Into(x) the Wild

The Anthropogenic Landscape: How the Human Shapes Nature

Into(x) the Wild

The Anthropogenic Landscape:
How the Human Shapes Nature

Livia Stacchini

Into(x) the Wild

Graduation Thesis Project

Master Interior Architecture: Research + Design (MIARD)
Piet Zwart Institute
Willem de Kooning Academie
Hogeschool Rotterdam

Assessors:
Max Bruinsma, Füsun Türetken, Marta Roy Torrecilla

Rotterdam 2018

Imprint

Livia Stacchini
liviastacch@gmail.com

"But natural science has invaded and transformed human life all the more practically through the medium of industry; and has prepared human emancipation, although its immediate effect had to be the furthering of the dehumanisation of man. ...The nature which develops in human history – the genesis of human society – is man's real nature; hence nature as it develops through industry, even though in an estranged form, is true **anthropological nature**."

– Karl Marx, *Economic and Philosophic Manuscripts of 1844*

Contents

Preface

I spent the first eleven years of my life in the countryside near Rome. We lived in a series of farmhouses, surrounded by cultivated fields and stables for animals. My parents didn't have strict rules in general and my two brothers and I were pretty free and independent there. Only one rule had to be respected: no TV before dark. Go and play outside! After school, we spent every afternoon outside in the garden on our bikes, feeding cows and horses or running in the fields and eating raw corn.

I grew up considering these activities as the only natural entertainments for a kid; the freedom of running was a must and the smell of cow manure signaled home. The relation I had with the 'outside' was probably different from any kid living in cities or city centers. Countryside does not only mean having green spaces around. It is also a place filled with sounds of the nights, sounds made catching frogs and fireflies, hours spent on the swing, climbing trees, and cold winters in front of a crackling fire. Living there for years gave me a naive conception of nature.

When my family and I moved to Rome, a city carved in stone and history, I remember the first thing I looked for in the new house was a chimney. It wasn't there. Suddenly we were in a big city; different 'creatures' were making sounds in the night, not birds or cows but cars and scooters. The tall, narrow windows with the mosquito net of the farmhouse became a large square window covered with an alarmed metal grid.

In the beginning, the chaotic and congested city was alienating; the different rhythm of it was overwhelming. There was one aspect of the new surroundings that kept disturbing me. Considering the 'nature' that I had experienced before, living in the city and being in the middle of buildings and concrete, I realized that nature did not exist anymore. Nothing around me was spontaneous or wild, every urban green area was designed. It was artificial nature, anthropogenic nature.

Since I moved to Rotterdam, the feeling of living in an artificial landscape became stronger. In fact, I am impressed that most of the country of The Netherlands has been constructed on a previously non-existent land. The determination of humans to inhabit a submerged land both worried and fascinated me and the human ability to transform landscapes to human needs is at once astonishing and sublime.

Abstract

Humans have always manipulated, engineered and shaped nature through technology according to their needs and imaginations. Lately, the human impact on Earth is transforming the landscape so drastically that a new term has been introduced to describe this current geological era, the Anthropocene. Built on the analysis of a case study and an empirical research in-situ, this thesis is an attempt to redefine the term nature in the contemporary context of the Anthropocene, to create awareness about this urgent topic and to better understand the intricate connections between capitalist industry, natural resources and the environment, as well as to demonstrate how economic and social processes are shaping the contemporary landscape.

Introduction

From their earliest existence, humans and their ancestors have controlled and disciplined nature for their benefit. In the prehistoric age, our ancestors shaped spears and weapons from stones in order to kill predators, created fire for heat and protection, and unveiled the first forms of art in their caves. The human alteration of nature increased with the invention of agriculture, with livestock breeding and later with the Industrial Revolution. Nowadays, the transformation of the landscape and exploitation of natural resources has reached a critical situation in which humans are considered a geological force and through their impact, have ushered in a new geological epoch: the Anthropocene.

Fig. 1: Illegal Sand Mining – West Bengal, India – Sudipto Das – 2010

However, if we consider human beings as natural creatures and the development of technology as a natural form of evolution, the modern dichotomy between nature and artifice vanishes, merging into a contemporary anthropogenic nature. Conquering the landscape or even surpassing the boundary of our own bodies, as in 'Transhumanism', the technological progress humans have achieved represents the practical application of their intellect and knowledge.

With the purpose of better investigating the idea of an anthropogenic nature, the following thesis provides a case study of the Italian 'White Beaches,' also called 'the Caribbean of Italy'. Located in Rosignano Solvay in the province of Livorno in Tuscany, the bleached landscape subsists as (one of the) products of decades of industrial production of Solvay, a Belgian chemical company that produces sodium carbonate commonly known as soda, a cleaning product for the interiors.

My intention with this project was to investigate Solvay and its processes, in order to understand the consequences of the chemical contamination, ranging from diseases in humans to alterations in the surroundings. Through this empirical research, it was possible to explore, the – largely invisible – boundary between the artificial and the natural and to determine if today it is still possible to use the term 'nature' at all. Finally, by examining how the usage of a cleaning product for maintaining the hygiene

in the domestic space is contributing to the environmental transformation of the outer landscape, I was able to discover a link between the field of Interior Architecture and the vast topic regarding the human 'colonization' of the landscape.

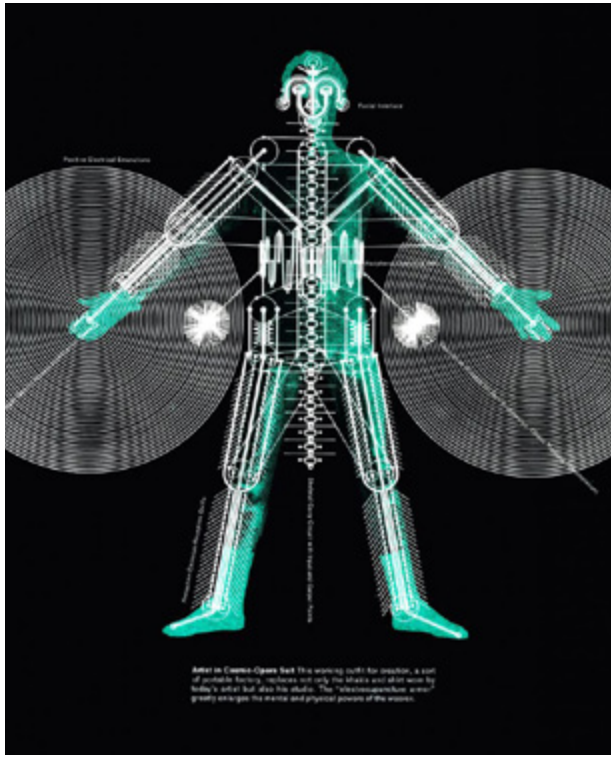


Fig. 2: François Dallegret – Art Fiction – 1966

In "Art Fiction", Dallegret asked to speculate about the future of art, and designed a technologically enhanced human who as an artist creates physical art pieces, but also sends electric signals that generate "aesthetically stimulating atmospheres for the tuned-in collector" (Dallegret, 2016).

In 2016, his drawings were Included in the third Istanbul Design Biennale "Are We Human? The Design of the Species: 2 seconds, 2 days, 2 years, 200 years, 200,000 years" curated by Beatriz Colomina and Mark Wigley. Based on a curatorial manifesto, they invited designers, architects, theorists, choreographers, filmmakers, historians, archaeologists, scientists, labs, and collaborators in order to examine the relationship between human and design. Design is considered not only as a tool serving humans, but is redesigning them and, therefore the history of design reflects the history of the evolution of our species (Colomina and Wigley, 2015).

Methodology

Led by a preliminary theoretical research, after having clearly determined the topic, the analysis initiated with the identification of a case study that could properly reflect and present human traces and, subsequently, a significant transformation of the landscape. An empirical research in situ began on the 'White Beaches', in Rosignano Solvay, Tuscany. There, a Solvay plant is chemically altering the land in every aspect.

Historical research about the development of the factory revealed many social, political and economic aspects about Rosignano Solvay. Moreover, studying the chemical analysis made by the institution for the environmental protection of Tuscany (ARPAT) was necessary, in order to understand if toxic materials are contained in the sea and on the beach; if so, which ones and furthermore, if they came from the factory. Additionally, the finding and analysis of stratigraphic coastal maps[1] of Tuscany revealed intriguing unknown aspects about the geological development of the location of interest. Collecting all this information formed the first phase of the investigation that played a main role in the development of the design project.

1. Maps are one of the first visual appropriation of the landscape. "The word 'map' comes from the medieval Latin *Mappa mundi,* wherein *mappa* meant napkin or cloth and *mundi* the world. Thus, 'map' became the shortened term referring to a two-dimensional representation of the surface of the world" ('Map', 2018).

Notes

Throughout this project, when describing how humans have modified the landscape, I will avoid the use of the word ‘man’ as much as possible, since this word implies a gender distinction that values the male over the female. Instead, the terms ‘human’, ‘humans’, ‘human race’ or ‘humankind’ will be used, except in the case of quotations, which will appear in their original form.

Research question

The first concept encountered during the theoretical research was the ‘Anthropocene’. The use of this term has been increasing over the last decade and with it a debate about today’s definition of nature. Due to overexploitation and pollution, humans are considered a new geological force that have radically modified the environment. The introduction of the new term in our vocabulary and the critical condition of our planet encouraged different questions.

How is it possible to define nature in contemporary societies? How long will humankind control and shape the landscape? When will this overexploitation irrevocably affect our existence? What is the role of economic processes and industrial activities in this context? Finally, how can I, as an interior designer, address this urgent topic?

Chapter One:
The Relation Between Humans and Nature

"Landscape as a cultural medium … always greets us space, as environment, as that within which 'we' … find – or lose – ourselves. [The] landscape is not merely a body of paintings to be interpreted 'in historical contexts' but a body of cultural and economic practices that makes history in both the real and represented environment, playing a central role in the formation of social subjects … [and] national identities".

– W.J.T. Mitchell, *Landscape and Power*

Fig. 3: Caspar David Friederich
"Wanderer above the sea of fog" – 1818

Fig. 4: Claude Monet
"Impression, soleil levant" – 1872

Considering the two images above, one wonders what the difference is between Friederich's "Wanderer above the sea of fog" and Monet's painting "Impression, soleil levant". Besides the noticeable differences regarding techniques, styles or artistic and historical contexts, the main distinction is the emphasis on how humans relate to nature.

The first painting is dated 1818, the Romantic era and nature is seen as strong, wild and irrational. It is sublime. Burke defines the sublime as "Whatever is fitted in any sort to excite the ideas of pain and danger... Whatever is in any sort terrible, or is conversant about terrible objects, or operates in a manner analogous to terror" (1757). The sublime sentiment is an intense emotion, a feeling of fear and anxiety but it also creates a sense of pleasure and attraction. The Sublime is not the same as the beautiful. While beauty is harmonic and balanced in relation to the human reason, sublimity overwhelms it[2].

In the second painting, the landscape is not sublime at all; here it

2. As Kant wrote in his third critique: "Through the impossibility of understanding and controlling natural phenomena, humans become aware of the limits of reason and capability" (Kant, 1790). After the Kantian concept of sublime, other philosophers, such as Schiller, could explore the effect of "terror" from a more positive perspective, as an emancipating moment. Facing the unknown consequences of nature's power, reason is unable to comprehend reality. But such moment also offer an occasion for humanity to break its relation of dependence on nature and overcome its sensuous essence to rise above it (W. F. Wertz, Jr., 2005).

seems Romanticism is over. The fishermen in Monet's painting do not pay the same attention to their surroundings as the *Wanderer* in Friederich's does. Around 50 years after the *Wanderer*, Monet represented a natural scene of the sunrise with fisherman boats and in the background the artificial context of the harbor. It is a human-designed landscape which describes a precise era characterized by an industrial and economic growth of France.

The different roles of the landscape in the two paintings are linked to the perception of reality in those years. During Romanticism, one of the primary subjects in paintings is the theme of untouched nature, where the impetuous landscapes represent the tension between human smallness and nature's immensity. The relation human-God – a Protestant God – was usually embodied by the infinity and irretrievable distance human-nature in paintings (Dorfles, Laurocci and Vettese, 2010). Nevertheless, it is questionable how the *Wanderer* relates to the spectacle of the surroundings. There is a conflict between the visual distinctness of the foreground where he is located, and the vastness of the panorama he is observing. In fact, through the capacity of detaching his reason from the violence of nature, he can observe 'the sea of fog' from 'above'. He stands 'above' the horizon. On the other hand, the landscape in front of him does not have the same detailed quality as the cliff, the clouds in the sky are indefinite and his eyes are gazing into the endless horizon.

In the second half of the 19th century, with the philosophy of positivism[3], a new confidence in scientific and technological progress was established and, with it also a new way of understanding reality. Everything that was physically experienced was conceived as real. With this empirical knowledge, humans could approach nature in a scientific and objective way, rather than metaphysically (Comte and Andreski, 1974).

Even though "Impression, soleil levant" by Monet was not part of realist paintings[4], its relation with nature was strictly connected to a sensory impression of reality. He illustrated reality through the perception of his retinal impression, as the impression of lights and colors in the precise moment when it appeared in his eyes. In addition, thanks to positivism, the subject of paintings changed. Popular episodes and moments of Parisian bourgeoisie daily life became commonly portrayed, and with them all the features of a modern[ized] society, environments included. (Isaacson, 2002).

3. The Western philosophical theory of Positivism was founded in the 19th century when the French philosopher Auguste Comte introduced the term *positivisme* intending "imposed on the mind by experience". In fact, Positivism states that everything that is empirical and based on sensory experience can be considered as effective knowledge. It is real and evident, deriving from an *a posteriori* knowledge and later elaborated by the reason. In other words, the positivism ignores every metaphysical or *a priori* conjecture (Elmer Barnes and Fletcher; Feigl).

4. Impressionism arose after realism, inaugurated and named in 1874 by art critics in reaction to Monet's painting.

The two different landscapes reflect specific cultural identities. While in Romanticism a mysticism and devotion toward nature are evident, in “Impression, soleil levant” the artificial harbor docks in the misty horizon witness the mid-19th-century industrial boom of Paris.

As Mitchell (2009) argues in the introduction of “Landscape and power”, landscape’s representation in old paintings generates certain information about the cultural and economical framework in which a definite subject existed, and helps reveal remote aspects of past societies. In paintings, the way in which the landscape is illustrated constitutes a first visual appropriation. The images reproduced are the reflection of artists’ inner thoughts and interpretations. Furthermore, in the chapter “Imperial Landscape”, Mitchell suggests that the landscape’s representation is a Western European modern phenomenon that emerged within imperialism in the 17th century and culminated in the 19th century. The artists that pictured the landscape in canvas are described as “‘we moderns’ [who] are somehow different from [nature] and essentially superior to everything that preceded us”. In this context, the landscape is considered as a cultural practice, an instrument of cultural power. Throughout history, humans could reflect their authority and capacity of dominance as a “colonial” appropriation.

In sum, landscape paintings do not only contain a physical reproduction of the historical reality re-created by the artist in an

objective or subjective way. They serve as a tool for projecting a constructed image of reality, in which the depicted environment does not merely construct the imagery of a certain historical context, but turns into a medium of communication and actualizes the interpretation of certain social, economical and cultural values. More than this, considering the artists as “moderns”, their representations of natural landscapes were not natural landscapes anymore. Within modernity, nature “is already artifice in the moment of its beholding, long before it becomes the subject of pictorial representation” (Mitchell, 2009). The paintings are like a matryoshka. They show the interpretation of what was previously interpreted. Humans first colonized nature and then represented it.

Chapter Two:
The Human Age and Anthropogenic Nature

"Not all the winds, and storms, and earthquakes, and seas, and seasons of the world, have done so much to revolutionise the earth as MAN, the power of an endless life, has done since the day he came forth upon it, and received dominion over it"

– Horace Bushnell, *Sermon on the Power of an Endless Life*

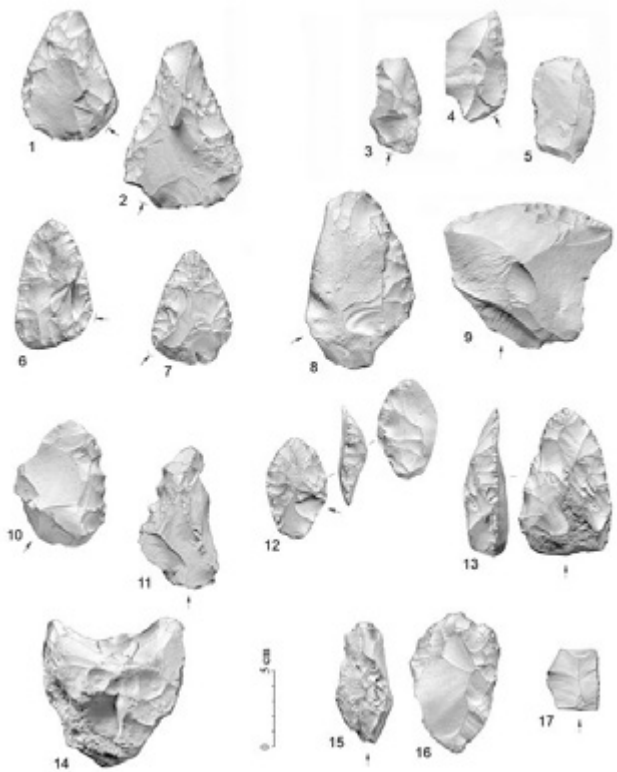


Fig. 5: Series of 'racloir', modified stones used as hunting or cutting tools during prehistoric ages.

Since the beginning of existence, humans started to manipulate and transform nature according to their needs. 1.9 million of years ago homo erectus was the first hominid to use fire, while the first weapons are dated back to 300.000 years ago when our ancestors created stone-tipped spears in order to hunt and kill animals more efficiently. Through the technology they achieved at their time they could shape nature in accordance with their will (Jha, 2012; Bradshaw Foundation).

An effective domestication began within human aggregation and creation of society. Hunters abandoned their nomadic lifestyles and started to settle down. Agriculture first, and livestock farming later represent the first substantial alteration of the landscape conceived as land, and domestication of living beings. With technology and industrialization, decade after decade, the presence of humans on earth had a strong impact. The landscape became more and more human-made and the image of an untouched nature has disappeared. Today, a wild nature is simply inexistent.

One could argue in fact, that there is not a single square meter, area or piece of land where humans have not engaged with. Even the frontiers of space have been crossed, and the last frontier of the deep sea will soon be conquered (in conversation with Füsun Türetken, 2018, Rotterdam). From the project of colonialism to the widely circulated famous first step taken on

Fig 6: Aerial view of the cultivated landscape over the Miura-Hanto Kanagawa, Japan

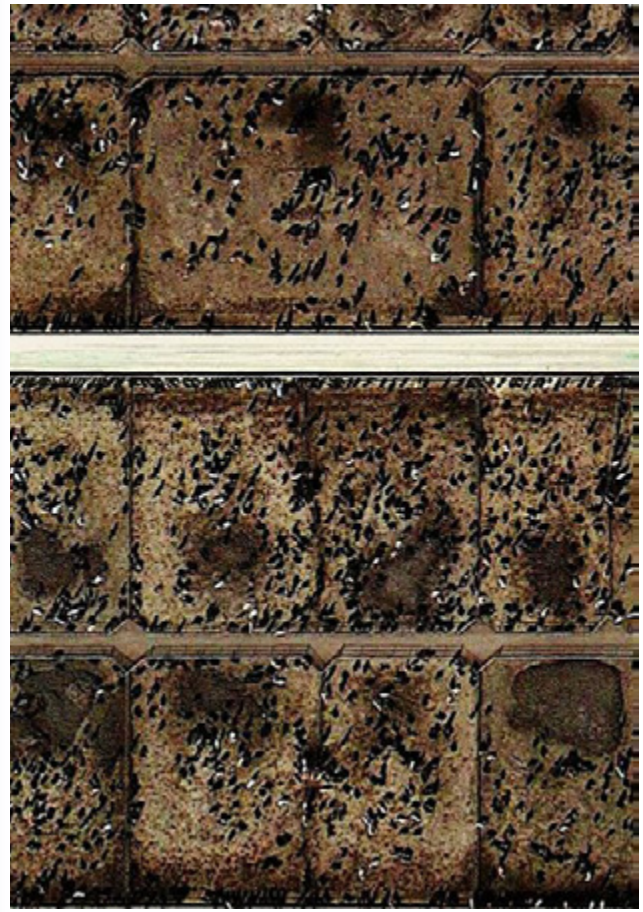


Fig. 7: Satellite image of an American factory farming
Mishak Henner – 2014

the moon in the sixties, and considering current attempts to secure rare earth minerals, we have continuously expanded our territory and cities towards untouched realms of nature.

The overexploitation of natural resources has reached a point where nature, after being threatened by us for centuries is now becoming a threat itself. Global warming, plastic pollution, sea level rising, deforestation, biodiversity loss, biosphere, and geosphere transformation and many other issues are features that characterize a new epoch of post-human evolution.

In fact, after the Pleistocene, Pliocene, and Miocene, we are supposed to live in the Holocene, the current era that started 12.000 years ago with the end of the last ice age (Steffen, Crutzen, and McNeill, 2007). However, in a conference, the Dutch Nobel prize-winning chemist Crutzen, due to the rapid and drastic changes which have occurred since the mid-20th century, realized how inappropriate the term Holocene was and he defined our era with a new word[5]: the Anthropocene (Macfarlane, 2016; Carrington, 2016).

According to Steffen, Crutzen, and McNeill (2007), we live today in the third stage of the Anthropocene[6]. After having caused all these modifications and in order to ensure a liveable habitat, humans now have to change from exploiters of Earth to become “stewards of the Earth System” through means of energy conservation, fossil fuels

Fig. 8: Aerial view of the Diavikk Diamond Mine, Canada
Digital Globe – 2014

Fig. 9: The Corinth Canal is an artificial canal that connects the Gulf of Corinth with the Saronic Gulf in the Aegean Sea built in 1881-1893

replacement, behavior variation or even actual intervention. In order to survive, humanity should shift to alternative energies and generally to a more sustainable lifestyle. Otherwise, it would be necessary to find a different ecosystem suitable for humankind – as in the post-apocalyptic condition in Interstellar* or project a human image onto the only survivor, such as the example given in Wall-E**, in order to continue existing on Earth. Throughout this discourse, humans are considered the main cause affecting the environment and causing the phenomena that characterize the Anthropocene. Ranging in scale, from the introduction of chemicals in the soil to the transformation of the biosphere, we have been altering the whole natural asset of Earth. We have been creating an **anthropogenic nature**.

5. Apparently, this term was already coined in the early 1980s by a less known ecologist Stoermer from the University of Michigan (Haraway, 2016).

6. The first stage commences with the beginning of industrialization when the use of fossil fuels expanded. The second and most harmful stage is defined as "the Great Acceleration" and covers the period from the end of the Second World War until 2015. During this time, the world's population grew rapidly and moved into cities, the concept of mobility arose, a technological boom occurred, the global economy and industry substantially increased and with them also the production of plastics and metals. The third stage is now (Steffen, Crutzen, and McNeill, 2007).

Fig. 10: Volunteers try to clear a dam which is filled with discarded plastic bottles and other garbage, blocking Vacha Dam, near the town of Krichim, Bulgaria – Dimitar Dilkoff – 2009

Fig. 11: A sandstorm hits Shandam Horse Ranch in Zhangye City in northwest China's Gansu province – 2013 "Dust Bowls Aren't Just An 'Interstellar' Thing"

*In the dystopian science fiction movie Interstellar directed by Nolan, Earth is no longer an inviting planet but is threatening human survival. Dust storms and plant infections are the menacing environments in which every citizen has to become a caretaker of the planet, while the only alternative they have is to find a new planet to colonize (Interstellar, 2014).

Fig. 12: Screenshot from WALL-E – 2008
The spaceships with the entire human race leave Earth.

**In the animated science fiction movie Wall-E, Earth becomes uninhabitable due to extreme pollution causing every natural organism to disappear. The only form of 'life' on the abandoned planet is a small humanoid robot who has the responsibility of collecting and compacting the waste that is consuming the planet's surface, while the entire human race in order to survive leaves Earth and relocates in spaceships (Wall-E, 2008).

What is 'Nature'?

Considering this dissertation regarding 'nature' and how we as humans created a new version of it, it is curious to review the *Oxford English Dictionary* definition of 'nature':

1 [*mass noun*] The phenomena of the physical world collectively, including plants, animals, the landscape, and other features and products of the earth, as opposed to humans or human creations.

Examining this definition, the romantic idea of nature as something disparate from us arises again. How is this related to all the alterations humans have made? Are the landscapes not altered nature, nature shaped by humans in order to become convenient, in order for humans to exploit its resources? Did we not just coin

Fig. 13: Azuma Makoto- "Leaf Man" – 2013
The flower artist blends human and plant, creating a mysterious creature that often appears in his dreams.

the term Anthropocene – in which 'Anthropos' (ἄνθρωπος) means humans in Greek – in order to define our geological era? Do we not live in an anthropogenic nature?

Today, many scientists and experts would positively answer these questions, arguing that it would be appropriate to think about a substantial shift in the romantic idea of nature as something separate from humans and to embrace a new concept of materialism.

For instance, a multidisciplinary network of designers, scientists and thinkers called "Next Nature" considers the relation between human and nature in an innovative perspective. Analyzing how human beings evolved through history, they define human-designed technology as a 'next nature' created by humans as part of the evolution of a natural but technological species within a technological environment.

Moreover, the philosophy behind this movement does not simply consider humans as "an anti-natural species, capable only of spoiling and wrecking nature", but they are considered to be part of it, where 'nature' is conceived as an ensemble of species, of human and non-human, living and non-living. Indeed, "Next Nature Network" claims that we are not the dominant species on the planet, but that we co-exist with many others such as bacteria, algae colonies or insects (Next Nature Network).

Fig. 14: Cover of the Next Nature book

Despite the anthropocentric vision that dominates the conception of our existence and, consequently of our societies, we live in a world that should be increasingly considered as part of a holistic[7] nature, in which human primacy doesn't exist, but where all the systems (human and non-human) are considered as a whole and are continuously interconnected.

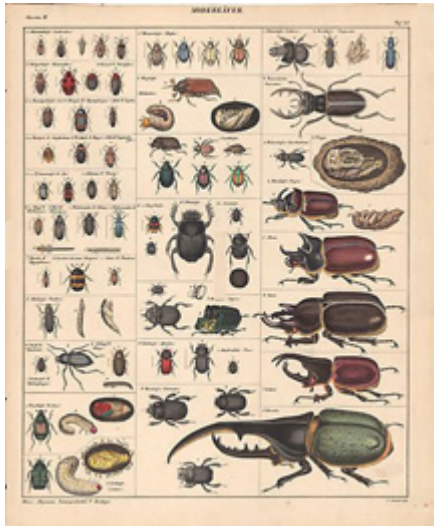


Fig. 15: Laurence Oken – Variety of Beetles – 1833

7. Holism is a term coined by J.C. Smuths in 1927 in "Holism and Evolution". In his opinion holism is described as "fundamental factor operative towards the creation of wholes in the universe." However, the modern concept of holism has a different meaning. In fact, it considers that "all the systems (physical, biological, chemical, social, economic, mental, linguistic) and their properties should be viewed as wholes, not just as a collection of parts" ('Holism', 2018; 'Holism and Evolution', 2017).

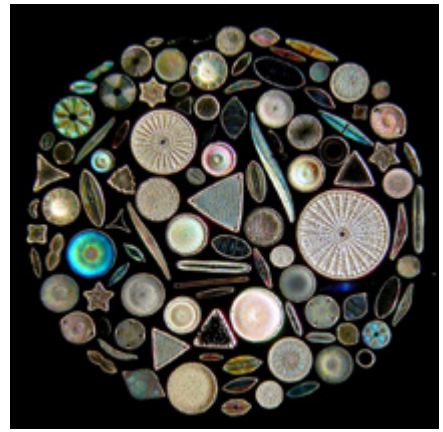


Fig. 16: Variety of diatoms, microscopic unicellular algae appeared on Earth 145 millions of years ago and still existing

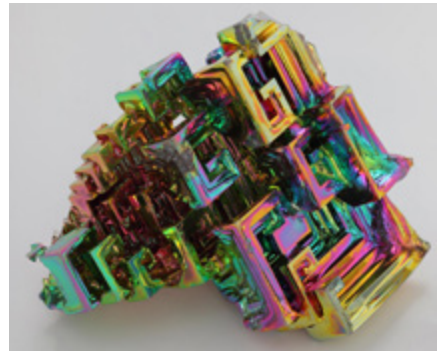


Fig. 17: Crystal of bismuth, it is a chemical element, a non-toxic heavy metal present in nature. Most bismuth is produced as a byproduct of other metal-extraction processes including the smelting of lead, and also of tungsten and copper

Bennet in "Vibrant Matter: A Political Ecology of Things" (2010), describes 'matter' as something vital, "a fuller range of the nonhuman powers circulating around and within human bodies". In her analyses of the political and theoretical implications of vital materialism, she illustrates how "organic and inorganic bodies, natural and cultural objects" – storms, metal, electricity, stem cells, worms, consumed food, trash, and landfills... – can participate in events and affect situations as active forces in a broadly accepted eco- (or political) system.

Moreover, as cited by Lointier (2016) in his *Manifeste compositionniste* (2011), Latour, supporting the idea of the existence of many natures affiliated to one another, writes:

"Pluralism is here to stay with us forever. A pluralism of cultures, yes, of ideologies, opinions, feelings, religions, passions, but also a pluralism of natures, of relations with the living and material worlds, and also with the spiritual worlds. No final answer is possible about what the world is composed of, about its present, past and future inhabitants."

In conclusion, It can be argued that the definition displayed in the *Oxford English Dictionary* seems inaccurate, or at least outdated. The idea of constraining 'nature' as a detached entity compared to humankind appears as an attempt to evoke an aged interpretation of reality, in which the whole realm of knowledge is organized and categorized in dualistic opposites. Indeed, these various approaches to the new materiality are clearly rejecting the univocal consideration of two conflicting existences between subjects and objects, active and passive, human and natural. These theories definitely deny the distinction between an active agent, who performs the action versus a passive object, who endures it, which in this case would correspond to a human, the subject who appropriates nature itself. In fact, these theories aim to re-think the entire approach, giving rise to a more complex understanding of a totality, where nature, landscape, and humans become completely entangled into a flow of matters.

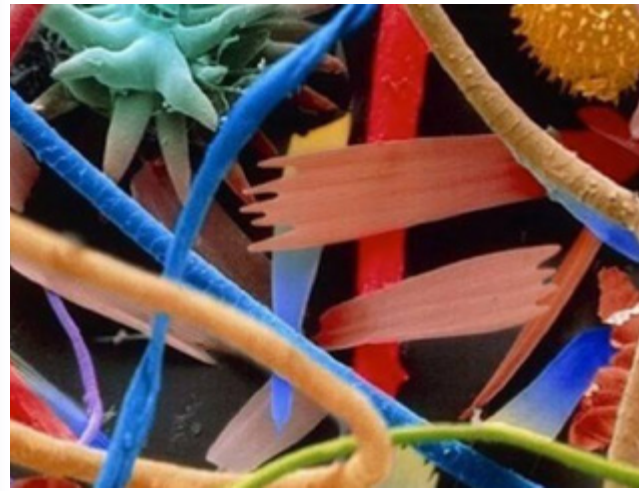


Fig. 18: Magnified 22 million times, this microscopic photo is of household dust containing long hairs such as cat fur, twisted synthetic and woolen fibers, a pollen grain, plant, serrated insect scales and insect remains

Chapter Three: Different Visions of the Anthropocene

"The same currents that are used by the shipping industry to map the fastest passages across the globe, the same currents that opened the world to the age of plunder and colonization in the fifteenth century, currently churn the detritus of that system into smaller and smaller fragments of microplastic".

– Kirsty Robertson, *Plastiglomerate*

The term 'Anthropocene' was introduced into the *Oxford English Dictionary* in June 2014, only 14 years after it was conceived by Crutzen. However, nowadays, it is fairly well known and used not only by scientists or anthropologists but in various creative fields such as architecture, photography, art, and design.

A first widely known architectural example that dealt with climate change and limitation of resources, is Buckminster Fuller's "Biosphère", a museum in Montreal dedicated to the environment, and part of the 1967 World Fair. Through the construction of a geodesic dome[8], and a peculiar study of shades, the intention

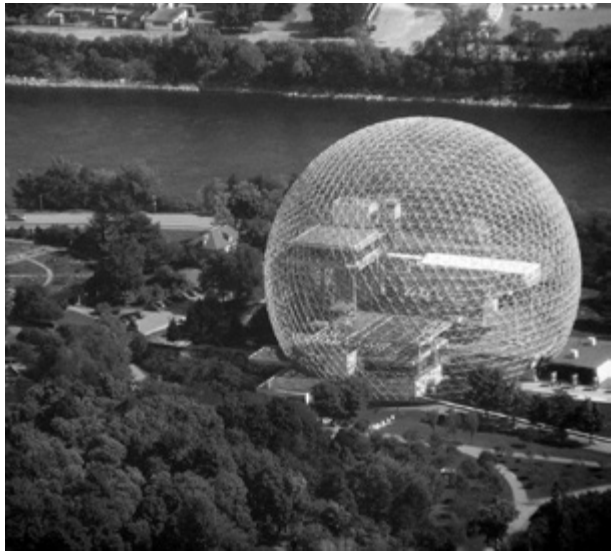


Fig. 19: Montreal Biosphère- Richard Buckminster Fuller – 1967

Fig. 20: Oase No. 7 – Haus-Rucker-Co and Coop Himmelblau – 1972

Fig. 21: Shrink – Lawrence Malstaf – 1995
shown during in the exhibition "Climate Capsules: Means of Surviving Disaster" at the Museum für Kunst und Gewerbe in Hamburg

of the architect was to create, with the minimum amount of material, an enclosed environment that could maintain a stable internal temperature (Langdon, 2014). Through his innovative design, Buckminster Fuller inspired many other architects and designers who reflected about the model of closed spaces as a possible solution for a future co-existence with the advancing climate change. In 2010, for instance, more than twenty-five appealing examples were presented in the exhibition "Climate Capsules: Means of Surviving Disaster" at the *Museum für Kunst und Gewerbe* in Hamburg. From floating cities to body capsules, from temporary to living experiments, the concept of capsules was explored through various scales (Climate Capsules: Means of Surviving Disaster, 2010; Whole Earth Catalog, 1969).

The speculative projects just illustrated served for the preceding generation as possible strategies and alternatives way of living in a dystopian future. However, the Anthropocene era, becoming a compelling topic in today's society, is producing an assorted knowledge which is now reflecting more about the present situation, rather than speculative futures. For instance, since 2013, an intriguing ongoing series of events called "The Anthropocene Project" organized by the *Haus der Kulturen der Welt* bringing together various figures from artists to scientists, and from

8. A geodesic dome is a system of triangular steel modules based on a geodesic polyhedron shape. This kind of structure became famous with Buckminster Fuller's projects and researchers ('Geodesic dome', 2018).

researchers to academics, addresses different aspects of the topic through exhibitions, publications and lectures (The Anthropocene Project. A Report, 2014).

Fig. 22: Anthropocene Observatory – India – Armin Linke – 2014

Fig. 23: National Park Service, California – Lucas Foglia
Trees marked for cutting after a wildfire.

Besides those invited by the HKW's multidisciplinary project, many other creatives individually examined the urgent theme. In 2017, the American photographer Foglia, in his publication "Human Nature", presented his 12 years of research. He traveled around the world and collected 80,000 images concerning humans' effects on nature and the relation amongst them and finally declared: "Nature used to mean the Earth besides humans and human creations. But now there is no place on Earth unaltered by people, which has led many to argue that Nature no longer exists" (Foglia, 2017).

As previously mentioned, there is a nature still existing, but it is a human nature: we are creating new strata in the planet and new fossils are arising. In her article titled "Plastiglomerate", Robertson writes about how the remnants of plastic garbage invade the surface and soil of the planet, especially the oceans. The focus is on Kamilo Beach, a Hawaiian beach where in 2012 the geologist Corcoran and the sculptor Jazvac collected many sculptures made out of an uncanny mix of materials, composed of conglomerates of natural materials melted with particles of plastic due to bonfires. In the first image, a plastic lighter has been inglobed by an agglomeration of natural sediments and particles, creating a unique "Plastiglomerate" (Robertson, 2016).

Due to the erosion process, plastic waste in the ocean becomes "microplastics"(Cózar et al., 2014) and invisibly floating just

Fig. 24-25-26: Plastiglomerate – 2012 sample/ready-made collected by geologist Patricia Corcoran and sculptor Kelly Jazvac

below the water's surface, they follow the currents until they find convergence zones – "the five large subtropical gyres"(Cózar et al., 2014) – where they stop and concentrate. In this regard, in 2013 the artist, architect and designer Finucci founded "The Garbage Patch State", a "federal state consisting of five plastic islands" with the extension of 16 million km2 , to which it is possible to apply for citizenship (Finucci, 2013).

One more link comes from the visual artist Andriessen who made a series of "Resilient bodies" using ceramic, plastic, metal and a wax derivable from petroleum, that due to the warming up and melting materials, during the exhibition change its aspect. Her aim is to speculate about potential fossils to be discovered in the future, but also to illustrate a criticality that is already present today (Andriessen, 2017).

Another artist who addressed a similar topic concerning materials is Licari in "Schlak", his solo exhibition in Tent, Rotterdam. During his residency in a former foundry area in Luxembourg, he observed the post-industrial landscape involuntarily created by this overexploitation, and found it uncanny and fascinating. The artist, as a geologist created a "modern mineralogical cabinet" characterized by the unnatural presence of iron, as a witness of human traces and he extracted the colors from the collected stones referencing to the ancient technique of obtaining pigments from precious minerals (TENT, 2017).

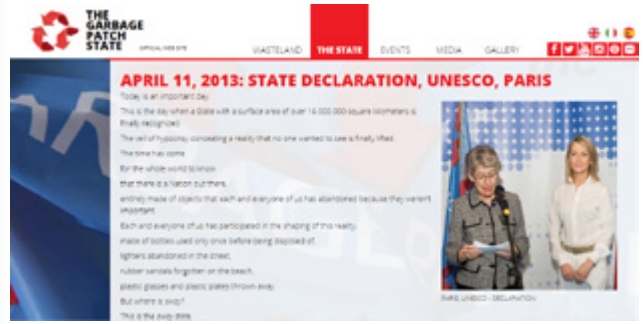


Fig. 27: The Garbage Patch State Declaration – Maria Cristina Finucci – 2013

Fig. 28: Isabelle Andriessen – Resilient bodies – 2017

It is interesting to observe the parallel drawn between the preciousness certain minerals had in the past for artists, compared to the value that metals has in today's society and the significance of the process behind their exploitation. However, it is curious how Licari presented his research and findings in the realm of a white cube gallery. On the one hand, he created awareness about the urgent topic of metal foundry, but on the other, he displayed the beautiful minerals, products of the exploitation almost comparable to jewelry, staging an aestheticization of the theme, without showing any collateral aspects of it like the crucial working conditions in such a context.

In conclusion, considering today's relevance of the Anthropocene and all the drastic phenomena deriving therefrom, it is noticeable that compared to the 1960s' speculative models of living, nowadays a wide range of creatives and academics have been suggesting new cooperative and multidisciplinary approaches to the topic. Instead of looking into imaginable solutions for the near future, they aim to create awareness about the critical – and present – situation through diversified media and especially to stir up public interest in the issue in order to encourage individuals to accept culpability and to find – if still possible – what might help human survival.

Fig. 29: Giuseppe Licari – Schlak – 2017
Picture of the post-industrial landscape in Belval, Luxembourg

Fig. 30: Giuseppe Licari – Schlak – 2017
One slag stone, part of his modern mineralogical cabinet

Chapter Four:
Rosignano Solvay,
from Green Fields to Grey Plants

"The forest of smokestacks, … remains in my memory
as a gray landscape with little vegetation,
a clouded sky hovering over dark buildings, and an atmosphere
that suddenly made breathing a conscious act.
… it signaled our entrance into The City."

– William Cronon, *Nature's Metropolis*

This project is inspired by the need for interdisciplinary attention in the Age of the Anthropocene. While the theoretical and intellectual approaches are clear, however, there is an urgent need for site-specific and local-level analysis. In the following pages, I introduce and analyze precisely such a case study, one that properly reflects and presents human traces and, subsequently, a significant transformation of the landscape. This is the case study of the Solvay Company and its sodium carbonate (soda) manufacturing plant on the coast of Tuscany.

Fig. 31: Rosignano Solvay's plant – 1980s aerial view

Fig. 32: Collage of Google Earth images – Rosignano Solvay

The empirical research in situ began in Rosignano Solvay, in Tuscany, and in particular on its 'White Beaches'. Here, a Solvay's plant is chemically altering the land in all aspects. Solvay is a Belgian company which has 145 sites in 53 countries with its head office in Brussels. It was founded in 1863 by Ernest Solvay and his brother and produces sodium carbonate by the Solvay process. This is the synthetic process for the production of soda which, after being invented by the chemical Leblanc and optimized by Solvay, the (then called) Solvay process became the method used for 91% of the industrial production of sodium carbonate until the second half of 20th century ('Rosignano Solvay', 2018; 'Solvay process', 2018; 'Solvay S.A.', 2018).


Una Nuova Industria Chimica Italiana

FABBRICAZIONE A ROSIGNANO (Pisa)
di CARBONATO DI SODA 98-100 p. %

SOLVAY & C.

La SODA SOLVAY è consegnata franca in qualsiasi stazione ferroviaria d'Italia a vagone di 12 Tonnellate alla volta, in sacchi gratis di 100 Chilogrammi peso netto.

Ogni sacco è piombato e porta il nome SOLVAY e la marca di fabbrica. Rivolgersi:

SOLVAY & C. - 46, Corso Sempione - MILANO

La Stampa 20 luglio 1921

Fig. 33: Solvay's plant advertisement in the newspaper of July 20th – 1921

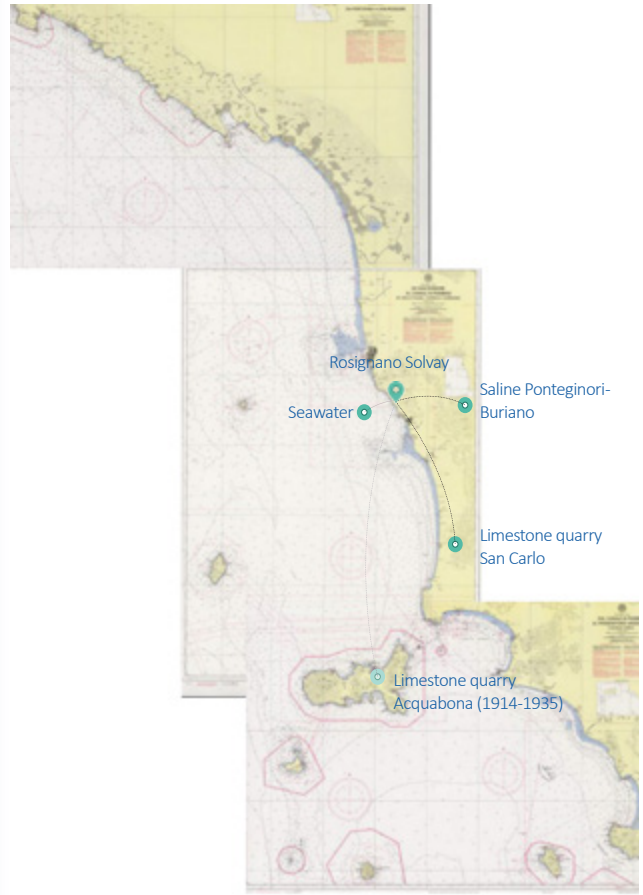


Fig. 34: Areas where Solvay extracts natural resources in order to produce soda through the Solvay process. This process consists of chemical reactions between salt (brine), limestone and ammonia creating the end product: sodium carbonate or soda, commonly known as a cleaning product (Lomb.it).

In 1912, Solvay bought 160 hectares of land from an Italian Knight at the price of 400.000 lire (in today's economy around one million and five hundreds thousands euros) and built Europe's biggest plant at 700 meters distance from the sea in the province of Livorno in Tuscany (Lomb.it). The location chosen is strategic. Indeed, the natural resources for the chemical process are extracted within the regional area: limestone comes from the Solvay's quarry in San Carlo and saline deposits from the surrounding town of Ponteginori. Moreover, the factory is next to the sea and close to a river, both of which provide the water necessary to cool down the machines during the soda's production. Additionally, its close proximity to the railway makes it especially convenient for export, for commercial transportation.

Since it has hosted the company, the small village has undergone a tremendous shift. Not only was it named after the company itself[9], but its agriculture-based economy switched to an industrial economy, and over time it grew from a village to a small city. Due to the necessary labor force for the industrial activity, whilst building its plant, Solvay launched a hierarchical urban model dedicated to its employees, in which each class of workers corresponded to a certain model of habitation. Additionally, the company founded not only the 1921 Solvay's club, a recreational

9. In 1908 the name of the village was "Paese Novo" (new village), in 1914 "Rosignano Nuovo" (new Rosignano), then became just "Rosignano" and, since the plant was built till 1936 a senseless continuous change between "Rosignano-Solvay", "Solvay-Rosignano" or "Rosignano Solvay" occurred.

Fig. 35-36: The first image shows the Saline of Ponteginori; the second one shows the limestone quarry of San Carlo. Considering all processes, the modification of the landscape is not merely happening in Rosignano Solvay, but also in the areas where the sources are exploited, as shown in the Google Earth images.

association for monitoring social aggregations among its employees after work, but also most of Rosignano Solvay's cooperatives and institutions (hospitals, theatres, cinemas, schools, and libraries) (Lungomare Castiglioncello).

In fact, one could argue that the factory brought the Anthropocene and especially the Capitalocene[10] to Rosignano Solvay. Colonizing a small portion of Tuscany, Solvay created its own realm which brought not only a labor force but a community of citizens and an entire society.

10. "Capitalocene" is a term proposed in 2009 by Andreas Malm in a seminar in Lund, Sweden and used by other scholars afterward. Donna Haraway in her article "Tentacular Thinking: Anthropocene, Capitalocene, Chthulucene" uses it referencing to the relationship between the Anthropocene and the capitalist economy. Indeed, capitalism could be considered as one of the main cause of all the environmental changes – features of the Anthropocene – humans provoked (2016).

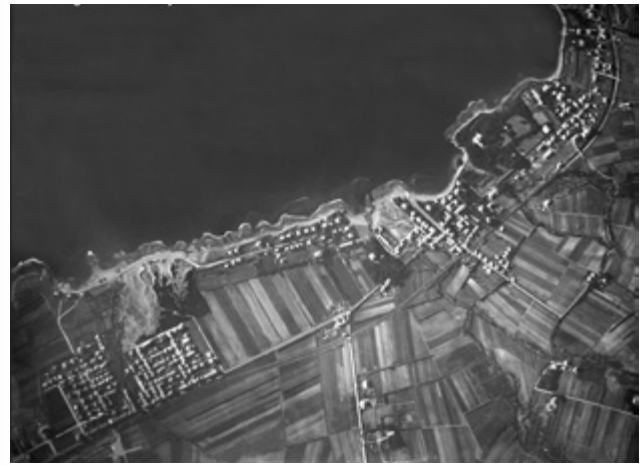


Fig. 37-38: Aerial views of Rosignano Solvay in 1938 and in 1965

Fig. 39: Interior view of Rosignano Solvay hospital, delivery room – 1923

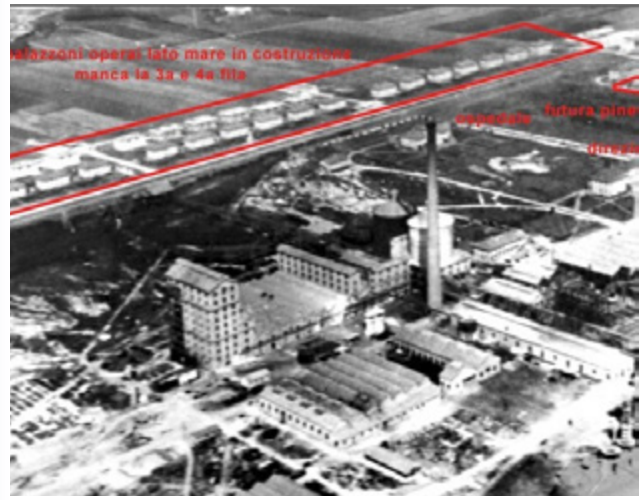


Fig. 40: Aerial view of Solvay's plant and the growing village around it – 1923

Fig. 41: Facade of Rosignano Solvay primary and secondary school
To be noted the sign "Scuole Solvay" (Solvay Schools)

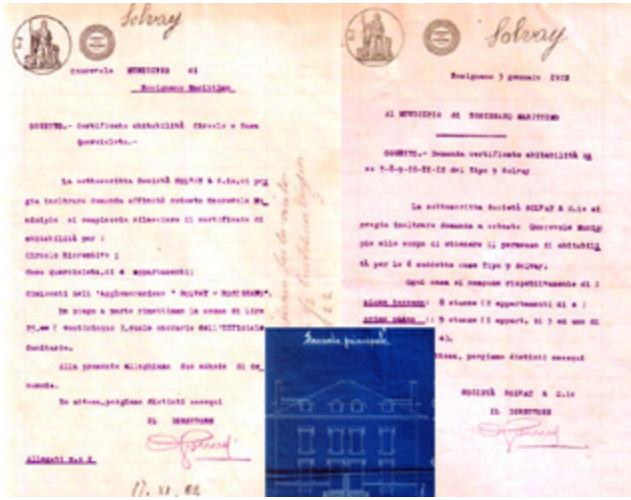


Fig. 42: Solvay's requests to Rosignano Solvay municipality of the certificates of habitability of the recreational club and the apartments 1922

Fig. 43: Google Earth image of the current status of Rosignano Solvay village compared to the extension of Solvay's plant.

Bleaching the Landscape, From Toxicity to Commodity

"Landscape is a natural scene mediated by culture.
It is both a represented and presented space,
both a signifier and a signified,
both a frame and what a frame contains,
both a real place and its simulacrum,
both a package and the commodity inside the package."

– W. J. T. Mitchell, *Landscape and Power*

Fig. 44: The 'White Beaches' – Rosignano Solvay

The factory based in Rosignano still produces its commodity today: sodium carbonate. However, in order to produce it, it also produces less desirable toxic by-products. Indeed, during the chemical process a massive quantity of residual material, consisting of sodium carbonate, calcium chloride, and limestone, is released into the nearby sea. The aspect of the waste material is similar to the three ingredients. They have a white powdered form which reaches the seawater through the drainage, dispersing and causing an unexpected result. These pollutants have had the paradoxical consequence of turning the surrounding beach sands white. Even though the sea is polluted and not safe for swimming, the Caribbean-like aspect of these newly bleached beaches has transformed the site into by-product itself, a supplementary commodity of the factory, in the form of a widely popular tourist attraction.

Moreover, the accumulation of the white powder-like materials is detected on a geological aspect. Some maps found in the stratigraphical archive of Tuscany, reveal how the coast of Rosignano Solvay is mainly constituted of carbonated white sand caused by the industrial activity; the origin is dated in 1920 – 6 years after the foundation of the plant. Additionally, despite the fact that the majority of the region's coastline is eroded, due to the fact that the waste material is continually being produced without stopping, the land is growing (Comune di Rosignano, 2002).

Fig. 45-46-47: Three of Solvay's by-products: from the top sodium carbonate, calcium chloride, and limestone

Fig. 48: Stratigraphic map (scale 1:40.000) re-designed by Livia Stacchini
It shows the anthropogenic origin of the carbonatic white sand of the 'White Beach', and the fact that this is the only area of the coast where the land is growing.

Furthermore, the chemical waste is – not only visually – altering the landscape, but a further invisible toxicity seems to be more harmful to the environment. The sea, and in particular the seabed in the area, are soaked in a lethal mixture of ingredients including cadmium, nickel, chromium, lead, arsenic and especially mercury – of which Solvay's related toxic remains are most certainly cadmium, arsenic, and mercury, and have been released in the sea until 2010 (ARPAT, 2014).

Paradoxically, as a result of the bleaching process, the 'White Beaches', also commonly referred to as the 'Caribbean of Italy', appear to be a paradisiacal and tropical place with white sand and a crystal-clear blue sea, and have become one of the most popular hotspots for seaside tourism in Tuscany. In fact, apart from the "giant smokestacks looming behind it" (Atlas Obscura), the view of the coast could easily be part of a Caribbean island. Furthermore, the chemical waste, as an element of distortion of the imagery, created an 'exoticized' version of a Tyrrhenian landscape, where beauty is the marker of toxicity. The unintentional transformation is broadly considered as inoffensive, even attractive because of the beach's transformation into white sand and a crystalline sea, as opposed to a dark smoggy or oily entity.

11. The measurements show how many milligrams of mercury are contained in one kilo of dried sand – collected from the marine sediments. DMB stands for "dry matter basis".

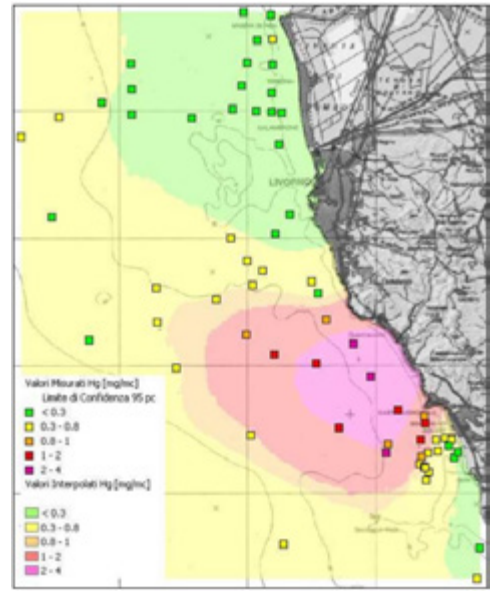


Fig. 49: Distribution of the concentration of mercury (mg/kg DMB[11]) in the superficial marine sediments (stratum 0-3 cm).

The area where the concentration of mercury in the superficial marine sediments is higher than 0,8 mg/kg DMB (orange, red, and pink in the legend) is **258 km²** ; the area where containing higher than 1 mg/kg DMB (red and pink) is approximately 191 km² and the one with the highest value 2-4 mg/kg DMB (pink) is 64 km² (ARPAT, 2014). Without taking into consideration the yellow and green areas, the most contaminated orange, red, and pink areas correspond to 258 km². In order to grasp a better understanding of these numbers, it might be helpful to make some size comparisons: the area of **Rotterdam** city is 325,8 km², whereas **Amsterdam** is 219,3 km². Moreover, examining only the first superficial stratum (0-3 cm), all these areas correspond to a volume of surely contaminated (< 1 mg/kg DMB) sediments of around 5.730.000 m³. Additionally, a further value of 38.200.000 m³ should be added when taking into consideration the lower seabed layers (until 25-27 cm), where more mercury is accumulated over time (ARPAT, 2014). Conclusively, using the volume of water contained in **Kralingse Plas** in Rotterdam as an example, considering all the marine sediments contaminated it would be possible to fill the entire lake **1757 times**.

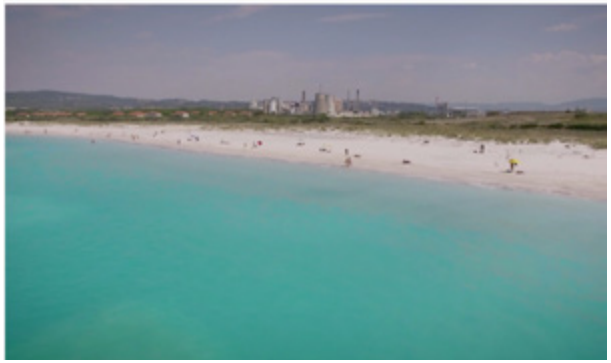


Fig. 50-51: Panorama of the 'White Beaches' with (up) and without (down) the factory – edited by Livia Stacchini – 2018

Thompson in "An Eye for the Tropics" (2007) analyzes the role of photography and postcards during the colonial era of the Anglophone Caribbean. She argued that through the process of "tropicalization", and the use of overpainted and reviewed postcards, the capitalist tourism-industry manipulated and constructed the imagery of these exotic islands and their inhabitants. In reference to the two images of the same beach, one shows the original situation whereas, in the other, the factory has been removed. In the superimposed image, the attractiveness of the landscape is completely transformed, the intoxicated beach becomes a Caribbean paradise.

The discussions surrounding Solvay's hazardous implications can be mainly identified by two factions. The political faction defends the factory by claiming it to be the founder of the whole city through providing a substantial source of income for many families. This doubts the factory's provenance of the toxic chemicals and in turn, relates them to a more general anthropogenic source. The environmental faction researched official reports about the toxicity of the altered sea and the causes of deaths in the area and discovered that over past decades, 600 tons of mercury have been released into the sea (Medicina Democratica Livorno, 2014). Consequently, it became apparent that shore in Rosignano is one of the 15 most polluted spots on the Mediterranean coast (United Nations Environment Programme, 1999), and that the mortality rate for mesothelioma[12] is three times higher than expected (Medicina Democratica Livorno, 2014).

Regardless of the fact that the coast has been declared as safe and the drains and its components are carefully monitored (Anonyme Solvay's employee, 2018; ARPAT, 2014), the regional institution for the environmental protection of Tuscany (ARPAT) often detected that the amount of certain toxic substances exceed the established maximum levels. Whether the chemicals derived from the factory or not, Solvay – or

12. Mesothelioma is cancer scientifically related to exposure to asbestos (Medicina Democratica Livorno, 2014).

Rosignano Solvay's municipality – should consider the (surely) extremely expensive option of the potential removal and reclamation of the entire coast – especially since they have received over 30 million euros through – Italian – public taxes for (not existent) environmental remediation projects (Lannes, 2012). Nonetheless, Solvay continues to reassure locals about the safety of the altered terrain, and permits swimmers to be within a 100-meter proximity from the drains. As a result, Solvay is supporting the exposure of centenary harmful contamination solely for the sake of its economic growth, and thus, is committing subtle and steady violence in a foreign territory.

Fig. 52: Solvay's drain, called by locals 'Fosso Bianco' (White Ditch)
Screenshot of Livia Stacchini's video "The White Beaches" – 2018

In conclusion, as a pharmakon, Solvay's by-products are simultaneously creating "remedy and poison" (Derrida, 1981). As a unique inseparable amalgam or like the biblical apple, an appealing 'exoticized' landscape coupled with poisonous contamination, are co-existing in the same landscape. Playing with the negligence of visitors, and setting the fictional imagery of the perfect holiday in exotic and overseas destinations, the uncanny and beautiful sea becomes itself the object of desire. Through capitalist and industrial production, while producing its commodity, Solvay produces the altered sea, which becomes a commodity again as a result of tourism.

Fig. 53: Simone Girlanda – Photograph of the popular 'White Beach' with Solvay's plant in the background

Chapter Five: Design

"The entire body is pulled into the cerebral sediment, where particles and fragments make themselves known as solid consciousness. A bleached and fractured world surrounds the artist. To organize this mess of corrosion into patterns, grids, and subdivisions is an aesthetic process that has scarcely been touched."

– Robert Smithson, *A Sedimentation of the Mind: Earth Projects*

The information obtained through the first phase of the theoretical and empirical research inspired a conceptual connection between the outer landscape and the interior. Ironically, the production of a cleaning product for interior spaces is polluting and altering exterior ones. The waste material of the factory is bleaching the sea and the sand but is also producing a new land, the beach, which is continuously growing. The obsession with cleaning our apartments and maintaining the hygiene in the interior is causing the exploitation of natural resources and the transformation of the landscape.

Geological processes such as the formation of a beach or the change of sand's pigment are large scale mechanisms that usually take millions of years, but were accelerated by the factory's activity. The aim of the research is to compile a pattern of experiments and discover a method to metaphorically reproduce Solvay's activity into another landscape, the domestic interior.

The design methodology resided in a research through experiments initially using the end product of the factory, soda, and then one of the raw materials for the soda's production, salt.

Fig. 54: The packaging of Soda Solvay where the product is described as an "Ecological Multi-Purpose Detergent"

Fig. 55-56: First experiment: the soda cleaned the mug after 30 minutes

The first experiments made with soda revealed an unexpected aspect of this product. Initially, being a cleaning product, its main effect was cleaning the objects used. However, it was interesting to observe that when applied to other materials such as aluminum or wood, instead of cleaning the surfaces, they became ruined, almost corroded. Therefore, the soda can only be used on specific materials, not everywhere (taking into consideration the interior but also the exterior – bleached landscape).

Moreover, considering time as an important factor of the modification, these findings allowed to draw a parallel between the bleached landscape and the consumed interior. The usage of the interiors through time is leading to two facts: within a short term, the interior is getting dirty, whereas within a long term of usage it gets ruined. By continuously cleaning after we make something dirty, the materials become damaged and eroded over time, therefore just cleaning is not a solution. Observing the interior of the old building where I live in Rotterdam, pictures of ruined elements, as traces of usage were collected.

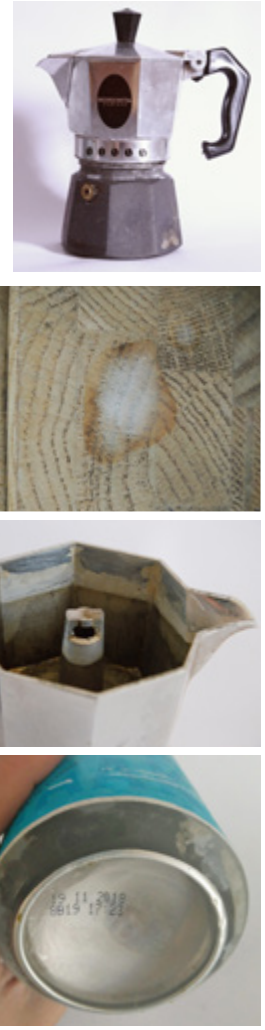
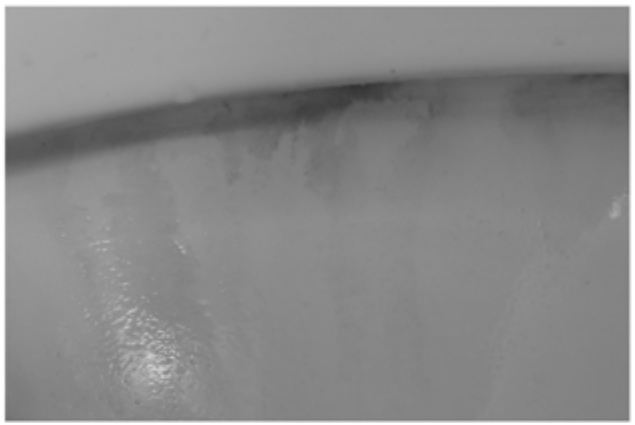
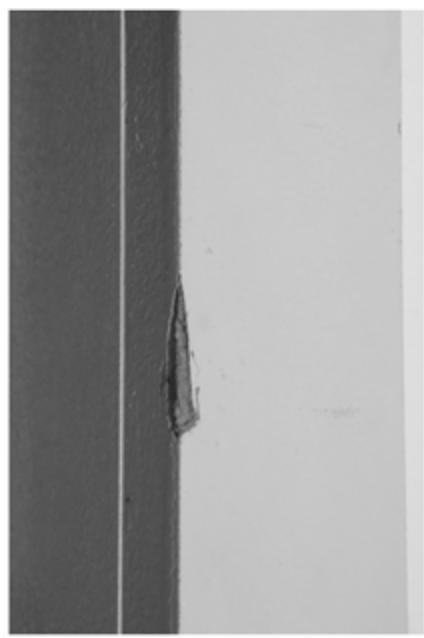


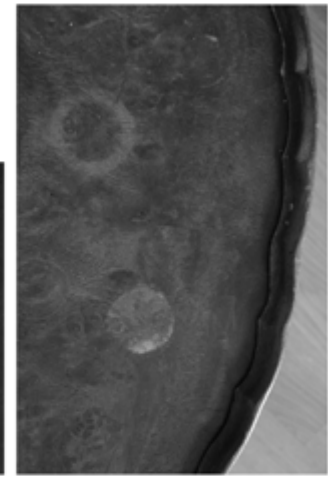
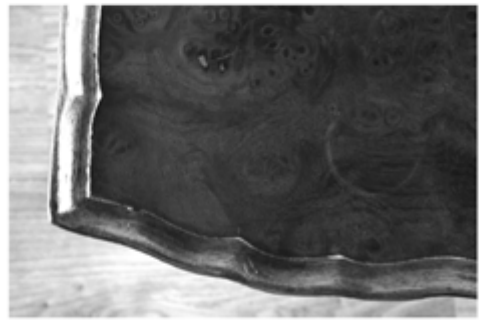
Fig. 57-58-59-60: Second experiment: the soda ruined wood, aluminum (can) and zinc-aluminum alloy (moka)

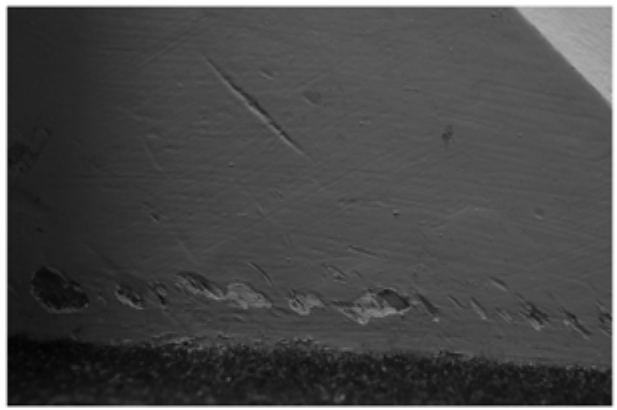


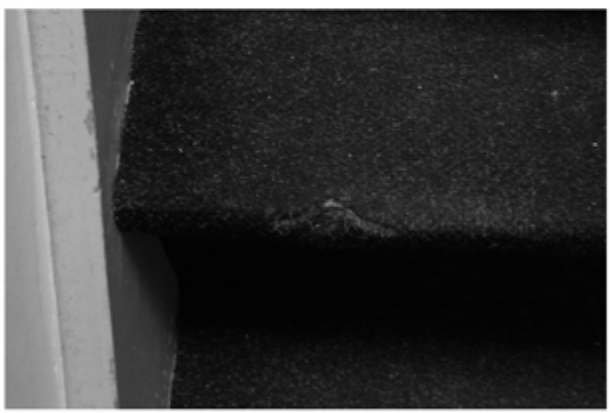
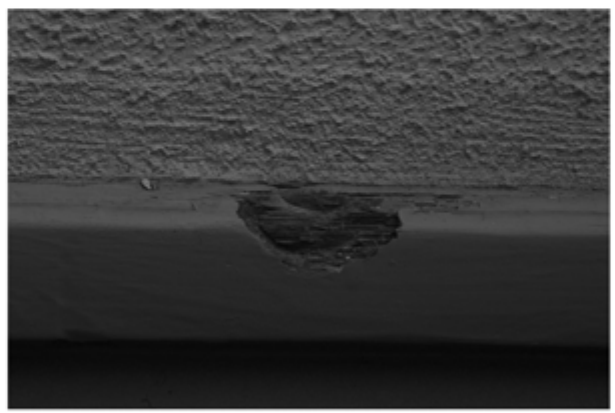


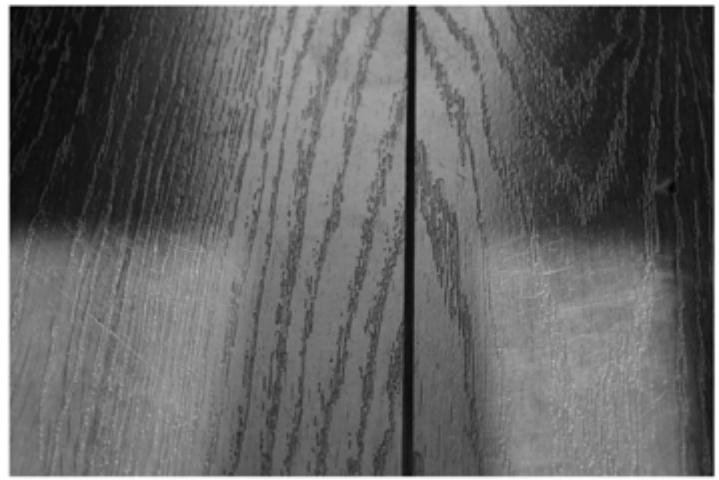








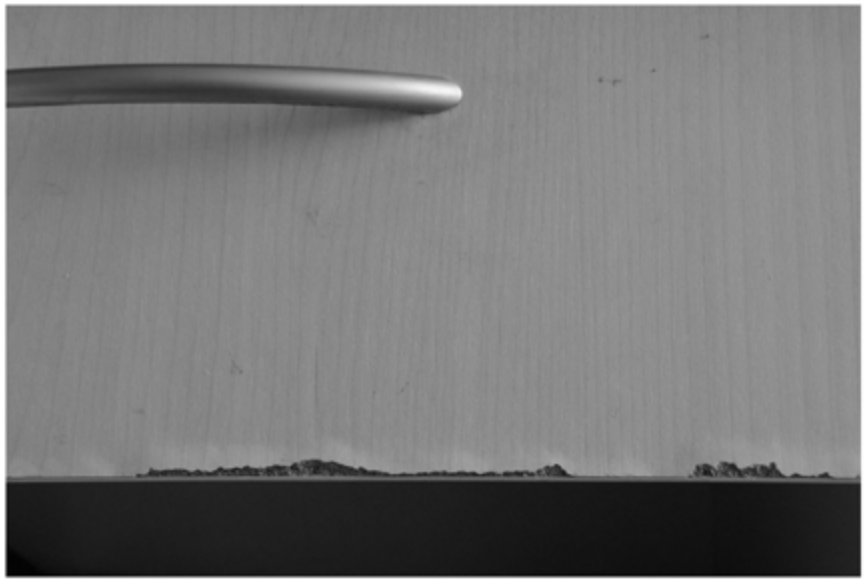


Fig. 61-62-63-64-65-66-67-68-69: Collection of photographs of ruined elements, as traces of usage taken into an old building in Rotterdam – Livia Stacchini – 2018

Reflecting on the depicted details, a question arose: what if the consumption of the interiors could be as visible as the reaction of soda on aluminum? What if every time we use the interior we would leave a trace? What if the trace would be a trace of erosion, a trace of bleach?

Living in our interiors would become a continuous bleaching. By tracing the movements of the objects in the space, we would experience the sense of time passing and of the interior getting used and corroded. Moreover, if the traces were to be made of bleach, they would be extremely cleaned and the surfaces were they occurred would be consumed by the bleach itself. This extreme cleaning process will finally become dirty.

Cleaning the interior is something intentional and necessary, while what is happening on the beach is unintentional and unnecessary. If every movement in the interior would leave a trace of bleach it would become an unnecessary and unintentional cleaning.

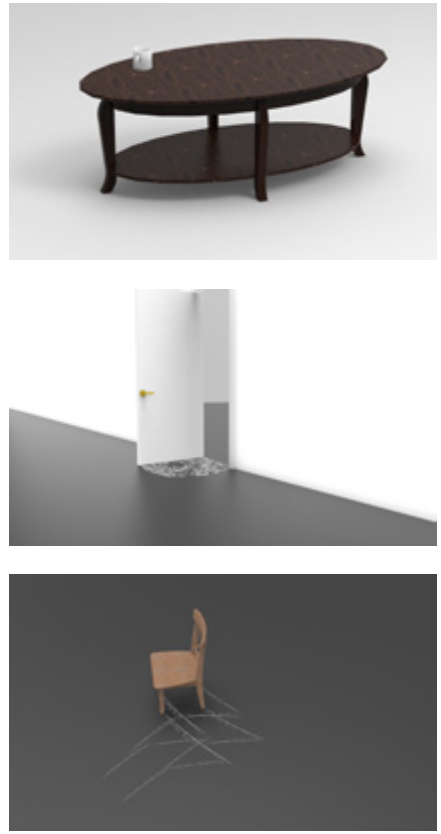


Fig. 70-71-72: The Bleaching Interior
Screenshots of Livia Stacchini's animations – 2018

However, the bleaching landscape is also growing. Inspired by the stratigraphic map indicating the beach expanding, a second phase of experiments started. Using one of the natural resources Solvay uses, a series of experiments of growing salt and salt crystals followed.

The third experiment consisted of growing quick crystals using a piece of cardboard as support. After having prepared a highly saturated salt solution (pouring salt in boiling water until it doesn't dissolve anymore), and soaking the cardboard into it, I placed it onto a plate to dry, and resultantly observed the grown small crystals that became visible after a few days.

The fourth experiment resided in growing a seed crystal of salt. Initiating with the same procedure of the third experiment, but instead of soaking a piece of cardboard into the saturated solution, in order to obtain a clean solution (without any of the undissolved material), the latter got filtered through a coffee filter into a plate. One week later, when the solution had completely evaporated, many seed crystals materialized.

The chemical structure of sodium chloride (salt) crystals, as part of the cubic crystal systems, favors the creation of hyper-geometrical face-centered cubic shapes, ('Cubic crystal system', 2018) which when examined under the microscope are fractal and infinite repetitions of the very same form.

Fig. 73-74-75-76-77: Third experiment: growing quick small salt crystals – Livia Stacchini – 2018

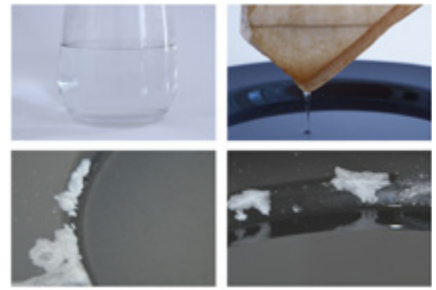
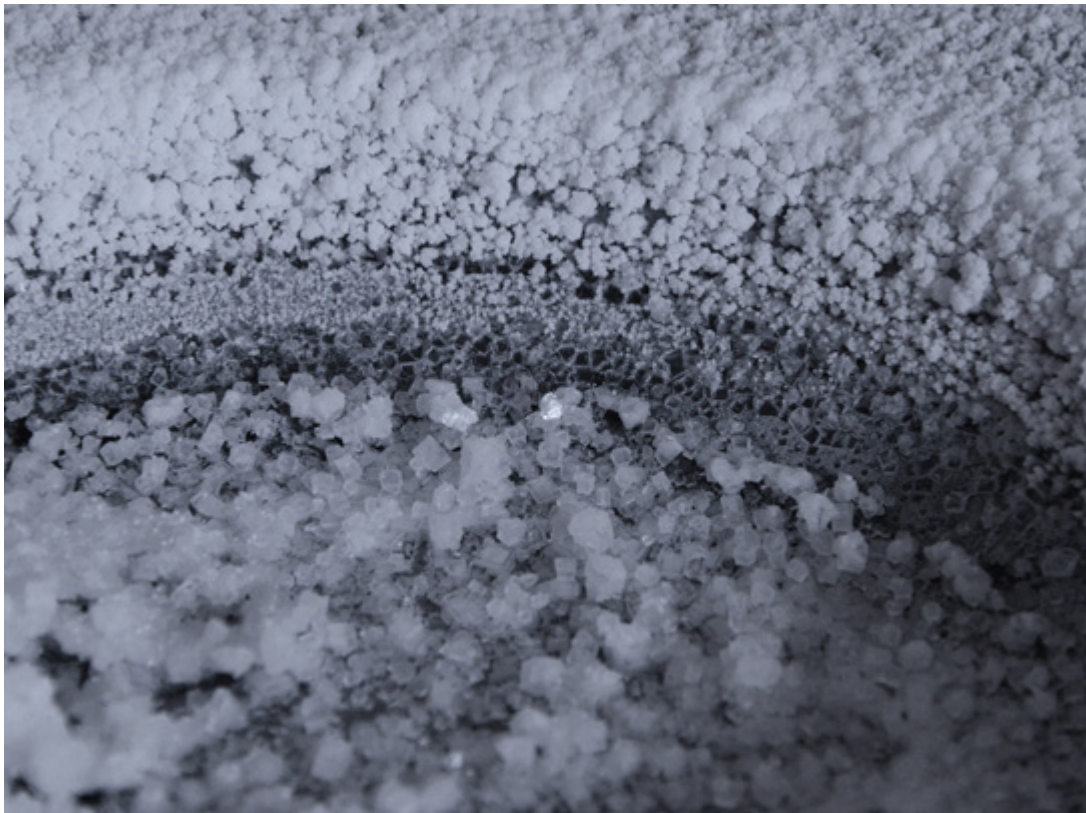


Fig. 78-79-80-81: Fourth experiment: growing a seed crystal salt – Livia Stacchini – 2018

Fig. 82: Growing a seed crystal salt after few days – Livia Stacchini – 2018
Fig. 83: Fourth experiment: seed crystal salt after one week – Livia Stacchini – 2018



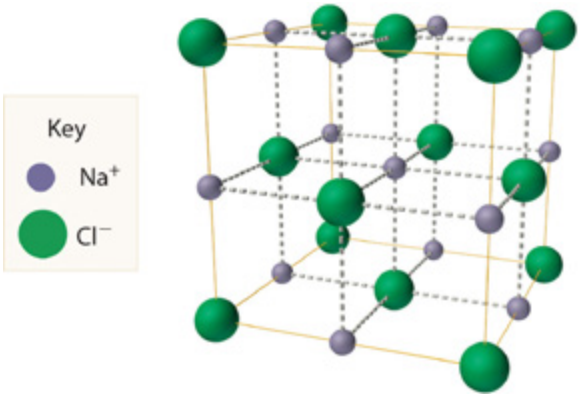


Fig. 84: Chemical structure of a salt crystal

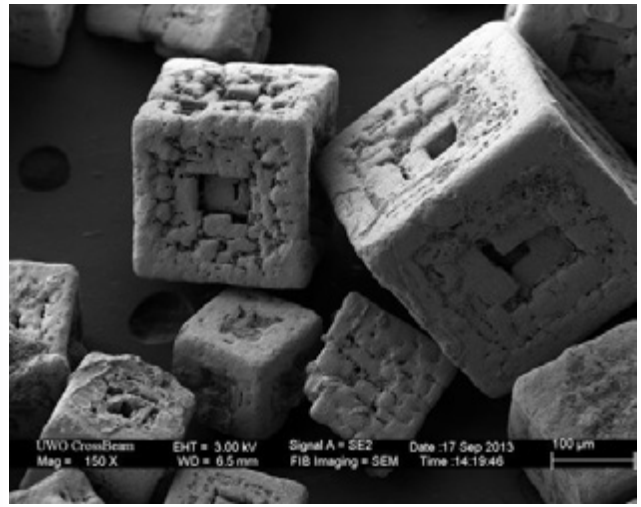


Fig. 85: Structure of a salt crystal with a microscope

The experiments accomplished until this point, were attempts of re-creating and re-performing the two phenomena happening on the 'White Beaches' of Rosignano Solvay. The next step was to make new experiments overlapping the two events, bleaching and growing, in order to have one unique phenomenon that could properly reflect the reality of that altered landscape.

A new phase of experiments with salt crystals commenced due to the discovery of an additional cleaning product called Mrs. Stewart's Bluing. Throughout these experiments, the cleaning product was poured onto a base material, a spongy foam. This product can be recognised as a type of bleach, characterized by a vivid blue color, and is used to whiten white clothes that have lost their pure whiteness due to repeated washings. However, the bluing is "a colloidal suspension[13] of extremely minute particles of a blue powder, ferric hexacyanoferrate," (Mrs. Stewart Bluing, 2018) which when introduced during the experiments, accelerated the crystal growing process[14]. Another ingredient that could increase water evaporation is ammonia which can be added afterwards.

Fig. 86: Mrs. Stewart Bluing

13. *Colloidal state* (or *colloidal suspension*), a state of aggregation in which one substance is dispersed in another (dispersing medium) in the form of amorphous or sometimes crystalline particles, so small that they are not visible under the microscope and are able to spread only very slowly through a porous membrane, unlike solutions (which spread rapidly) and suspension (which do not spread) ('Colloid', 2018).

14. In the highly saturated solution, when the water evaporates the salt crystallization process starts taking place "around the blue particles as nuclei" (Mrs. Stewart Bluing, 2018).


12A
13A
14A

Fig. 87-88-89-90-91-92-93: Series of experiments with Mrs. Stewart Bluing

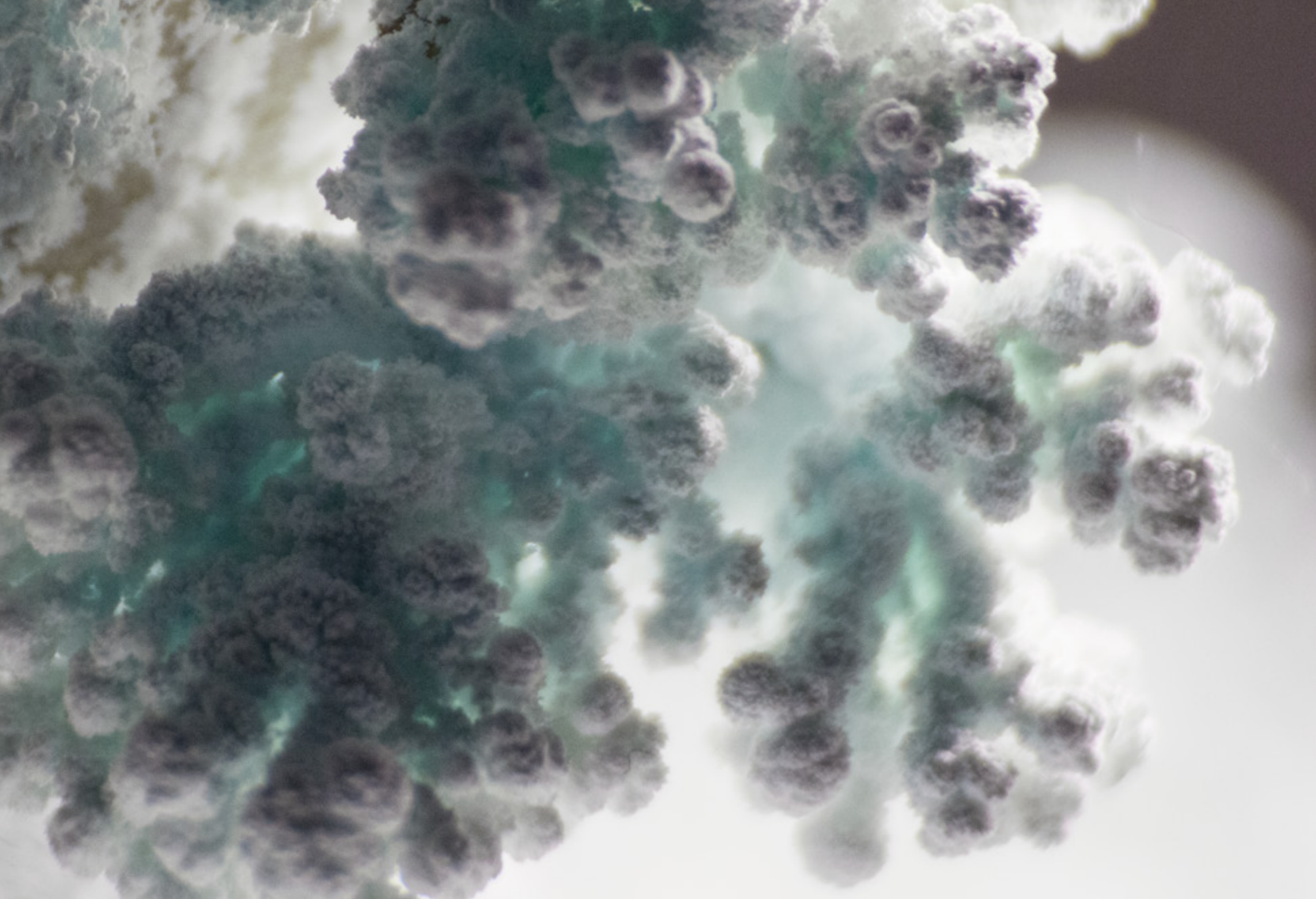


Fig. 94-95-96-97-98-99-100-101: Macro photographies of the crystals

Moreover, the choice of spongy foam as the base material, besides recalling the concept of cleaning, comes from the necessity for a porous material that could provide a capillary action in order to bring up all the ingredients from the base to the top of the sponges. In order to comprehend the potential of the growing crystals, to explore the formal aspects of different patterns of the growing crystals and to better learn how to control their growth, a series of over 25 experiments occurred.

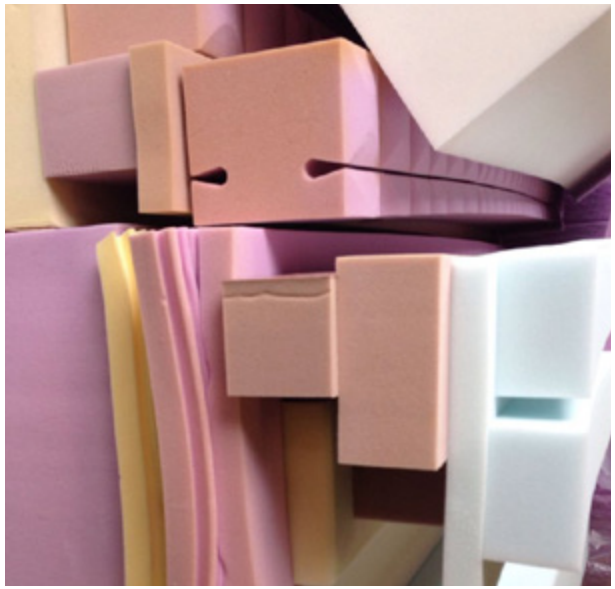


Fig.102: Palette of spongy foam used as a base material

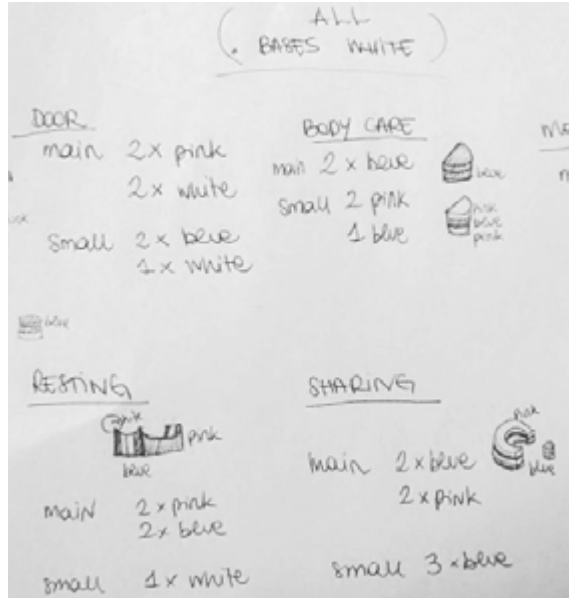


Fig. 103: Sketches of the sculptures and choice of colours

The final phase of the project consisted of designing five small sculptures made out of foam that could become the base material for the final experiments. The abstract geometries of the tiny sculptural shapes, in sharp contrast with the organic aspect of the crystals were inspired by the conceptualization of five different actions that usually occur into the domestic space: entering the threshold, (considered the limit between the public and private sphere); taking care of the personal body; meditating or enjoying the free time; sharing thoughts, stories or food; and finally resting.

The five sculptures contained in Petri dishes are realized three times and displayed in three different rows. The ingredients are poured onto them in different moments in order to capture different phases of the crystal growth. Moreover, it is possible for the visitors to admire these sculptures and explore micro details of the crystals through macro lenses displayed on top.

The paradox between the growing land and the eroding soda, the consumed interior and bleached exterior, cleaning the inside and polluting the outside, the macro scale of the landscape and the micro one of the crystals are the guidelines to follow, in order to create a design – in the form of an installation – that bleaching and growing, could transform over time, visually representing how this deadly but also paradisiac environment is created. This would reflect how our obsession with hygiene in the interiors is polluting and altering the exterior and demonstrate how economic and social processes are shaping the contemporary landscape.

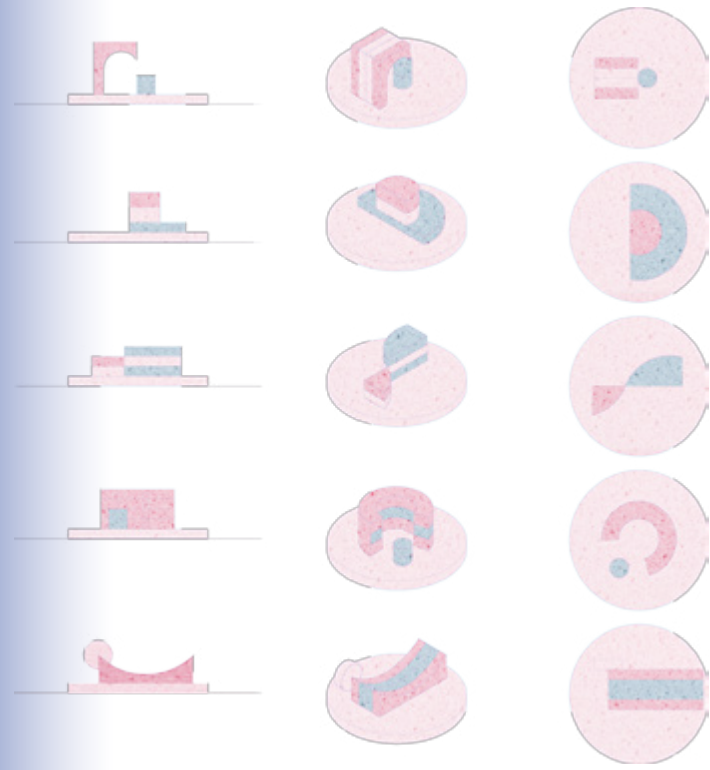


Fig. 104: Front, isometric and top views of the small foam sculptures

Conclusion

"Within this new relationship between humans and nature, there is no place for being spectators. How can you sense the sublime if you feel responsible for what's happening 'out there'?"

– Bruno Latour, *Reset Modernity!*

Industrial activities, capitalist economy and the pace of our consumerist society's development are worsening the actual status of our planet and causing the advancement in the Anthropocene's era. With humans as drivers, these factors remain all determinant agents responsible for this new Anthropogenic nature where we live in.

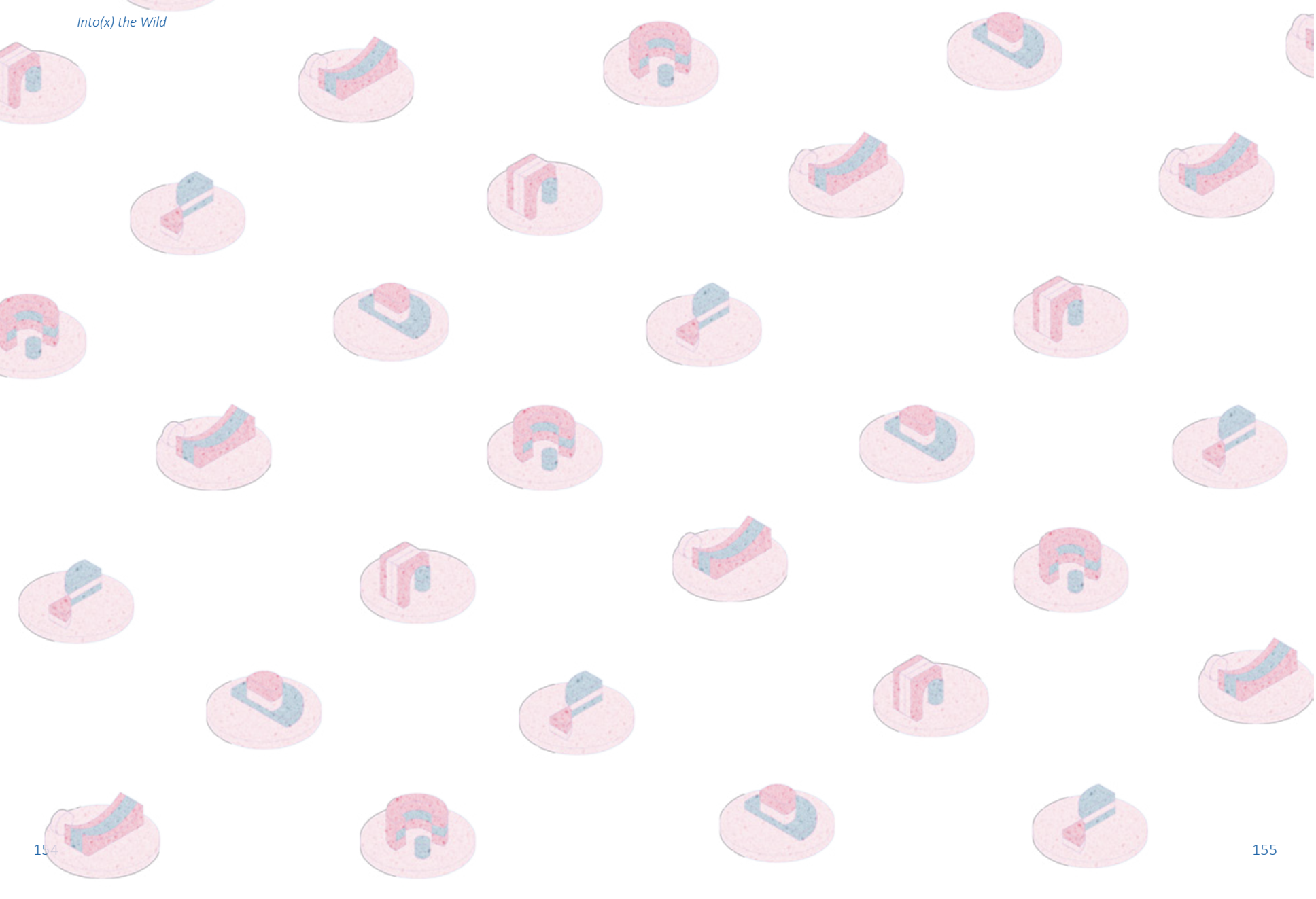
Solvay, the Belgian industry, introducing its chemical plant in Rosignano Solvay, producing and selling its commodity, pushing consumers to obsessively clean their interiors, provoking a new altered nature, where toxicity is desired by tourists, is an example of the never-ending capitalist commodification of "any thing intended for exchange" (Appadurai, 1986), where 'nature' is not landscape anymore, but a mere source of profit and the source of human contamination.

Considering the progression of the human race, from the prehistoric to the post-industrial age, and recognizing its "cultural power" (Mitchell, 2009), the idea of an eventual closure of natural resources' exploitation and "colonial" usurpation is hard to detect. While the current effort in shifting from fossil fuels to renewable energies seems a tardy attempt of a technological species saving its own habitat, looking at the predetermination of humans consuming any natural resources available, demonstrates the vicinity of the earth's complete decay.

For the rest of our existence, as survivors, we will have to deal with dystopian altered surroundings whose features might be physically contaminated, but visually incredibly beautiful as much as a Caribbean beach in a Tyrrhenian sea. The absurdity embedded in the utopian aspect of the 'White Beaches' contrasts with our ideal of the sublime, which should be recontextualised within the contemplation of "human damaged landscapes" as a "toxic sublime" (Peeples, 2011), where Burke's concept of "terrible objects" that cause "pain and danger" (1757), is replaced by lethal contaminations that create a tension between the deadly invisible toxicity and the glorious expression of an imposing power.

"Rather than celebrating or affirming a post-human world, where man no longer deludes himself with regard to his primacy or distinction, and rather than asserting the joyous truth of ecology where life is finally understood as one vast, self-furthering interconnected organic whole, we should perhaps take note of the violent distinction of the human."

— Clare Colebrook, *Extinction*



References list

‘Colloid’ (2018) *Wikipedia*. Available at: https://en.wikipedia.org/wiki/Colloid (Accessed: 5 June 2018)

‘Cubic crystal system’ (2018) *Wikipedia*. Available at: https://en.wikipedia.org/w/index.php?title=Cubic_crystal_system&oldid=828866627 (Accessed: 26 April 2018).

‘Geodesic dome’ (2018) *Wikipedia*. Available at: https://en.wikipedia.org/w/index.php?title=Geodesic_dome&oldid=829078629 (Accessed: 16 April 2018).

‘Holism and Evolution’ (2017) *Wikipedia*. Available at: https://en.wikipedia.org/w/index.php?title=Holism_and_Evolution&oldid=778130311 (Accessed: 19 April 2018).

‘Holism’ (2018) *Wikipedia*. Available at: https://en.wikipedia.org/w/index.php?title=Holism&oldid=836723251 (Accessed: 19 April 2018).

‘Map’ (2018) *Wikipedia*. Available at: https://en.wikipedia.org/w/index.php?title=Map&oldid=837895242 (Accessed: 25 April 2018).

‘Rosignano Solvay’ (2018) *Wikipedia*. Available at: https://it.wikipedia.org/w/index.php?title=Rosignano_Solvay&oldid=96094793 (Accessed: 26 January 2018).

‘Solvay process’ (2018) *Wikipedia*. Available at: https://en.wikipedia.org/w/index.php?title=Solvay_process&oldid=832885681 (Accessed: 26 January 2018).

‘Solvay S.A.’ (2018) *Wikipedia*. Available at: https://en.wikipedia.org/w/index.php?title=Solvay_S.A.&oldid=836075828 (Accessed: 26 January 2018).

After 'Are We Human?' – Beatriz Colomina and Mark Wigley Discuss the Istanbul Manifesto (2017) *ArchDaily*. Available at: http://www.archdaily.com/805727/after-are-we-human-wigley-istanbul-manifesto (Accessed: 18 April 2018).

Andriessen, I. (2017) *I S A B E L L E _____ A N D R I E S S E N / WORK*. Available at: http://www.isabelleandriessen.com/work/ (Accessed: 26 February 2018).

Anonyme Solvay's employee, 2018. Interview. By Stacchini, L., 20 February 19:30

Appadurai, A. (1986) 'Introduction: commodities and the politics of value', in Appadurai, A. (ed.) *The social life of things*. Cambridge: Cambridge University Press.

ARPAT (2014) *Qualità delle acque marino costiere prospicienti lo scarico Solvay di Rosignano, Issuu*. Available at: https://issuu.com/arpatoscana/docs/arpat-report-scarichi-solvay (Accessed: 24 January 2018).

Atlas Obscura (no date) *Spiagge Bianche (White Beaches)*, Atlas Obscura. Available at: http://www.atlasobscura.com/places/spiagge-bianche (Accessed: 24 March 2018).

Bennett, J. (2010) *Vibrant matter: a political ecology of things*. Durham, N.C.: Duke University Press.

Bradshaw Foundation (no date) *Acheulean Stone Tools, Bradshaw Foundation*. Available at: http://www.bradshawfoundation.com/origins/acheulean_stone_tools.php (Accessed: 25 March 2018).

Burke, E. (1757) *A Philosophical Enquiry Into the Origin of Our Ideas of the Sublime and Beautiful*. Wentworth Press.

Bushnell, H. (1858) *Sermons for the new life*. New York, C. Scribner. Available at: http://archive.org/details/sermonsfornewli02bushgoog (Accessed: 12 February 2018).

C'è il paese, ma il nome? 22 anni per trovarlo (no date) Lungomare Castiglioncello. Available at: http://www.lungomarecastiglioncello.it/ROSIGN_SOLVAY/Ros_solv_ieri/~Ros_solvay_ieriind.htm (Accessed: 19 April 2018).

Carrington, D. (2016) *The Anthropocene epoch: scientists declare dawn of human-influenced age, the Guardian*. Available at: http://www.theguardian.com/environment/2016/aug/29/declare-anthropocene-epoch-experts-urge-geological-congress-human-impact-earth (Accessed: 24 March 2018).

Von Borries, F. (2010) *Climate Capsules: Means of Surviving Disaster*. Available at: http://www.friedrichvonborries.de/en/projects/climate-capsules-means-surviving-disaster (Accessed: 20 April 2018).

Comte, A. and Andreski, S. (1974) *The essential Comte; selected from Cours de philosophie positive*. London; New York: Croom Helm; Barnes & Noble.

Comune di Rosignano (2002) *Index of /html/piano_strutturale/documenti/quadro_conoscitivo, Componente Geologico Tecnica ed Idrogeologica, Carta Geologica, map, scale 1:40.000*. Available at: http://www.comune.rosignano.livorno.it/html/piano_strutturale/documenti/quadro_conoscitivo/Geologia/Cartografia/a2_g2.pdf

Comune di Rosignano (2002) *Index of /html/piano_strutturale/*

documenti/quadro_conoscitivo, Componente Geologico Tecnica ed Idrogeologica, Carta Geomorfologica, map, scale 1:40.000. Available at: http://www.comune.rosignano.livorno.it/html/piano_strutturale/documenti/quadro_conoscitivo/Geologia/Cartografia/a2_g3.pdf

Comune di Rosignano (2002) *Index of /html/piano_strutturale/documenti/quadro_conoscitivo, Componente Geologico Tecnica ed Idrogeologica, Sezioni Geologiche, map, scale 1:75.000.* Available at: http://www.comune.rosignano.livorno.it/html/piano_strutturale/documenti/quadro_conoscitivo/Geologia/Cartografia/a2_g4.pdf

Cozar, A. et al. (2014) 'Plastic debris in the open ocean', *Proceedings of the National Academy of Sciences*, 111(28).

Derrida, J. (1981) '*Plato's Farmacy*'

Dorfles, G. Laurocci, F. and Vettese, A. (2010) *Storia dell'Arte 3: L'Ottocento*. Bergamo: Atlas.

Elmer Barnes, H. and Fletcher, R. (no date) Auguste Comte | *French philosopher, Encyclopedia Britannica*. Available at: https://www.britannica.com/biography/Auguste-Comte (Accessed: 31 March 2018).

Feigl, H. (no date) *Positivism | philosophy, Encyclopedia Britannica*. Available at: https://www.britannica.com/topic/positivism (Accessed: 31 March 2018).

Fertz, William F., Jr. (2005) *A Reader's Guide to Letters on the Aesthetical*. Available at: https://schillerinstitute.org/fidelio_archive/2005/fidv14n01-02-2005SpSu/fidv14n01-02-2005SpSu_080-a_readers_guide_to_schillers_let.pdf (Accessed: 5 February2018).

Finucci, M. C. (2013) *The Garbage Patch State*. Available at: http://www.garbagepatchstate.org/web/index.php (Accessed: 25 March 2018).

Foglia, L. (2017) "Human Nature" *Finds New Ways to Understand Our Impact on the Environment* PDN Online, 12 October. Available at: https://www.pdnonline.com/features/photo-books/lucas-foglias-human-nature-finds-new-ways-understand-impact-environment/ (Accessed: 20 April 2018).

Haraway, D. (2016) 'Tentacular Thinking: Anthropocene, Capitalocene, Chthulucene', (75). Available at: http://www.e-flux.com/journal/75/67125/tentacular-thinking-anthropocene-capitalocene-chthulucene/ (Accessed: 25 March 2018).

Herbert, M. (2015) 'The Anthropocene Project. A Report', April. Available at: https://frieze.com/article/anthropocene-project-report (Accessed: 22 March 2018).

Interstellar. (2014), [film] Directed by C. Nolan.

Isaacson, J. (2002) 'Impressionism and Journalisitc Illustration', p. 20.

Jha, A. (2012) *Stone me! Spears show early human species was sharper than we thought, the Guardian*. Available at: http://www.theguardian.com/science/2012/nov/15/stone-spear-early-human-species (Accessed: 24 March 2018).

Kant, I. (1790) *Critique of judgement*. Mineola, N.Y.: Dover

Publications. Available at: http://public.eblib.com/choice/publicfullrecord.aspx?p=1890038 (Accessed: 24 March 2018).

Lungomare Castiglioncello (no date) *La fabbrica: Un secolo di storia Solvay.* Available at: http://www.lungomarecastiglioncello.it/ROSIGN_SOLVAY/Ros_solv_fabbrica/Rosig_S_fabbri_cronistoria.htm (Accessed: 20 April 2018).

Langdon, D. (2014) 'AD Classics: Montreal Biosphere / Buckminster Fuller', *ArchDaily,* 25 November. Available at: http://www.archdaily.com/572135/ad-classics-montreal-biosphere-buckminster-fuller/ (Accessed: 20 April 2018).

Lannes, G. (2012) 'Mercurio all'ultima spiaggia'. Available at: http://sulatestagiannilannes.blogspot.com/2012/08/mercurio-allultima-spiaggia.html (Accessed: 14 April 2018).

Latour, B., Leclercq, C. and Zentrum für Kunst und Medientechnologie Karlsruhe (2016) *Reset modernity!*

Lointier, M. F. (2016) *Reset Modernity! By Bruno Latour at the ZKM, Seismopolite Journal of Art and Politics.* Available at: http://www.seismopolite.com/reset-modernity-by-bruno-latour-at-zkm (Accessed: 19 April 2018).

Lomb.it: Rosignano Solvay (no date). Available at: http://www.lomb.it/s/viaggi-vacanze/rosignano-solvay/?page=26 (Accessed: 2 February 2018).

Macfarlane, R. (2016) *Generation Anthropocene: How humans have altered the planet for ever, the Guardian*. Available at: http://www.theguardian.com/books/2016/apr/01/generation-anthropocene-altered-planet-for-ever (Accessed: 24 March 2018).

Marx, K. (1844) *Private Property and Communism*. Available at: https://www.marxists.org/archive/marx/works/1844/manuscripts/comm.htm#44CC8 (Accessed: 23 March 2018).

Medicina Democratica (2014) *Medicina Democratica Livorno - Salute della popolazione, il sindaco è il primo responsabile. L'informazione è la prima prevenzione, Medicina Democratica.* Available at: https://www.medicinademocratica.org/wp/?p=2069 (Accessed: 24 March 2018).

Mitchell, W. J. T. (2009) 'Imperial Landscape', in *Landscape and Power*. Chicago, Ill, Univ. of Chicago Press.

Mitchell, W. J. T. (2009) *Landscape and power*. Chicago, Ill, Univ. of Chicago Press.

Mrs. Stewarts Bluing — Whitening Whites Safely Since 1883 (no date). Available at: http://mrsstewart.com/ (Accessed: 30 May 2018).

Next Nature Network (no date). Available at: https://www.nextnature.net/welcome/ (Accessed: 18 April 2018).

Peeples, J. (2011) 'Toxic Sublime: Imaging Contaminated Landscapes', *Environmental Communication: A Journal of Nature and Culture*, 5 (Accessed: 22 April 2018)

Robertson, K. (2016) 'Plastiglomerate', (78). Available at: http://www.e-flux.com/journal/78/82878/plastiglomerate/ (Accessed: 25 March 2018).

Smithson, R. (1968) 'A sedimentation of the mind: earth projects.', *Artforum*, 7(1).

Solvay sotto inchiesta: l'esposto di Medicina Democratica del 2008 - Senza Soste (no date). Available at: http://archivio.senzasoste.it/interventi/solvay-sotto-inchiesta-l-esposto-di-medicina-democratica-del-2008 (Accessed: 26 April 2018).

Steffen, W., Crutzen, P. J. and McNeill, J. R. (2007) 'The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature', *AMBIO: A Journal of the Human Environment*, 36(8). Available at: https://doi.org/10.1579/0044-7447(2007)36[614:TAAHNO]2.0.CO;2 (Accessed: 25 March 2018)

TENT (2017) *Schlak*, *TENT Rotterdam*. Available at: https://www.tentrotterdam.nl/en/show/schlak-giuseppe-licari/ (Accessed: 18 April 2018).

Thompson, K. A. (2007) *An eye for the tropics: tourism, photography, and framing the Caribbean picturesque*. Durham: Duke University Press. Available at: http://site.ebrary.com/id/10276570 (Accessed: 26 March 2018).

Türetken, F. (2018) Personal conversation. Rotterdam

United Nations Environment Programme, Mediterranean Action Plan and World Health Organization (1999) *Identification of priority pollution hot spots and sensitive areas in the Mediterranean*. Athens: UNEP.

WALL-E. (2008). [film] Directed by A. Stanton.

Wertz, W. F. (no date) 'Letters on the Aesthetical'.

Whole earth catalog, (1969).

Bibliography

'Transhumanism' (2018) *Wikipedia*. Available at: https://en.wikipedia.org/w/index.php?title=Transhumanism&oldid=832720992 (Accessed: 31 March 2018).

Anthropogenic Landscapes - Matthew Lahoud (no date). Available at: http://www.matthewlahoud.com/Anthropogenic-Landscapes (Accessed: 25 March 2018).

blindfieldcollective (2016) 'The Great Pacific Garbage Patch is Late Capitalism's Safe Deposit Box', 27 October. Available at: https://blindfieldjournal.com/2016/10/27/the-great-pacific-garbage-patch-is-late-capitalisms-safe-deposit-box/ (Accessed: 25 March 2018).

Boulos, M. (2008) *All That Is Solid Melts Into Air.* Stedelijk Museum Amsterdam. Available at: https://www.youtube.com/watch?v=BX6rYfNzTJ8 (Accessed: 27 March 2018).

Cronon, W. (1997) *Nature's metropolis: Chicago and the Great West*. New York: W.W. Norton.

Ecstatic Purification - e-flux Architecture - e-flux (no date). Available at: http://www.e-flux.com/architecture/superhumanity/179221/ecstatic-purification/ (Accessed: 24 March 2018).

Epochal Aesthetics: Affectual Infrastructures of the Anthropocene - e-flux Architecture - e-flux (no date). Available at: http://www.e-flux.com/architecture/accumulation/121847/epochal-aesthetics-affectual-infrastructures-of-the-anthropocene/ (Accessed: 24 March 2018).

Ginwala, N. (2015) 'Oil For Aladdin's Lamp', in *Art in the age of...* Rotterdam: Witte de With Center for Contemporary Art.

Latour, B. (2004) *Politics of nature: how to bring the sciences into democracy.* Cambridge, Mass.: Harvard University Press. Available at: http://www.dawsonera.com/depp/reader/protected/external/AbstractView/S9780674039964 (Accessed: 19 April 2018).

Lazzotti, F. (2013) *Inquinamento alle Spiagge bianche, bonifiche della Solvay per 7 milioni di euro - Cronaca, il Tirreno.* Available at: http://iltirreno.gelocal.it/livorno/cronaca/2013/10/15/news/inquinamento-alle-spiagge-bianche-bonifiche-della-solvay-per-7-milioni-1.7924214 (Accessed: 24 April 2018).

Lewis, S. L. and Maslin, M. A. (2015) 'Defining the Anthropocene', *Nature*, 519(7542), p. 171. doi: 10.1038/nature14258.

Meschiari, M. (no date) 'Terra Sapiens. How Landscape Invented Man', p. 13.

Morelle, R. (2015) 'The Age of Man "started in 1610"', *BBC News*, 11 March. Available at: http://www.bbc.com/news/science-environment-31836233 (Accessed: 25 March 2018).

Nixon, R. (2009) 'Neoliberalism, Slow Violence, and the Environmental Picaresque', *MFS Modern Fiction Studies*, 55(3) (Accessed: 10 April 2018).

Paul Virilio (1977) *Speed and Politics*. Paris. Available at: https://archive.org/stream/PaulVirilioSpeedAndPolitics/Paul%20Virilio%20-%20Speed%20and%20Politics#page/n0/mode/2up (Accessed: 24 March 2018).

Riding, C. (2013) *Shipwreck, Self-preservation and the Sublime*. Tate. Available at: https://www.tate.org.uk/art/research-publications/the-sublime/christine-riding-shipwreck-self-preservation-and-the-sublime-r1133015 (Accessed: 24 March 2018).

Society, T. R. (no date) *Unthought Environments | Exhibitions | The Renaissance Society.* Available at: http://www.renaissancesociety.org/exhibitions/531/unthought-environments/ (Accessed: 24 March 2018).

Some Sketches on Vertical Geographies - e-flux Architecture - e-flux (no date). Available at: http://www.e-flux.com/architecture/superhumanity/68726/some-sketches-on-vertical-geographies/ (Accessed: 24 March 2018).

This Rare Earth - Stories from Below - Announcements - e-flux (no date). Available at: http://www.e-flux.com/announcements/168150/this-rare-earth-stories-from-below/ (Accessed: 24 March 2018).

Waters, C. N. et al. (2016) 'The Anthropocene is functionally and stratigraphically distinct from the Holocene', *Science*, 351(6269).

What is Transhumanism? (no date) *What is Transhumanism?* Available at: http://whatistranshumanism.org/ (Accessed: 31 March 2018).

Visual References

Fig. 1: Das, S. (2018). *Illegal Sand Mining*. [image] Available at: http://sudiptodas.co.in/ (Accessed: 15 March 2018)

Fig. 2: Dallegret , F. (1996). *Art Fiction*. [image] Available at: http://www.arteria.ca/ (Accessed: 18 April 2018)

Fig. 3: Caspar David, F. (1818). *Wanderer above the sea of fog*. [image] Available at: https://archive.nyafuu.org/wg/thread/6255899/ (Accessed: 10 February 2018)

Fig. 4: Monet , C. (1872) *Impression, soleil levant*. [image] Available at: http://www.experiences.it/archives/9120 (Accessed: 10 February 2018)

Fig. 5: Airvaux Dessins, J. (no date) *Series of racloirs*. [image] Available at: https://journals.openedition.org/paleo/docannexe/image/2329/img-14.jpg (Accessed: 20 March 2018)

Fig. 6: Unknown, (no date) *Aerial view of the cultivated landscape over the Miura-Hanto Kanagawa, Japan* [image] Available at: https://twitter.com/zo_ro_me (Accessed: 30 March 2018)

Fig. 7: Henner, M. (2014) *Feedlot Photography 4* [image] Available at: https://inhabitat.com/mishak-henners-apocalyptic-photos-show-how-factory-farming-is-destroying-the-american-landscape/mishak-henner-feedlot-photography-4/ (Accessed: 30 March 2018)

Fig. 8: Digital Globe (2014) *Aerial view of the Diavikk Diamond Mine* [image] Available at: https://viewfromastar.com/#220-1 (Accessed: 10 March 2018)

Fig 9: Unknown, (no date) *The Corinth Canal* [image] Available at: http://caratteriliberi.eu/2015/08/28/in-evidenza/il-canale-di-suez-

emblema-della-difficolta-di-modernizzazione-del-mondo-arabo/ (Accessed: 10 March 2018)

Fig. 10: Dilkoff, D. (2009) *Volunteers try to clear a dam which is filled with discarded plastic bottles and other garbage, blocking Vacha Dam, near the town of Krichim on April 25, 2009* [image] Available at: https://www.gettyimages.nl/detail/nieuwsfoto's/volunteers-try-to-clear-a-dam-which-is-filled-with-nieuwsfotos/94984818#volunteers-try-to-clear-a-dam-which-is-filled-with-discarded-plastic-picture-id94984818 (Accessed: 8 April 2018)

Fig. 11: Unknown, (2013) *A sandstorm hits Shandam Horse Ranch in Zhangye City in northwest China's Gansu province* [image] Available at: https://www.npr.org/sections/goatsandsoda/2014/11/14/364084008/dust-bowls-arent-just-an-interstellar-thing (Accessed: 2 May 2018)

Fig. 12: Screenshot from *WALL-E* (2008) (Accessed: 2 June 2017)

Fig. 13: Makoto, A. (2013) *Leaf Man* [image] Available at: http://www.jeremyriad.com/wp-content/uploads/2012/08/makoto-azuma-plants.jpg (Accessed: 15 November 2018)

Fig. 14: Next Nature Network (2015) *Cover of Next Nature book* [image] Available at: https://mastersofmedia.hum.uva.nl/wp-content/uploads/2011/11/Next_Nature_book_cover.png (Accessed: 10 December 2018)

Fig. 15: Oken, L. (1833) *Variety of beetles* [image]

Fig. 16: The Manchester Hermit (2009) *Diatom* [image] Available at: http://ozarkswellness.com/diatomaceous-earth/ (Accessed 6 March 2018)

Fig. 17: Wikipedia (no date) *Crystal of bismuth* [image] Available at: https://en.wikipedia.org/wiki/Bismuth#/media/File:Wismut_Kristall_und_1cm3_Wuerfel.jpg (Accessed: 7 March 2018)

Fig. 18: Microcosmos (2010) *Magnified 22 million times dust* [image] Available at: https://io9.gizmodo.com/photos-of-the-amazing-and-gruesome-world-under-a-micros-1291328130 (Accessed: 10 April 2018)

Fig. 19: Flickr user abdallahh (no date) *Montreal Biosphère* [image] Available at: https://www.archdaily.com/572135/ad-classics-montreal-biosphere-buckminster-fuller/547c765be58ececbba0000c4-abdallahh-jpg (Accessed: 6 March 2018)

Fig. 20: Rucker-Co, H. and Himmelblau C. (1972) *Oase No. 7* [image] Available at: https://www.flickr.com/photos/29745442@N04/4615426029 (Accessed: 3 April 2018)

Fig. 21: Malstaf, L. (1995) *Shrink* [image] Available at: https://curiator.com/art/lawrence-malstaf/shrink (Accessed: 3 April 2018)

Fig. 22: Linke, A. (2014) *Anthropocene Observatory* [image] Available at: https://www.hkw.de/en/programm/projekte/2014/anthropozaenobservatorium20132014/the_dark_abyss_of_time/veranstaltung_101494.php (Accessed: 3 April 2018)

Fig. 23: Foglia, L.. (2017) *Trees marked for cutting after a wildfire* [image] Available at: http://www.nationalgeographic.com.au/photos/photos-reveal-our-deep-ever-weirder-relationship-with-nature/13_lucasfoglia_humannature_trees-marked-for-cutting-after-

a-wildfireadapt11901.aspx (Accessed: 5 April 2018)

Fig. 24-25-26: Wood, K. (2012) *Plastiglomerate* [image] Available at: https://www.e-flux.com/journal/78/82878/plastiglomerate/ (Accessed: 2 February 2018)

Fig. 27: Screenshot from *The Garbage Patch State* website Available at http://www.garbagepatchstate.org/eng/dichiarazioni.html (Accessed: 3 March 2018)

Fig. 28: Andriessen, I. (2017) *Resilient bodies* [image] Available at: http://www.isabelleandriessen.com/work/ (Accessed: 4 April 2018)

Fig. 29-30: Licari, G. (2017) *Schlak* [image] Available at: https://www.tentrotterdam.nl/show/schlak-giuseppe-licari/ (Accessed: 2 December 2017)

Fig. 31: Lungomare Castglioncello (1980s) *Aerial view of Rosignano Solvay's plant* [image] Available at: http://www.lungomarecastiglioncello.it/ROSIGN_SOLVAY/Ros_solv_ieri/~Ros_solvay_ieriind.htm (Accessed: 30 January 2018)

Fig. 32: Stacchini, L. (2018) Collage of Google Earth images of Rosignano Solvay

Fig. 33: Lungomare Castglioncello (1921) *Picture of a newspaper advertisement of Solvay's Company* [image] Available at: http://www.lungomarecastiglioncello.it/ROSIGN_SOLVAY/Ros_solv_ieri/~Ros_solvay_ieriind.htm (Accessed: 30 January 2018)

Fig. 34: Stacchini, L. (2018) Provenience of Solvay's natural resources

Fig. 35-36: Screenshots of Google Earth images of Solvay's natural resources' provenience (2018)

Fig. 37-38: Lungomare Castglioncello (1936, 1965) *Aerial views of Rosignano Solvay* [image] Available at: http://www.lungomarecastiglioncello.it/ROSIGN_SOLVAY/Ros_solv_ieri/~Ros_solvay_ieriind.htm (Accessed: 30 January 2018)

Fig. 39-40-41-42: Lungomare Castglioncello (various dates) *Historical pictures of Rosignano Solvay* [image] Available at: http://www.lungomarecastiglioncello.it/ROSIGN_SOLVAY/Ros_solv_ieri/~Ros_solvay_ieriind.htm (Accessed: 30 January 2018)

Fig. 43: Screenshot of Google Earth images of Rosignano Solvay and Solvay's plant.

Fig. 44: Blitz quotidiano (2017) *White Beaches in Rosignano Solvay* [image] Available at: https://www.blitzquotidiano.it/ambiente/rosignano-solvay-spiaggia-e-mare-da-sogno-ma-leffetto-caraibi-e-un-pacco-inquinato-2736699/ (Accessed: 3 March 2018)

Fig. 45: Unknown, (no date) *Sodium carbonate* [image] Available at: https://www.amazon.com/Pounds-Sodium-Carbonate-Washing-Additive/dp/B00B08IUAS (Accessed: 3 May 2018)

Fig. 46: Unknown, (no date) *Calcium chloride* [image] Available at: http://www.uniquedmwater.com/calcium-chloride-2646723.html (Accessed: 3 May 2018)

Fig. 47: Unknown, (no date) *Limestone* [image] Available at: http://canacopegdl.com/single.php?id=https://4.imimg.com/data4/HM/QA/MY-8055714/dolomite-rock-500x500.jpg (Accessed: 3 May 2018)

Fig.48: Stacchini, L. (2018) Re-designed stratigraphic map based on 'Carta Geomorfologica' Available at: http://www.comune.rosignano.livorno.it/html/piano_strutturale/documenti/quadro_conoscitivo/Geologia/Cartografia/a2_g3.pdf (Accessed: 18 February 2018)

Fig. 49: ARPAT (2014) *Distribution of the concentration of mercury* [image] Available at: https://issuu.com/arpatoscana/docs/arpat-report-scarichi-solvay (Accessed: 18 February 2018)

Fig. 50: Unknown (no date) *Panorama of White Beaches of Rosignano Solvay* (Accessed: 19 April 2018)

Fig. 51: Stacchini, L. (2018) *Panorama of White Beaches of Rosignano Solvay edited in Photoshop*

Fig. 52: Stacchini, L. (2018) Screenshot of Livia Stacchini's video "The White Beaches"

Fig. 53: Girlanda, S. (2013) *Saluti da Rosignano Solvay* [image] Available at: https://www.flickr.com/photos/simonegirlanda/9192211328/ (Accessed: 10 March 2018)

Fig. 54: Stacchini, L. (2018) Solvay's packaging

Fig. 55-60: Stacchini, L. (2018) Experiments with soda Solvay

Fig. 61-69: Stacchini, L. (2018) Ruined details of my home in Rotterdam

Fig. 70-71-72: Stacchini, L. (2018) Screenshot of Livia Stacchini's animation "The Bleached Interior"

Fig. 73-83: Stacchini, L. (2018) Experiments with salt and salt crystals

Fig. 84: Research gate (2015) *Sodium and Chlorine atoms form Sodium Chloride* [image] Available at: https://www.researchgate.net/figure/Sodium-and-Chlorine-atoms-form-Sodium-Chloride-via-an-FCC-cubic-lattice_fig3_304247397 (Accessed: 20 April 2018)

Fig. 85: Blaze press (2014) *Salt* [image] Available at: https://blazepress.com/2014/11/everyday-items-look-completley-different-microscope/ (Accessed: 20 April 2018)

Fig. 86: Mrs. Stewart (no date) *Liquid Bluing* [image] Available at: http://mrsstewart.com/ (Accessed: 10 May 2018)

Fig. 87-93: Stacchini, L. (2018) Series of experiments with Mrs. Stewart Bluing salt water and ammonia

Fig. 94-101: Stacchini, L. (2018) Macro photographies of the crystals pictured by my amazing friend Razvan Alexandru Isac

Fig. 102: Stacchini, L. (2018) Palette of spongy foam used as a base material pictured in 'De Matrassen Fabriek Rotterdam'

Fig. 103: Stacchini, L. (2018) Sketches of the sculptures and choice of colours

Fig: 104: Stacchini, L. (2018) Front, isometric and top views of the small foam sculptures

Fig. 105: Stacchini, L. (2018) Pattern of the small foam sculptures

Acknowledgments

I would first like to thank my thesis advisors: Max Bruinsma, Füsun Türetken, and Marta Roy Torrecilla. Thanks for the support, for the patience, for the feedback and for always pushing us forward, during the last months of the thesis, but during the whole Master.

Thanks to Lisa Swanstrom for the interest she demonstrated and for her time spent in editing the text of my thesis.

I wish to thank Alex Suárez for the amazing opportunity to be part of this 2-years experience in such a dynamic and inspiring context of MIARD and of the Piet Zwart Institute.

Thanks to Ephraim Joris for being a fundamental help during the whole course. Thanks for the wise comments he gave to me and to all of us. Thanks for loving your job as a teacher.

Thanks to Susana Pedrosa and Zoraima Hupkes for the help and for the enormous patience they showed. Thanks for organizing our exhibition and making everything possible.

Thanks to all the staff of the stations that are always available and open to new experiments. Thanks for their time and amazing patience. I would like to give a special thank to Jasper de Koster for being so helpful in all the printing trials I did in the last two years and for all the times you had to change the ink of the plotter for me! Thanks to Stephan Gotz van der Vet for helping, teaching and supervising us with your smile and charismatic presence. Thanks to Emiel Gilijamse for the fundamental help using all the machines of the Digital Lab, from 3d printers to laser cutters. Thank you all, because without you none of my projects could have been materialized.

Thanks to my cousin Marco Denti, and to the CHEMIRICERCHE

SRL lab of Brescia for analyzing the samples of sand of Rosignano Solvay I sent. We created an international triangle Rosignano Solvay-Rotterdam-Brescia.

Thanks to my family to always support me not only during my studies but during my whole life. Thanks for being always so interested in all my projects, for helping me, for believing in me and for giving me the opportunity of moving to Rotterdam. Thanks for sending me boxes full of food and of chemical stuff. Thanks for sharing links of crazy experiments to test. Thanks for coming on this special day and for all the love you all give me.

Thanks to all my classmates to be part of this studio where to sing, dance, laugh, share ideas, projects and stress, (and work) altogether and get a bit more crazy day after day :)
OMG, WE MADE IT!

Thanks to all my amazing friends of Rotterdam for being always next to us during the course. Thanks for all the help in making videos, audios, photographies, in painting, reading, checking English grammar, giving feedback, providing materials...Thanks for being interested, inspiring, curious, helpful, available and (after all) for still being our friends!!

Thanks to Andrea for being next to me all the time even if far. Thanks for coming with me to Rosignano the first time, when all this started. You have been always with me. Thanks for supporting me in everything, for coming and visiting me every month and for being here today, all the previous times and in the future. <3

Thanks to Agnese and Evgenia for being two amazing flatmates and friends. Thanks for supporting (and sopporting) me with all the experiments spread in our living room. Thanks for the curiosity and encouragement of every day.

Thanks to Alessia for assisting me during my creative process, for listening to all my ideas and for being a fundamental psychological (and practical) support! I am so happy that since the bachelor we are still so close.

Thanks to everyone! I am so glad to be here writing these thanks because you guys are all amazing!

Two years ago a phase of my life started here,
...now a new one will start!

What's next?