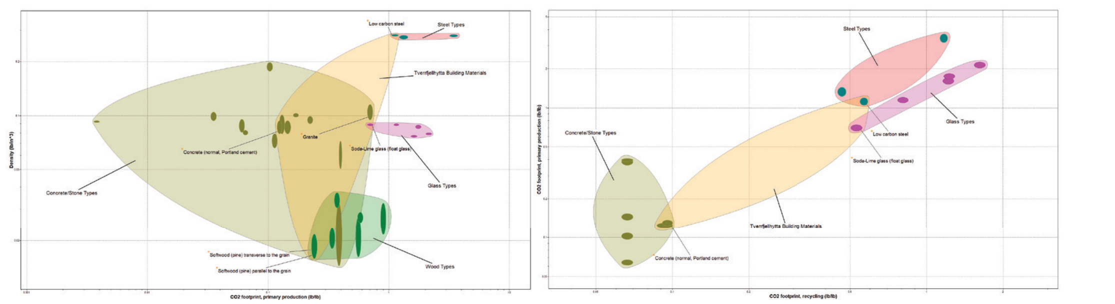
Steel: (Low Carbon Steel)
Total Volume = 15.455 m³ * 7900 kg/m³ (typical raw weight) = 122094.5 kg
Total Mass = 122.09 tonnes
Carbon: 2.210 - 2.440
Embodied Carbon = 269828.84 kgCO2e

Concrete: (Precast)
Total Volume = 12.015 m³ * 2371 kg/m³ (typical raw weight) = 28488.5 kg
Total Mass = 28.45 tonnes
Carbon: 0.093 - 0.280
Embodied Carbon = 1185.12 kgCO2e

Stone: (Limestone)
Total Volume = 15.770 m³ * 2515 kg/m³ (typical raw weight) = 39661.5 kg
Total Mass = 39.66 tonnes
Carbon: 0.016 - 0.090
Embodied Carbon = 634.560 kgCO2e

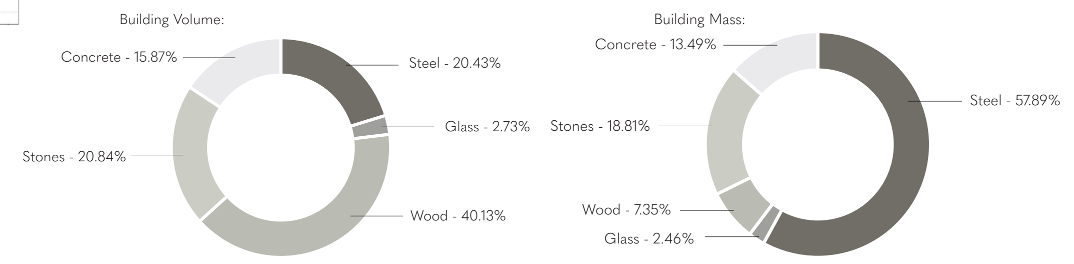
Glass: (No change)
Total Volume = 2.065 m³ * 2510 kg/m³ (typical raw weight) = 5182.1 kg
Total Mass = 5.18 tonnes
Carbon: 0.758 - 1.440
Embodied Carbon = 596.45 kgCO2e

Carbon Emissions:

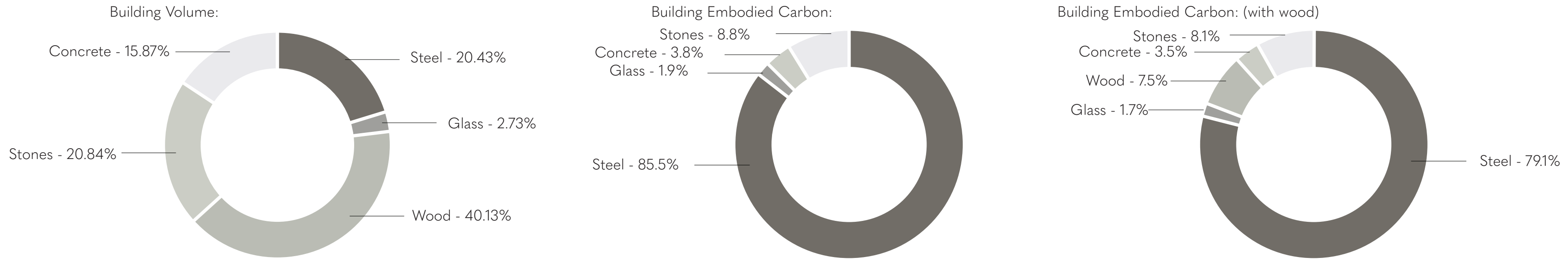


The five materials present in the project are charted against similar, replaceable, options in their material bracket as well as against themselves. Low carbon steel, granite, and float glass posing as the higher carbon-producing materials against softwood pine and concrete, which produces the least amount of carbon. Granite, which is a local Norwegian product, produces the highest carbon of all rrelated stone types. However, may be chosen due to its close proximity and local inclusivity. Pine wood, steel, float glass, otherwise, are all the lowest carbon-producing materials in their respective bracket. Wood and granite however, did not have a recycling CO2 footprint according to the ANSYS database, which begs the question: what happens to its CO2 count?

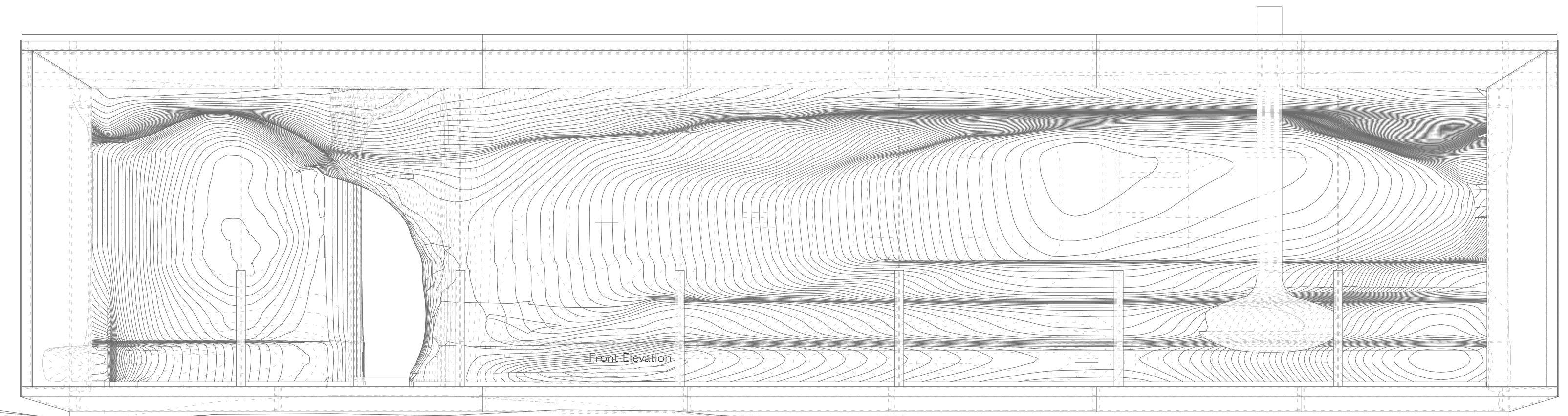
Tverrfjellhytta is built with 5 main materials: steel, wood, stone, concrete, and glass. Concrete, glass, and stone occupy similar volume to mass ratio, but the interestingly, the steel which only occupies 20.43% of building volume occupy 57.89% of the building's mass, almost three times its percentage. On the other hand, wood has an extremely low v/m ratio. Many conclusions could be drawn, but based on this volume to mass study, the building is much heavier due to the steel structure as oppose to if it was built with wood.



If we look at the volume to embodied carbon ratio, it would be clear that the usage of steel, deliberately increased the carbon involved in the overall project by by 600%. Wood, on the other hand, is not included in this comparison due to its negative embodied carbon.

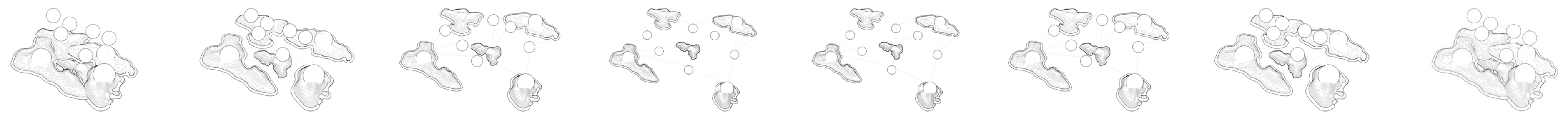


If its negative number is turned positive, it would occupy 7.5% of the overall embodied carbon, or since its negative, 'removes' 7.5% of all carbon involved.



4. Island-pelago

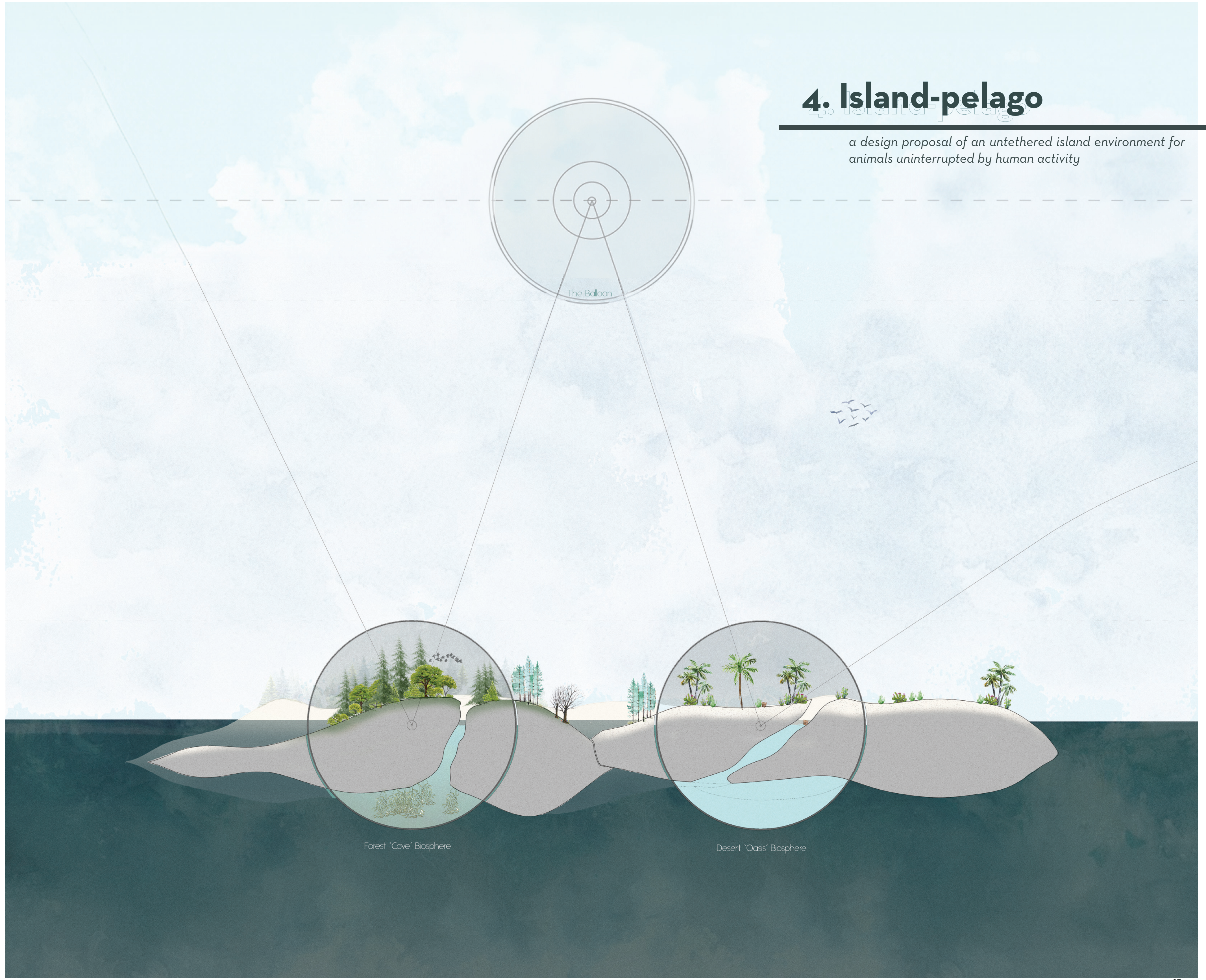
a design proposal of an untethered island environment for animals uninterrupted by human activity

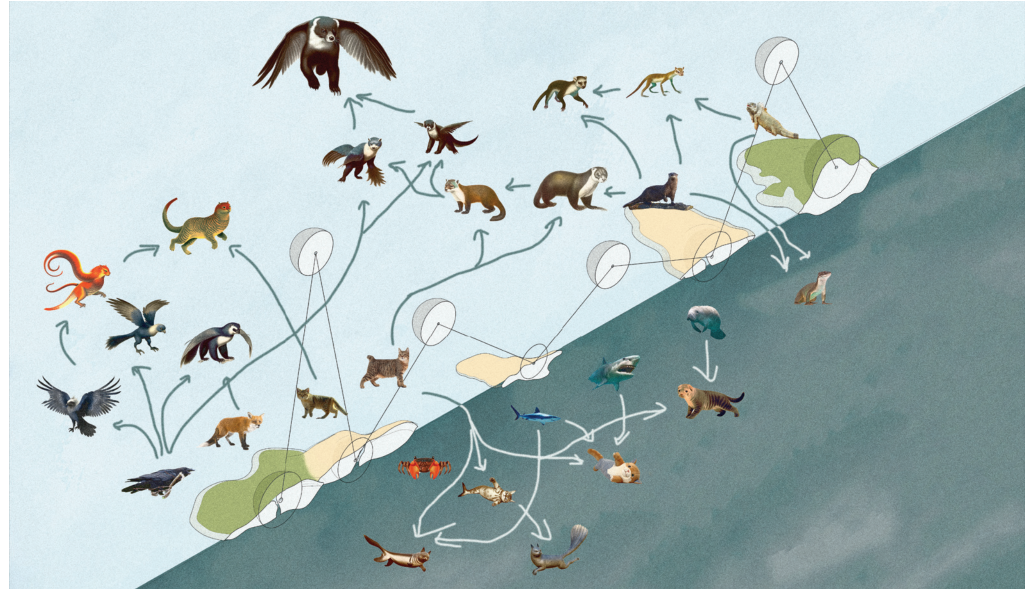


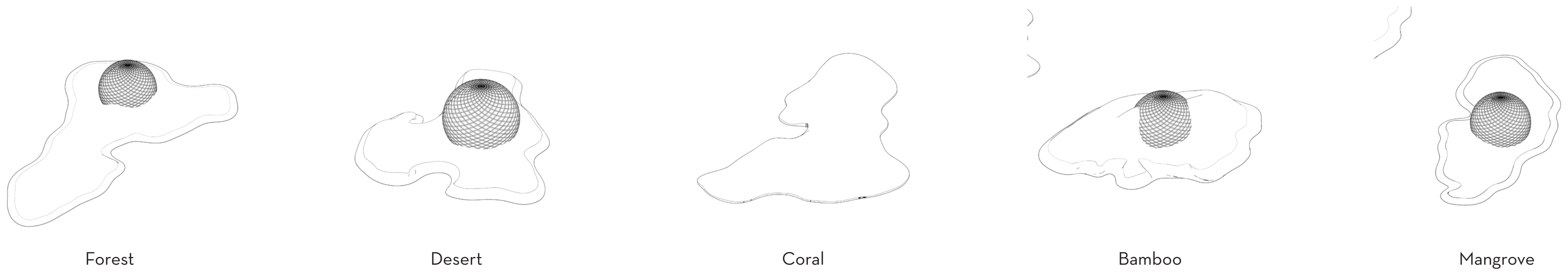
Tense -> Releasing -> Untensioned -> Rising -> Tense

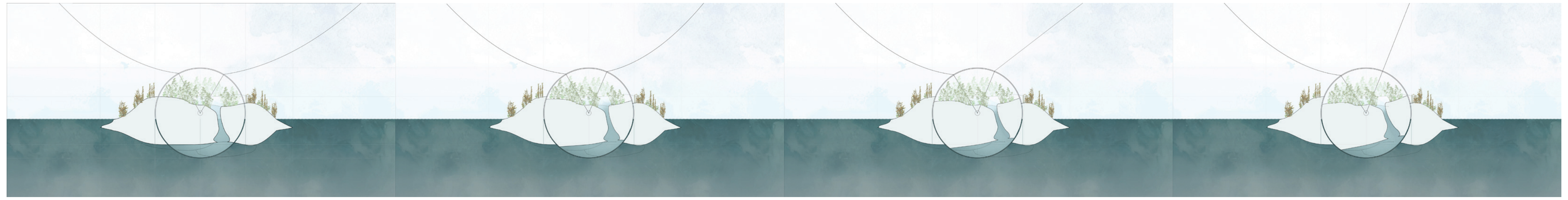
Island-pelago is an exploration and experimentation to reunite the fragments of a once-unified pangea through the use of artificial intervention, all in order to speculate potential cross-pollinations between developed habitats. Is-pegalo looks at five distinct islands with unique forms, datums, habitat, and eco-systems. Each ecosystem sustains its own distinct fauna and flora, yet the systems on each island remain relatively monocultured. With limited biodiversity, the habitats could not develop any further. Being selective with which islands can interact with another, new species could potentially be generated to fill in that lost diversity.

The artificial intervention comes in the form of biospheres as control variables, and balloons, taking on the role of rebinding the islands. The spheric forms of artificial abiotic components declares itself as a separate system from the natural landscapes of the original pangea. With edges which reflect the original form of the pangea, the islands can be brought together to rejoin the previously broken ecosystem and allow nature to heal itself.





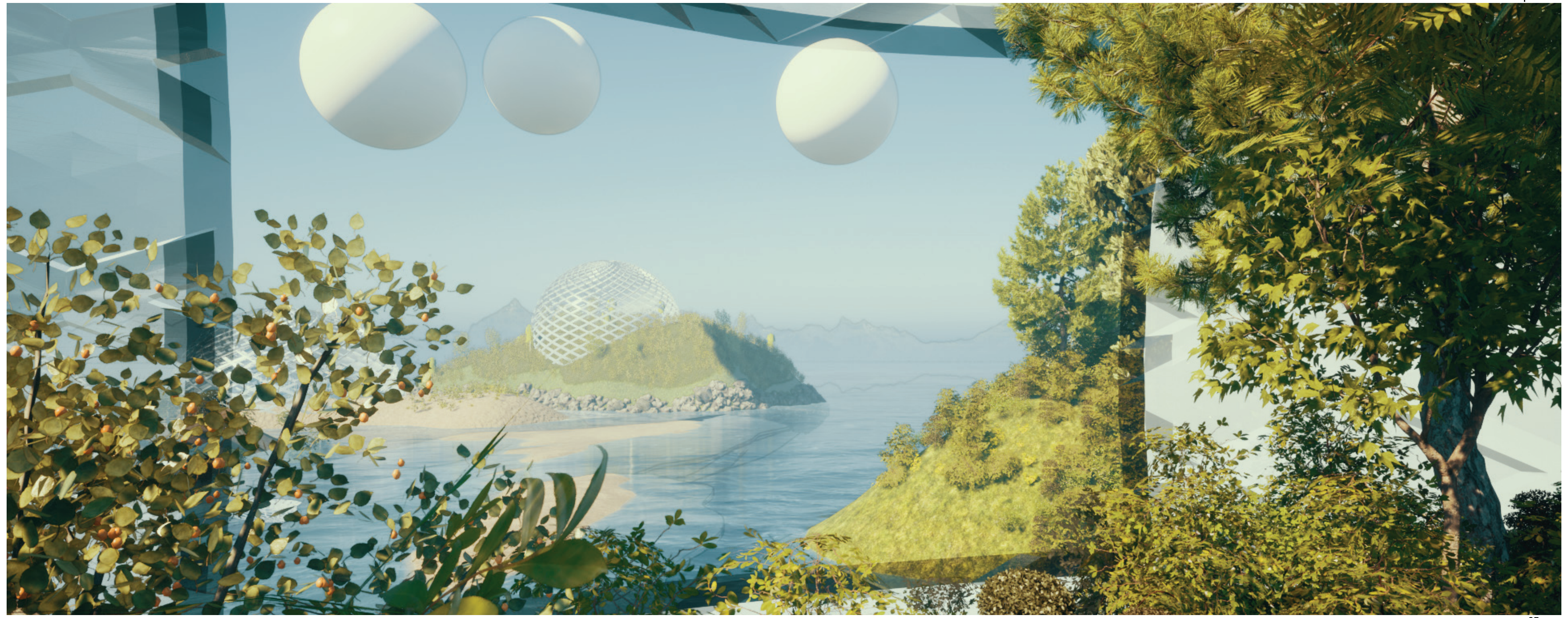


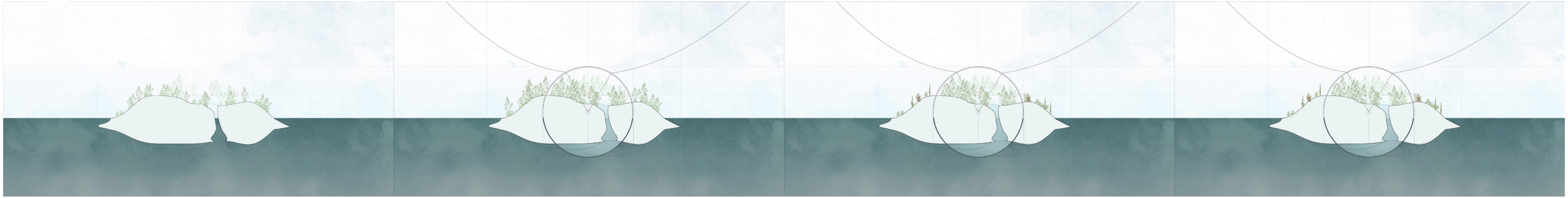


Biosphere Rotation

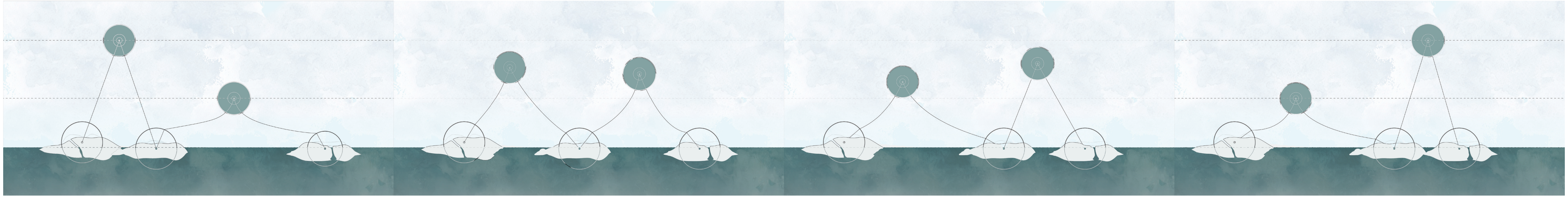
Island-pelago as Binded Render

From within the biosphere





Biosphere Aging



Balloon Rise and Fall

The existing ecosystem on the island is kept at a smaller scale. The growth of the bamboos are preserved within the biosphere while the bamboo and species outside the biosphere is expected to undergo development as more and more engagements with other habitats occur. While the exterior melting pot of ecosystems develop, species are expected to migrate and with them types of organisms which had not been experienced by the individual island.

Within the project, multiple levels of 'ecosystem' exist, operating at different scales. At the smallest scale are the biospheres, an enclosed sanctuary preserving developed ecosystems unique to each island. As the islands enter their bound-state, whether in pairs, trios, quads, or quintets, different combinations result in brand new forms of biodiversity. When all five islands recombine as one, a massive coalescence is established, encouraging cross-pollination of both flora and fauna. It is here that the highest-scale ecosystem takes form, a homogeneous pot of ecological elements.

5. History of Milkfish Ponds in Colonial Taiwan

an essay on the culinary heritage thus influenced by the colonial history of Taiwan

Taiwanese cuisine is a rich tapestry woven from diverse cultural influences, making it a fair reflection of the island's complex history and identity. Shaped by centuries of colonization, migration, and trade from various powers including the Dutch, Spanish, Japanese, and Chinese, Taiwanese culinary practices blend indigenous flavors with those brought by colonizers and alike. Each colonial power carries over its own unique culinary techniques, ingredients, and flavors which builds up the local Taiwanese food culture as we know it today. This fusion of influences has not only created a distinctive gastronomic landscape but has also played a crucial role in shaping the modern Taiwanese identity. But to truly understand modern Taiwanese identity, one must trace back to the roots of the island's culinary heritage, which finds its beginnings in practices like aquaculture farming introduced by early settlers and colonial powers.

In 1624, the Dutch navy under Cornelis Reijersen established Fort Zeelandia and Fort Provintia on Taiwan's southwest coast, initially intending to facilitate a base for the exchange of Chinese silk for Japanese silver . Yet, they soon recognized the island's potential for other lucrative goods. Taiwan's soil was fertile and well watered, ideal for growing rice and sugar, while the highlands hosted an, at the time, abundant number of sika deers. This understanding prompted a shift in the Dutch trade focus towards hides, venison, rice, and sugar. The Dutch, however, faced a shortage of labor for production activities. The existing aboriginal Taiwanese were opposed to laboring for the Dutch and rather than importing settlers from Europe, the Dutch East India Company opted to recruit workers from Hokkien coastal cities across the Taiwan Strait in China. Throughout the invitational campaigns, between 15,000 to 35,000 immigrants from Hokkien and Fujian provinces had settled in southwestern Taiwan.

This influx of Hokkien and Fujianese immigrants not only provided the necessary workforce for the production of goods to flourish but also contributed to the cultural and economic vibrancy of Taiwan. While traders already had a small trading hub where the Dutch settled between the Taiwanese, Chinese, and Japanese, it wasn't until the Dutch expanded Taiwan's production of commodities that Taiwan was placed on the trade map for further global interactions. Ultimately, in 1661, the Dutch colonization of Taiwan came to an end when Zheng Chenggong (also known in modern history as Koxinga), a Chinese warlord of the last Ming Dynasty, invaded Taiwan while fleeing from the Manchu army and established a base where the Dutch were stationed. With a relatively short colonized duration of roughly four decades, the Dutch colonial rule of Taiwan was not without far lasting legacies. One, they almost thoroughly depleted the sika deer population on the island for trades, which prompted preservation acts from national parties and a deep-rooted fondness of sika deers for modern Taiwanese; two, they were the first to introduce fishery cultivation techniques from other southeast island nations of Philippines and Indonesia into Taiwan, specifically: milkfish ponds. It's unclear whether the introduction of milkfish ponds were due to the massive inflow of people arriving on the island and the Dutch require a stable and economical alternative to food or because it was a marine protein the Dutch enjoyed. Nevertheless, milkfish became a staple ingredient for the Dutch and Chinese workers and those who eventually stayed on the island.

Milkfish, formally referred to in Latin as Chanos Chanos, is a tropical and subtropical aquamarine species local to the waters surrounding Indonesia, Philippines, Malaysia, Australia, and Hawaii. In Indonesia and Malaysia, it is called bandeng, in the Philippines, bangas, and in Taiwanese dialect, sabahi. Without getting into the dozen interpretations surrounding the etymology of the name of the fish, the English and modernized word for it is milkfish, which will be used throughout the essay.

Milkfish was selected as the main cultivated and cultured species throughout the southwestern Taiwan and has remained as one for a couple of reasons. One of the most significant reasons was due to its abundance. Limited by their understanding of aquaculture technology and knowledge during the 1600's, Indonesia's milkfish cultivation technique, which the Dutch have reused in Taiwan, consisted of growing young milkfish (milkfish fry) in brackish shallow-water ponds created near the coast. By catching milkfish fry throughout the spawning season from April to August, fishermen are able to cultivate them throughout the summer, ending around November. This meant that the annual supply of milkfish depended on the efficiency of fishermen during harvest season. However, the abundance of milkfish fly surrounding the southern Taiwan waters meant the efficiency of the initial haul was of no concern. Additionally, milkfish have particularly high fertility rates during season and are easy to identify, catch, and relocate as they are 'hardy and euryhaline'. Once relocated, milkfish require a basic amount of nutrients as compared to other potential fish in return for its high growth rate. Being largely herbivores, milkfish's main source of food are algae, which can be grown within the same stocking pond. While they very occasionally consume meat, they are non-cannibalistic, which only entices the Dutch who had plans to take in thousands of workers/settlers that need to be fed. By overstocking ponds, the production value of milkfish per surface area is much higher than other potential fish species. Lastly, despite being a bony fish, milkfish are greatly beloved for its texture and delicious meat quality.

Due to the lack of academic interest and scientific endeavor into aquaculture at the time, little to no information can be found of when the connection between the milkfish ponds and the Dutch settlers in the 1600's started. Yet the fact stands that Taiwan was neither reliant nor consumed milkfish in the same quantity as they did before the Dutch's arrival. During the 1600s, the Dutch had already conquered Indonesia and were in the midst of its colonial plan for expansion into the Philippines and Taiwan. Thus, it is widely inferred that the technical understandings of milkfishing cultivation came with them. The existence of milkfish ponds in Southeast Asia can be traced as early as the 14th century in the Philippines and the 15th century in Indonesia. In Indonesia, milkfish are kept in tambaks (Indonesian for fish pond or brackish fish pond) throughout the Java, Sumatra, and Sulawesi coastline and inland. In Taiwan, these ponds are called wun. Formally, wun are similar to the tambaks, consisting of a singular pond made from rich soil and the occasional fences. With the additional influx of Hakka workers throughout 1630-1660s, as well as the added pressure of animal protein deficiency of an island nation, milkfish became the most reliable source of protein for all types of people staying in Taiwan. Milkfish, however, was not a maritime trade priority for the Dutch East Asia Company. Unlike commodities such as venison, hides, sugar, and rice, milkfish was never considered for trade with the Chinese or Japanese. Instead, the Dutch prioritized other products such as sugar, hemp, cotton, ginger, indigo, and Chinese radish. Desperate to compete with the Spanish colony which resided in the North of Taiwan, the Dutch prioritized products which were of high value for other rich states such as China, Japan, Portugal, and other European nations.

As aforementioned, the traditional milkfish cultivation relied on catching wild milkfish fry and relocating them into man-made brackish ponds. Given the fry's abundance near the southern waters of Taiwan, the Dutch and their workers should have found it quite a miniscule feat to obtain large amounts of fry every spawning season. Whether fortunately or unfortunately, the Dutch's stay in Taiwan was brief. The notion of aquaculture and its subsequent developments weren't the priority as the Dutch East India Company struggled to protect their commodity farms and people from aboriginal attacks. Ultimately leaving Taiwan for good in 1661. And for more than two hundred years, there was little to no recorded history of Taiwan. Under the rule of the Qing Empire, Taiwan was neither a province nor a state. The Qing Empire, which had no interest in other territories or countries across the seas, blocked global maritime trade in Taiwan, effectively silencing Taiwan from the global economy. It wasn't until 1895 after Qing's defeat in the Sino-Japanese War was Taiwan once again open for development.

Perhaps it was because Taiwan was Japan's first colony or because they wanted to get a head start in the Greater East Asia CoProsperity Sphere colonial plan, but Japan took no shortcuts to achieve rapid and sustained growth in Taiwan's development of literature, agriculture, urban plans, culture, etc.. Japan established working urban-scale infrastructure and planning in the North of Taiwan, now known as Taipei, and reformed the institutional and educational systems closer to the Japanese governmental system and its pedagogy. But colonialism isn't colonialism without a motive for profit. The aspect made

possible only due to the newly stable institutional and organizational reform is the agriculture production of rice and sugar in Taiwan. Under Qing's rule, corrupted officials increased the farmer's tax burden. At first, Japanese continued the tradition, but in November of 1904, tax was "levied on paddy, field, and fish pond land". Alongside the reformed tax, Japan introduced advanced tools and methods for agriculture. The largest improvement made was the introduction of fertilizers, or at least artificial fertilizers.

It can be inferred that the traditional fish pond farming has constantly been in improvement by local aboriginal Taiwanese fish farmers throughout its various colonized rule, after all, there are no deliberate or specific records of milkfish ponds from the end of Dutch colonial Taiwan in 1661 to the beginning of Nationalist Taiwan around the 1950s, yet the start of the records in the 1950s suggest an advancement in milkfish pond treatment and understanding. After Japan conceded Taiwan in 1945, there came the age of internationalism and Taiwan took a large step towards modernity as we know it. As ROC took its time solidifying the newly acquired Taiwan, the foundation of scientific knowledge and research left behind by the Japanese encouraged Taiwanese academics and researchers to advance in areas which were previously stagnant. Aquaculture-related conferences were performed during this time period alongside other island nations such as the Philippines, Indonesia, and Hawaii (USA). After 300 years since the introduction of the milkfish pond in southwestern Taiwan, records finally show improvements in the traditional shallow-water system. I-Chiu Liao, a Taiwanese academic specialized in aquatic life farming, presented the most up-to-date shallow-water system in the "Reproduction and Culture of Milkfish" conference held at Tungkang Marine Laboratory, Taiwan during April 22-24, 1985 as follows: an outer dike to protect tidal land, a controlled water supply and drainage system through a main canal, 2 nursery ponds, 2 winterting ponds, and 4-6 production ponds (3-5 hectares each). The size and organization may vary depending on the location and topography of the chosen coast, but these components build up the traditional milkfish ponds in the most modern fashion. Originally a single pool with canals for sea tidal water replenishment has developed into a fully-adaptable system. However, the traditional shallow-water ponds have reached a bottleneck.

Decades of milkfish cultivation from wild-caught fry have drastically reduced the wild supply of fry and on the other hand, the demand for consumable milkfish has grown exponentially. For a market that depended solely on the availability of wild-caught fry, its economic market was unstable. Despite the technological advancements made in the shallow-water ponds, the market suffered from the economic law of supply and demand. With low supply and high demand, the producers shifted towards other potential food fish and crustacean species such as carps, oysters, crabs and shrimps. Milkfish production area relative to the "total aquaculture area decreased from 41% in 1965 to 25% in 1979".

In the 1970s came about a new pond system called the deep-water pond cultivation system. As compared to the 50 cm ponds of the traditional shallow-water pond, the deep-water ponds reach 2-3 meters, effectively quadrupling traditional style's yield rates. According to Taiwan Fisheries Bureau, deep-water pong produced 200 metric tons of milkfish in 1976 as compared to the 26,600 metric tons in shallow-water ponds. In 1983, shallow-water pond production remained at 26,000 metric tons while deep-water ponds produced roughly 9,000 metric tons. With a more fortified understanding of aquaculture, scientists were able to mitigate the two main issues shallow-water was created in the first place: aeration and algae management. Milkfish are highly sensitive to oxygen and by modifying paddle wheel aerators, the pools can be deepened without endangering the milkfish population. Algae, which was naturally grown or encouraged with fertilizers in the shallow-water ponds has since been replaced with automatic feeders consisting of an artificial combination of rice bran, soybean cakes, and/or peanut meal with additives. With the two main issues out of the way, the transition from shallow-water ponds to deep-water ponds became a problem of risk and reward. Deep-water ponds can produce a yield of roughly 4-5 times the traditional, yet carry with it high investment risks and require more expensive facilities and formulated feed, not to mention the upkeep for potential diseases and transport. Unfortunately, even with the technical advancements, with the sales price per piece not comparably to other species such as tilapia, not many producers were willing to invest in the modern style.

The true leap to modern aquaculture only came into being after Taiwan's nationalist empowerment had extended into the late 1970s. Immediately after Japanese rule had ended, Taiwanese people were conflicted in identity. Continuous colonial rule from entirely different cultures, languages, and religious groups and the lack of a single origin forced the Taiwanese citizens to create their own identity. During this time period, Taiwanese researchers and scientists worked with international On October 6, 1983, after decades of research into the improvements of milkfish culture, was the first fully successful artificial spawning of milkfish fingerlings. The man in question was LieTang Lin, an academic famous for his interest in propagation. Following the experimentations and papers from other propagation researchers such as William Vanstone and H. Chaudhuri, Lin was the first to accomplish naturally-spawned milkfish eggs in a captive environment with survival rates of over 75%.

Using the new modern deep-water ponds as the base, Lin changed the game for the rest of the industry. Selective captive broodstocks were injected with hormones for maturation and after making minor changes to the feed to include formulated eel and for milkfish fry to be polycultured alongside shrimp, 16% of the surviving larvaes grew into the fry stage, ready for transports into production ponds. Although only about 80,000 out of 500,000 larvaes survived into fry stage in the six induced spawning in 1983, propagation of milkfish was achieved and the milkfish ponds changed their ways drastically. Milkfish ponds used to stand alone as the sole facility needed in the industry, but nowadays, hatcheries and broodstocks are found throughout the island, no longer a site-specific industry in the south of Taiwan. Though the hatchery/broodstock systems were not perfect, it paved the aquaculture way for generations forward for an island with an ever-increasing population.

In conclusion, it is slightly disappointing to see that aquaculture and in-depth documentation of the aquaculture economy didn't exist until the late 1900s, thus, information pertaining to fish production ponds and the history of so before the 1900s were largely incomplete. In "A historical review of aquaculture and economics research" published by Ping-Sun Leung and Yung C. Shang in 2003, they provided a standard account of aquaculture economics in model form, creating a public shift from milkfish pond as a 'free' market to an industrial commodity. The model included resource, production, marketing, consumption and its related subsystems. Repeatedly, Leung and Shang highlighted the lack of aquaculture economic awareness and wished for further exploration into the global market as more and more fish ponds are becoming privatized. This is true not just for Southeast Asia, but throughout the world. Nevertheless, milkfish production has finally achieved modernization through the colonial empowerment of Taiwan agriculture and aquaculture. The Dutch began aquaculture in Taiwan, the Japanese provided foundation and steadied its growth, and the Taiwanese made it truly ours.

In recent years, Taiwan has encouraged self-identity searching in gastronomy, even more so as political pressure rises, embracing culinary innovation while staying true to its ethnic and colonial roots. As legislation recognized the power of food as a tool for global showcasing, there has been active promotion of its culinary heritage on the world stage through gastrodiplomatic campaigns. These initiatives such as food festivals and culinary events that are sponsored both domestically and internationally aim to showcase the unique Taiwanese cuisine, emphasizing its colonial influences, indigenous roots, and contemporary innovations. By working with local Taiwanese partners related to the food and beverage industry, these events not only create business opportunities for privately owned businesses but also open a path for cultural exchange between Taiwan and other nations. From night markets teeming with street foods to Michelin-starred restaurants pushing the boundaries of what food can be, Taiwanese cuisine continues to evolve and captivate food in the most traditional yet modern form. Through this notion of gastrodiplomacy, Taiwan not only seeks to satisfy international appetites but also serves as a cultural ambassador and to create a better national brand recognition in its identity.

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6. Dangers of the Medical-Industrial Complex

an essay on the complex relationship between radical care and the modern industrial era

Psychology and its associated industries gained prominence through the contributions of Sigmund Freud and Carl Jung in the early 20th century, but it wasn’t until the 2010s that the general populace began to pay attention to mental well-being. Nowadays, therapy and psychoanalytic sessions which were once stigmatized are openly discussed and shared. New policies and commercial industries are being put in place for the massive increase in therapy sessions and discourse groups. But how well has the world adapted to the surplus of depressed teenagers and overworked corporate workers? The reality is rather mediocre. The only reason it has improved in recent years is due to COVID-19 effectively putting physical and mental care at the top of every country’s priority list in 2020. During the pandemic, the number of US citizens who have reported a high level of anxiety and depression increased 6 times compared to previous years. COVID-19 was especially relentless to students where roughly 50% of all US college students reported symptoms of depression. During this time, many government-issued laws and acts were put in place such as the Families First Coronavirus Response Act, which paid for coronavirus-related sick leaves, and the Coronavirus Aid, Relief, and Economic Security Act, which included many provisions for various health providers. Beyond simply treating COVID-19, laws such as the Consolidated Appropriations Act and the American Rescue Plan Act were issued, massively increasing the funding for existing disorder treatment and mental health services for patients, health care professionals, and first responders. This was huge. It wasn’t untrue to say that for the first time, the world’s leaders had their eyes on the physical and mental health of the people. Many care activists and theorists began realizing, however, that the tools of psychiatric intervention are ingrained within a wider framework of structured power. The relationship between social injustice and corporeal health became imminent and information went public that the current healthcare system is a “powerful, global medical-industrial complex” that profits off people’s illnesses. This paper analyzes the thriving medical industries to drag out the underlying neoliberal and authoritarian agendas embedded within those industries.

Firstly, it should be noted that doctors are not at the center of this structured power. For the patients, it is easy to see them as the opposition as they are the ones in direct interaction, but doctors are also a tool of medico-politics. Doctor Stephen Soloway, an MD based on the East Coast, wrote two books exposing the corrupted side of the American healthcare system titled Bad Medicine: The Horrors of American Health Care and Medical Politics: How to Avoid Bad Doctors and Insurance Companies and Overreaching Government and shared that the internal corruption of the American healthcare system stems mainly from the health insurance companies and the American government. This, however, is not news. Throughout American history, psychiatric establishments have had a recurring account of rejecting entire groups of people, more notably, those who were queer, black, women, and/or poor. During the 1900s, the federal government pulled back public goods funding and gave rise to for-profit health systems that actively discriminated against communities that were not white-male-dominated. Seemingly supporting racial injustice and neoliberal views, the medical community at the time was determined to use minorities as guinea pigs for medical experiments as well as underserve them for profit. Entire neighborhoods were inadequately treated. For example, in Philadelphia’s Seventh Ward, uncovered in a study by W. E. B. Du Bois in 1899, the mortality rate for Blacks for pneumonia was double the amount for Whites (356.67 per 10,000 Black people and 180.31 per 10,000 White people). The neglect and suffrage of these ‘outcasts’ consequently prompted the responses and the creation of multiple radical health activist groups such as the Black Panther Party which demanded equal healthcare for all Blacks, the Young Lords in Chicago that sought to empower Puerto Ricans, Latinos, and other minorities, and the United Farm Workers, a labor union for farm workers based in California. Deemed aggressive activists and labeled as ‘hate groups’, these organizations were fighting systemic discrimination to obtain basic human rights and needs. In today’s modern times, healthcare slavery acts are much less transparent.

With the aforementioned legislative acts which granted multiple provisions and funding to public care and health services, it is logical to conclude that the democratic government has left its iron hand on the medical industries. Unfortunately, the struggle just shifted from state terror and racial capitalism to what is termed the medical-industrial complex, a terrible offspring of its two predecessors. Originally coined by Barbara Ehrenreich and her husband John Ehrenreich in their book The American Health Enterprise: Power, Profits, and Politics, published in 1970, the medical industrial complex refers to a multi-billion dollar system of enterprises including physicians, allied health personnel, hospitals, nursing homes, insurance companies, and other health-related industries. The dependency of growing laboratories and commercial health businesses on federal funds proves dangerous as more power is given to those at higher institutional and financial statuses, allowing these individuals to compromise doctors and researchers and other health-related positions of lower statuses of their rights to research or publish freely. One example of such a relationship being recognized is the invention of a biotech technique called recombinant DNA (rDNA) to mass-produce human proteins created by Dr. Stanley Cohen at Stanford University and Dr. Herbert Boyer at UCSF. Many inventions are created at university laboratories, however, these two doctors decided to not publish their discovery publicly like all those before them but instead patented it into the Cohen-Boyer patents. Through patenting the rDNA techniques, they sold non-exclusive licensing to a large number of pharmaceutical and production companies, essentially giving birth to a brand new biotechnological industry and reportedly produced over $35 billion in sales for an estimated 2,442 new products over the past 17 years. Notably, this was made possible through the US Supreme Court’s decision to allow anything made by man to be patentable. The invention has since contributed significantly to the financial resources of Stanford and the University of California, ultimately paving the way for other university research to extend into industrial settings. The Cohen-Boyer patent has set an ugly ‘golden standard’ of scientific research. University- and government-funded research no longer has an eye for truly healthy work, clouded by economic profits that one can only deem neoliberal and capitalistic. In such a money-driven world, the medical-industrial complex was firmly established and took hold of not just the scientific world but also the healthcare system and the psychiatric community.

Occupy, a mental health activist movement, had written a book, Mindful Occupation, categorizing different ways of involvement in health activism, addressing the lack of public awareness of mental health, and initiating a toolkit of ideas and visions for public reform. More importantly, they highlighted that injustice in the mental health system is closely intertwined with the injustice that results from corporatocracy and socioeconomic circumstances. COVID-19 proved this statement correct, with the increase in anxiety and depressive levels. However, the issue turns sociopolitical when pharmaceutical corporations decide to exploit people’s insecurities for additional financial growth. Occupy wrote in Chapter 3 “Radical Mental Health” that “corporate influence corrupts the powers that [are] in the mental health system” through financial connections between the members of the Diagnostic and Statistical Manual of Mental Disorders (DSM) and multiple pharmaceutical companies, the same pharmaceutical corporations who test the drugs for the Food and Drug Administration (FDA) approval. While they didn’t specify any examples, it isn’t hard for anyone to look up pharmaceutical fraud on the internet. In 2012, Abbott Laboratories Inc. paid $1.5 billion to resolve allegations of promoting a drug for managing agitation and aggression in elderly dementia patients and individuals with schizophrenia, both drugs being tested as not safe by the FDA. In 2013, Johnson & Johnson pleaded guilty to ‘misbranding’ the antipsychotic drug Risperdal used to treat mental health conditions including schizophrenia, bipolar disorder, and some symptoms of autism, for $2.2 billion. In 2022, Cardinal Health, McKesson, AmerisourceBergen, and Johnson & Johnson, four major drug distributors in the US, have put forth a $26 billion settlement for more than 3,00 lawsuits against them across the country for outsourcing opioids for numerous patients who did not require it, causing a major opioid addiction crisis. These are the major frauds that have caused a storm in the US, but they do not represent the amount of occurrence nor the depth of corruption within the pharmaceutical system. The Occupy movement is of the mind that 'we' the people should learn how to take care of ourselves and those around us through mutual support and maintain a skeptical perspective on the knowledge delivered by a society that remains mainly "dominant of whiteness, patriarchy, and heternormativity".

Another form of governmental intervention that gives way to neoliberal agendas is the non-specifically relocated funding of the American healthcare system. In his interview with iHeart's podcast 'Everything's Political', Dr. Soloway brought forth the idea that although larger funding is beneficial to the medical industries, it turned healthcare employment into "a good job, not a [good] career". In his experience, under government-issued medical acts and organizations such as Obamacare, many professionals, supporting staff, and administrative staff have entered the medical industry due to the high financial payoff and not for the act of caring. Although this isn't an issue for the patients, the doctors, nurses, and other medical staff members who are working overtime to care are paid the same amount as those who don't. During a doctor's visit, the patient will end up with a student with no experience or a fellow with decades of experience by luck. The insurance companies the patient enrolled with will pay the same amount of money to either the doctor or the nurse, which fuels that initial monetary gain for those who had just entered the industry. Furthermore, the non-specific funding for the healthcare system created incentives for massive amounts of applications for positions that don't require any medical knowledge or a high level of education. Slowly but surely, the caring industry has given birth to a new generation of doctors and health professionals with no ties to the act of care.

Similar to the notion of radical mental health from the Occupy movement, radical care, a term recently coined by Hi'ilei Julia Kawehipuaakahaopulani Hobart and Tamar Kneese in their article Radical Care: Survival Strategies for Uncertain Times, believes that care, in the 21st century, has transitioned to a collective strength against structured power. By presenting a united imperative action for a mass of individuals, radical care is developed as a response to the global surge of authoritarianism, bringing forth broader societal change against the power that is systemic discrimination. In the context of the medical-industrial complex, radical care means that assumptions ingrained in the concept of care, "it is both essential for social reproduction and yet often invisible or undervalued", renders it susceptible to exploitation and co-optation. In this case, the co-optation of neoliberalism and individual capitalism. The process of care, and especially the treatment of mental health care, is slow and cumulative, thus easily overlooked by the general public and government powers. As a result, mental health care and other long-term care services such as elder care lack the required funding from its profits and the required manpower without funding. With the medical-industrial complex standing atop billions of dollars from its enterprises, it becomes extremely easy for them to overtake smaller care industries with low profits and high required funding for neoliberal marginalization.

The medical-industrial complex is a looming danger for all, but that does not mean there is nothing to be done for the common folks. The notion of radical care, the Occupy Movement, and various other activist groups have been in the works to influence and bring awareness of this hidden phenomenon, and have sought others to do the same. The Occupy group criticizes the pharmaceutical companies that care more than financial gain than the Hippocratic Oath to "do no harm", and it feels rather fitting to end on such a note. Change needs to happen and it needs to happen deep within the system. Health activist groups such as the BPP and the Occupy movement are not the first mental health activists to publicize the medical-industrial complex rooted deeply in society, but more than often, activist concerns and expressions are washed over by being framed as a form of mental illness. Since when has being radical, asking for basic human rights against neoliberalism, capitalism, and imperialism a form of mental illness? Oh, that's right, since humanity first began segregation.

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