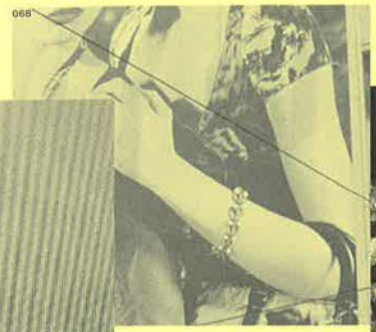
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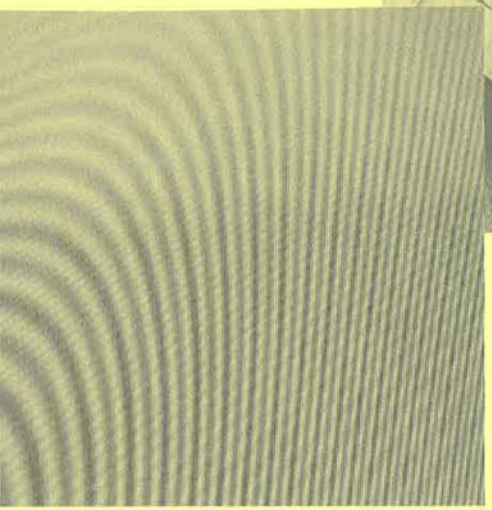


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VIEWING THE EARTH FROM WITHOUT OR FROM WITHIN

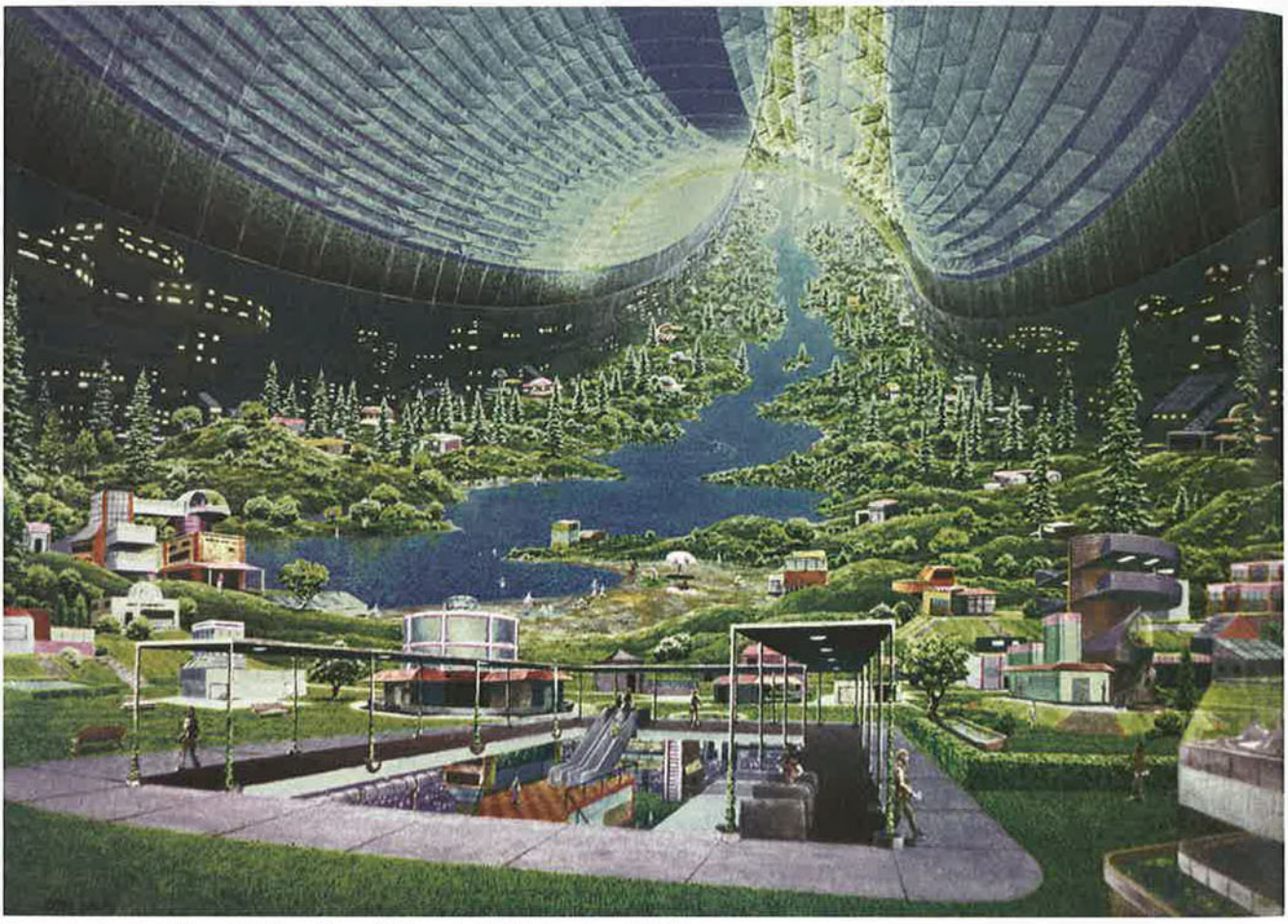
Global warming poses new challenges to the architectural community. The immediate response has been a turn toward a host of energy-saving technologies. What has rarely been addressed, however, is the problem of scale. How can the designer make sure that global solutions do not come at the expense of local traditions, cultures, and environments? There is a top-down and also a bottom-up answer to this question. The first takes a Google-Earth view from without and zooms in on the local, while the second begins within the human condition and zooms out toward the horizon. These two ways of viewing the Earth, we argue, represent two different modes of design in which the first reinforces a narrow objectifying rationality while the second embraces a richer understanding of human experience. The view from without has its own history, reaching back to the age of outer-space explorations during which the Earth and its environmental problems were seen by astronauts from above. The view from within, on the other hand, can be found in some of the Modernist designers of the Bauhaus heritage who placed human rational, emotional, technological, and social needs at the center in answering global environmental concerns. In our discussion of these different historical trajectories, we propose a design in keeping with Edmund Husserl's horizontal perspective: "The earth is a spherical body, certainly not perceivable in its wholeness all at once and by one person; rather it is perceived in a primordial synthesis as a unity of mutually connected single experiences."[1] Geography thus conceived is not about mapping and planning the landscape from without, but a "condition of flux"[2] in which the individual understands the surrounding world from within.

The View from Without

Viewing the Earth from above is a dominating trend in current understandings of geography and space. It allows an elevated and privileged perspective that, when enforced by tools such as geographic information systems (GIS), reduces nature to an abstract visual database. The growing use of environmental planning programs based on GIS allows its users to zoom in on particular places from points of view in outer space, as if they were rapidly descending astronauts. Though such mapping programs may look innocent at first, it is worth contemplating what this view represents both historically and methodologically for the design community. As we will argue, the view from without empowers a type of planning and design that is insensitive to local conditions and cultures and alienates humans from themselves. It mobilizes narrow managerial rationalities at the expense of a more widely defined human condition.

The landscape designer Ian McHarg may serve as a suitable starting point in tracing the importance of the problematic Google-Earth perspective. His *Design with Nature* (1969), which became a phenomenal success (more than 350,000 copies sold over thirty years), came to define the field for a generation of landscape designers. McHarg advised readers to adopt the perspective of an astronaut when trying to design with nature on the ground. "We can use the astronaut as our instructor," he argued, as he (they were all men at the time) saw the Earth from above, allowing a managerial overview of the landscape.[3]

McHarg was inspired by the sciences that, since the late 1950s, were working toward sending humans into outer space. The chief method was to try to build spaceships in which water, air, and food would circulate within what was called "space ecological systems."[4] In the following decades ecologists, space enthusiasts, and NASA would pour considerable resources into researching how to build closed ecological systems in outer space. A NASA report from 1977, for example, was adorned with somewhat fantastic images



Drawing by Don Davis from 1975. From *Space Settlements*, (1977). Courtesy of NASA.

of future landscapes inside a giant turning wheel that would create artificial gravity in outer space. Its enclosed ecosystem included human-made rivers, beaches, forest, and hills, with humans living in modernist buildings.[5]

McHarg found inspiration in these unworldly ecosystems for astronauts in outer space. He saw them as a model for how humans should live in harmony with nature on Earth. To him, these ecologically construed spaceships and settlements came to represent the rational, orderly, and wisely managed in contrast with the irrational, disorderly, and ill-managed environments on Earth. Technology, terminology, and methodology developed for outer space became his tools for designing with nature on the ground. In his subsequent writings, environmental ethics often became an issue of trying to live like astronauts by adapting space technologies such as bio-toilets, solar cells, recycling, and energy-saving devices, along with a utilitarian philosophy.

McHarg was not the only environmental designer enthused by the life of the astronaut and the managerial view from without. "We are all astronauts," Richard Buckminster Fuller explained in his famous book *Operating Manual for Spaceship Earth* (1969), which basically postulates using space ecological engineering manuals for astronauts to solve environmental problems on Earth.[6]

The astronaut, it is worth noting, was a great hero across political spectrums at the time, including the counterculture. His home in outer space became a model for architects shaping the future of green buildings equipped with the spaceship's water and air recycling technologies. The astronaut's photos of "Spaceship Earth" evoked an elevated perspective that significantly influenced our conceptions of space.

This view from without was reinforced by technological innovations from the space industry that enabled self-sufficient buildings. From the vertical perspective of the astronaut, they could be seen as closed objects shut off from the surrounding environment. With the slump in the space industry in the early 1970s, key movers of its technology began marketing know-how to the architectural community. The result was a surge in ecological remedies such as new waste-disposal systems prompted by space recirculation technology, a sewage system prompted by the astronaut's toilet, and an energy-efficiency system for homes that became known as "autonomous" buildings.

Key "autonomous" designers include early British ecological architects such as Alexander Pike and John Frazer, and their students such as Kenneth Yeang and Brenda Vale. Similar projects came along under names such as "bio-shelter" and "integral house" in the United States by Sean Wellesley-Miller and Day Chahroudi, the co-directors of the Solar Energy Laboratory at MIT, Sim van der Ryn, Phil Hawes, and perhaps most prominently, John and Nancy Todd and the so-called New Alchemists at Cape Cod.

These designers had in common the fact that the buildings they designed were detached from the environment they were meant to save. Paradoxically, they came to regard the surrounding social and natural environment as irrelevant. Just as a spaceship was detached from the surrounding environment in outer space, a building designed as a self-sustained microcosm was, at least in theory, detached from the Earth. As a consequence, some of today's ecological buildings tend to resemble spaceships by incorporating closed ecosystems, and space technologies such as solar cells, and by often being isolated from the local landscape they are supposed to protect.

For all its good intentions, the problem with such ecological designs is an overemphasis on technology and a narrow understanding of rationality. Juhani Pallasmaa points out a similar problem in the use of technology in architecture today: "the tendency of technological culture to standardize environmental conditions and make the environment entirely predictable is causing a serious sensory impoverishment. Our buildings have lost their opacity and depth, sensory invitation and discovery, mystery and shadow."[7] Current ecological design tends to suffer from the same tendency to neutralize architectural spaces. "Autonomous" ecosystems representing a microcosm of the global often dismiss local realities, cultures, environments, and traditions. To avoid this loss of humanism in ecological architecture, we suggest turning to a different tradition in designing with nature as experienced from within.

The View from Within

There are "unmistakable signs that the climate of the North Atlantic region is growing warmer," Herbert Bayer pointed out in 1953, in a surprisingly early reference to what is now known as global warming.[8] Bayer, also an architect and earth artist, was at the time a leading graphic designer and former head of the printing and advertising workshop at the Bauhaus. His statement came in his *Geo-Graphic Atlas*, published to attract readers to the environmental cause. On its frontispiece, he placed an image of a human being encircled by related scientific fields, with carefully defined colors that recalled Goethe's chromatology. The Atlas was to mobilize a human-centered view from within in reading the spatial geography of a landscape. He tried to develop a visual language of communication that could create proximity between individual responsibility and global environmental crisis.

Yet unlike ecologists preoccupied with building closed ecosystems, Bayer believed that the best way to address the issue was to begin with the human condition and our ways of sensing the world. The eco-crisis was to him a crisis of human alienation from the natural world, and like his friend and compatriot Richard Neutra, he fashioned his own role as architect and designer in the image of a Freudian therapist healing the unfortunate separation.[9]

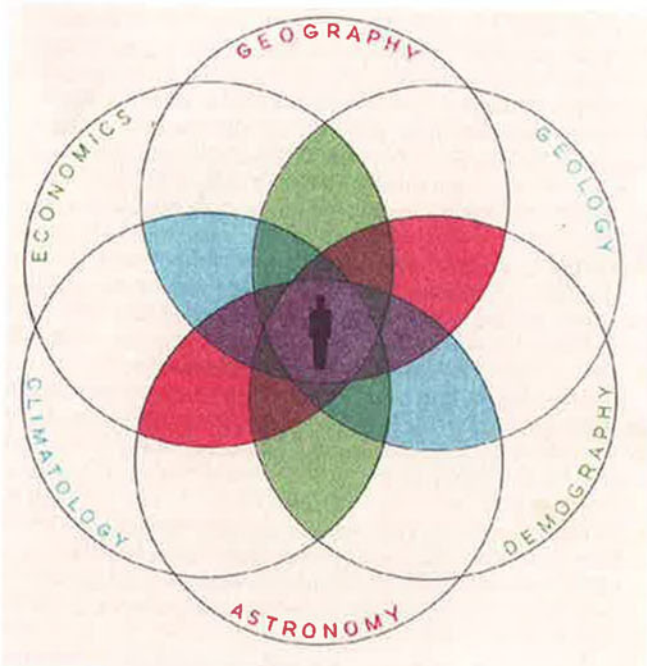
Bayer was not the only former member of the Bauhaus faculty who became deeply concerned with environmental issues. At Harvard, for example, Walter Gropius would address suburban sprawl, telling his students, "until we love and respect the land almost religiously, its fatal deterioration will go on."[10] Similarly, László Moholy-Nagy in Chicago formulated his own "biological 'bill of rights'" by incorporating the environment.[11] To simplify the Bauhaus program as design for the "machine age" where nature serves the role of ornamental background is misleading.[12]

Bayer believed that graphic design would be functional if its form followed human conscious and subconscious reactions to light and structure. He sought a simplified graphic that could better human functioning in a dramatically changing social and natural world. His call for designing according to people's environmental, rational, emotional, and social needs was, in effect, also a plea for proximity between the individual and the global.

Maxwell Fry and Jane Drew also serve as examples of designers who embraced the International Style while insisting on placing human experiences at the center of environmental and climatic conditions. For that reason they disliked incorporating air-conditioning systems and even electrical fans in their buildings for the tropics, as they believed that these devices created closed and claustrophobic environments. Instead, the human body should be shaded and in contact with the breezes created by climatic filters of the building threshold: "Tropical air conditioning should be done as much as possible using the building fabric itself," they argued in *Tropical Architecture* (1956). Air conditioning was "pleasant enough," but it had the unfortunate consequence of creating "a shock, both physical and psychological" when one left the building.[13] Thus the issue was not a matter of saving energy but of opening the building from within to the world outside.

The brothers Aladar and Victor Olgyay also came to pursue architectural design with nature in which human experience becomes the point of departure. Both graduates in architectural engineering, they developed a design program that prioritized a structure's environmental setting. When they came to New York in 1947, they immediately began to promote a design program that took the proximity of human being and earthly climatic forces into account, where bodily sensation of thermal qualities were included at the inception and all phases of the design process.

A similar line of reasoning can be found in Lisa Heschong's *Thermal Delight in Architecture* of 1979. According to her, architects often neglect thermal pleasure and variation: "thermal conditions are commonly standardized with the use of modern mechanical systems that can be specified, installed, and left to function independently of the overall design concept."[14] Because shadow can provide relief from solar heat or glare, the use and distribution of materials



Herbert Bayer, World Geo-graphic Atlas (1953), 1. ©2010 Artists Rights Society (ARS), New York /VG Bild-Kunst, Bonn.

corresponds partly to the amount of shade needed in a particular place and time. The building's representation is an outcome of this logical process, not its initial conception.[15]

To the Olgyays, "architectural expression," had to be "organic" in order to behave "in a manner somewhat similar to the great coordinator, nature."[16] The shading devices they describe were designed according to their belief that architecture was subjugated to natural forces. The constancy of the sun contrasts with the variety of outcome of its laws: "The motifs vary, but are subordinate to the sun, whose strength and angles, according to orientation and location, prescribe the regional patterns."[17] They encouraged a type of breathing structure that contrasts with sealed, controlled environments.

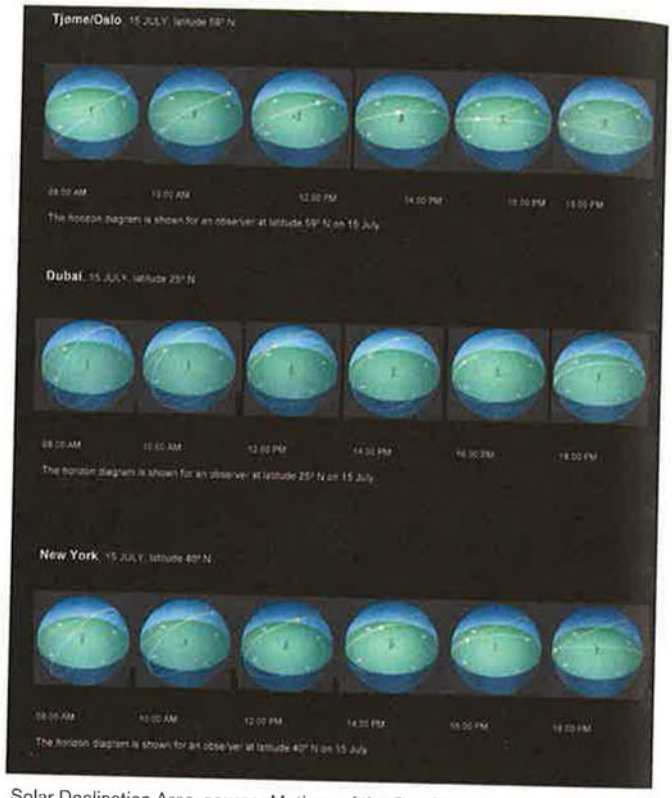
Fry, Drew, and the Olgyays' porous building skin's subtle mediations of external forces find their opposite in the enclosed interiors found in many ecological designs. They encouraged the passage of sun and air, and they used the wind to cool their buildings. Their geographic approach to design prefigured the words of architect Linda Pollak: "Architecture is construed not as object but as device that can transform an urban landscape yet at the same time is not in complete control of the relationships between its constitutive elements."[18] Architectural designs thus conceived are as open as possible to local geographic circumstances.

In Victor Olgyay's classic *Design with Climate* (1963), he developed a design program in which local weather and climate were the main determinants in the sheltering of humans. Detailed analyses of a place with respect to directions of wind and sun, as well as seasonal fluctuations of temperature, were the basis of design suggestions and served as key tools in the design of effective environmental structures and devices on a global scale. We believe the solar-control principles, diagrams, and climatic charts outlined by the Olgyays in 1957 in their Solar Control and Shading Devices are as relevant today in our efforts to address global warming as they were then: "Today, as the view of architectural problems approaches a global scale and as our buildings become more vulnerable to heat exchange, a rediscovery of solar control principles arises and the pursuit of solutions becomes an important matter."[19] Olgyay sought to develop a language of shadows based on shading devices and forms adjusted to varying climatic conditions.[20] The great variety of screens they presented, categorized into vertical, horizontal, and egg-crate types, were fine-tuned to respond to the subtleties of individual climates and local conditions.

A shared belief in bringing the full human being in proximity with the global environment by means of engaging local cultural and climatic conditions through systematic design methods brings together the work of Bayer, Fry, Drew, and the Olgyays. Fry and Drew, for example, were so concerned about not creating enclosed spaces that they were reluctant to use mosquito screens in the tropics. "[T]he night is cool, the stars are brilliant" without them, they noted in their plea for proximity between the human and the universe.[21]

With the help of a type of architecture that promotes tactile experience through passive heating and cooling methods, we may touch the presence of the things we see in a visceral way. In the words of Maurice Merleau-Ponty:

> The painter accepts with all its difficulties the myth of the windows of the souls: one has to take that which vision teaches one literally: only through her do we touch the sun, the stars, we are at the same time everywhere, as close to the beyond as to things near, and the same our power to imagine ourselves elsewhere.[22]



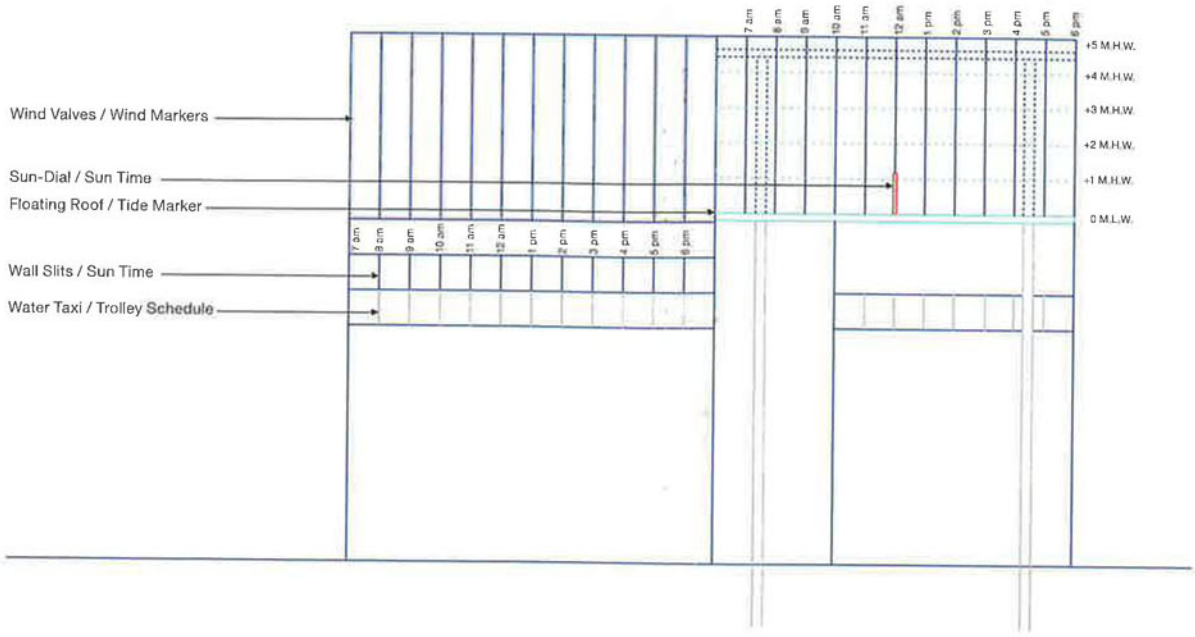
Solar Declination Arcs, source: Motions of the Sun Simulator

A View from Within a Shelter

An unbuilt project from nea studio may serve to outline an approach to design in which perception of the site's geographic constituents drives the outcome. In our proposal, we do not suggest a naive return to the wisdom of the designers discussed above but offer instead a reinterpretation suited to our time. Our point of departure has been to explore what type of design the view from within would generate. With the support of local institutions, we propose a shelter to be placed in New York's Red Hook, Brooklyn waterfront.[23] Shaped by the site's geographical world, it will shelter from extreme weather conditions, including winds, hot summer sun, rainfalls, cold winter winds, and perhaps even dramatic waves hammering a pier on which it could stand. At the same time, it will underline and intensify the presence of cyclical and unpredictable environmental rhythms, thereby stimulating perception through multisensory experience. By responding to the surrounding climatic and cultural conditions, we also aim to create an architectural space that embraces layered notions of time and scale.

We used the reasoning of the Olgyays to generate its S-shaped structure. The form is the result of a digital model based on their climatic statistical calculations for ideal shading conditions for the New York City region. It is derived from an analysis of the minimization of shadows behind the shelter in the morning and the maximization of shadows during the overheated afternoon. Fry, Drew, and the Olgyays' use of climatic charts that operate on a "glocal" scale helped us to design in subtle dialogue with nature. When the body senses temperature changes within the thermal comfort zones outlined by the Olgyays, thermal pleasure is felt more intensely. By pinpointing a comfort zone, we address the sensitivity of perception.

The structure's surfaces and shadows, which move according to wind, sun and tidal forces, mediate between human and global scale.



Elevational diagram of a shelter as a register of time through light and shadow

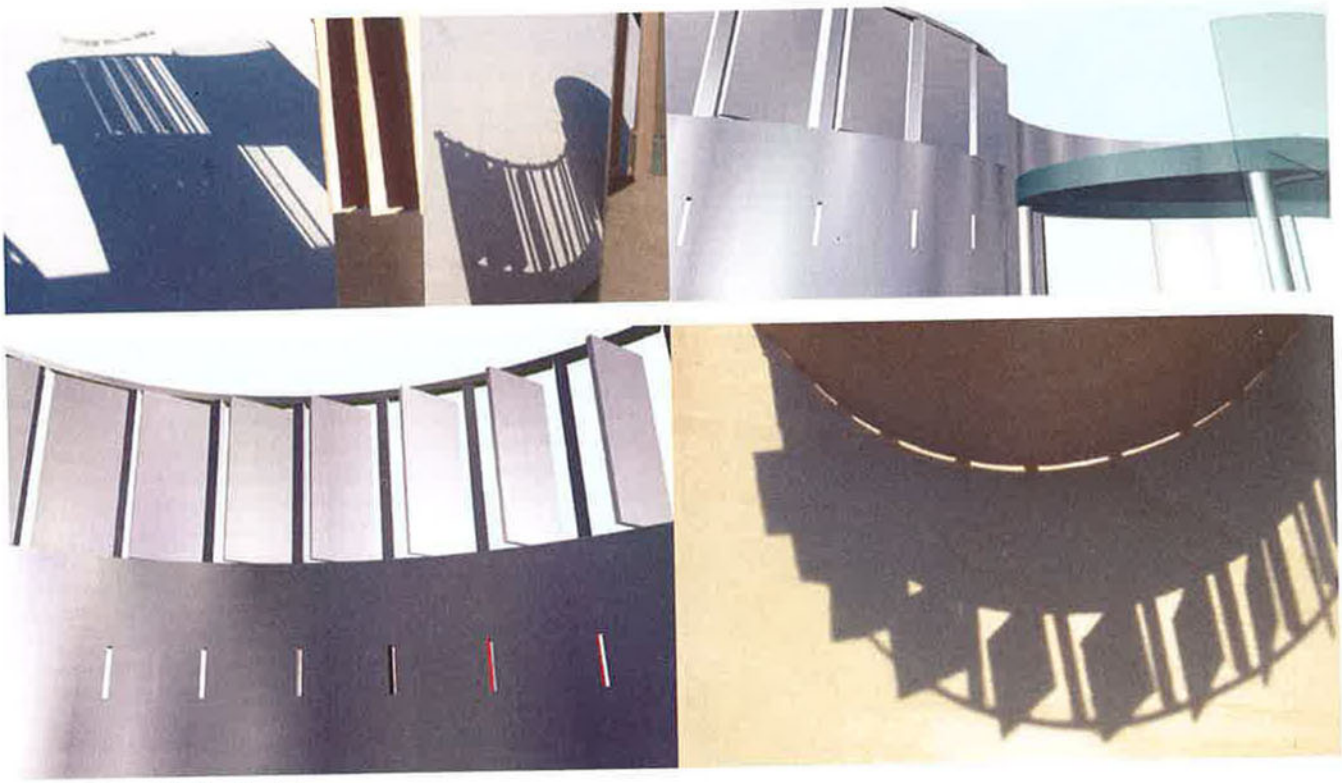
By adapting to the vast forces of the natural surroundings, the responsive skin of the structure incorporates the concept of the extra-large scale and the infinite. Both visible and invisible forces acting at multiple scales influence visitors' perceptions. Global scale is brought to the bodily scale of its users by paying attention to sun, wind, tide, and ground and how they can be registered in multisensory experience. The combination of auditory and visual sensations, for example, leads to a heightened awareness of scale where the flickering sound of the wind valves evokes the vastness of the horizon. Different conditions of shading for Oslo, Dubai, and New York are illustrated in the "solar declination arcs" diagram that makes visible this dialectic between horizontal and vertical perspectives. Since these sun paths are based on human perspectives at different latitudes, it is the human scale that defines the global.

Referring to this diagram, the shelter adopts an adaptable global language that enables a rule-based design process following the parameters set out by Fry, Drew, and the Olgyays. By changing the geographic conditions to a different location, the shelter can take on a different shape. Adaptable geometry is facilitated by the use of digital parametric modeling techniques. We decided to let the shelter's location generate environmental data through digital measuring devices, which also helped us to understand local climatic conditions. Using recycled wood and steel from nearby building demolitions, the shelter will reflect local construction techniques.

Cultural rituals are often rooted in environmental factors, such as the afternoon siesta in hot climates. In the case of New York, the daily rhythm of travel to and from work starts and ends later than in Oslo, for example. Therefore the positioning of the sun slits and ferry schedule markers, as well as the shape, materials, and degree of openness of the structure's skin, will adjust according to location, physiological, and cultural criteria.

We organized the shelter to register both scheduled and unscheduled time. It will become a type of architectural clock and light modulator, with its various moving elements and light slits generating shifting spaces of gray and light. It will have the capacity to produce a constantly changing temporal experience of waiting through the overlapping of rhythmic and unexpected movements. The moving elements will interact with changes in local climate and weather conditions. The steel columns supporting the roof will, if placed on a pier, move up and down with the rhythm of the tide and waves. Twelve metal wind-valves graphically aligned with the marked hours will open and close to relieve wind pressure. A curved transparent glass wall toward the harbor will allow views while protecting against rain and wind. A horizontal stripe at eyelevel will provide bus or ferry schedules. The wall will consist of thin vertical perforations marking the day's scheduled hours through the sun's daily travel. The sun shining through slits in the east section of the wall will mark the hours by creating light strips on the shaded floor behind it. A sundial on top of the glass roof will also indicate solar time. The marking of overlapping times in the structure will give the user the recognition of departure and arrival, diurnal, annual, and tidal rhythms through direct sensory experience.

Contrary to a design strategy that reinforces the eye and a sense of distant control, we allow geographic parameters to control the design. The shelter will oscillate between open and closed, both protecting from the environment and capturing its vitality in an attempt to reconcile the human with the climatic condition. This structure will act as a transitory threshold that provides a pleasurable space for immersion in the flow of time.



Shelter Light and Shadow Rendering

NOTES

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