

SKY: In their grand masterplan schemes for the world, architects seem to find the 'final solution' to all possible situations.  
 SMITHSON: They don't take those things into account. Architects tend to be idealists, and not dialecticians. I propose a dialectics of entropic change.

SMITHSON: [...] There is an association with architecture and economics, and it seems that architects build in an isolated, self-contained, ahistorical way. They never seem to allow for any kind of relationship outside of their grand plan.  
 [...] And then suddenly they find themselves within a range of desolation and wonder how they got there. So it's rather static way of looking at things. I don't think things go in cycles. I think things just change from one situation to the next, there's really no return.

— 'Entropy Made Visible' (1973) Alison Sky, interview with Robert Smithson

AESTHETICS OF ENTROPY |  
 AT THE CONCRETE PLANT  
 BY  
 KARIANNE HALSE

# LANDSCAPE PROCESSES

## APPROACHING ARCHITECTURAL CONDITIONS

### 1 PRELUDE: THE LANDSCAPE. PROCESSES. CONDITIONS

The anthropogenic landscape we inhabit consists of different layers, traces, geological and man-made mechanisms and processes. Despite the fact that we experience it as immutable, the land we inhabit is inherently unstable. Natural actions like active tectonic plates and geological processes of natural agents such as air, water and the sun are, together with human activities like industry, cultivation and consumption of land, triggers of a constant modification of the landscape.

The inevitable processes of entropy<sup>1</sup>, decay and chronotopic changes initiates the setting for this narrative, which seeks to explore the relationship between a dynamic landscape and the creation of *process architecture*. The intention is to explore a way of comprehending the processes and forces of the landscape as an operational field, and use the transformational potential to generate architecture as conditions of mutual impact and interdependence on the landscape.

Entropy was a loaded term in the American land art artist Robert Smithson's vocabulary: 'it customarily means decreasing organisation and, along with that, loss of distinctiveness'. Basically, Smithson's idea of entropy was concerned not only with the deterioration of order, though he observed it avidly, but rather with the clash of uncoordinated orders. Examples of entropy range from minor changes over a long period of time, such as increasing vegetation and sand displacement, to enormous destructions such as eroding coastlines, natural catastrophes and human devastations. The impact and speed of entropy may be generated at various paces creating varying characteristics, but it is always an irreversible process.

#### ARCHITECTURE AS CONDITIONS

In the field of architecture, there is a common fear of unplanned changes caused by time; our work exists in its ideal condition the moment it is constructed – then the struggle of keeping it in a fixed state begins – a fight against different weather phenomena, decay, growth of weeds and daily wear and tear caused by users. There is a tendency to rather work against the landscape and the processes, restricting both the site and architecture within fixed frames, instead of focusing on the potentials of this transformation. By taking these matters into account, a new approach of possible aesthetic, functional and spatial qualities within architecture is conceived.

<sup>1</sup> Entropy: the second law of thermodynamics – nature tends from a distinguishable order to a disorder in closed systems, leading to a state where all the differences are indistinguishable. This loss of energy can be seen as decay and deterioration.

### INVESTIGATIONS OF LANDSCAPE PROCESSES: FLUSHING BAY NYC, CONCRETE PLANT

The different processes<sup>2</sup> and forces within a landscape are unfolded through the optic of a concrete plant, located in Flushing Bay, NYC. The site is an eminent example of an area transformed by an intricate balanced system of geological and man-made processes. The coastline of Flushing Bay has been transformed due to human actions like constructions of piers, ports and other interventions, where the water acts as a transformative agent of erosion and sedimentation.

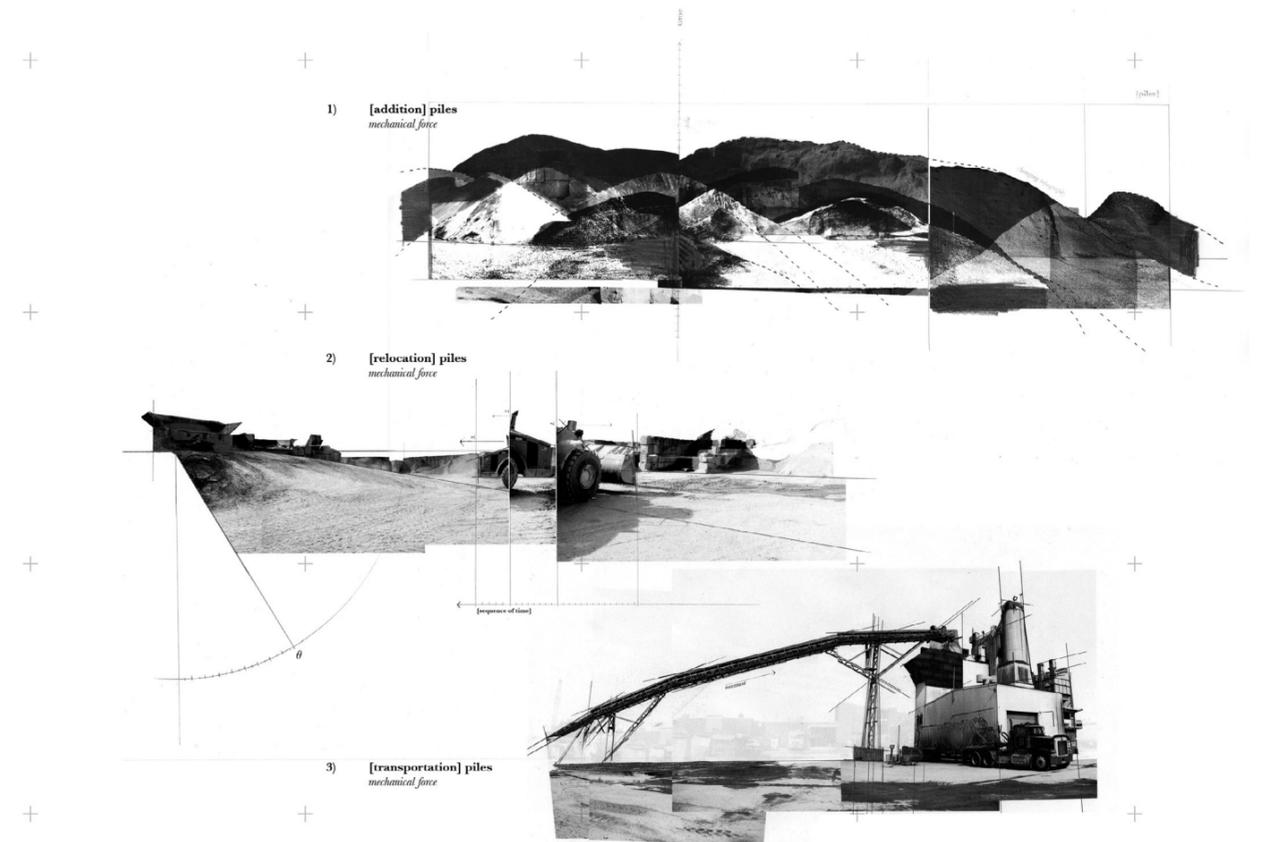
The bottom of the bay can generally be characterized as silt/clay with some areas of sand. The runway extension at La Guardia Airport is held responsible, as the main channels are cut off causing a low level of energy. As a result particles of silt and clay settle in the area leading to an accumulation of mud. It might seem like a static landscape, but mud saturated with water is incredible unstable, and is prone to change any time.

The term *angle of repose*, which appears in both the geological<sup>3</sup> and mechanical<sup>4</sup> vocabulary, is essential to comprehending

this subject. This term is embedded in all types of changes, and interpreted as a shift between conditions. It is a complex balance of forces - the level between stability and dynamics, which involves aspects of speed, time and movement.

The site, an industrial territory producing concrete, is a system based on its own logic and order. Every component is limited to a programmatic purpose, and the motivation of the actions is purely functional. By focusing on the term 'landscape' as a comprehensive metaphor, the area is transformed into an object of aesthetic sensibility. Through this approach, the man-made landscape is no less nature, in a way, than what is considered a 'natural' landscape generated by geological processes.

A classification of the processes of producing concrete, based on both the pragmatic and phenomenological aspects, reveals an interesting duality between the practical operations and the unintentional aesthetic effects upon the landscape:



#### 1 THE PROCESS OF MIXING / CONSTANT TOPOGRAPHICAL CHANGE

**Pragmatic:** Piles of gravel and sand are stored separately in different chambers and subsequently transported onto a conveyor belt leading to an immense machine which mixes the different components into concrete. The concrete is then transferred to concrete mixer trucks and directly transported to construction sites in the city.

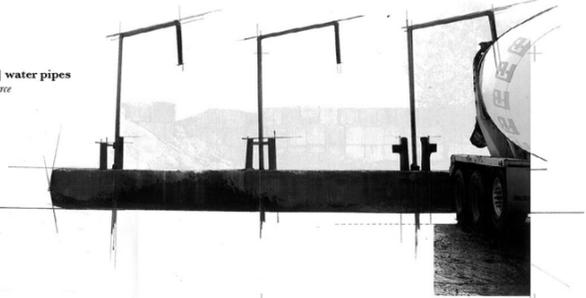
**Aesthetic optic:** The area is a dynamic landscape of piles – an ever-changing terrain of sand and gravel, framed and controlled by dividing, static concrete chambers.

<sup>2</sup> Process, noun – a natural or involuntary series of changes – a systematic series of mechanised operations performed in order to produce something

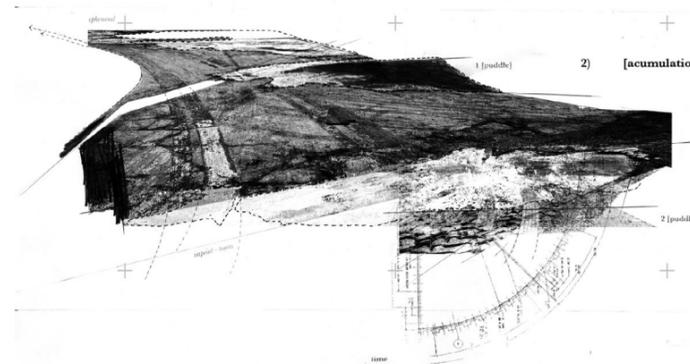
<sup>3</sup> In *geology* the term describes the slope stability as the steepest angle that a cohesionless slope can maintain without losing its stability. When a slope possesses this angle, its shear strength perfectly counterbalances the force of gravity acting upon it. Imbalance in the relationship between forces as gravity and resistant force can cause erosion, deposition and mass movement as landslides, rockfall and mud flow.

<sup>4</sup> In *mechanics* it refers to the maximum angle at which an object can rest on an inclined plane without sliding down. This angle is equal to the arctangent of the coefficient of static friction between the surfaces.

1) [spooling] water pipes  
mechanical force



2) [accumulation of water] puddles



3) [separation basin] process water  
gravity force



2 THE PROCESS OF SPOOLING / EPHEMERAL ACCUMULATIONS OF WATER

**Pragmatic:** Subsequent to delivering the concrete, the concrete mixer trucks turn back to the area where the next step is to rinse the tank and empty the containing mix of water and remains of concrete, 'process water', into the submerged settling basins at the site.

**Aesthetic optic:** The water level of the basins increases, and puddles of different sizes and depths occur near the water pipes. Ephemeral traces of actions materialise, emphasising directions and frequency.

3 THE PROCESS OF RECYCLING / PARTICLES OBSCURING THE ATMOSPHERE

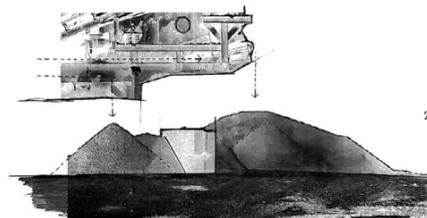
**Pragmatic:** The concrete is crushed by a machine and the pieces sorted into two different piles by size – to be transported and stored separately in different chambers.

**Aesthetic optic:** The air is filled with dust, spread and intensified by the wind – blurring the area into an epic scenery.

1) [crusher]  
mechanical force



2) [separation]  
mechanical force



3) [ephemeral] dust  
registers time by way of accretion,  
accreted dust - dirt - soil - earth



2 BARNACLE REMOVAL PLANT / THE PROCESS OF UNFOULING<sup>5</sup>

As a testing ground for developing architecture as conditions a restoration plant removing barnacles from boats is implemented in this dynamic landscape. The process of removing barnacles can be seen as a *negentropic* operation, where energy is added to maintain the boats in an ideal condition. This activity is not a complicated operation and can be carried out using simple tools, but it is an extremely frequent and laborious kind of work. Also, there is a lot of biological and chemical waste involved, where the contaminated remnants from anti-fouling paint need to be stored and recycled in a proper way.

The unfoiling-plant is characterised by a contradictory and dialectical relationship between the *negentropic process* and the *increasing entropic effect*. This demonstrates the concept of entropy; it is impossible to preserve something in a fixed position. The barnacles need to be removed on a constant basis – a repetitive, cyclic process. When energy is added in one place to keep the entropic effect away, the disorder is relocated to some other place in the system.

The architectural scheme is based upon two layers: an active ground floor where all the mechanical processes are performed, and a series of sub-terrain chambers, serving both rational and phenomenological purposes.

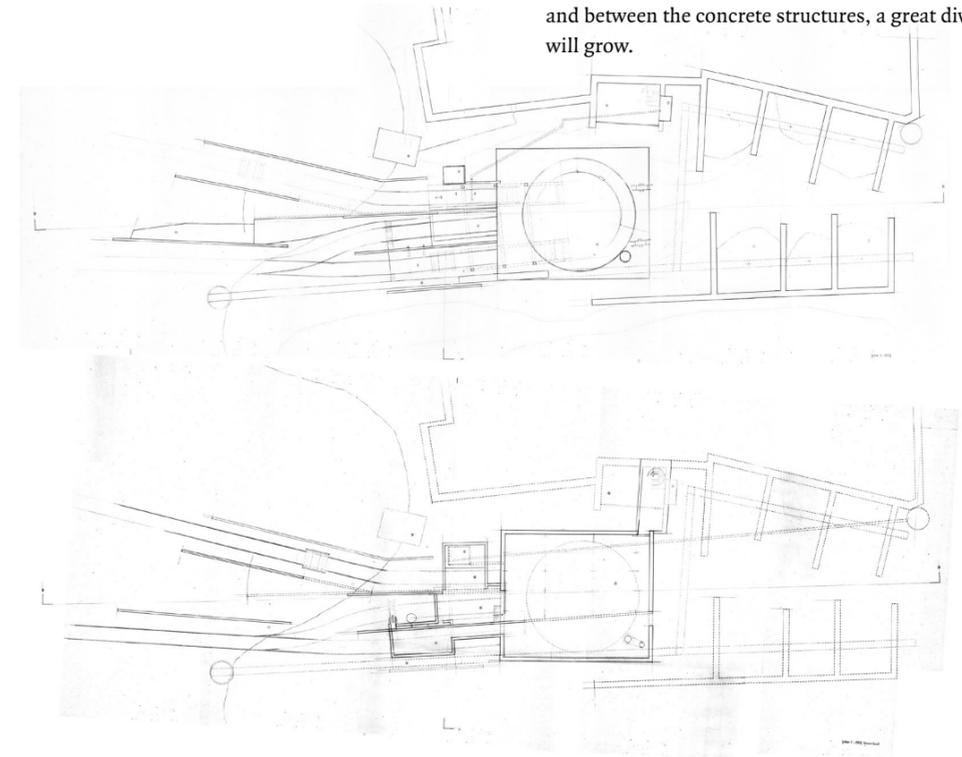
The steps of the operation are:

STEP 1: REMOVAL OF SHELLS / WATER CHAMBER

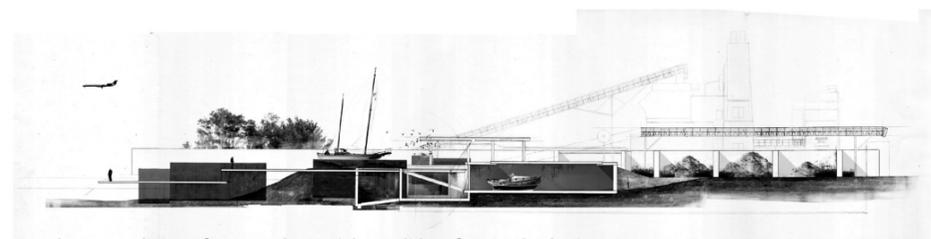
The boats are pulled up and high-pressure cleaned with water to remove the outer-shells of the barnacles.

In the chamber beneath, which serves as a water recycling chamber, a membrane delays the running water, creating a moist environment where the spatial condition is slowly changed by mud, algae and other processes of fouling.

The shells are subsequently transported onto a conveyor belt and stored in chambers at ground level. The slow process of storing and filling up the chambers with barnacle shells takes years. The calcium of the shells will be dissolved when exposed to rain, which will lead to a new process; an *allogenic succession* where the vegetation is increased over time, radically changing the character of the industrial landscape. Through the dry ground and between the concrete structures, a great diversity of plants will grow.



5 Fouling, noun: – the accumulation of unwanted material on solid surfaces to the detriment of function. Fouling is usually distinguished from other surface-growth phenomena in that it occurs on a surface of a component, system or plant performing a defined and useful function, and that the fouling process impedes or interferes with this function.



**STEP 2: REMOVAL OF BARNACLES AND HUSKS / CHEMICAL CHAMBER**

The biological waste containing remains of anti-fouling paint is removed and piled up as a landscape element in an open container, which is immersed and connected to an underground chamber, thus preventing the contaminated content from being released into the environment. The lower part of the container collects the polluted water, which results from waste being exposed to rain and excess seawater.

The constant process of filling the container leaves no visible signs until the water reaches its maximum level and the gravity is greater than the resistant force of the shutter. The water is released in the instant of a moment, manifesting the shift of forces – the *angle of repose*. This sudden shift will cause various effects within the chamber underneath, such as a more immediate moist environment, traces of chemical fluids, and ephemeral aspects such as sound resonance of water and the falling shutter. The blackbirds that eat the biological waste from the container above - connected to the chamber with adjustable hinges - will instantly respond to the shift, recoiling the action. The sky turns black, filled with screaming, flying birds - making the event perceptible at distance around the Flushing Bay area.

**STEP 3: CHEMICAL CLEANING / CLEANING CHAMBER**

Positioned at the same spot, the boat is cleaned with chemical solution.

**STEP 4: POLISHING AND SANDING / DUST CHAMBER**

The boat is polished and sanded - a pipeline transports the dust into a glass-chamber connected with the service area. The container also serves as a window between the space and the outside, filtrating the light through particles of dust.

**STEP 5: PAINTING**

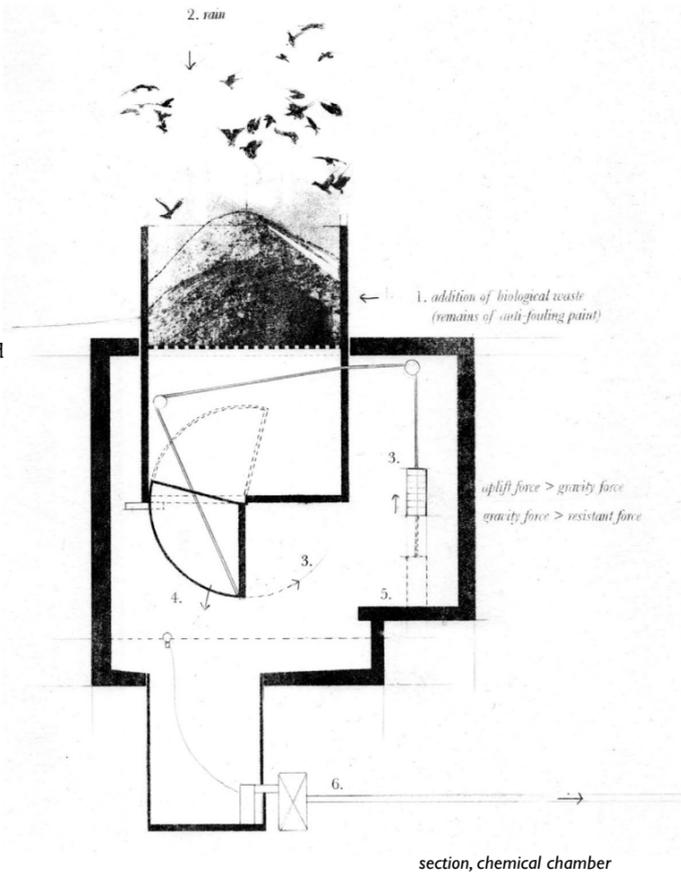
Finally, the boat is painted with anti-fouling paint, and released into the water in clean state. In a few months this operation will be performed once again.

**UNDERGROUND CHAMBERS**

The system of passive underground chambers is operated and affected by active structures, for the pragmatic purpose of closing and opening the chemical chamber at day/night time; others are closed off or subdivided based on the seasonal changes that affect the plant. The temporary absence of the structures generates open slits, instantly changing the spatial condition by altering the light and creating new connections and relations. Besides the abrasion<sup>6</sup> between the fixed concrete chambers and the movable structures, which, over time, leaves traces of forces, processes and actions - this additionally exposes the chambers, making them more vulnerable to external phenomena like moisture, rust, algae and mud.

6 Abrasion (geology) noun – the process of scraping or wearing away; – the mechanical scraping of a rock surface by friction between rocks and moving particles

7 The category of passive locomotion includes movement by fluid stream or air transport, physical attachment to another moving body, and gravity – all conditions in which the object moved does nothing itself to produce motion. Initiative locomotion, is defined as locomotion through an environment of any medium (water, soil, air, wood, etc.) by virtue of the entity's own controlled kinaesthetic and kinetic abilities.



**3 EPILOGUE**

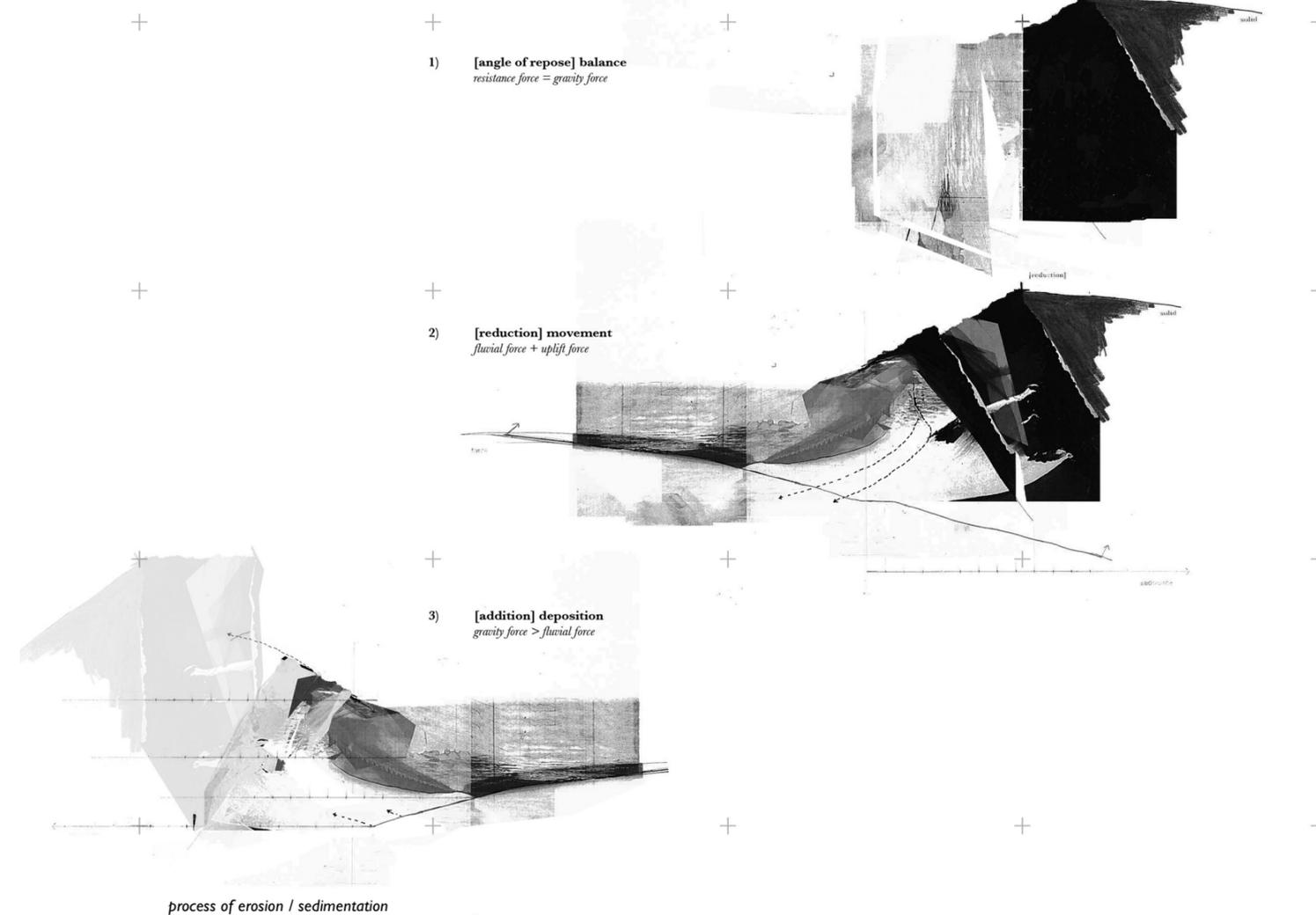
'[...] the very concept of energy prevents us from drawing any concrete conclusions as energy transforms each conclusion into a new beginning and opens up new opportunities for thinking and acting. Each end contains both the nostalgia for what it lacks and also the promise of the novel and unforeseen.'

—S. R. Pansera, 'Beyond Entropy'

**SYNTHESIS, 'ARCHITECTURE-NATURE'**

The ambition has been to explore the dialectical relationship between the machine and the landscape, weaving the structure into the complex, intertwined systems of processes on the site. The relationship between the architecture and the landscape concerns both passive<sup>7</sup> and active<sup>8</sup> locomotion, where the landscape affects the architecture - spanning from the elements being displaced, which leads to a new revelation of a secret space – to the reverse situation where phenomena like rain and seawater trigger an integrated mechanism. This allegory establishes a translation of the vocabulary and terms which apply to geology and ecology, into man-made landscapes - and moreover to architectural matters which become a sort of conglomerate of building and landscape, nature and machine.

8 Movement is a characteristic inherent in all machines; operations where material or non-material is moved, or shaped. Mechanics, though, do not work the same way a motor does: in mechanics, movements are simply propagated, not created.



**ARCHITECTURE OF SUSPENSE**

Time is of great importance and presents a diversity of experiences - through the *linear changes*, as abrasion on surfaces and structural displacements, to the *cyclical aspect* where changes applies to specific seasons or changes at an hourly basis; from the *gradual change* to the *instant occurrence* of the event. The different factors involved, such as the quantity of boats being cleaned, the amount of shells and biological waste, the volume of rain, the number of people working and visiting, etc., determine the speed and frequency of these changes.

By developing some 'focal points' based on assumptions of probable changes, potential change is embedded within the architecture. In other areas, the unpredictable forces of nature take control and the structure constitutes a framework that time and processes can work with and within. The place will perform differently from one instance to the next; a theatre of staged uncertainty. It will require attention to discover some of the changes – others will be predictable even before the action takes place, leaving the place in a state of suspense. □

SMITHSON: I mean planning and chance almost seem to be the same thing.

— 'Entropy Made Visible' (1973)  
Alison Sky, interview with Robert Smithson