WATER WORLD
An artificial shape of meaning

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**WATER RESERVOIR function and principle**

Water world is a water reservoir. It works according to the principle of communicating vessels, it evens out the water pressure in the pipeline and this is its main function. Despite its name it does not store water.

During time of construction the function of the reservoir can not be interrupted for more than a few hours. Half of the existing reservoir is therefore torn down and replaced by the new structure and when this can be taken in use the next half is erected. The new structure follows the same linearity as the old one.

The core of the mountain consists of a steel grid structure with three different dimensions. The water reservoir and the concrete shell is held up by square steel beams and pillars with the dimension 600 mm at a cc distance of 6000 mm. Where the surface of the mountain cut the outer intersections of these beams and pillars they are scaled down by half, and when the outer intersections of these beams and pillars are cut by the surface they are once again scaled down by half. From this third layer of beams and pillars, beams are welded with a horizontal distance of 1500 and a vertical distance of 2000 mm cc. This deviation from the geometry of the grid enables these beams to act as scaffolding during construction.

The reservoir consists of two chambers containing 14 000 m³ water each. It is filled up with fresh purified water from Lovö Vattenverk during night, not by a pump but by the pressure in the pipeline and then emptied and used by the inhabitants of Stockholm during daytime. The height of both surface and bottom off the water stored in the reservoir is required to maintain the correct pressure in the pipeline.

The function of the waterfall is separate from the reservoir. The water is pumped up from the exterior pool via a chamber inside the mountain through a pipe divided into three parts two meters below the outfall of the waterfall. When in use 60 m³ water per second circulates the system. The waterfall is in use one quarter a day during weekdays and one hour per day on weekends. In wintertime the waterfall is out of use due to cold weather.
Perspective diagramme

Pump

Pool

Reservoir chamber 1
14,000 m³

Reservoir chamber 2
14,000 m³

Elevator and staircase

+ 66.6 m
+ 62 m
+ 56 m
+ 55.2 m

60 m³/s
**Internal structure No 1**
Grid system consisting of beams and columns cc 6000 mm
600 x 600 mm square steel

**Internal structure No 2**
Grid system consisting of beams and columns cc 3000 mm
300 x 300 mm square steel

**Internal structure No 3**
Grid system consisting of beams and columns cc 1500 mm
150 x 150 mm square steel

**Internal structure No 3,5**
The last member of the inner structure consists of tilted square beams with the same dimensions as the 3rd. On these tilted members a second beam is welded horizontally. These beams are during construction used as scaffolding why they have a cc distance of 2000 mm vertically.

**External layer No 1**
A 90 mm layer of concrete (shotcrete) is applied to the structure.

**External layer No 2**
A 60 mm layer of decorative concrete is applied to the structure. This is treated with tools to give it the final texture within 8 hours of application.
The surface of the mountain consists of two layers of shotcrete. Before applying the first layer of shotcrete, 8 mm rebars are welded on to the horizontally placed beams with a cc distance of 150 mm. On these rebars, towards the core of the mountain, expanded metal is attached with a distance of 50 mm. The first layer of shotcrete is applied to a thickness of 90 mm. Before applying the last layer the horizontal beams are cut off. This process starts at the top of the mountain since these beams act as scaffolding during construction. The last layer of shotcrete is applied and treated to create cracks and texture within 8 hours of application. The surface is painted with silicate mineral paint coloured with mineral pigments. Behind the waterfall the surface is treated with a water repellent paint, eg tapecrete.
Images

Clockwise from top left: View from east; View from north-east (structural frame); View from north-east (concrete surface); View from Lidingövägen.
Models

Surface model scale 1:2

Situation model scale 1:1000

Model of waterfall scale 1:200
Still from movie picturing the water fall
An artificial shape of meaning
Humans, like all things alive, depend on water. Many forms of life are able to store water in their bodies during periods of drought; the camel stores water in her bloodstream and succulents such as the cactus store water in their thick leaves and stems.

Humans on the other hand survive a mere three days without water and often need to rely on communal coordination for fresh water. Storing water is thus an indispensable keystone in civilization; a dependency that also poses one of the foremost threats in case of a societal collapse.

The modern temple
Urban water supply systems are quite similar around the world: we build waterworks and lead the water to inhabitants through pipelines. The used water is then carried through a sewage system to a purifier before it is released back into nature.

Water reservoirs are important parts of the fresh water supply system. The reservoir is, despite its name, not mainly used for storage but for pushing water through the pipelines using the principle of communicating vessels. Stockholm has 12 water reservoirs and Uggleviksreservoaren in Norra Djurgården is one of the most prominent ones. It was built in 1935, designed by Swedish architect Paul Hedqvist in the shape of a modern concrete temple.

Today, Uggleviksreservoaren faces many challenges: the water level is too low in correspondence to the pipeline, the volume stored in the reservoir is too small and the concrete in the structure is worn out. Moreover, modern security demands make the design inappropriate, having left the reservoir vulnerable to both natural and human destruction. How do we protect fresh water, one of the most basic and important of human needs?

Humans, as well as other animals, have a primal instinct to bury and hide objects we want to protect, and throughout human history mountain caves have protected both us and our belongings. Moreover, mountains symbolize safety and its intrinsic stability conveys reliability and abiding refuge.

Water World combines two of humanity’s most basic needs: a reliable fresh water supply and protecting precious belongings by burying them in the ground. The result is a water reservoir disguised as a mountain with an external waterfall posing as a redemptive and atoning gesture; a proposed link between nature and culture.

Visibility: Civilization and awareness: Hyperobjects
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Timothy Morton introduced the concept of hyperobjects in 2009 to describe objects that are so massively distributed in time and space as to transcend spatiotemporal specificity, such as global warming, styrofoam, and radioactive plutonium. According to Morton, hyperobjects not only become visible during an age of ecological crisis, but alert humans to the ecological dilemmas defining the age in which they live. Additionally, the existential capacity of hyperobjects to outlast a turn toward less materialistic cultural values, coupled with the threat many such objects pose toward organic matter (what Morton calls a “demonic inversion of the sacred substances of religion”), gives them a potential spiritual quality, in which their treatment by future societies may become indistinguishable from reverential care.
Limits and boundaries, fear and protection as trigger for walls

Stan Allen: “We need to remember that the marking out of territory and the separation of a protected interior space from nature are founding acts of architecture (If architects are expert at anything, they are experts at limits and boundaries.)”

Rosi Braidotti: “The notion of ‘life itself’ lies at the heart of biogenetic capitalism as a site of financial investments and potential profit. The ongoing technological revolution often intensifies patterns of traditional discrimination and exploitation. In contemporary society, ‘life’ itself can be a threatening force, which engenders new epidemics and environmental catastrophes, blurring the distinction between the natural and the cultural dimensions.”
Camouflage, constraints of the senses: visibility and depth

Our preconceptions of what hides behind a surface may in many situations save us time, but in the complex world of today it may just as well come and bite us from behind. What do we expect or demand from a surface and how (if we think necessary) can we turn this notion around?

BURDENS OF LINEARITY

Measurement, line vs animal, a new materialism
Fractal landscape, emergence and morphogenesis
Perception and representation: How to create nature, or what humans can do with lines

Water World brings a few questions to the table: is the essence or ontology of the mountain dependent on its making? Or can a mountain be a mountain even if it is made by man? Does a water reservoir shaped as a mountain lose its function as a mountain? What is the reservoir in the shape of a mountain in comparison to a mountain mined for minerals?

Nature is infinite, the notion that it can be modeled and understood in its full extent is questionable. We use lines to make sense of the world around us, and create algorithms and fractals to mimic nature’s constructions.

Measurement, line vs animal, a new materialism
On early European maps from the 11th century until the renaissance, mountains were represented figuratively as hummocks or molehills. The idea presenting heights with the use of lines that join points of equal value, contour lines, became commonly used from late 18th century in the western world.
Diana Coole & Samantha Frost: "A second and urgent reason for turning to materialism is the emergence of pressing ethical and political concerns that accompany the scientific and technological advances predicted on new scientific models of matter and, in particular, living matter. As critically engaged theorists, we find ourselves compelled to explore the significance of complex issues such as climate change or global capital and population flows, the biotechnological engineering of genetically modified organisms, or the saturation of our intimate and physical lives by digital, wireless, and virtual technologies. From our understanding of the boundary between life and death and our everyday work practices to the way we feed ourselves and recreate or procreate, we are finding our environment materially and conceptually reconstituted in ways that pose profound and unprecedented normative questions. In addressing them, we unavoidably find ourselves having to think in new ways about the nature of matter and the matter of nature, about the elements of life, the resilience of the planet, and the distinctiveness of human."

Catherine Ingraham: "The Donkey is the burden beast to who Le Corbusier attributes the plan of all the pre-modern cities. According to the Swiss-French architect, the donkey by his zigzag's tracks that 'takes the lines of least resistance, drew the lines of the city. Modernity, on the contrary, advocates for the pure and same orthogonality that celebrates the fact that "Man has made up his mind". Le Corbusier's obsessive pathology for sanity, is fully expressed here: Architecture and the City have to constitute thaumaturgic machines in which health is no longer a mean to perpetuate life but rather celebrated as a self-justified end.

To the asserted "ruinous, difficult and dangerous curve of animality" by Le Corbusier, one can think of Deleuze's Becoming Animal that celebrate the adherence to the counter-standard imposed by Modernity. In this matter, the anti-modern behavior by excellence is the Situationist drift (drive) and the anti-modern architecture/urbanism is Constant's immanent labyrinth constituted by the New Babylon, the city of humans who did not make up their minds."

Fractal landscape, emergence and morphogenesis

A fractal landscape is a surface generated using a stochastic algorithm designed to produce fractal behavior mimicking natural terrain. Many natural phenomena exhibit some form pattern that can be modeled by fractal surfaces, but real landscapes have varying statistical behavior; for example sandy beaches don't exhibit the same fractal properties as mountain ranges. A fractal function however is statistically stationary with the same statistical properties everywhere and any real approach to modeling landscapes requires that you can modulate fractal behavior spatially.

Fractal functions unless very advanced are not comparable with nature, and even if we would perceive it as such, we can not be surtain of the correctness is this assumption. Water World is shaped from my perception of a mountain, without the limitations or possibilities posed by mathematical algorithms. Instead of habitually reshaping nature in accordance with our needs and wishes, Water World mimics nature with synthetic means.

Emergence requires the recognition of architectural structures not as singular and fixed bodies, but as complex energy and material systems that have a lifespan, exist as part of the environment of other active systems, and as an iteration of a series that proceeds by evolutionary development.

This mountain rejects thoughts of emergence and morphogenesis.

After construction the man-made surface is exposed to decay.
The lines traced by humans (and architects) impose a violence on the bodies that they subjugate. These lines bind bodies to create volumes in which these bodies have no choice but to fit. What is in the thickness of these lines that separates bodies from their architecture? If our body is the temple then what is the temple?

William E. Connolly: “Perception depends upon projection into experience of multiple perspectives you do not have. This automatic projection into experience also makes it seem that objects see you as you see them. The perception of depth anticipates a perspective from which my actual angle of vision is felt to deviate. Perception thus cloes itself as actuality, a norm it cannot in fact instantiate. There is no denying that we humans - while often differing from one another - judge the new outcomes to which we are exposed or that we have helped usher into being. What is denied is that the judgements express an eternal law or bring us into attunement with an intrinsic purpose of being.”

Maurice Merleau-Ponty: “The unity of either the subject or the object is not a real unity, but a presumptive unity on the horizon of experience.”

Diana Coole: “The depth and perspective that permit visual clarity belong to neither seen nor seen, but unfold where they meet.”

Rosi Braidotti: “The posthuman predicament is such as to force a displacement of the lines of demarcation between structural differences, or ontological categories, for instance between the organic and inorganic, the born and the manufactured, flesh and metal, electronic circuits and organic nervous systems. As in the case of human-animal relations, the move is beyond metaphorization. The metaphorical or analogue function that machinery fulfilled in modernity, as an anthropocentric device that embodied human capacities, is replaced today by a more complex political economy that connects bodies to machines more intimately, through simulation and mutual modification.”

As a first attempt to shape the mountain I used the line to make contour lines in 2D representing 1 m in the scale of 1:1000. This first model has then been altered in the same manner as it was first made, before using the lines as a base for a mesh against which I could then construct the upholding interior linear structure. The linear logic of the interior meets an exterior that is part of another order, an order attempting to mimic nature.
The reservoir itself holds two chambers containing 14,000 m³ of water each, with a separate system for the waterfall. The core of the mountain consists of a steel grid structure, covered by a concrete shell. The water reservoir and the concrete shell is held up by square 600mm beams and pillars at a cc distance of 6000mm. Closer to the surface, the beams and pillars are scaled down and finally rebars are attached to hold up the outer shell. The concrete surface is created by applying shotcrete to the outermost layer of metal bars and the surface is then painted with silicate mineral paint colored with mineral pigments.

Pro Memoria Garden was the winning entry in a competition for a memorial that would remind future generations of the horrors of war. The unrealized project consists of a series of small, irregularly shaped gardens divided by seven-foot hedges and narrow paths. Children of the town of Lüdenhausen would be assigned one of the plots at birth and assume responsibility for taking care of it at age five. This, it was hoped, would teach them a respect for life. Over time, the hedges would be removed to make a single large communal garden. Ambasz usually addresses the mystical and poetic side of architecture in his work, but here he has used what he considers to be architecture’s ability to produce myth-making acts to suggest a collective commitment to the performative dimension of public space.
LONGING FOR NATURE

The sublime; at the end of the world; mimesis

Waterfall - everything changes, redemption

In times of crisis we tend to turn to nature for consolation. The mountains’ intrinsic stability makes it a subject comfortable to lean on.

The sublime; at the end of the world; mimesis

Robert Macfarlane: “Mountains seem to answer an increasing imaginative need in the West. More and more people are discovering a desire for them, and a powerful solace in them. At bottom, mountains, like all wildernesses, challenge our complacent conviction - so easy to lapse into - that the world has been made for humans by humans. Most of us exist for most of the time in worlds which are humanly arranged, themed and controlled. One forgets that there are environments which do not respond to the flick of a switch or the twist of a dial, and which have their own rhythms and orders of existence. Mountains correct this amnesia. By speaking of greater forces than we can possibly invoke, and by confronting us with greater spans of time than we can possibly envisage, mountains refute our excessive trust in the man-made. They pose profound questions about our durability and the importance of our schemes. They induce, I suppose, a modesty in us.”

Caspar David Friedrich: “The artist should paint not only what he sees before him, but also what he sees within him. If, however, he sees nothing within him, then he should also refrain from painting that which he sees before him. Otherwise, his pictures will be like those folding screens behind which one expects to find only the sick or the dead.”
Mimesis, from (mimeisthai), “to imitate,” from mimos, “imitator, actor”, is a critical and philosophical term that carries a wide range of meanings, which include imitation, representation, mimicry, imitatio, receptivity, nonsensuous similarity, the act of resembling, the act of expression, and the presentation of the self. In ancient Greece, mimesis was an idea that governed the creation of works of art, in particular, with correspondence to the physical world understood as a model for beauty, truth, and the good.

Waterfall - everything changes, redemption

The downward movement of water alternates with the upward movement of the mountain, the dynamism of the waterfall with the static properties of the rock. It is, and this coincides with the teachings of C’an (Zen) Buddhism, the symbol of impermanence as opposed to changelessness.

Ch’uan T’eng Lu: “Before a man studies Zen, to him mountains are mountains and waters are waters; after he gets an insight into the truth of zen, mountains are not mountains and waters are not waters; but after this when he really attains to the abode of rest, mountains are once again mountains and waters are waters.”

Nature
Human
Anthropocentrism
Hyperobjects
Posthumanism
New materialism
Fake nature
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