Atmospheric | Metabolic: Subsistence in the Antarctic

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Antarctica remains as the last bastion of vestal earth; still the perceivably vacant landscape seems an unlikely setting for the discussion of architecture. The vast continent boasts no permanent human residents and as a result has proven to be the most optimal case study of climate change. As its namesake suggests, the Anthropocene has known more widespread urban coverage than any other period. Not just urban sprawl, but all landscapes in service of such urbanism, such as industrial farming and oceanic gyres impact life at the poles. To understand humanity’s global influence on nature, we glean the most substantive information from areas that thrive in our absence. Evaluating the effects on marine life, the formation and degradation of ice, and the altered conditions of the ecology will help to inform ways in which architecture can better adapt to its polar environment.

In the most remote part of the planet, with six months of darkness and complete isolation, human settlement within the Antarctic is entirely reliant on resources found elsewhere. The remoteness of the continent and the dangers of traveling in winter months prohibits a steady stream of resources, which are used cautiously. There are no readily available building materials or means by which to sustain life long term in Antarctica. Research facilities depend on continually advancing building and material technologies in order to withstand Antarctic conditions.

In response to the prompt, “Architecture of Attunement and Planetary Ecology,” Atmospheric | Metabolic addresses opportunities for architecture to better adapt to a landscape that actively rejects it. Can these facilities that so closely monitor the landscape form a symbiotic relationship with its surroundings in order to evolve with the rapidly altering environment? Sean Lally speaks of expanding the capabilities of microclimates and ecosystems so as to make them architectural materials themselves. These investigations can lead us to a better understanding of the role of architecture in an increasingly volatile landscape, at the regional polar scale as well as globally. This is not to suggest that designers interfere with otherwise pristine landscapes, but instead consider how the built environment at large can be reconsidered within the context of more precarious surroundings.

While the surface of land mass in Antarctica is mostly barren and desolate, the ice shelves that extend into the Southern Ocean are teeming with life. Algae flourishes off the coast in summer months with nutrients upwelling from the ocean floor and 24 hours of sunlight. This is a major food source and an integral part of the ecosystem. Algae grows in abundance and is one of few photosynthesizing organisms on the continent. By incorporating algae into the built environment, there is an opportunity to provide significant reduction of external resources. With self-sufficiency comes reduced carbon footprint in an extremely fragile environment. The architecture in Antarctica has an opportunity to materialize energies so as to be an active testing ground that is both adaptive and informative, while helping to mitigate fallout from the build environment.
atmospheric [ metabolic ]
An Architecture of Subsistence

Architects today, as the last bastion of power, arts, and the inevitability of the influence of the visionary mind, are responsible for leading the discussion of architecture. The work synthesized, in the best case, is a new vision for the global environment in which we live. This vision is not just a new way of thinking but an integrative whole, a tool to reframe the way we understand our relationship with the environment. The need for sustainable architecture is more urgent than ever, and the role of the architect is to lead the way toward a more just and equitable future.

PROJECT

ARCHITECTURAL TYPOLOGIES

TYPE 1: DONE

Type 1: Done is a type of architectural typology that focuses on the integration of human and natural elements. This approach emphasizes the importance of sustainability and the need to preserve the environment. The design is characterized by a strong connection to the landscape, with buildings that are both functional and aesthetically pleasing. The use of local materials and the incorporation of natural elements such as water and plants create a harmonious environment that is both beautiful and sustainable.

Type 2: Linear Link

Type 2: Linear Link is a type of architectural typology that involves the creation of linear structures that connect different areas or elements. This approach is often used in urban planning and infrastructure projects, where the goal is to provide a seamless connection between different parts of a city or a region. The linear link typology is characterized by its simplicity and efficiency, as it allows for easy access and movement between different areas.

Type 3: Mobile Map

Type 3: Mobile Map is a type of architectural typology that involves the creation of mobile structures that can be moved and reconfigured to suit different needs. This approach is often used in temporary or emergency situations, where the need for flexibility and adaptability is crucial. The mobile map typology is characterized by its ability to accommodate changes and adjustments, making it a versatile and dynamic solution.

Type 4: Island

Type 4: Island is a type of architectural typology that involves the creation of self-sustained islands that are isolated from the mainland. This approach is often used in remote or inaccessible areas, where the need for independence and self-sufficiency is essential. The island typology is characterized by its self-contained nature, with all necessary facilities and resources integrated into the building itself.

Type 5: Iceberg

Type 5: Iceberg is a type of architectural typology that involves the creation of structures that resemble icebergs. This approach is often used in cold or harsh environments, where the need for insulation and protection is important. The iceberg typology is characterized by its ability to withstand extreme weather conditions and its unique aesthetic appeal.

EPHEMERAL CONDITIONS

Sunrise Sun DEC 21

Sunset Sun JUNE 21

HARVESTING SNOW ALGAE

Snow algae exist within 10 inches of the surface in permanent or semi-permanent snowpack. This type of algae contains temperatures around 4°F. This algae strip is a plant that contains living algae cells that live and multiply all summer months when there is 24 hours of daylight.

PROCESSING ALGAE

Algae is grown and harvested from naturally occurring conditions. The initial process starts with separating out the salt from the algae. The algae are then processed by being washed and pureed. These microalgae must be processed as food, pharmaceuticals, or biofuels. The resulting products can then be used for a variety of purposes, such as food, medicine, or energy.