# JACQUERIE MIMESIS

*The transformation of life during the Anthropocene concerning the build environment.*

FLORIAN NELEMANS

*Jacquerie*

ˈdʒeɪk(ə)ri/

A communal uprising; French farmers revolt against the noble in 1358.

*Mimesis*

/maɪˈmiːsəs/

Plato and Aristotle saw in mimesis the representation of nature.

# JACQUERIE MIMESIS

*The transformation of life during the Anthropocene concerning the build environment.*

DELFT UNIVERSITY OF TECHNOLOGY

Faculty of Architecture and the Built Environment

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## Preface

This thesis is made during my graduation project within the studio Explore Lab at the Technical University of Delft on the Faculty of Architecture, Urbanism and Building Sciences. Since the writing of my first master thesis, the fascination for the topic arose. At the Architectural Theory department under guidance of Andrej Radman I wrote; 'Biomimicry: Mimicking biology in architecture to achieve sustainable development'. Although there was so much more in this thesis then just the idea of using nature's ingenious solutions to serve human needs. I was already thinking in a much broader sense how we ever ended up in this climatological crisis? And how we could be able to solve it? Are we as individuals even able to change anything within this metastable system? With these questions in mind I dived into a research process with Peter Koorstra my research mentor, nevertheless he also gave guidance during the design process. The thesis is an elaboration of my first master thesis and functions as a source for design occurred parallel to my graduation project; 'The Temple of the Natural Delights'. Robert Nottrot and Jan van de Voort supervised the design, even though they were also involved in the thinking process of this thesis. Through research a specific kind of philosophy is developed, to achieve a certain goal. The architectural design is just an imagined posture of this philosophy on a moment of time.

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## Prologue

Since the first humans started to populate the earth, we have the desire to build a society which is satisfying our needs. Nowadays we see that the systems we've created to gain prosperity are also working against us. Besides the fact that the capitalistic system is generating economic instability and the drive to authority results in cultural conflicts, there is a lack of the feeling that we all live on the same earth with the climatological crisis as the biggest challenge humankind has ever known and therefor is a concern to all of us.

The build environment has an enormous impact on the behaviour of man, the energy consumption and the exhaust of greenhouse gasses. Architects, urban planners and developers on the universities contemplate about how to shape the build environment; I think it is our duty to seriously consider the consequences, the impact on earth and thereby on humanity. My compassion for the responsibility towards society of the profession generated the following main question of my graduation research:

> *How can architecture in times of climatological crisis, economic instability and cultural conflicts contribute in the most effective way to the transformation of the finite society of nature, animals and humans to a community which is more sustainable?*

Humankind has developed an anthropocentric approach to life and we are constrained by our own imaginary order. According to Radman (2015): "It is time for the discipline to awaken from the slumber of anthropocentrism and shake off the baggage of old dichotomies." This is emphasized by Deleuze and Guattari (2004) who propose that we drop anthropomorphism for geomorphism. To answer this question we first have to broaden our perspective about life on earth. The first part of the research tries to summarize and chronologically theorize the important parts of the evolution of life on earth. Subsequently I will describe the development of the pandoric phase of human life on earth and the acknowledgement of the Anthropocene. Thereby the development of the built environment in a multidisciplinary fashion is clarified. Sustainable design involves knowledge about the earth and its systems, because it is the immediate context of the build environment.

In the Anthropocene the dominant presence of mankind within the biosphere and its immense destructive impact on its surroundings became undeniable. If we are not taking action soon we are going to cause our own extinction. The problem is that we have known this for decades, for almost half a century and there seems to be consensus that

we have to take action. Despite the fact that more people nowadays acknowledge that climate change represents a significant threat to human well-being, it hasn't translated into meaningful action yet. To explore, clarify and find reason for this reiterating phenomenon in chapter two 'the mechanisms of behaviour' and conceptions of humankind get investigated.

Through centuries humanity has developed culture, habits and imaginary orders. At a certain moment in your life you wake up and are able to see that everything we are doing is made up by ourselves and sustained by an intersubjective belief. How are we able to change the foundation of our society? Is it even possible to influence the direction humanity is taking? Or are we all in the same directionless rocket towards the eternal impetus of evolution? In the third chapter I am trying to give insight in the underlying superstructures for life, to find clues on how transform the foundation of society.

To solve the climatological problems we are facing, we have to, like Einstein already mentioned: solves them with different reasoning then what caused them. And like Darwin disseminated it is not the strongest nor the most intelligent kind that survives, but the one that is able to adapt to change. After the Neolithic, industrial and digital revolution it is in my opinion - if we want to live as long, healthy and happy as possible - time for a biological revolution. Nature has developed in 3.8 billion years complex efficient and ingenious circular sustainable systems which accomplish maximal with minimal means. Architects and urban planners can learn from biology, to sustainably innovate the build environment. Therefor I am doing research on biological structures, systems and processes.

The knowledge on and technologies to become a sustainable society are there. To change our behaviour we also need a clear reason for it. Most of our actions are led by our emotions, due to way our brain is functioning. As humans we need something which makes us desire to change. Perhaps the architectural aesthetics could be able to create desire to fulfil an ethical goal. Like a flower that with its aromas and remarkable colours attracts bees for the practical utility to pollinate and therefor continues the species existence. Aesthetics are after all able to evoke emotion, and man experiences a specific feeling. Colour, texture, light, sound, climate, composition and proportion of spaces that envelop and surround us stimulate our senses and in the right combinations are able to make us feel secure, astonished or divined. Actually words already deprive. Language is after all also only a solidified abstract translation of our real indescribable feeling.

# The Earth

*Life on earth flourished prior to the metastatic development of humankind.*

## Intro

In 1758 Carl Linnaeus named modern humans: Homo Sapiens; the wise man. But are we actually as smart as we asses ourselves. During the Anthropocene humankind created a system for life on earth to benefit our prosperity. Although we thought so, with the first visible consequences due to the influences of man on earth, we now notice that this conception about life is starting to work against us. To overcome the ecological problems that we face humanity has to reframe the foundation of our society. A critical reflection on how life came into existence and how it developed, will give new insights. In the broadest sense, the earth is our home within the universe and should be considered as the context. Its location within the solar system and particular chemical consistency created conditions for life to emerge and flourish into the great, beautiful and functional diversity as we know it. To be able to find solutions that not only address the symptoms of climate change but grip on to the origin of the problem, we have release ourselves form existing dogmas. With a fresh perspective humanity could be able to redevelop concepts for life where nature, animals and humans live in symbiosis to create mutually beneficial and resilient systems for life on earth.

### Genesis of life

Knowledge about the history of the earth and the evolution of life creates a deeper understanding of how humans distinguish themselves from other organisms. The existence of the first modern human is estimated to be two hundred thousand years ago, such a small amount of time in comparison to the genesis of the earth that occurred approximately four billion five hundred and sixty million years ago. Humankind can learn from this rich source of information. Our presumption is that life started for the second time, three billon and eight hundred million years ago as chemical sequences of amino acids in the Precambrian era, when the lithosphere was volcanic. Through evolution, autotrophic[1] organisms developed within an anaerobic environment, feeding themselves by photosynthesis. Stromatolites started producing oxygen into the atmosphere, a process that developed with the natural evolution of the sun. Higher oxygen concentration turned methane into a less effective greenhouse gas, causing temperatures to drop and creating the first glaciated mass extinction. Two billion years ago bacteria parasitized larger cells that had evolved to metabolize their waste products and create more energy that in turn created stable organisms through symbiosis, called mitochondria. Evolution has continued through a very interesting principal since the beginning of life; Living organisms have created cycle based ingenious solutions in order to survive and develop within the changing biosphere.

### Ecosystems

Before starting an intervention, architects should be familiar with the already embedded systems on earth. The earth works as an ecosystem[2] and contains biotic and abiotic components. The biotic part – all the living organisms – is called the biosphere. The abiotic part consists out of the lithosphere (earth), the hydrosphere (water) and the atmosphere (air). (Clapham, 1973, 2) The globe has a great geodiversity[3], which forms the framework for living organisms. Ecosystems can be divided in terrestrial and aquatic systems, the latter covers 71% of the earth. Despite a far smaller dry land, there is much more complexity and variety of the ecosystems. Because as Clapham explains: "There is no unifying theme in terrestrial ecosystems analogous to the physical

[1] An autotroph is an organism that produces complex organic compounds from simple substances present in its surroundings, generally using energy from light (photosynthesis) or inorganic chemical reactions (chemosynthesis). (Clapham, 1973, 23)
[2] Ecosystem is defined by CBD as: "a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit" (United Nations 1992: Article 2)
[3] "Geodiversity is most evident in spatial patterns which indicate a certain geological structure. Geodiversity could be defined as the diversity of non-biotic systems – in other words, the structure, function and dynamics of the abiotic parts of ecosystems, such as the lithosphere, atmosphere and hydroshpere." (Barthlott, 1998, 132)

properties of water." (1973, 182) On the land the climate[4], landscape and the 'biotic community' together create a great diversity of biomes[5]. In this dynamic system patterns of flow and biochemical cycles are driven by external sources of energy which make finite chemical substances continuously cycle within the system.

> The role of soil as a source for nutrients is unique to terrestrial environments. It is the site of the entire detritus food chain, and thus is central to the biogeochemical cycling of nutrient materials. Different types of soils have different properties that affect the availability of nutrients to plants, so the productivity of the terrestrial ecosystems is very closely tied to the chemistry of the soil. (ibid., 182)

The most important sources of energy are according to Clapham: "gravitation, internal forces within the earth, and solar radiation". (Ibid., 17) Solar radiation[6] causes air to circulate, water to cycle and vegetation uses the sun to photosynthesise[7]. Through interaction, an ecosystem creates a metastable system. These interactions encompass: the relation between organisms, the connection of the living with their physical environment and the synergy of several stages abiotic components. (Ibid., 1) The vitality of an ecosystem is determined by the number of connections within and with other ecosystems. (ibid., 25) Perturbations cause alterations within ecosystems, natural feedback mechanisms regulates a respond, thereby creating a self-sustaining resilient environment. (ibid., 11) The build environment is a simplified ecosystem, since it only is designed to serve man. Dissociating themselves from nature, and thereby blocking natural feedback, makes man not conscious in their everyday lives of the abatement of the earth's versatility. Development with this velocity and quantity is causing alterations that normally only would happen over geological time. This is disrupting natural feedback systems. While we still depend on the services of the ecosystem[8] and brings quality to many human lives. (ibid., 233) Man is not taking the principals of an ecosystem into account, hence create a non-resilient environment.

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[4] The most important aspects of climate are the temperature and water relations of the ecosystem. These relations include mean annual temperature, amount of temperature fluctuation, annual rainfall, degree and time of fluctuation in rainfall, and potential evapotranspiration.

[5] "A biome is a formation of plants and animals that have common characteristics due to similar climates and can be found over a range of continents. Biomes are distinct from habitats, because any biome can comprise a variety of habitats." https://en.wikipedia.org/wiki/Biome

[6] The sun; a thermonuclear reactor where the fusion of small hydrogen atoms form larger helium atoms and release electromagnetic waves.

[7] Photosysthesis converts electromagnetic waves to chemical energy

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|---|---|---|---|---|
| 6CO2 | + 6H2O | + hv | > 6C6H12O6 | + 6O2CO2 |
| form atmosphere | + Water from soil | + light energy | > Sugar in plant cell | + oxygen |

[8] "Ecosystem services are the benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as flood and disease control; cultural services such as spiritual, recreational, and cultural benefits; and supporting services, such as nutriet cycling, that maintain the conditions for life on earth." (M.E.A.B., 2003, 49)

**Biodiversity**

As Pianka (1994) confirms, through evolution life has flourished and multiplied into many species, thereby it was able to prolong up to nowadays. According to Barthlott (1998, preface): “Life and its extraordinary diversity is the unique wealth which distinguishes the planet earth from all other planets in the universe.” Biodiversity[9] as we call it counts roughly 1.7 million known species if we believe 'de Jong (2008, 353)' and one prosperous new form of life is born every year. On the other hand the same source points out that on average 500 breeds are abolished every year. As humans inhabit the planet more species are going instinct than ever before, exceeding that of the meteoric disaster that made the dinosaurs extinct. (Steffen, 2008) Rodilfo Dirzo Professor in Biology from Stanford University is warning that we are facing earth’s sixth mass extermination. The highest rate of decline is found among megafauna[10], a trend that matches previous extinction events. (Dirzo, 2014) In the Netherlands from all plant and animal species that ever lived here only 15% is left. (Pierson, 2017)
Changes in biodiversity are made due to habitat modification and invasion by the dominant presence of humans within the biosphere[11]. (Schulze and Mooney 1993; Loreau et al. 2002) According to Pierson (2017) the biggest cause of loss of biodiversity is the monoculture cattle farms.

According to de Jong: “There are positive and negative relations between human health and biodiversity.” (de Jong, 2008, 366) The influence of humankind on earth is not bad for all animals, for instance jellyfish[12] are benefitting from global warming. Likewise there are more species that benefit from us, pigeons for instance, they are not afraid of human activity, which makes them able to invade our cities and eat wasted food. Although we are able to conclude that the tendency is a decrease in biodiversity, if you look over the whole the history of mankind. Humanity has to be careful that its influence in the biosphere is not creating too many monocultures, because diversity has

[9] Biodiversity is defined by the CBD (Convention on Biological Diversity) as: “the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems” (United Nations 1992: Article 2)
[10] Megafauna are land mammals roughly larger than human which are not domesticated like elephants, rhinoceroses, polar bears and countless other species worldwide
[11] The biosphere is the global ecological system integrating all living beings and their relationships, including their interaction with the elements of the lithosphere, geosphere, hydrosphere, and atmosphere. (Malabou, 2015)
[12] Jellyfish have roamed the seas for at least 500 million years, and possibly 700 million years or more, making them the oldest multi-organ animal. Jellyfish are better able to survive in nutrient-rich, oxygen-poor water than competitors, and thus can feast on plankton without competition. Jellyfish may also benefit from saltier waters, as saltier waters contain more iodine, which is necessary for polyps to turn into jellyfish. Rising sea temperatures caused by climate change may also contribute to jellyfish blooms, because many species of jellyfish are relatively better able to survive in warmer waters.

a lot of value. According to de Jong (2008, 353): "[...] the existing species represent an enormous genetic richness, of which we are hardly aware." A research by the University and research centre of Wageningen (Scheffer, 2015) shows that diversity among bees within the same species – which first seemed redundant –, is actually functional. A Sub-species of bees with the same function in the ecosystem adapts itself to a continually changing biosphere. Thereby creating a resilient species, if one sub-species dies because of changing climate conditions, the adapted species continues life, as Londo (1998) and de Jong (2008, 367) endorse. This is important because flowers are pollinated and thereby reproduced by bees. (Steffen, 2008, 487) Barthlott (1998, 192) indicates that it has economic value and cultural value; the biodiversity of a country contributes to its national identity. Wilson (1988, 201) reinforces this statement by concluding that a species has commercial value if it can be sold and amenity value when the presence of it contributes to our joy of experience, for instance, sightseeing. This creates according to Wilson (ibid.): "huge market value as recreation."

> Finally, species have moral value. Here, we begin to encounter controversy. Some philosophers would say that species have moral value on their own. They are according to this view, valuable in themselves, and their value is not dependent on any uses to which we put them. (Regan, 1981; Taylor, 1986)

Randall (1986, 79-109) confirms this by explaining that: "Moral values that people attach to species are quite high. Responses to questionnaires have indicated that people place a surprisingly high value on just the knowledge that a thing exists independent of any use." To conclude Wilson states that:

> The value of biodiversity is the value of everything there is. It is the summed value of all the GNP's[13] of all countries from now until the end of the world. We know that, because our very lives and economies are dependent upon biodiversity. (Wilson, 1988, 205)

Biological diversity has several values for mankind. This can be broken down to: economic, cultural, amenity and moral value, but most importantly, the broad varieties of species that work together in the ecosystem, sustains and creates an environment that services mankind. Mankind depends on biodiversity.

### Homo sapiens

Roughly two million years ago till ten thousand the earth was inhabited with multiple species of man. (Harari, 2017, 16) The first humans inherited corporal features from their ancestors, which are suitable for gathering food, despite this they also became hunters. A good visual faculty and the necessity to distinguish individuals within a

[13] Global Natural Product

group made the identity of an individual important. The formal characteristics of the face were used to do so, while many social animals do this by smell. (Attenborough, 1979, 298) In addition to that man was able to create their own social identity by aesthetic expression. (Huston, 2015) Art was already in these early days of our existence a fundamental part of our life and distinguishes us from our living and extinct relatives. Six hundred thousand years ago it gradually got colder and sea-level lowered, because of this land bridges emerged, which led to the spread of the Homo erectus. Although we do see the purposeful genius loci[14] of people, for instance dark skin is less sensitive to excessive sunrays and large skin surface in comparison to body weight can quickly transfer heat to rapidly cool down. And in cooler less sunny climates we see white skin and low surface-to-weight ratio that retains heat. (ibid., 305) A creative mind and skill full hands allowed them to use stripped animal skins for keeping themselves warm. In my opinion the moment when man made it possible to go against the laws of nature, can be seen as the very first beginning of the 'culture of congestion'[15]. (Koolhaas, 1994) Fire, made it possible to cook their meat to be able to chew it with their small and round teeth, but because of this their teeth became even smaller after generations. (Attenborough, 1979, 300) Man was made to create things to help him survive, but on the other hand innovation stimulated evolution, known as the concept of evo-devo[16]. Thirty-five thousand years ago Homo sapiens was born; the wise man as anthropologists humbly called themselves.

> Homo sapiens had suddenly become the most numerous of all large animals. Ten thousand years ago, there were about ten million individuals in the world. They were ingenious, communicative and resourceful, but they seemed, as a species, to be subject to the same laws and restrictions which govern the numbers of other animals. Then, about four thousand years ago, their number began to increase rapidly. Two thousand years ago it had risen to three hundred million; and a thousand years ago, the species began to overrun the earth. (ibid., 293)

The cognitive revolution in the evolution of mankind was the moment where it separated itself from biology. This development made it possible to collectively create fiction. Myths give the unique possibility to work together with large groups in a flexible manner this made it possible to run over all other human species and animal species. (Harari, 2017, 34) There has been no physical development of brain or body, only technical development that influenced our behaviour. Man has several talents but

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[14] 'In classical Roman religion a genius loci was the protective spirit of a place.'

[15] Instead of imposing some type of hyper rationalist, efficient, Utopian ideology on Manhattan, Koolhaas suggest that signs are essentially not read within an Enlightenment sentiment anymore. It is about a flow of humanist desire. He sees the purism of early Modernism unsuccessful as well as nostalgic attempts at the plaza and triumphant monuments. Instead it is within the modern building we can reinvent and imagine city life. (https://touf2010.wordpress.com/2010/09/29/koolhaas-and-the-culture-of-congestion/)

[16] Evo-devo is an informal term to address; evolutionary developmental biology: the evolution of development is a field of biology that compares the developmental processes of different organisms to determine the ancestral relationship between them, and to discover how developmental processes evolved.

according to David Attenborough: “We are the only creatures to have painted representational pictures and it is this talent which led to developments which ultimately transformed the life of mankind.” (ibid, 302) An important development in the history of mankind is sharing and storing of knowledge, libraries started working as communal brains and DNA of our behaviour. In Uruk, Syria a small clay tablet covered with abstract diagrams was found, it is the origin of writing as we know it. The possibility to accumulate and transfer knowledge through time and space, gave the opportunity to simulate everything everywhere. (ibid., 307; 308) This led to deterritorialization[17], the radical enlightenment and eventually the culture of congestion. The things that are least important for our survival are the very things that make us human.

**Neolithic Revolution**

Homo sapiens spread themselves from East-Africa to the Middle-East and from there to Europe and Asia, and eventually to Australia and America. Roughly two and a half million years mankind fed them self’s by gathering plants and hunting wild animals. Due to their desire for an easier life man started domesticating plants and animals, which is defined in history as the Neolithic revolution[18]. Monocultural[19] agriculture resulted in worse nutrition patterns, because man was limited in the variety of domestication. Even though the human mammal is an omnivore and prospers well with great diversity of food. Civilization was able to produce more food; the cultivation of wheat guarantied more food per square meter. Human population exponentially grew because of it; therefore less food per person was left. The farm villages definitely had a few direct benefits; it was easier to protect themselves from dangerous animals and bad weather influences. But for the average human this was a negative development in the history of mankind. Farmers had to work hard in ways where the human body wasn’t designed for, hierarchical class systems in society spoiled the elite and less food was left for farmers. The agglomeration of man in villages created a fertile base for infection diseases and attractive stacks of food caused violence. The human desire for convenience brought huge changes with it and transformed the world forever. This was

[17] 'Deterritorialization is a concept created by Gilles Deleuze and Félix Guattari in Anti-Oedipus (1972), which, in accordance to Deleuze's desire and philosophy, quickly became used by others, for example in anthropology, and transformed in this reappropriation. It can be described as any process that decontextualizes a set of relations, weakening of ties between culture and place. This means the removal of cultural subjects and objects from a certain location in space and time.'

[18] The Neolithic Revolution was the first Agricultural Revolution where man made the transition from a lifestyle of hunting and gathering to one of agriculture and settlement. This period in human development started 10.200 BC and places itself within the New Stone Age.

[19] ‘Monoculture is the agricultural practice of producing or growing a single crop, plant, or livestock species, variety, or breed in a field or farming system at a time. Monoculture is widely used in both industrial farming and organic farming and has allowed increased efficiency in planting and harvest.’

the transition in the history of the earth where symbiosis between man and nature started deteriorating and mankind headed towards a new direction. There was no way back, satisfied need developed to necessity which created new obligations.

### Relinquished ecology

The scientific revolution depends on the amplified reciprocal dynamics of science, politics en economy. Economic reasons and political decisions nurtured the means to preform scientific research. Science gains new capacities, which are used to create new means; this revolves in a vicious circle. The scientific revolution was not a knowledge revolution, but one of Ignoramus[20]. Since modern science accepted its own ignorance it became more dynamic, flexible and curious. This resulted the last five-hundred years in phenomenal inventions. Not only did it change the destiny of mankind but also the destiny of all living beings on earth. One of the consequences was the industrial revolution, which started around 1760. The development provided a combination of an abundant amount of cheap energy and building materials, with an explosion of human productivity as consequence. Fridges, ships and airplanes created possibilities to store food and encouraged global transport. Plants and animals even got mechanized and treated like machines which lead to forgetting about the psychological needs of the animals. The industrial revolution freed humanity for their ecology and thereby also disconnected humans from nature. While the world got adjusted by humans, natural habitats got destroyed and species got extinct. Humanity is disturbing the ecosystem which cause of natural disasters like global warming, rising sea levels and amplified pollution. This could even endanger the existence of mankind by our own doing. While humanity detached themselves from the dangers of nature, society got determined by the prescriptions of modern industry and government. The industrial revolution made room for a lot of experiments in terms of social viability and adjusted daily life and human mentality. The rhythm of traditional agriculture – natural time cycles and grow cycles - got replaced by the industrial time schedule and the assembly line became a mould for human activities. Artificial light disconnected human circadian[21] rhythms

[20] Ignoramus is the Latin translation of 'we do not know'. This is the basic principle on which modern science is based. The acceptance of our own ignorance resulted in new questions and an arms race of answers.

[21] A circadian rhythm is any biological process that displays an endogenous, entrainable oscillation of about 24 hours. Although circadian rhythms are built-in and self-sustaining, they are adjusted entrained to the local environment by external cues, which include light, temperature and redox cycles. (Bass, Joseph 15 November 2012)

form diurnal[22] rhythms, which causes sleeping problems. Modernism segregated functions within our build environment which causes disconnection of feedback loops. Although there are some short term advantages, most of the development humankind are making is not contributing to better conditions for the quality human life.

The last five-hundred years humanity has made extraordinary growth. The population grew from five-hundred million in 1500 to 7 billion now. (68) The total value of goods and services grew from 250 billion dollar (69) to 60 trillion now. (70) And the consummation grew from thirteen trillion calories to 1500 trillion. (71) The population grew 14 times, the production 240 times and energy consumption 115 times. (Harari, 2017, 267) These numbers show that our need and greed generates squandering and more greed. In these centuries there were great revolutions, which caused the economy to exponentially grow and humanity to live in extreme wealth. Science and industry gave humans superficial powers and an endless energy supply. There has been a metamorphosis of the social order, politics, daily life and human psychology. But are we also happier?

### Digital revolution

After the agricultural and industrial revolution, the digital revolution has started and now mankind is in the age of information. At first the industrial revolution and technology made everything easier. Until digitalisation started taking over jobs, this result in a life with more time for leisure, but on the other hand a life with less satisfaction, which will be elaborated on in 'The mechanisms of behaviour'. Therefor humanity needs to transform the systems for life and start doing more interesting things. According to Robert Dijkgraaf (2017) Dutch professor and director at Princeton University; humanity faces the threshold of a new age – we have decoded the building blocks of mater; atoms, of life; DNA and of information; zero and one – with powerful computing tools mankind is able to start building with the elements of life. Elon Musk's future forecast emphasises this tendency and he poses an integration of biological intelligence and technology, for humans in order to stay ahead of robotic development. Professor Stephen Hawking has said that mankind has to be careful creating machines that have the ability to think, because it is a threat to our own existence. It is likely that deep thinking and learning through artificial intelligence will gradually take over, because it becomes smarter as humans. As British Cosmology Martin Rees mentions:

[22] Processes with 24-hour oscillations are more generally called diurnal rhythms; strictly speaking, they should not be called circadian rhythms unless their endogenous nature is confirmed. (Vitaterna, MS; Takahashi, JS; Turek, FW 2001)

“Billions of years of evolution resulted in humanity in the small amount of time man is ruling on earth something new got created by humans; technology, which will take over and these robots are going to travel and explorer the universe, humans are basically the transfer figure.” This puts a moral question to the table, how should mankind handle the developments among artificial intelligence and how we would like to see the future. Our ability to analyse and creativity causes new technologies to occur these are all part of the creation of nature. Will we head into the direction of transhumanism, posthumanism or will we create a next nature? Do we even have any influence on the direction of society? I will elaborate on this in the “Transformation of the Foundation”.

### Anthropocene

Currently humanity lives in the Holocene era. However, researchers including Eugene F. Stoermer are proposing the Anthropocene as the epoch where influences of man on land, using ecosystems and biodiversity became significantly undeniable and irreversible.

> For centuries scientists thought that the earth processes where so large and powerful that nothing we could do could change them, the human chronologies were insignificant compared with the force of geological processes and once they were, but no more. There are now so many of us, cutting down so many trees and burning so many billions of tons of fossil fuels that we have indeed become geological agents, we have changed the chemistry of our atmosphere causing sea levels to rise, ice to melt and climate to change there is no reason to think otherwise. (Malabou, 2015)

This metastatic[23] development of humankind, where a part of the biosphere is destroying the earth including itself, is seen as a geological force instead of a simple biological agent. According to Chakrabarty (2008): “We humans never experience ourselves as a species, we can only intellectually comprehend or infer the existence of the human species but never experience as such.” Daniel Smail (2012) thinks human actions are led by pshychotropy[24], neurotransmitters that are leading these automatic processes in our brains, therefore humankind should think that we are exposed to history rather than creating our own history. These observations show that humans as a geological force are non-conscious and do not have any voluntary intentions to destroy the earth. Due to the capitalistic craving to efficient prosperity, functions got separated in urban planning. One does not physically gets confronted with the consequences of their actions. Therefor feedback and resilience of the system gets endangered.

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[23] 'Metastasis, or metastatic disease, is the spread of a cancer or other disease from one organ or part to another not directly connected with it. Metastasis is a Greek word meaning "displacement", from μετά, meta, "next", and στάσις, stasis, "placement".'

[24] Psychotropy, - is led by desire and linked to the chemical changes we experience within our bodies that can alter perception, mood, and behaviour – 'comes in different forms, things we do that shape the moods of others, things we do to ourselves, things we ingest.' (Malabou, 2015)

## Epilogue

Since the genesis of life on earth it flourished into the great biological diversity. A variety of animals, vegetation and their geological context interact a dynamic complex which is called an ecosystem. They live in symbiosis and therefor mutually benefit each other, this creates a system that supports and increases life. Within the Anthropocene the dominant presence of humankind within the biosphere caused biodiversity to degrade. Due to habitat invasion and modification by humans more species are going instinct than ever before. While biological diversity has a lot of value for mankind. Economic, cultural, amenity and moral value, but most importantly, the broad varieties of species that work together in the ecosystem, sustains and creates an environment that services mankind. Humanity depends on biodiversity.

The human desire for convenience brought huge changes with it and transformed the world forever. This was the changeover in the history of the earth where symbiosis between man and nature started deteriorating and mankind headed towards a new direction. No way back now, luxury developed to necessity which created new obligations. The possibility to accumulate and transfer knowledge through time and space, gave the opportunity to simulate everything everywhere. This led to deterritorialization, the radical enlightenment and eventually the culture of congestion. This metastatic development of humankind, where a part of the biosphere is destroying its environment including itself, is seen as a geological force instead of a simple biological agent. Perturbations cause alterations within ecosystems, natural feedback mechanisms regulates a respond, thereby creating a self-sustaining resilient environment. Although the build environment is a simplified ecosystem, since it only is designed to serve man. Dissociating ourselves from nature, and thereby blocking natural feedback, makes man not conscious in their everyday lives of the abatement of the earth's versatility. This is disrupting natural feedback systems. Man is not taking the principals of an ecosystem into account, hence creates a non-resilient build environment. To sustainably develop mankind can learn from the evolution of life. Living organisms have created cycle based ingenious solutions in order to survive and develop within the changing biosphere. In this dynamic system patterns of flow and biochemical cycles are driven by external sources of energy which make finite chemical substances continuously cycle within the system. Humanity has decoded the building blocks of mater; atoms, of life; DNA and of information; zero and one – with powerful computing tools mankind is able to start building with the elements of life. Mankind has to be careful though because this development might overrun mankind.

# Mechanisms of Behaviour

*Cerebral chemical reactions and social philosophical conceptions.*

## Prologue

In the Anthropocene the dominant presence of mankind within the biosphere and its immense destructive impact on its surroundings became undeniable. The Homo sapiens, only inhabits the earth for two hundred and fifty thousand years. In comparison, to make it comprehensible, since the genesis of the earth one could say that if the whole history of the earth took one hour that humanity only lived for twenty seconds. In these twenty seconds humans caused more species to go instinct than ever before, exceeding that of the meteoric disaster that made the dinosaurs extinct. Mankind caused biodiversity to degrade, land to transform and air to pollute. Humans have changed the chemistry of the atmosphere causing climate to change. If we are not taking action soon we are going to cause our own extinction.

The problem is that we have known this for decades, for almost half a century and there seems to be consensus that we have to take action. In 2015 all the world leaders came together at the climate conference of the United Nations. They all came to an agreement to counteract climate change. The maximum increase of the average temperature on earth should be one and a half degree Celsius. A rise of two degrees will already have catastrophic consequences for life on earth. While according to Elon Musk it is not the question if the two degree border will be crossed but when. Despite the fact more people nowadays acknowledge that climate change represents a significant threat to human well-being, it hasn't translated into meaningful action yet. Psychologists emphasize that the best way to resolve any crisis and prevent it from happening again is to understand the minds of the people who caused it. To explore, clarify and find reason for this reiterating phenomenon I started to investigate the mechanism of behaviour and conceptions of humankind.

**The Brain**

The brain is our operating system and determines our actions. Could the underlying structure of the brain clarify human behaviour? Scientists do not know everything about it, but they do know a lot. Does the way in which information is processed within our brain – apart from our free will – influence our behaviour?

The brain is divided in several parts that work closely together in order to make humans function. The cerebrum, also known as the cerebral cortex, is the biggest part of our brain; it contains the nerve centre for thought, personality, the senses and voluntary movement. The folded surface provides space to myriad neurons through them communication occurs, which will be elaborated later on. The cerebral cortex is divided in two hemispheres; logic takes place the left part and creativity in the right part. These both have several sections; each accommodates a specific structure to accomplish different functions; the frontal, parietal, temporal and occipital lobes. In the frontal lobe consciousness and emotions emerge. In this part of the brain ideas are made and connections between them; this gives us the ability to solve problems. This section also makes us behave in socially acceptable ways, because it contains space that stores inappropriate actions. The motor cortex is also located here, which makes you able to consciously move your muscles. Next to it in the parietal lobe is the sensory cortex they communicate closely with the motor cortex; this part interprets information from the senses. The parietal lobe is also involved in our vision, movement and mathematical calculations. The occipital lobe detects and interprets visual information. Last but not least we find the temporal lobes in the cerebral cortex; which gives us the ability to hear, speak and remember.

Secondly we have the limbic systems; here we can find the olfactory bulbs, amygdala, thalamus and hippocampus. This collection plays an important role in the expression of survival instincts, drives and emotions. The cerebellum is the second largest part of your brain and is involved in coordinating your muscles to allow precise movement and control of balance and posture. The brain stem is attached to the cerebellum and connects the brain to the spinal cord; it is responsible for regulating many life support mechanisms; such as your heart rate, blood pressure, digestion and breathing. It also regulates when you sleep and wake. It is made up of three sections called: the midbrain, pons and medulla oblongata. Your midbrain serves as the nerve pathway from your brain stem to your cerebral hemispheres and contains auditory and visual reflex centres. Now we know which parts of the brain execute specific functions, but actions or

behaviour is always a combination of these skills so how does the brain connect particular functions and communicates between them?

### Neurological information processing

The brain is according to Hendriks build out of an interconnected network of neurons that process the information. (1997, 14) Neurons communicate with each other by generating electrical pulses. (Coolen, 2005, 3) To have a deeper understanding, we will have a look at the neurochemical details. A neuron has an output channel, the axon and an input channel, called dendrite. In between output and input are the synapses, which "represent both 'data' and 'program' of the network" (ibid., 3). Communication occurs inside the synapses with chemical substances, called neurotransmitters. (ibid., 9) Electric potentials are produced by the difference – between the inside and the outside of the cell membrane – in concentrations of several ions[25]. (ibid., 7-8) The nerve system conducts sensory information to the brain where the information is processed. Subsequently the information that determines our actions is sent through the nerve system to our muscles. (Hendriks, 1997, 30)

### Cognitive Biases

As Coolen (2005) confirms, different information can be processed at the same time while multiple actions can be done simultaneously.

> The neurons of each given brain region are organized and wired in a specific network, the structure of which can vary from very regular (especially in regions responsible for pre-processing of sensory data) to almost amorphous (especially in the 'higher' regions of the brain, where cognitive functions are preformed). (Coolen, 2005, 3)

To perceive man needs to actively interpret the observations made by the visual system, the cerebral capacity of this function is very limited to where attention is focussed on. (ibid., 94) Therefore perception includes automatic chemical processes besides, selective conscious processes. (ibid., 144) This is one of the reasons cognitive biases occur. Buster Benson (2016) elaborates on this phenomenon. According to him cognitive biases primarily exist to save energy. [26] This is very useful because we would not be able to cope with being aware of all the processes in the brain, but it also results in mental errors.

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[25] An ion is and atom or molecule with more or less electrons and thereby positive or negatively loaded.
[26] The brains of Homo Sapiens weigh two to three per cent of the total body weight, but they use twenty-five per cent of the energy in rest. In comparison: the brains of other man apes only use eight per cent of the energy when the body rests. (Harari, 2017, 17)

### Unconscious cognition

As mentioned in report number one; ‘The Earth’, humans are a non-conscious geological force. If so, perhaps humanity does not want to live their life like they live it today and should be able to change the way they live within the built environment. After all I think nobody wants to be the cause of its own extinction. Other researchers support this assumption.

> [...] a consensus is emerging among cognitive psychologists and others that most of human behaviour is not conscious. We like to think that all of human behaviour is consciousness, […], consciousness seems to occupy the totality of our mental life because consciousness is the narrating function, but underlying consciousness and all these other cognitive processes which are non-conscious and they occupy far more of our mental life then consciousness does. (Hayles, 2014, 17:51)

Humankind believes that they are in control of their own destiny, but according to Hayles, most of our decisions are made unconsciously. This means the solution is never to blame people for their actions, but rather, making them conscious. Humans have unconsciously influenced the geological processes of the earth, can you imagine, if we become conscious of that and really start doing something, what we are able to achieve as humanity. One of the problems is that in our hedonistic society humans got addicted to the delights and conveniences of non-sustainable nature.

### Psychotropy

Daniel Lord Smail (2012) professor of History at Harvard University disseminates that our behaviour is dictated by psychotropic mechanisms; everything that is able to change perception, emotion, mood or behaviour.

> Psychotropy, - is led by desire and linked to the chemical changes we experience within our bodies that can alter perception, mood, and behaviour – 'comes in different forms, things we do that shape the moods of others, things we do to ourselves, things we ingest.' (Malabou, 2015)

Simon Sinek (2013) emphasizes that and declares that several chemicals are released in the brain when man does particular things. In return it will give us a good feeling, therefor humans get addicted to it, which has lots of positive effects but also negative when obtained in the wrong way. According to him the four most important neurotransmitters that create happiness are: endorphins, dopamine, serotonin and oxytocin. Endorphins get produced to make physical pain bearable. Due to this system were able in the early days of humankind to chase animals for hours even when we were exhausted this chemical substance ensured that we were able to endure. This was a good system for survival. Endorphins are still released when man does its physical activity,

but modern society does not support this, lots of heavy activity is replaced by technology. Dopamine is released when man accomplishes something. Even if humans are about to accomplish something and we are able to see it, we get small shots of it, in order to tease and seduce us to achieve something. This is highly addictive and so in a way good to make us achieve our goals. Although man has to be careful with it because for instance drugs or even our smart phone also releases dopamine, without any constructive value for life and negative side effects, it is more likely to get depressed. Serotonin is the chemical of pride and status when for instance there is a ceremony to get your diploma, the bigger the effort the bigger the reward. We invite our friends and family people who supported us and they also get a bit of serotonin, this reinforces relationships.

> It functions to regulate appetite, sleep, memory and learning, temperature, mood, behaviour, muscle contraction, and function of the cardiovascular system and endocrine system. It is speculated to have a role in depression, as some depressed patients are seen to have lower concentrations of metabolites of serotonin in their cerebrospinal fluid and brain tissue.

In modern society man like to consume material goods in order to feel proud and show of our status, although this does not really work; due to the fact that nothing real has been acquired. Oxytocin is the chemical of love and trust, it inhibits addiction. This gets produced when we sacrifice something for someone else; the receiver gets a shot to and even witnessing also feels good. On the other hand there is cortisol; this is the most important stress chemical. Our hard rate goes up and we get paranoid and make us ready for battle and are really useful in order to protect ourselves. But also shuts of our immune and healing systems of the body. The stress levels of modern society can therefor directly affect your health.

These neurotransmitters have short-term or long-term effects, determined by their chemical substances. The amino acids are responsible for the short-term information transfer. Peptides[27] on the other hand get broken down very slowly hence have long-term effects. In time this causes more or less sensitivity of neurons for stimulants over time. (Hendriks, 1997, 48) Neurotransmitters are influential; delights can stimulate or even change the perception of the senses. (ibid., 49) Stimulants can change processes in the brain because humans can get addicted to them, this influences our behaviour. Luckily the brain is able to adapt the way it processes information.

[27] "Neuropeptides are small protein-like molecules (peptides) used by neurons to communicate with each other. They are neuronal signalling molecules that influence the activity of the brain in specific ways. Different neuropeptides are involved in a wide range of brain functions, including analgesia, reward, food intake, metabolism, reproduction, social behaviours, learning and memory."

### Connectome

A reformation in cognitive structures leads to a metastable system this operates the conception and the behaviour. Although the experience is that a continuous process leads to discontinuities. The idea that cognitive development is created by self-organisation is elaborated by the Swiss psychologist Jean Piaget. He applied the common biological adaptation principles to the human spirit.

> The key to the adaptive and self-programming properties of neural tissue and its ability to store information is that the strengths of the synapses and the levels of the firing thresholds are not fixed, but are being updated all at the same time. (Coolen, 2005, 10)

Sebastian Seung (2010) a professor of Computational Neuroscience in the Department of Brain and Cognitive Sciences at Princeton University emphasizes this. He calls the cognitive metastable system the connectome; electrical signals that travel a specific route through several neuron branches. These epigenetic[28] processes are to some extend programmed by your genes but for a larger part by influenced by the context.

> Neural activity is encoding our thoughts, feelings and perceptions our mental experiences and there is a lot of evidence that neural activity can cause your connections to change and if you put those two facts together it means that your experiences can change your connectome. (Seung, 2010)

Even though the development is a process of self-organisation, it does depend on information from the surrounding environment. (ibid., 260) According to Hendriks (1997, 240) Professor Language and Cognition of the University in Groningen: "Learning can be defined as the process of gathering knowledge from the environment, or out of experience, in such a way that the behaviour will be influenced sooner or later". The connectome is the cognitive structure through which the neural activity flows; over time it is possible to change your cognitive structure by causing different neural activity.

### Behaviour Transformation

Behaviour can also be conditioned according to two influential classical behaviour scientists; Pavlov[29] and Thorndike[30]. They experimented with animals but the

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[28] 'Epigenetics are stable heritable traits that cannot be explained by changes in DNA sequence. The Greek prefix epi- in epigenetics implies features that are in addition to the traditional genetic basis for inheritance. Such effects on cellular and physiological phenotypic traits may result from external or environmental factors, or be part of normal developmental program.' "https://en.wikipedia.org/wiki/Epigenetics"

[29] "Ivan Petrovich Pavlov born in 1849 and lived until 1936 was a Russian physiologist known primarily for his work in classical conditioning. Pavlov won the Nobel Prize for Physiology or Medicine in 1904, becoming the first Russian Nobel laureate. A Review of General Psychology survey, published in 2002, ranked Pavlov as the 24th most cited psychologist of the 20th century." https://en.wikipedia.org/wiki/Ivan_Pavlov

assumption is that it has the same effect on humans. The principle is that some stimulants cause certain responses. Pavlov's conclusion was that a biological functional stimulus could be taken over by a conditioned stimulus. Skinner[31] an influential psychologist was working on a general theory and claimed that; complicated behaviour patterns can be taught by reward. (Hendriks, 1997, 241) With this knowledge in mind we could say that; behaviour is influenced by the physical environment and possibly controllable, but in real life with many influential factors it is very hard to control.

Elisabeth Shove[32] a sociologist who does research in the relation between consumption, everyday practice and ordinary technology. In her research: How social science can help climate change policy, she draws some interesting conclusions on changing behaviour.

> "Social practices, like driving or cycling to work, taking a daily shower, cooking and eating dinner, they all involve the act of integration of elements, and elements include materials, objects, infrastructures, forms of competence and know how, images and meanings." (Shove, 2011)

Practices are made up of an integration of three elements; meanings, skills and materials. Social practices depend on complex networks of provision, production, consumption and supply; which give certain infrastructures, skills and shared ideas resulting in certain routines. Considering the concept of unconscious cognition this sounds logical and we can confirm that this is not just the consequence of individual choice. Transformations of behaviour therefor have to focus on the relation of location, knowledge and reason.

### Representation Space

The influence of our physical environment significantly determines how people live their daily lives, while we might not even want to. Humans trust conventions that they established themselves and therefor stick to daily routines. David Harvey an influential social theorist has the following comment on this notion:

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[30] "Edward Lee Thorndike (August 31, 1874 – August 9, 1949) was an American psychologist who spent nearly his entire career at Teachers College, Columbia University. A Review of General Psychology survey, published in 2002, ranked Thorndike as the ninth most cited psychologist of the 20th century.[3] Edward Thorndike had a powerful impact on reinforcement theory and behaviour analysis, providing the basic framework for empirical laws in behaviour psychology with his Law of Effect."

[31] "Burrhus Frederic Skinner (March 20, 1904 – August 18, 1990), commonly known as B. F. Skinner, was an American psychologist, behaviourist, author, inventor, and social philosopher. He was the Edgar Pierce Professor of Psychology at Harvard University from 1958 until his retirement in 1974. Skinner considered free will an illusion and human action dependent on consequences of previous actions. If the consequences are bad, there is a high chance the action will not be repeated; if the consequences are good, the actions that led to it being repeated become more probable. Skinner called this the principle of reinforcement."

[32] "Elizabeth Shove is a sociologist who has written about social practice theory, consumption, everyday life and energy demand. She is Director of the Centre on the Dynamics of Energy, Mobility and Demand (DEMAND) at Lancaster University. The DEMAND Centre is one of six End Use Energy Demand Centres."

> The spaces and times of representation that envelop and surround us as we go about our daily lives likewise affect both our direct experiences and the way we interpret and understand representations. [...] we adhere to unexamined routines. [...] and build up certain spaces of representation for ourselves. (Harvey, 2005, 102)

Humans trust conventions that they established themselves and therefore stick to daily routines. The wellbeing of nature and thereby humankind is constrained by the spaces that surround us, because it limits our thinking. The knowledge of nowadays regards sustainability points out that the build environment is designed with false motives and therefore not viable on earth. Transforming 'spaces of representation' (Harvey, 2005) could change the way humankind interprets its environment and there-by slowly changing their way of living.

### Imaginary Order

During the cognitive revolution Homo sapiens acquired the ability to create imaginary realities. Myths made it possible to work together in larger groups and aloud more complex social structures to occur. Fiction is seen as the reason why Homo sapiens started to overrun other species on earth and their population grew exponentially because of it. According to Clifford Geertz (1973, 193) an American anthropologist: “Culture consists of socially established structures of meaning.” This is physically expresses itself in: “fairy tales, dramas and movies, paintings, songs, etiquette, political propaganda, architecture, recipes and fashion”. (Harari, 2017, 125) Religions, democracy and capitalism are all imaginary orders and determine for a significant part our behaviour. From the moment a human gets born he or she starts ignorantly living in particular social construct. Without being conscious of it, man is surrounded by the physical gestures and constantly reminded about specific cultures and therefor assumes that this is how life is lived. It is difficult to broaden your perspective as a human due to our relatively short period of life on earth and the busyness and of everyday life. By the time one becomes adult and gets conscious of this macro view of life on earth man is already indoctrinated by the standards and values of society and the habits that come along. Although these social constructs are still imaginary orders which are made up by society, through complex historical sequences of events. These might not be valid according to recent insights on quality of life on earth. The hard part is that these imaginary orders are intersubjective. To change an imaginary belief you have to change the imagination of millions of people in order to create support for a new belief. (Harari, 2017, 127)

### Subject and object

French philosopher René Descartes stood at the base of the motives behind modern society, in 17e century rationalism. Descartes was the first one to disapprove the Aristotelian philosophy, the Cartesian Dualism separated values from quantities and therefor experience from geometry. The philosopher Immanuel Kant is seen as the first German idealist. During the Age of Enlightenment his ideas had lots of influence on the western philosophy. Since Immanuel Kant conceptualized his epistemology – regarding the distinction of the human as a research subject and on the other hand the reality as an object of research – this was and still is universally accepted. This is the basis of the capitalistic system and the consumption society in which we are all living. This shows a clear difference between the human world and the natural world. Timothy Morton (2007, 63) emphasizes that this is the fundamental reason why humans distinguish themselves from nature and sees this as the fundamental philosophical reason that humanity destroys the environment. Morton thinks that because of this conception we are exploiting nature and disrupting natural processes that create the conditions that are needed for human life on earth. After all we are part of nature. Humans are an integrated factor of the natural and that the solution is to experience ourselves as nature and thus not destroy it. (Morton, 2007, 63) It is very hard to erase or deconstruct theories and philosophical conceptions from the way people think. We can only humbly construct a new theory by invalidating the old theory.

> The reality of human induced climate change challenges the relationship between man and nature conceived as the relationship between man and its environment. In fact also the notion of environment is dismissed and this even if we define man as a biological agent that share essential characteristics with its environment itself. No, what we have to take in account is the newly acquired geological agency of humans. (Chakrabarty, 2008; Malabou, 2015)

Chakrabarty emphasizes that man and its environment cannot be seen separately, because the subject has influence on the object, mentioning there has and always has been an intertwining of the cultural and the genetic. (Chakrabarty, 2008; Malabou, 2015) These observations seem logical because when we feel part of nature our species would never try to destroy it. The main question here would be how could we experience ourselves as such within the current society? I will elaborate on this question in: ‘Ethical Aesthetics’.

### Capitalism

Through centuries of imperialism, capitalism became the global mechanism of behaviour nowadays. This ideology defines how man behaves, what children get

thought and how they should think. Justice, freedom and happiness are all depending on economic growth and this is therefore the greatest good. (Harari, 2017, 339) To depict the origin and run-up to this world leading order, at first the existence of money has to be exemplified. Hunters and collectors in the early days operated an economy of service and commitment. Exchange commerce could never work for a complex economy where multiple strangers work together. Money had a couple of advantages it was able to easily convert, store and transport wealth in a cheap manner. Money is the most tolerant thing in our society, which does not discriminate on terms of religion, gender, race, age or sexual preference. This psychological construct is only able to exist if man trusts the collective imagination. Trust is originated by a complex and slow build up network of political, social and economic intercourse. Because of money people that barely know each other are able to effectively work together. Thereby it had the ability to create complex business networks and dynamic markets.

The negative side of money is that the abstraction of value to a mere number and unconditional trust in it makes it possible for horrible things to occur with it. Scientific research was only able to flourish through capitalism, because it generates surplus of money. Capitalism influences the scientific agenda, because research gets funded by the system it should of course contribute to the system. In the early modern time Europe was the first that was able to develop science and capitalism, because of their ambition to explorer and conquer. Whit this development they were able to gain significant technological advances, which encouraged colonialism and therefor had lots of influence on the becoming of the world. Europeans made the first world imperia and instigated global trade. This transformed the world from isolated tribes to an integrated human society. Brutal imperialism brought death, suppression and iniquity but the European imperia also caused the spread of scientific knowledge and therefor improved the conditions for the servants.

The basic principle of capitalism is the vicious circle that confidence generates credit, which creates economic growth, which generates more confidence and this generates more credit. The more profit one makes, the more investments are able to be done, which generates more profit; this is the endless principle of collective wealth and prosperity. But where is it going? The downside of it is that without well considered ethics, economic growth is the greatest good. Profit can be made and distributed in unfair manners; capitalism took many lives through bleak calculation and greed. Just like the agricultural revolution the modern economy might be not so valuable after all and it is hard to transform, because a capitalistic world can only be managed by capitalists. But what kind of system should we use then? Communism is a system where

the idea was that everybody would work according to its capabilities and would receive according to its needs. But in practice it became a system where everybody would work the least and take as much as possible. Perhaps this system only works within small communities as for instance the Inca's executed a more successful version. However the capitalistic and consuming approach to life is the most successful ideology in the history of mankind. This religion is the first from where the disciples do exactly what is desired from them.

### Desire

Human intrinsic drives and instincts, where do they come from? What is the force which makes life and evolution go on? Dieter Duhm has an interesting view on this topic:

> "The inner impetus of the evolution of life, going from one form of life to the next, producing the whole spectrum of animalistic instincts and drives, reveals itself in the as yet most developed form, in humans – as desire, longing, will, emotion, and 'soul'. This constitutes the inner continuity in the evolution of the living world." (Duhm, 1993, 46)

The formulation of a theory started with the great Greek philosopher Plato. His notion was that next to our static tangible world around us, there is a dynamic component. Plato describes in his written dialogs the Symposium[33] and in the Phaedrus[34]; a dualistic energy, called 'Eros' which drives us in the direction of ideas. On the other hand this desire can also be negative. After that Aristotelian dynamics were brought into the discourse; the impetus-theory; tried to clarify the movement of object against gravity. Much later Sigmund Freud[35] added himself to the theoretical field and depicted the mind and body as a whole of energy streams, which he called 'driften'. His theory about the division of the human mind is comparable with that from Plato. Instincts are primary and work unconsciously. 'Eros' is the primary drive to self-preservation; continuation of the species, love for yourself and empathy for others. Next to that there is the drive to die, the aspiration for pleasure and libido; sexual drives. He calls these drives 'es' and these are in principal aimless and unrestrained. It is the ego 'ich', the conscious part of

[33] The Symposium is a dialog written by the Greek philosopher Plato in 395 B.C. Plato constructed this dialog as a framed story, a story within a story, this provides him with the possibility describe his philosophical conceptions about knowledge. The text depicts on the one hand the origin, the nature and purpose of love, and on the other hand as most important theme human consciousness.

[34] "The Phaedrus, written by Plato, is a dialogue between Plato's protagonist, Socrates, and Phaedrus, an interlocutor in several dialogues. The Phaedrus was presumably composed around 370 BC, about the same time as Plato's Republic and Symposium. Although ostensibly about the topic of love, the discussion in the dialogue revolves around the art of rhetoric and how it should be practiced, and dwells on subjects as diverse as metempsychosis and erotic love."

[35] Sigmund Schlomo Freud (1856 – 1939) was a Jewish neurologist from Austrian-Hungary and was the founder of psychoanalysis. Freud's is seen as the most influential psychologist and philosopher of the 20th century, his theories and methods are still used.

our psychological machine that learns to control these instincts. Education and culture determine the transformation of these thrives. Conscience; the 'über-ich' is the part of our psychological machine internalizes these conceptions. For the Swiss psychologist Carl Gustav Jung, Libido was the term which addresses psychological energy or energy of life. This forms the personality to strive, desire and wanting. Where Freud limits libido to sexual energy, according to Jung it can also be the lust to food, beverage and emotions. Experience is converted to psychological energy, reciprocal this generates physical energy. Grossberg and Levine constructed in 1987 a theory of drives and emotions:

> "Instinctual drives can be modelled as internal sensors that measure vital bodily parameters and indicate their safe ranges. If a parameter is outside its safe range, this information is transmitted by neural signals to decision-making parts of the brain-mind initiating appropriate decisions and behaviour. These neural signals are perceived internally as emotions motivating behaviour." (Perlovsky, 2014)

Additionally Wellman and Woolley (1989, 246) describe the overall system for human behaviour. Humans perceive their environment with their senses and therefrom construct what they belief in. Basic emotions create a desire, which intersect with one's beliefs, this creates certain behaviour. Our belief in the imaginary order determines our desire. (Harari, 2017, 127) The romantic consumerism nowadays is teaching us to experience as much as possible to be a fully developed human. The consumerism tells us that we become happy when we consume as much products and services as possible. The romanticism which stimulates diversity goes along well with consumerism. Gilles Deleuze and Félix Guattari emphasize this:

> A sequence of desire is extended by social series, or a social machine contains desiring-machine parts within its workings. The desiring micro-multiplicities are no less collective than the large social aggregates; they are strictly inseparable and constitute one and the same process of production. (Deleuze & Guattari, 340)

The goal oriented approach to life of humanity without functioning as a means to an end is in the evolution of life a relatively recent development. (Duhm, 1993, 48) For the hedonist, happiness is the greatest good. Obsessive search for delight through stimulation of the senses is the only source of self-development. So far this approach had overall an enormous negative impact on the earth and the life that it contains. (Leibovici, 2000) According to Dieter Duhm: "The goals we set will only be meaningful in terms of a life-oriented culture if we see and understand a way of existing without intent and effort as a universal principle of the living world." Perhaps Buddhism is a religion which suits and enhances these kinds' conceptions. Buddha summarized his dogma in a single law: "We suffer because we desire; the only way to

have total freedom is to be freed from all desires and the only way to be freed from your desires is to train the mind to experience reality as it is".

**Grasp**

Longing is a feeling we all have. It is very personal and context related. The desire to solidarity and love is perhaps the most common since we, humans, are highly social animals. When the first humans started to populate the earth their desire for their primary needs - like food, water, sex, sleep, safety and security - was the strongest in order to survive. Their instinct told them to satisfy their needs due to their desire to live. With a creative mind and skilful autonomy we were able to ingeniously create circumstances to avoid the laws of nature.

For thousands of years human civilization thought they were building up a society which was able to guaranty the safety of the primary needs of humankind. Our physiological needs like breathing, food and water. And the need of safety: security of body, of employment, of resources, of morality, of the family, of health and of property. Once these needs where only desires for people that were not fortunate and got borne in regions or in certain social constructs that were not able to guaranty the primary needs for humankind. But no more, due to air pollution in the big cities, the modern living environment, even breathing fresh air becomes a desire. Due to stubborn conservative political leaders investing in -the capitalistic system to create growth- in sectors of industry which are at the end of their lifetime, this is starting to create unemployment, insecurity of property resources and health. And thereby at the same time a desire for these needs. Due to climate change and population growth the desire for food and water in less fortunate regions is getting bigger and bigger. We need to solve those issues with a different approach then we already used for thousands of years, because these are the ones that caused the problems.

If we solve these problems we are able again to achieve things we did not do yet because we as humans have a desire to the unknown. As soon as life starts to become normal, we want something that appeals to us, something new, something exciting, something which astonishes us. As we did in the early days of our existence we did discovery expeditions, like Columbus, around the world to find new places to live, new goods to eat, because we had the desire to something we didn’t know yet and we had the idea that it was better then what we had. Or the desire of knowledge the aim of science to be able to know everything about the universe into macro and micro level, but as with all things we desire we are never able to know everything to comprehend the vast amount of information we made up through science mainly due to the way our brain is wired. Maybe we should be happy that we will never know everything because the satisfaction of every desire is maybe just the desire itself.

# Transformation of the Foundation

*Influence-ability exploration of the mysterious paradoxical self-regulating system.*

## Intro

The Big Bang created the universe into an ever expanding and in energy increasing complex system of galaxies. At least if we believe this mysterious non calculable theory by scientists about the cosmological origin. It is here that the spread of all elementary molecules started and the mixing of them until there was life. Billions of years of evolution let to our species the Homo sapiens; time will tell if this is the end of biological evolution.

In the history of mankind the scientific revolution was the most influential because it not only changed the lives of humanity but for all living beings on earth. Humanity developed through the intertwining of natural occurrence and cultural events. Through the cognitive evolution humans started to work together in larger group. The last five-hundred years mankind enormously increased the population because of human influence. From five-hundred million to seven billion people nowadays. The last three millennia money, imperia and religions caused globalisation and this is the basis of the fundaments of the united world of today. Civilization automated the capitalistic system which is increasing in speed in an exponential manner. The foundation of modern society is the cumulating effect of cognitive evolution and technological development that has been solidified in the physical world and intersubjective reality.

As a species we will still distinguish groups, no social animal makes decisions based on the benefits of the total species. Every culture has its own conceptions, standards and values. Everything is interconnected through self-organisation, chaotic dynamic structures independently created a metastable system. Humans have a never ending desire to clarify the world through knowledge and thereby be able to understand and control nature. Although humanity likes to think they do.

The build environment and the systems which are supposed to support life were designed in a time when man didn't know yet that it would be able to alter the conditions enhancing life.

> We have to remember that many other humans existed on earth and they are not here anymore. And so that should give us a certain level of modesty or warning. We have to be careful species are mortal and evolution is mostly about extinction. (Jean-Jacques Hublin; Dijkgraaf, 2017, 2)

More than 99,9% of all species that ever lived do not exist anymore. Often is said that the idea of survival of the fittest is immoral. It is not the conceptions about it which

does not know a moral. It is nature itself which is amoral, survival is rough. Nature doesn't know any ethics. With today's knowledge we are able to say that the foundation of society it is based on out-dated motives. It is this environment which hosts unsustainable systems and processes this requires us to rethink the design and the transformation of the foundation of our society.

Architects and urban planners contemplate about how the build environment is given shape on the highest level. It is our social responsibility to seriously consider the consequences, the impact on earth and thereby on humanity. Since the occupation of land by mankind, the basic climatological factors that sustain and enhance life are decreasing. Richard Ingersoll (2012, 574) mentions a deeply rooted paradox within the ecological approach to the art of building: "every act of building betrays the environment, as it requires the displacement of natural relationships." Is there a possibility to make a difference within this self-organising system, or is the system only transformable by geological events, does mankind has the capacity to change their habits or is the parasitic act of humanity inherent to us?

### The Foundation

Humanity resides in the most censorious period in history. From an excessive phase to times of modification; social, economic and ecological structures are transforming vigorously. Poverty, social fracturing, pollution, climate change, food access and decreasing educational quality are influencing humanity and it is in the urban areas that this transformation is most perceptible. The foundation of modern society is the cumulating effect of cognitive evolution and technological development that has been solidified in the physical world and intersubjective reality. Civilization automated the capitalistic system which is increasing in speed in an exponential manner. The question here is only; where are we heading as humanity? According to Mumford (1970, 180) humans have lost the power to slow down or change the pace of this development. Perhaps mankind did not even ever have any intentional influence? Deleuze and Guattari describe this process as following:

> A sequence of desire is extended by social series, or a social machine contains desiring-machine parts within its workings. The desiring micro multiplicities are no less collective than the large social aggregates; they are strictly inseparable and constitute one and the same process of production. (Deleuze & Guattari, 1972, 340)

Desire is according to Deleuze & Guattari (1972, 347) like agape. Unintentional craves to something which is needed to be to done and the individual needs are parallel to the whole; seen as humanity. Is the evolution of life really just an on-going desire, an inner impetus[36], which evolves outside of our control?

### Transformation

The problems we are facing require humans to transform the foundation of our society. Being natives to the way we live makes it more difficult to change. Richard Sennet wrote a book in accordance to 'the foreigner'. The stranger in a new environment can hold up a mirror to society and is an interesting metaphor for the transformation to a new sustainable life. According to Dr. Paul Raskin (2014) – Co-Founder of 'the great transition initiative' – there are a couple scenarios for the future. The first one is 'conventional worlds'; an evolutionary sequence of events, basic paradigm and values persist into future. The second is 'barbarisation'; markets and policies are unable to cope with the crisis, social disruption, environmental deterioration. And last is 'the great transition'; people rise to the possibility to the promise of this planetary phase with new

[36] The *impetus* theory was an assisting or secondary theory from Aristotelian dynamics, which at first came into existence to elucidate the movement of projectiles against gravity.

values and new institutions and steer towards a more fortunate for of civilization. This will take a communal up rise, because an individual will not have enough impact.

> Wind, wind, wind, the small amount of wind produced by somebody's mouth picks up by degrees to become a breeze and in some cases a full fletched storm. An atmosphere filled with hundreds of words cannot avoid the meaning of those words. You should try is some time it starts blowing sooner or later. (Jansen, 2017)

When we want the have a bigger impact on the transformation of society it is case to spread the word and create a movement. Psychoanalysts, educators, artist, architects, urban, planners, fashion designers, musicians and journalist should all try to intervene on people's minds to positively influence change. Deleuze and Guattari (1972, 344) reminds us that revolution occurs through desire. Does the flow of development take the path of the least resistance or is it possible to seduce and thereby steer the direction in which humanity is heading? Or do we not even have to steer because the consequences become so visible that change in inevitable?

The necessary agent in this last scenario is the global citizen movement that is able to see an intermural blue planet. Globalism, with a sense for sustainable evolution of life on earth is what's needed. This should function as a natural unit for human organization, identity and life in general. A new Copernican revolution[37] advocates that humanity is not at the centre of earth but that mankind is part of the web of life of this vast ecology. If man does not take care to see our place within it then we might become the cause of our own extinct. Although current conceptions are difficult to erase out of the minds of people or deconstruct. Successfully initiating and accelerating transitions requires researchers with the right technologies, entrepreneurs with the right business models, supporting government in legislation and regulation, and the general public which embraces the transition in order to support these developments.

> The blockchain technology as a foundation for distributed ledgers offers an innovative platform for a new decentralized and transparent transaction mechanism in industries and businesses. The inherited characteristics of this technology enhance trust through transparency and traceability within any transaction of data, goods, and financial resources.

In order for these developments to take place mankind also needs to change the system. The total capacity of the earth is being overshoot which results in: climate change, ocean acidification, chemical pollution, nitrogen & phosphorus loading, freshwater withdrawals, land conversion, biodiversity loss, air pollution and ozone layer depletion.

[37] Nicolaas Copernicus was a mathematician and an astronomer who around the 1500 proposed a new paradigm for the universe; the heliocentric model where instead of the earth the sun was the centre of our solar system.

The ecological ceiling of the earth has been reached. Kate Raworth[38] (2017) comes up with a new economic model for life; the doughnut model where a stable regenerative and distributive economy is created. Within this model the social foundation is tried to be secured for every human; water, food, health, education, income & work, peace & justice, political voice, social equity, gender equality, housing, networks and energy. While on the other hand the ecological ceiling is not being overshoot. With this model innovations will have better opportunities to succeed because economic growth is not the only measurement.

### The limits of Science

Since the age of Enlightenment measurements are getting more important. Nowadays we almost cannot do without them, but are these numbers not controlling us to much? Humans have a never ending desire to clarify the world through knowledge and try to comprehend and control nature. To a certain extent humanity is also able to do this. Math is the abstract language we made through observation, for example we count to ten because we have ten fingers. According to Erik ver Linden it is therefore logical that nature shows coherence to math. Science dissects reality into elementary building blocks; hence scientist can create new combinations perhaps even new forms of life. (Dijkgraaf, 2017, 1**)** Hereby one sees that mankind tries to intervene in biological evolution by the ability to create new life forms and make existing ones more perfect. Nature has never been perfect. Perhaps humanity is even destroying its own future hereby, through the rise of new more powerful species. Dieter Duhm[39] advocates - in line with the theory of Deleuze & Guattari-, that humanity has panoramically[40] disconnected themselves from the holistic[41] system which is controlling the development of natural evolution.

> The human has disconnected himself, through false programming, from elementary life energies and life processes and has ideologically supported this separation from its own source by creating the concept of "objective science". (Duhm, 1993, 47)

[38] Kate Raworth is an English economist from the University of Oxford. She is well known for the 'doughnut economy, an economic model which balances between human rights and limits of the earth.
[39] *Dieter Duhm* was a psychoanalyst, sociologist, author and art historian is one of the founders of Tamera, a research center for peace in south-western Portugal.
[40] Pandora is in Greek methodology the first women with all the skills, because the gods did not think it was fair they offered her a box with all what was evil in it, because of her curiosity she couldn't resist to open and released a disaster. (Gill, 2017)
[41] *Holism*. According to the American philosopher, Ken Wilber (1992, 308); "a conception which assumes that life phenomena are determined by the totality of the living organism". It is the idea that every part functions as an elementary component of the total structure. (Wilber, 1995)

Science and research produces knowledge, which is most of the time disposed from qualitative values. This happens because these values are hard to measure and to be expressed in numbers. These are human values that are important for the quality of our lives and that of the planet. Abstraction is a form of forgetting certain information and it is in many cases this information that is necessary to really understand. Carlo Rovelli compares it to the production of a work of art. The colours and brushes are the tools and would compare with our abstract image of reality. Although the real value of the painting is the ability to evoke emotion and this is what the painting is really about. It is not about the strokes of paint but about the constellation and total configuration of the whole which evoke a certain kind of effect and had nothing to do with the measurable. Even Copernicus and Einstein used creativity to design mathematical structures that work surprisingly well to describe the world. Scientist Erik ver Linden states: "Beauty is much more often truth, because we are more likely to accept". Through the modernisation of human society man has been dissecting into different specialisms while the power is actually in an integral perspective on reality, therefor man needs to work in interdisciplinary manner. And even the uninitiated one is able to apply coincidence the expert cannot, because he learned how to do it. The clumsy, capricious, intuitive and the emotional values are the expertise of the inexpert. Humanity should be aware that the objective abstracted image of reality cannot be used as a format for society's production processes, if mankind wants to improve the quality of life. These objective images of reality are mostly based on expansion and profit without thinking about the consequences and the losses. If this determines the operation of society it is inevitable that the quality of life will be degraded. The human desire to define reality through objectivity has failed.

At the same time humanity has been trying to dissect life on the smallest micro and the largest macro level. The more knowledge man obtains the more we think we know, but it could always be different. Theories could have been constructed in a false manner; it is hubris[42] to think we know everything. Mankind needs to think in the same way as Cusanus[43] who practised 'De Docta Ignorantia[44]'; the acceptance of our lack of knowledge stimulates us to think further. Because the moment one defines a theory as meaningful, it loses its meaning. The search for meaning is a creation that produces new concepts and knowledge as a stepping-stone for further searching. According to

[42] Hubris: Ancient Greek for someone who has foolish pride.
[43] Nicolaus Cusanus (1401-1464): Mathematician, scholar, experimental scientist, and influential philosopher who used the incomplete nature of man's knowledge of the universe.
[44] De Docta Ignorantia is a book on philosophy and theology by Nicolaus Cusanus were he advocates that since mankind is not able to clarify the infinity of the universe through rational knowledge, the limits of science need to be exceeded by means of speculation.

Kaulingfreks (2016, 2) even the obscure is part of our empirical reality, because as explained in "Mechanism of Behaviour" our brain is not totally in control of everything. Dieter Duhm (1993, 50) claims that: "The deeper we delve into the living world the more we discover the intimate belonging of every truth to a counter truth, every principle to a counter-principle, every thesis to an antithesis."

> Growth is flow and form. Creation is freedom and necessity. Freedom is spontaneity and regularity. Development is motion and stillness. Evolution is determination and (growing) freedom from determination. To every cardinal thesis there is a cardinal antithesis. (Duhm, 1993, 51)

The phenomenon of paradox emphasizes the overall ambiguity of the universe. Life appears to be functioning in principle contradictory. A two sided way, only together opposed to each other life functions as it does. To be able to understand the universe humans are forced to objectify it. On the other hand it works too paradoxical, profound and holistic to be clarified with the traditional model. To be able to comprehend the metaphysical processes that control or steer life a more soft, open and flowing paradigm must be utilized. (Duhm, 1993, 54) According to Flotz (2004, 165): "Perhaps our knowledge will always stay incomplete and is the question how to act in ignorance paramount". The search for knowledge will be easier, new methods will be used, other question will be raised and new answers could be found. With this idea of science it can be used to asked new question and solve them in a more holistic manner. To transform society new research centres have to be developed for an emerging culture. Serendipity has place and time to occur in the wonderful mostly ungraspable adventure, called life. New connections can be made in the impressive web of occasions. Sometimes incidentally one bounces on something which one needed, is it coincidence or is it the deeper connected mind of the universe?

### Quantum entanglement

Quantum physics and general relativity are the two great revolutions in science of the 21st century. Quantum theory describes the behaviour of elementary particles within the nuclei. This behaviour is very different from the theory constructed in Newtonian physics. Everything is granular, probability does not exists and everything interdependent.[45] Einstein believed in technical determination and if it could not be measured it did not exists. Although according to this new insights nothing is determined and time is able to create. This idea about reality is more in line with French

[45] The French artist Georges Seurat paints with the dot method, in between the dots is nothing but together they create an image.

philosopher Bergson who stated that; evolution is not recycling existing parts but emphasized that heterogeneity came into the world. Scientists are still not able to connect micro and macro theories, because of these conflicting principals.

The current view on the genesis of the universe is that a singularity[46] exploded into an ever expanding complex system of galaxies, known as the Big Bang. Everything is made out of star dust. Within this system the second law of thermo dynamics states that entropy[47] is only able to increase. Researchers from France and Canada (Macdonald, 2016) came up with a new hypothesis that the natural evolution which constituted the human brain reached a certain state of consciousness[48] they advocate that this is a side effect of ever increasing entropy. Other research (Guevara Erra, 2017) which analyses neurophysiological activity during unconscious and conscious sates is supporting this. The simple fact that when humans are awake, great numbers of interactions are found within the brains networks this resembles higher entropies. Guevara Erra (2017) deliberately speculates that: "Therefore, the information content is larger in the network associated to conscious states, suggesting that consciousness could be the result of an optimization of information processing." The complexity of man's cerebral functions suggests that the way in which matter is organised determines the level of consciousness.

The next step in this development is according to me quantum mechanics. Carl Gustav Jung[49] developed a theory in 1930 on synchronicity. Multiple similar occurring's which simultaneously happen without causality. In quantum physics researchers assumed for a long time that the same principle occurred within molecules. The Technical University of Delft proved that quantum entanglement is real. Particles are able to synchronically act the same on distance without being physically connected. With this knowledge humans could be able to design computers which are millions times faster than the current ones. (Dijkgraaf, 2017, 2) Would this new development be able to compute a higher level of consciousness which is able to unravel the mysteries of the unprecedented forces within the universe? Or is it about the eye of the observer which influences how we experience our empirical reality? On a more abstract metaphysical level this knowledge could clarify certain developments within society. If this principle functions on a micro level would this also be the case on macro scale. For example

[46] A singularity is in the cosmology a point with an infinite small volume and an infinite large density. Space-time has been curved so strong that space and time actually stop existing.
[47] Entropy is basically the term used to describe the progression of a system from order to disorder. Picture an egg: when it's all perfectly separated into yolk and white, it has low entropy, but when you scramble it, it has high entropy - it's the most disordered it can be.
[48] Human consciousness: the ability to be aware of ourselves and our surroundings.
[49] Carl Gustav Jung (1875 – 1961) was a Swiss psychiatrist and psychologist; he founded the basis of analytical psychology.

would the green movement be a happening which occurs without any connection from the start or is everything connected through the web of life?

### Interaction

According to Catherine Malabou, as explained in “The Earth”, history is the intertwining of natural occurrence and cultural events. It can never be seen separately, because you cannot tell which one influenced the other, known as the concept of evo-devo. Christof Alexander legitimately states that everything is interconnected; the object has influence on his context and obviously on what happens within it, so the larger whole becomes more coherent. In a lecture on 'architectural patterns' he explains how the liveliness of a centre is determined.

> Everything is made out of centres, […], the question of whether a centre is more living or less living depend recursively on the amount of livingness in the other centres that it is made of, because each centre is actually a structure of other centres. (Alexander, 1996)

Self-organisation is an important part of interaction, chaotic dynamic structures independently creating metastability.[50] When we want to change the way we live, it is important to have a deeper understanding of how humankind works as a system. Keith Ansell-Pearson tells us to change the way we observe our behaviour: “Behaviour can no longer be localised in individuals conceived as preformed homunculi[51], but has to be treated epigenetically as a function of complex network systems which cut across individuals and which traverse phyletic[52] lineages and organismic boundaries.” (Ansell-Pearson, 1999, 171) This shows that relation is more important than the individual.

### Making kin

In the Anthropocene man destroyed refugia and has thereby created irreversible extinction. (Harraway, 2015, 160) According to Harraway: “With intense commitment and collaborative work and play with other terrains, flourishing for rich multispecies assemblages that include people will be possible. I am calling this the Chthulucene[53]”. (ibid.) Only if we make kin with other organisms, as if we were family, will we benefit

[50] 'Metastability denotes the phenomenon when a system spends an extended time in a configuration other than the system's state of least energy. During a metastable state of finite lifetime all state-describing parameters reach and hold stationary values.'
[51] 'Homunculi, a fully formed, miniature human body believed, according to some medical theories of the 16th and 17th centuries, to be contained in the spermatozoon.'
[52] 'Phyletic of or relating to the evolutionary descent and development of a species or other taxonomic group of organisms, especially to gradual change rather than to the branching of taxa.'
[53] Chthulucene: 'the not yet finished, on-going, ones that are generative and destructive', it argues with the antropocene and functions as an proposal for an new epoch, which creates better conditions for life on earth. (Haraway, 2014)

from the environment that we live in. (Harraway, 2015, 161) Making kin goes hand in hand with a spiritual intrinsic bound we need to have.

> To understand fully the intricacies of ecological interconnections is to treat ecological habitats reverentially. […] Reverence therefore emerges as a deeper understanding of ecology is not only through campaigns to save this of that threatened habitat but also in creating an attitude of mind within which the ecological and the spiritual are one. (Skolimowski, 1993, 6-7)

Actually there is a deeply rooted psychological and biological bond among living beings and their environment which influences health, prosperity and happiness. The Biophilia[54] studies further identify this bond through the inherent interaction between the elements that create flourishing built environments. (Keller, Heerwagen, and Mador 2008) Therefore as Barthlott (1998, 137) points out, we need a 'holistic approach' to benefit from our communal environment. In fact all organisms on earth are connected through their environment and it would be better to see everything as an ´assemblage´ rather than treating individual species as separate entities.

### Cultural Unity

Every culture has its own conceptions, standards and values. This is able to change because of contextual factors or by interaction with neighbour cultures. But cultures also transform through internal dynamics, even an isolated culture in an ecological stable location. There is a discrepancy between the consistency of the laws of nature and the contradiction of human conceptions. The process which leads to change is that cultures are constantly trying to created consensus between the inconsistencies. (Harari, 2017, 178) There is a tendency that human civilization has an increasing uniformity among global society. (Harari, 2017, 181) Small simple cultivations fuse bit by bit through millenniums to bigger and more complex civilizations. Obviously this generalisation only works on a macro perspective. On a micro-level these mega-civilizations disintegrate into smaller pieces. (Harari, 2017, 180)

Because of the cognitive revolution humans started to work together with total strangers. The last three millennia money, imperia and religions spread globally. This is the basis of the fundaments of the united world of today. Money was one of the most powerful factors in the globalisation process, because it transcendent any religion or imperia. (Harari, 2017, 186) The last centuries - when the world empires grew and the world-wide business expanded – was the most important for the process of an increasing global unity. Although the mental capacity of mankind has developed in such

[54] Biophilia means literally 'love of life or living systems' Edward O. Wilson like to define it 'as the urge to affiliate with other forms of life' (Wilson, 1984, 416)

a way that it distinguishes groups in ‘we’ and ‘them’. (Harari, 2017, 185) Actually no social animal makes decisions based on the benefits of the total species.

### Premeditated healing

Is there a possibility to make a difference within this self-organising system, or is the system only transformable by geological events, do we have the capacity to change? According to Bergson: “In order that our consciousness shall coincide with something of its principle, it must detach itself from the already-made and attach itself to the being-made.” (Bergson, 1998, 259) In other words if we want to make a change and innovate, you have to detach yourself form the existing. This is the reason why it is so difficult, because we are embedded in it.

When you build a thing you cannot merely build that thing in isolation, but must also repair the world around it, and within it, so that the larger world at that one place becomes more coherent, and more whole. (Alexander, 1996) Architects do nothing other than creating new relations within the metastable system. Thereby they have influence on behaviour if they make people feel differently, they are going to think differently. (Radman, 2015) But how can we feel differently? Smail describes physical and environmental psychotropic mechanisms that have neurochemical effects, to change the way we feel. (Smail, 2008, 161) In the last chapter ‘Ethical Aesthetics’ will go deeper into the following question: How can architects evoke neurochemical effects in order to create new experience routines?

### The role of the Architect

Are Architects able to use stigmergy[55] as a tool to create premediated healing? In the ‘Mechanisms of behaviour’ became clear that the build environment has an enormous impact on the behaviour of man. Architects and urban planners contemplate about how the build environment is given shape on the highest level. It is our duty to seriously consider the consequences, the impact on earth and thereby on humanity. But is the architect the main actor in the building process? In the conventional model the client initiates this process with its own priorities which is most likely not a response to public needs. The designer of the build environment needs to take up the role as initiator of the project or find clients with similar public ethics. Only then the architect is able to handle as an intellectual that can get actively involved in researching public demands and

[55] Stigmergy: Originally as a term applied in biology to analyse ants and other social insects’ behaviour, it is defined as a mechanism of spontaneous, indirect coordination between agents or actions, where the trace left in the environment by an action stimulates the performance of a subsequent action.

proactively initiate projects that respond to global needs. Architects and urban planner should come up with solutions that enhance life right now but also in the future. Although human needs are changing constantly, so the role of the architect should be to create a framework a basis which satisfies the overall needs wherein the public is able to intervene, transform and adjust according to their specific needs; like in the PREVI[56] project. Next to the physical challenges of the designers there is also a perhaps even bigger task to mentally advocate the global needs. The role of the architect is to influence the architectural discourse through a variety of media. Architects need to redefine the public needs and take in position. There needs to be risen a global awareness for problems humanity faces and the solutions that could be made otherwise there will be no public support to finalize the project with good public intensions. To achieve this architects can no longer work alone they need to collaborate with like-minded architecture firms, work parallel or found NGOs, teach at universities or give lectures, take part in Biennales and international exhibitions and publications. This process maximizes the impact architecture has on the society and employs the architect with the tools to operate simultaneously in multiple fields. To create social support architects can play an important role, because they are able to analyse the problems and visualize the solutions in order for the public mass to comprehend. But for the mass to believe in this new kind of living and transform the foundation of society there needs to be a change in perception because they believe something else which is maintained by representational spaces; 'Mechanism of Behaviour'.

**Perception**

Perception is personal and context related therefor people most likely have a different perspective on similar things. The individual embodied knowledge, memories and the point of view creates specific contextual factors. These inputs create a particular mental construct and direct on how stuff is being perceived. Therefor there is a possibility to change the perception of a person by influencing the context or the information one has by deconstructing current thoughts and providing them with new knowledge. By transforming these mental constructs man starts thinking differently because they have a new framework from where out their thoughts appear. If one thinks differently the person will be more likely to act differently.

[56] 'The Experimental Housing Project, known as PREVI, is one of the most ambitious experiments, regarding to social housing ever built. After more than three decades since construction, the residents adapted the dwellings to their needs and wishes. In some we can still recognize the remains of the original dwellings, while in others all initial traces have been lost. Some find this architectural loss regrettable, but the cultural-based aesthetics are not being questioned here.'
http://www.architectureindevelopment.org/project.php?id=438

As an example I would like to address the perception of life on earth by Dutch astronaut Andre Kuiper's. He explains that when he saw the earth floating around in the universe from out of space he experienced that all the physical borders or imaginary distinction between several nations where not there because it was one continuous landscape underneath the same fragile ozone layer, he concluded that we all are on the same planet with the same problems and therefor got a more careful attitude towards the earth. Most of us never experienced this; hence we will be less likely to think like that. It was this same principle in the 70's when mankind did its first visit to the moon and made a picture of the blue sphere we are living on which initiated the green movement. Perhaps if man would for instance find extra-terrestrial life, which is likely to happen because there are more planets in the universe then sand pieces on all the beaches of the earth, perhaps we would finally see humanity as a unity again because it will become us against them. (Kuipers, 2017) As a species which lives on the same sphere of dirt in the universe with the same problems.

Humanity communicates, negotiates and acts through media in current society. Media are ubiquitous interfaces in the construction of new realities and new forms of communication. New media bring the technologies of artificial perception, from photography to the computer, into the realm of art. This creates a new awareness of the interconnection of natural and artificial perception, of the object world and the media world, and of art and science. The transformation from visual to social media makes clear that the use of media is a vital factor. Media are performative. Artists today are less in search of subjective expression. Rather, their frames of reference are social systems and scientific structures and methods. This is the reason for new research areas such as art and science labs and art-based research. Scientization of art is beginning to emerge as it did during the Renaissance, creating a sort of Renaissance 2.0.

A powerful tool in the perception on life is the myth as we have seen in the chapter 'The Earth'. An early example of this is the tower of Babel. Thousands of years ago humans came up with an explanation for the fact that different nations speak other languages. According to this myth god punished humanity for their presumptuous attempt to build a tower which reached the heaven. (Groetelaers, 1998)

How humans exactly get ideas we do not know, often our brain operates unconsciously. Like Einstein once said; 'Imagination is more important than knowledge', because knowledge is constrained to everything we know and understand. Imagination encompasses the whole universe, without imagination neither creativity nor genesis.

(Dijkgraaf, 2017, 1) The brain is the centre of human cosmology. The universe is nothing more than rough data.

> Like an empty canvas. And the brain as the true painter. The human brain. Everything that we have; the history of the planet and cosmos, the history of human race. (Dijkgraaf, 2017, 3)

By combining knowledge and fantasy humanity can be capable of creating its own future. For example the ideas of science fiction writer Arthur Clark to send artificial moon into space which functioned as antenna for communication. Also the nuclear bomb and the internet appeared first as literary fantasies. What can be imagined also happens. Our creativity leads to a creating impetus and the irresistible urge to realize your ideas. (Dijkgraaf, 2017, 1) Perceptions, intuitions and utopias are the instruments artists use to present us their ideas about the world and about how to change it. Starting from a perception, and with the aid of science, technology, art, culture and politics, the selected artists and architects modify the way we see, hear and interpret reality. (WA Contents, 2016) Like Sir Thomas More (1516) used his utopian vision not as an actual solution for the problems of the current society but as a method to provoke. A conversation is a free interchange of ideas and a common search for meaning. (Kaulingfreks, 2016, 8) Humanity should create the future by using knowledge. Not just individual knowledge, but examine from several perspectives and use their experiences and their knowledge to feed our imagination. Man should decide what to create or not to create, that is the mind of the universe.

### Sustainability

Since the occupation of land by mankind, the basic climatological factors that sustain and enhance life are decreasing. Richard Ingersoll (2012, 574) mentions a deeply rooted paradox within the ecological approach to the art of building: “every act of building betrays the environment, as it requires the displacement of natural relationships.” However the development of humankind's built environment should establish a liveable climate and support life. Although sustainability imposes a little bit the ability of humankind to sustain the ancient ecological systems, in the metastable technological entropy we live in there is a tendency towards an ever increasing energy consuming evolution. In my opinion sustainability means develop to enhance life and sustain the climatological factors and ecological systems that support biological life on earth within the constant changing environment. Climatological factors like an atmosphere where the air is breathable and which has a certain chemical consistency that creates temperatures in which biological life is able to live. Life is a precious thing in space, people seem to forget that, sustaining it while creating what humans desire is what sustainability should

be about. Instead of addressing the symptoms and creating placebo solutions; like locking $CO_2$ in and putting it in the ground.

It would be better to deal with the underlying superstructure which causes climatological problems. (Richard Ingersol, 2012; Friedrich Engels, 1872, 573) Humanity could shape the lithosphere in a way that composes smaller ecosystems within the larger system. Is humanity able to change from creating psychotropic mechanisms in the built environment to autotrophic, where they produce instead of use? Or does humanity stick to 'green-washing'? The term sustainability has become so popular in societies discourse that it is often used as an advertising tool. Just as a marketing strategy to sell; 'Green buildings', but are actually these are not preforming in an ecological manner to enhance life on earth. For Duhm, the consequence was clear:

> If we want to escape from the *wetiko* disease of our current capitalist culture, we need a credible concept for a new nonviolent global society and for transforming the old matrix of fear and violence into a new matrix of trust, compassion and cooperation. (Winiecki, 2016)

The organic system of body and soul with its drives and emotions must recognize its natural ways of functioning. We can only break the alienation of our age by reconnecting the human forms of action and development to the universal processes of the living world. (Duhm, 1993, 56)

> Since the outstanding characteristic of the biosphere is its inherent ability to sustain life, a sustainable community is one that is designed in such a way that its ways of life, businesses, economy, physical structures, and technologies honour, support, and cooperate with nature's inherent ability to sustain life. (Wals, 2009)

Biological humanism strives for the maximum integration of the human social world into the overall realm of living nature. Humanity might even learn from nature for creating a build environment that in itself is sustainable.

## Grasp

As a reflection on the zeitgeist great thinkers and philosophers came up with myths, religions and global theories. It were these conceptions that described a future which was better than the current. These ideas about how life should be lived have always determined how man wanted that society lived their lives and in a large sense also did decide that, because they were able to create a desire. Luckily currents are able to change and the flow is able to take another direction when these interpretations of life seem not viable anymore. Objective science is able to unravel the mysteries of the myths and make it comprehensive and verifiable for the masses. Although it is never able to fully clarify and understand the paradoxical underlying superstructure on which the universe is based. If sailing on these rational flows, there is always a restriction, the restriction of reality. Art, fiction and fairy tales are opposed to that able to transcend the restraining laws of nature and advocate a scenario which is able to provoke through the power of seduction. It is the architect who can use this power to initiate the transformation of the foundation on a much larger scale, a global scale, a scale which is needed for the scope of the problem with which man is dealing with at the moment. Versus the building contractor or engineer who is limited by reality and the physical boundaries of the relative project and therefor has a much smaller impact. It is this brighter future, this utopian vision that the architect is able to create to give people hope and something which they are able to live up to in order to have to most effective influence on the transformation of the foundation.

# Biomimicry

*Mimicking biology in architecture to achieve sustainable development.*

**Intro**

Two billion years ago bacteria parasitized larger cells. These evolved in a specific manner, the bacteria were able to metabolize the cells waste, which made them able to produce more energy. By this symbiotic effect stable organisms came into existence, called mitochondria. According to this exquisite principle the evolution of life on earth continued. Living organisms have created cycle based ingenious solutions in order to survive and develop within the constant changing biosphere.

The last decade the destructive impact of the human race on the land, ecosystems and biodiversity has become undeniable and so vast that human kind starts to act as a geological agent. (Malabou, 2015) The built environment and the transportation of people together consume 70% of the total amount of energy that is used in the whole world and is influenced by the way the environment has been designed. The energy consumption by our society can be roughly divided among: Buildings 44%, transport 34% and industry 22%. The transport of people is 26%, so 70 % of our total energy consumption is influenced by the way our cities and infrastructure are designed. (Foster, 2015) The built environment determines for a large part how life is lived, because most of our cerebral processes are non-conscious. The green agenda is probably the most important agenda and issue of the day, sustainability has become a general concern.

To solve the climatological problems we are facing, we have to, like Einstein already mentioned: solves them with different reasoning then what caused them. And like Darwin disseminated it is not the strongest nor the most intelligent kind that survives, but the one that is able to adapt to change. According to Nobel Prize winner Jacques Monod:

> [...] the ultimate aim of the whole of science is indeed, as I believe, to clarify man's relationship to the universe, then biology must be accorded a central position, since of all the disciplines it is the one that endeavours to go most directly to the heart of the problems that must be resolved before that of “human nature” can even be framed in other than metaphysical terms. (Monod, 1971)

After the Neolithic, industrial and digital revolution it is in my opinion - if we want to live as long, healthy and happy as possible - time for a biological revolution. Nature has developed in 3.8 billion years complex efficient and ingenious circular sustainable systems which accomplish the maximum with minimal means. Nature knows how to sequester carbon, up-cycle materials, work with storm-water, and in general create conditions conducive to all life. (Pawlyn, 2011) Nature is smart, are we smart enough to learn from it? Biomimicry is a relatively new term, but the practice of gaining knowledge from nature is and has been present in perhaps all cultures, for as long as mankind has existed. Nature has created lasting and efficient systems which we can use

to sustainably develop our build environment. Hereby we will also influence humankind’s way of living, therefore contributing to our species adaptation to the climatological crisis.

### Nature's genius

The practice of gaining knowledge from nature is and was present in perhaps all cultures, as long as mankind has exists. Architects where mostly using biomorphism[57] within their architecture; mimicking natural shapes without a specific function or increase of structural efficiency. Imitating intelligent structures and well-adapted materials is one way to purposefully shape architecture, but there are more ways of imitating nature. Architects can learn from the evolution of living organisms, to develop our built environment. Thereby humanity could be able to design a build environment which households the systems for life in a sustainable manner. Hereby there is dealt with the origin of the climatological problem and not only the symptoms are addressed. To dissolve our worst climate concerns, human beings can use nature's genius as blue print for sustainable development. Bar Cohenn makes this into a cogent argument:

> Over the 3.8 billion years since life is estimated to have begun to appear on earth, evolution has resolved many of nature's challenges leading to lasting solutions with maximal performance using minimal resources. (Cohenn, 2006, preface)

Biomimicry can support sustainable innovation, and creates new insights into the evolution of our built environment. This method of innovation mimics clever natural solutions for ingenious systems to solve complex human problems. For instance, a built environment generating bioclimatic systems that naturally control the climate and using less energy as a result. A good example of this is the Eastgate Centre in Harare, Zimbabwe the building is inspired by termite hills. The ventilation system of this building, works in with the same principals as the airflow within a termite hill. One of the initiators of Biomimicry Janine Benyus has developed her own method: “Immerse ourselves in nature, interview the flora and fauna of our own plane, using nature as a model and measure and preserve life's diversity and genius.” In my opinion Benyus is quite cautious; we should not immerse ourselves but create what we desire while learning from the biosphere to maintain it.

### Intertwining

Nature within and around buildings, will create a build environment which is legitimately intertwined with its environment. The addition of plants, trees and other vegetation will stimulate biodiversity, by attracting animals. Will people feel more connected with nature in the presence of animals and vegetal life? Although this is not

[57] Modern architects have frequently used nature as a source for unconventional forms and for symbolic association. Eero Saarinen's TWA terminal and Frank Lloyd Wright's Jhonson Wax building.

scientifically proven it is plausible and if so, this could contribute to a certain state of mind where we are more aware of the world we are living in. According to Louise Cox, The President of the International Union of Architects (UIA): “Plants in and around buildings sensitively placed will not only reinforce a good natural environment, they will be able to cool buildings, offer a feeling of wellbeing and be useful at the same time.” (Cox, 2013) Through the evaporation of water plants and other vegetation will naturally cool down their surroundings, this phenomenon can be experienced in a city park on a hot day. Giancarlo Mangone’s did experiments on the effect of micro forests on the buildings in his doctoral research about; 'Performative Microforests: Investigating the potential benefits of integrating spatial vegetation environments into buildings, in regards to the performance of buildings, their occupants + local ecosystems.' Gardens inside buildings can reduce the energy consumption by 2 to 3 per cent. (Mangone, 2015) Working in the same space as the 'micro forest' has a psychological effect making users feel more comfortable when temperatures rise, this effect can reduce the energy consumption of a building with 10 per cent. In addition, the productivity of the employers is increased. (Mangone, 2015) Vegetation on the outside of buildings has positive effects on the environment and on the interior space. Lately the Council on Tall Buildings and Urban Habitat (CTBUH) has selected Stefano Boeri’s Bosco Verticale as the Best Tall Building Worldwide 2015 for “its extraordinary implementation of vegetation at such scale and height,” according to a press release. The apartment building has balconies with integrated trees and other vegetation. Trees and vegetation on the outside of a building have extra positive effects. As they filter the air: through the photosynthesis process, whilst also catching dirt particulates. It’s multitude of benefits do not end here as the plants offer advantages throughout the seasons, providing shade in the summer, while allowing sun light to penetrate in winter as a result heating the interior of the building. Last but not least they can absorb sound, as the intensity of a sound wave decreases with every bounce to a surface, thus improving the quality of the living environment.

### Material life cycles

In the first chapter; “The Earh”, it became clear that materials infinitely cycle through the ecosystem. The earth's resources are split up in two main categories: renewable materials such as timber and finite materials like iron ore. (Berge, 2009, 3) The building industry uses an enormous amount material. Extracting these resources form the earth, processing them into useable building elements and transport to the right place;

consumes energy and emits pollutant emissions[58]. (Hammond, 2008, 87) It is important to consider the complete life-cycle: Where does a material come from? How is it transported? How is it processed? And what happens with the material when a building gets demolished? This actually counts for every material we use in our everyday life. Recycling used materials into new ones requires lots of energy, since the materials have to be transported and processed. There are less wasteful and more integrated ways of constructing architecture. Extracting the materials from the surroundings of the building site will save in transport costs, energy consumption and polluting emissions. Using local materials will also according to Norberg-Schulz: contribute to the genius loci; the spirit of a place. (1980, preface) A good example of a renewable source is bamboo. This is the fastest growing plant in the world; during the growing process it will store carbon dioxide and create oxygen. In Indonesia, in the centre of Bali Island, along the Ayung River the Ibuku team – a group of architects – created a bamboo village. The Green Village comprises houses, a school, a factory and bamboo farms. The whole material supply and processing chain is situated within the village. This will be a good concept for rural non-civilized environments, but most building in current society occurs within the city and cultivated areas. Waste products could be used as building elements. The Dutch architectural firm Superuse Studios is 'creating architecture by shortcutting the flow of products and elements'. (van Hinte, 2007, 5) For every project they make a harvest map, to localize usable dissipated materials or products that are the closest to the building site. Villa Welpeloo is the first example of an architectural application of the up-cycle concept. Focussing on the least transport and as little as possible processing the materials, they reduce the ecological footprint of their projects to a minimum. Overall material flows have to be taken into account in current and future society, and new opportunities have to be developed to create an energy efficient continuous cycle of materials within the ecosystem.

### Form follows Nature

Complex structures in nature grow. The genotype contains the intrinsic values of the organism. The immediate context of the organism gives a certain input to the growing process. Sanford Kwinter describes this in an expressive manner.

> Each of these individual systems of rules represents different scales of shape pressures and different rates of unfolding creating a bonified complex and polyphonic structure with perpetual crosstalk between the strata. (Kwinter, 1994)

[58] “Energy and pollutant emissions such as carbon dioxide (CO2) may be regarded as being 'embodied' within the materials. Thus, embodied energy can be viewed as the quantity of energy required to process, and supply to the construction site, the material under consideration.” (Hammond, 2008, 87)

The same DNA can have for each specific location a different phenotype[59] within the boundaries of the prior instructions that are mutually modifiable. In nature, organisms survive by efficient metabolism, optimal use of resource, and thereby using the least amount of energy. Biological solutions can be taken as example to improve 'the energy efficiency of our engineering'. (Beukers, 2001, 44) According to Berge: “The chemical and physical properties of building materials decide what the material can and should be used for”. (2009, 53) Appropriate use of materials should follow the rules that are incorporated in them.

> Structures have to compensate for omnipresent forces: intrinsic molecular forces and built-in stresses, as well as extrinsic forces encompassing all environmental influences, such as gravity and the effects of temperature and moisture. This holds true for everything dead or alive and it should therefore be starting point for man-made constructions as well as anything else. (Beukers, 2001, 50)

D'arcy Thompson a biologist and mathematician, was one of the first scientists that analysed biological processes from a physical and mathematical perspective in his book 'On growth and Form'. Observing nature can teach us many constructional lessons: “Nature was strengthening the bone in precisely the manner and direction in which strength was required”. (Thompson, 1961, 232) Digital development in design and manufacturing; such as computational design and 3D printing creates opportunities to establish mathematical based complex geometry. Thereby more purposeful shape of structures can be created when the laws of nature are taken into account. Although history has shown that it is not necessary to design efficient structures with digital fabrication. The Sagrada Familia in Barcelona, by Antonio Gaudi, is a good example of this. The intrinsic physical properties of stony materials make it able to only resist compression stress. Bending forces and tension stresses will break the material. Inspired by nature, Gaudi designed his structures with physical funicular models. Gravity creates the shape with only tension forces within the cable, since it cannot resist bending nor compression. Inverting the parabolic shapes – upside down – will turn the load theoretically in pure compression forces. Hereby he designed a purposeful stone structure. (Beukers, 2001, 39-40) From a sustainable, point of view tension is preferable, thinner constructions can be made, thereby it uses less material and it will require less energy for transport. (ibid., 31) The Olympic Stadium in Munich, designed by the German architect Frei Otto, is a good example of a tensile structure. Otto experimented with physical soap bubble models to generate a minimal surface within tensile structures. In nature form is generated by intrinsic physical properties of the

[59] The phenotype is the totality of all apprehensive properties of an organism. The result of the influence on the genetic capacity of the individual by its surroundings.

material and external forces, architecture should learn from these principles to achieve purposeful design.

## Grasp

Architects, urban planners and landscape architects design the build environment and need to base their decisions theoretically. Since the immense increase of human population and the transformation of land, humanity started to act as a geological force which has its influence on all living beings on earth. Mankind needs to see their actions as an intervention on earth. This environment that surrounds man in his daily live determines how people live their daily life. Unconsciously people are forced to live their lives in a certain ways. Therefor it is important that this environment contains sustainable systems to satisfy the needs of people. At the moment most of the built environment is constructed with obsolete motives; with the knowledge of today we should know that we are destroying the earth and thereby eventually ourselves. The anthropogenic age has had an irreversible impact on the earth. There are so many of us exhausting the earth's recourses and destroying entire landscapes, that complete species are eradicated. Furthermore; Humankind consumes an enormous amount of energy causing an amount carbon dioxide to be emitted that is out of proportion. Hence heating up the earth and disturbing the natural ecosystems that humankind depends on. Humankind acts like a geological force, slowly changing the atmosphere to an uninhabitable environment.

Nature has developed clever sustainable systems from which humanity can learn, without compromising our desires. Living organisms have always survived and developed within the transforming biosphere. In the ecosystem biochemical cycles and dynamic patterns of flow are driven by external and infinite sources of energy. Matter cycles within the system continuously and no waste is produced. Material supply chains should be completely considered to let materials cycle continuously within the ecosystem. Man needs the services of the ecosystems in order to survive and it also brings quality to our lives. The built environment is not designed according to the principle that the earth functions as a holistic system, thereby resilience is not created. Humanity can change by changing the creation of psychotropic mechanisms in the built environment to autotrophic, where it produces and contribute to nature instead of using up all its resources.

Biodiversity has economic, cultural, amenity and moral value. Versatility; all the different species on earth work together as a functional unit; mankind depends on it and can even benefit from it. In fact all organisms on earth are connected through their environment and it would be better to see everything as an ´assemblage´ rather than treating individual species as separate entities. Like Harraway proposes to create

'multispecies assemblages'; where multiple organisms become kin to benefit each other. Architects do nothing other than creating new relations within the metastable system. According to Timothy Morton when we feel a part of nature our species would never try to destroy it. The intertwining and interconnection between different ecosystems will make us feel more embedded and will create more resilience and fertility.

The built environment is also not shaped according to the laws of nature, which causes extra material and energy waste. In nature form is generated by intrinsic physical properties of the material and external forces, architecture should learn from these principles to achieve purposeful design. Although the most important things in life for humans are the things that do not make sense at all. Would the combination of technical sustainability, which is supporting life and aesthetics, which stimulates the sensory experience of its audience create a desire for sustainable architecture?

# Ethical Aesthetics

*Evoke emotion through architecture to create a sustainable desire.*

**Intro**

The environmental crisis creates a new moral imperative in current society. Transforming society towards a more sustainable community has to happen as fast as possible, in order to prevent irreversible deterioration of ecological processes. Aesthetic design of sustainable environments and architectures are vital to the success of the wrapper of this new lifestyle. The green movement is getting bigger, although it is a necessity for success to increase the scope of the transformation of society. Like Norman Foster (2007) emphasized in his TED on Green Architecture, sustainable architecture has to glorify life. According to the well-known phenomenological architectural theorist Juhani Pallasmaa there is nowadays still a struggle between beauty and functionalism in most architecture.

> In today's world of materialism and quasi-rationality, the poetics of architecture is threatened by two opposite forces: instrumentalization and aestheticization. The first obsessive functionalization confines buildings to the realm of utility and economy, whereas the second turns architecture into calculated and manipulative visual effects, devoid of existential grounding or deeper mental meanings. This is the duality of Scylla and Charybdis in today's architecture. In our obsessive consumerism and blind materialism, even art tends to be confined to mere aestheticized objects and inventions, without mental meanings, or an echo of our existential reality. Art and architecture have increasingly turned into a deliberate fabrication, but artistic meanings cannot be invented, as they pre-exist and can only be identified. Artistic meanings are not fabricated. They always arise from lived life and the traditions of art itself. These meanings are always dialogues, not dictations. Constantin Brâncuși, the sculptor, gives a demanding qualification for art, which also applies to architecture: "Art [architecture] must give suddenly, all at once, the shock of life, the sensation of breathing". (Pallasmaa, 2017, 241)

Most of our actions are determined by our feelings. Lord Daniel Smail – also in 'The mechanisms of behaviour' - describes physical and environmental psychotropic mechanisms that have neurochemical effects, to change the way we feel. (Smail, 2008, 161) While our desire in combination with the sensory perception of our environment make neurological processes to happen, and subsequently determine our behaviour. Is it so that, like Andrej Radman (2015) states; 'If you make people feel differently, they are going to think differently'. The experience of life through sensorial perception is common ground for all humans. Could the built environment create an experience which creates enjoyment and appreciation? And would this result in taking more care of what we all received; life on earth. Or do we need a new kind of temple, which strengthens a new life philosophy. As Sang Lee (2011, 43) legitimately states that: "Architecture can literally be an advertisement for these alternative lifestyles and show that reduction in consumption does not necessarily mean a reduction in quality." Like in mediaeval Europe the great Gothic cathedrals got build to regain land from the Islamic spread. A communal hub as an icon of sustainability and creates an emotional climate

for change. Like the Ginkgo Biloba tree, which brought hope to Hiroshima? Is it possible to evoke emotion through architecture to create a sustainable desire?

## Ethics

Morality is occupied with the critical reflection on what acting correctly is supposed to be in contemporary society. The ethics is trying to set criteria to be able to judge if something is good or bad by assessing the motives and consequences of a certain act. Ethics are able to change over time due to technical, social or conceptual innovation in society. Early civilization based their norms often on myths or habits with natural philosophers like Heraclitus[60] and Pythagoras[61]. The philosophical and rational foundation of the ethics started to develop in western philosophy by the old Greeks like Socrates and Plato. The student of Plato; Aristotle was the first to systemize virtue ethics in the 'Ethica Nicomachea'. According to his theory the goal of humans is to live a virtuous and fortunate life. This was the basis for hedonism; delight is the highest good and the goal was to obtain as much as possible while on the other side eliminate pain. In contradiction to this there was stoicism with Epictetus as their main philosopher. In this epistemology being in control of your desires and emotions was the most important and a peaceful mind is there for the greatest good. At the base of all global religions a certain kind of ethics is condensated in form of a regime which is advocated through a particular story which is understandable for their disciples. In the renaissance the philosophers started to create a rational and universal moral for human lives on earth. The theoretical and practical developments have caused a revolution in moral conceptions. The sciences of matter, life, mind and complexity in general caused a fundamental reconsideration of the Homo sapiens within the web of life. (Warwick, 2000, intro) The influence of man on geological systems and the major impact of the build environment within this should make us question, how humanity dwells on earth and asks for a new building ethic. The Re Aedificatoria of Leon Battista Alberti from 1452 which advocated in a famous manner that architecture should consist of Utilitas, Firmitas and Venustas is still useful. We should only interpret Utilitas in a different way if one looks at utility the usefulness of architecture it should also be useful in this specific timeframe with it global problems to solve or to address. The environmental crisis creates a moral imperative to sustainably innovate the built environment.

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[60] Heraclitus (c. 540 – c. 480 BC) the core of his epistemology advocates that every genesis is creates through competition unity. 'Panta rhei': all is flowing, was his main thesis. Changes in the universe originated themselves from the transformation of the elements. Peace could be acquired by the appropriate proportion and specific position of everything and everybody within the cosmos. His philosophy had influence on the Classical antiquity; for example Plato and Aristotle refer to him, but his theories were most in line with the Stoicisms. In modern philosophy on Friedrich Nietzsche, Martin Heidegger and dialecticians like Georg Wilhelm Friedrich Hegel and auteurs like Harry Mulisch.

[61] Pythagoras thought that intellect and mental discipline is superior to meaningful nature.

Although the pragmatic interpretation of an ecological approach might not be the only way in which man is able to create sustainable architecture. The aesthetics of an environment is able to please its users which make them love their surroundings and therefor it is far more likely to maintain and is in that sense sustainable.

### Aesthetics

The build environment is the ornament of culture and a solidified expression of a particular 'zeitgeist'[62]. Inertia of the build environment contributes to the decayed imaginary order and is anachronism[63] to our times. The ecological approach to architecture often ends up in mere scientific solutions and pure functional structures. In order to seduce people to live other life styles sustainable buildings should next to their quantitative capacities also create qualitative values for human life, as also emphasized by Sang Lee (2011). The ethical paradigm could be enhanced by the aesthetic appearance of an environment, which embodies pleasurable ways of living. On the other hand beauty could also contribute to durability aspects.

> The idea has developed in western society that if something looks "nice," it must always be ecologically superior and better for biodiversity than something that is visually undesirable. […] Beauty is in the eye of the beholder. What may be judged to be "beautiful," sustainable and good stewardship by an ecologist or biodiversity expert may be ugly, at least for a period of time, to the average citizen. […] The challenge is to identify when our "gut reaction" to visual images provides a reliable basis for making changes in our relationship to resources and the environment, and when it does not. […] we must balance the important aesthetic considerations with the ecology of the values we wish to sustain. (Kimmins, 1999)

Just as Karan August advocates in her thesis - Building Beauty: Kantian aesthetics in a time of dark ecology - : "The importance of publicly accessible beauty in architecture". (August, 2013) Although it is difficult in human's intersubjective reality to create beauty through the metamorphosis[64] of the building process of sustainable architecture. But what is this beauty and how is it acquired through architecture? And are we even able to define this. To create some grip I am going to exemplify the basic principles so that we are at least able to talk about this mostly ungraspable but rather important feature. Aesthetic psychology studies the response of people to certain materials, tectonics and compositions. Materials have symbolic values, the anthropomorphosis[65] of materials according to Richard Sennet (2008): "does not aim at explanation; its purpose is to heighten our consciousness of the material themselves and in this way to think

[62] Zeitgeist; the defining spirit or mood of a particular period of history as shown by the ideas and beliefs of the time
[63] Anachronisme: Artefact which belongs to another time. (Sennet, 2008, 118)
[64] Metamorphosis: a change in procedure or technique. (Sennet, 2008, 120)
[65] Anthropomorphosis: The attribution of ethical human qualities – honesty, modesty, virtue – into materials. (Sennet, 2008, 120)

about their value". For example if one wants to express authority one will not use a brick because it does not utter the monumental aspirations of for instance Classic architecture. Honesty within materials is in my opinion achieved by the following procedure. Function and leitmotif is retrieved from the design brief, subsequently the matching material is chosen and eventually the material has to be applied and shaped. To make a logical decision - as influential of the English reformists was Christopher Dresser (1838-1904) mentioned - it is sensible to concede to the intrinsic values of the material and relation to what the material has to perform. (Wright, 148) Unity, harmony and simplicity in the architectural theory of Frank Lloyd Wright constitute beauty. These values could be acquired through tectonic[66] art; where a piece of the building – the 'architecture'[67] – is logically part of the whole (Wright, 144). In contrast to what Adolf Loos his 'ornament as crime' this does not mean that the expressive aesthetic enriching of architecture abolishes simplicity. The emphasis of architecture through texture, form or colour is enrichment and could be – if correctly introduced – an articulation of unity. Wright was inspired by Eugéne Emmanuel Voillet-le-Duc (1814-1879) he; "sought knowledge from biology and applied the criterion of functional and structural expression to style in the natural organism" (Hanks, 3). The atmosphere of space and thereby the experience of the user is something which is extensively disused in phenomenology by Juhani Pallasmaa and Peter Zumthor. It is rather hard to define, emotional and personal matter but very important for the value of architecture. The way in which architecture is shaped has the ability to symbolize and therefor create meaningful environments.

**Senses**

The aesthetics are perceived through the senses and create a certain kind of feeling or emotion in the brain. Perhaps it is possible to shed some light on how atmospheres influence us by having a closer look on the cerebral processes that cause this effect. According to Perlovsky (2014):

> […] information is transmitted by neural signals to decision-making parts of the brain-mind initiating appropriate decisions and behaviour. These neural signals are perceived internally as emotions motivating behaviour.

In first instance emotions are motivating the behaviour. The hypothesis is that if sustainable environments are stimulating the senses in the right way it is able to seduce

[66] Tectonics in architecture is defined as "the science or art of construction, both in relation to use and artistic design." It refers not just to the "activity of making the materially requisite construction that answers certain needs, but rather to the activity that raises this construction to an art form." (Maulden, 1986)
[67] The architecture of a building could be seen as a three dimensional 'texture' or composition of architectural elements in a specific configuration.

people to live a different life style. Therefore it is important to have a closer look on how this works. Following information is mostly based on the human brain map of the BBC a summary of research on cerebral cognition. Through somatopy humanity is trying to create a cortical homunculus. With this information man is able to see how different parts of the brain connect and therefor get an insight on how behaviour gets formed. The senses – sight, hearing, touch, smell and taste - perceive the immediate context. These biological signals travel through the nerve system via specific parts of the brain and sometimes one becomes conscious of them, but most of the time not because a lot of information is filtered as explained in "The Mechanisms of behaviour". It does therefor not mean that it doesn't influence our behaviour. In the Limbic system the Thalamus is responsible for transporting impulses from the nerve system to the rest of your brain. The limbic system contains a variety of unconscious systems like survival instincts, drives and emotions. Therefor one feels something before being consciously aware of it and for example is able to explain why it feels a certain way. The hippocampus is a depository for memories and regulates emotion. Because of this the personal experience of the individual is very important for what kind of emotion is created with the information from your senses. Visual information and sounds travel via a part of the brain stem which is called midbrain, then through the limbic system to the rest of the brain here are also auditory and visual reflex centres. Because of the duplicity of these organs – the ears and eyes – humans are able to see depth and locate sounds. Light that comes into your eyes gets interpreted in the occipital lobes - located at the back of the cerebral cortex - and thereby an image of reality is created. In the parietal lobes situated next to the occipital lobe the somatosensory association area is embedded. Evaluation of weight, texture and temperature is constituted here. Through the combination of senses man is able to recognize objects and propriocept[68]. The experience of day and night by your sight goes specifically to the pineal Gland. If systems work correctly this creates the hormone melatonin, which plays an important role in controlling your sleep-wake cycle. This system is distorted in current society by electrical light and an overdue of technological appliances with light emitting screens. Sounds get processed in the temporal lobe therefor man is able to hear and speaking. This part of the brain also plays an important role in storing memories. The nasal cavity detects smells and sends the information through the olfactory bulbs to other areas in the brain. Smells evoke strong emotions, because the olfactory bulbs are located in the limbic system. This is the part of the brain that also generates instinctive emotions. Papillae in the tongue receive chemical information nerve impulses travel to multiple parts of the cerebral cortex to process the information. Stimulation of sensory receptors

[68] Proprioception: a sense position and movement.

in the skin makes man able to feel touch, pain, temperature and pressure. This information gets processed in the parietal lobes. The sensory cortex interprets impulses from the senses and connects directly with the motor cortex just in front of it. This part of the brain makes you consciously move muscles. The Motor cortex is close to frontal lobe therefore movement can be at second hand adjusted according to behavioural codes which are stored in the frontal lobe. Although it is much harder to change your behavioural instincts then to just satisfy ones desires.

### Environmental psychology

The behaviour of man has lots of relation with how the configuration of the environment. Imagine the world simplified as a maze, the shape of the labyrinth determines the possible routes one can take. In a neurophysiological manner architecture or the build environment is able to evoke certain kinds of behaviour. If space and form are strictly defined it forms a direct sense a restriction for creative events or spontaneous activities. Lars Spuybroek (2004) explains that what he calls; 'motor geometry' is able to stimulate or definitely allows abstract movement. This is a simple example but could be an important principle in experimenting with other forms of life outside the dogmatic character of reality that could be supporting the manifestation of lifestyles that contribute to the overall wellbeing of the planet. In a metaphysical sense the imaginary order is condensated in architecture. Western society has an individualistic approach to life; this philosophy can be found back in the formation of an ordinary house. Dwellings get divided in individual rooms with even locks on it. According to Yuval Harari (2017, 126) it is not a miracle that people who grow up like this see them self's as individuals. In contrast to modern arrangements, the mediaeval teenager slept with all the boys in one big hall. Somebody who grew up under these circumstances came to conclusion that somebodies real value gets determined by his place in the social hierarchy. (Harari 2017, 127) The solidified imaginary order guides our desires and thereby also maintains them.

> The concept of culture […] denotes a historically transmitted pattern of meanings embodied in symbols, a system of inherited conceptions expressed in symbolic forms by means of which men communicate, perpetuate, and develop their knowledge about and attitudes toward life. (Geertz, 1973, 68)

Designers of the build environment must therefore take environmental psychological knowledge and study the responses of people to specific spatial configurations in order to design more suitable spaces. Concerning a sustainable transformation of society the maze has to be reconfigured in order to make people behave in a different manner. Although it is not possible to change all existing structures, due to the vast amount of

build environment and its accommodation of working processes. Architects, urban planners and developers will only be able to add and transform a small part of the build environment into sustainable environments before the climatological crisis has extensive consequences. The sustainable environments that can be created should at least also be good for human wellbeing. This way it will attract a larger group to live in these new environments. The aim should be to make sustainable building better for the wellbeing of man to stimulate the decision-making. According to Piet Vroon (1990) who did research to the sick building syndrome a human has in relation to its environment 5 psychological basic needs to experience a building as pleasant. At first the owner should have the ability to physically change the environment according to it personal needs and desires. Hereby man fulfils its need to manifests its private territory. Another basic need is that the user is able to change climatological conditions like temperature and air quality. Subsequently it is desirable to give meaning to perception; in sense of smell, sound, image ect. The last psychological need according to Piet Vroon is that humans should be closely situated to nature. In addition to that daylight is a very important factor for the wellbeing of man within the build environment, as well as clean air. With the increase of people living in cities and the decrease of rural exodus in current society, it is important to integrate nature into the build environment, due to the psychological binding with nature and the physiological benefits of it. Ma Yansong - head of MAD Architects - is proposing an inter-architectural natural structure; just like on an urban scale nature gets connected to stimulate interaction and to decrease urban cluttering. Dr. Susan Clayton emphasizes that the connection with nature and the personal bonding between plants animals and humans cause empathy; a powerful force in the attitude towards nature. Next to a couple of important factors that could be able to contribute to the transformation of society towards a more sustainable community it must definitely involve domestic comfort. This involves according to Torben Dahl (2008, 145): “convenient efficiency, leisure, ease, pleasure, domesticity, intimacy and privacy”. The combination of sensations contributes to the experience, this could feel very comfortable, but is an individual and emotional happening. It is important to redefine the chemical connections of space and the organism, because it influences the body in a physiological sense.

### Emotion

Comprehending the cerebral processes of the people that caused the climatological crisis gives an insight on how to solve the problem. The changes in the climate occur so slowly and humans are so little confronted with it, that the transformation becomes

normal. Hearing, seeing, tasting, smelling and touching makes one able to interpreted, to learn and are a significant factor in the emotional processes of man. The environmental stimulants obtained by the body's physiological system can have influence on how a person feels. It is just hard to clarify, due to the ambiguous character of aesthetic emotions. Leonid Perlovsky visiting scholar at Harvard University defines this in a clear manner.

> One difficulty is that aesthetic emotions might be subjective and change over time for each individual depending on internal states and external circumstances (e.g., Chapin et al., 2010). Therefore, averaging over individuals often leads to losing fine emotional differentiation and to detecting the most ancient and robust aspects of emotions, valence and arousal. (Perlovsky, 2014)

A large part of how one feels is determined by the historical background and the neurological functioning of the specific person. Similar input can therefor evoke different emotions. There are research methods to test this, Carretié (2001) and colleagues were able to conclude that humans respond faster to negative input and process positive experiences much longer. Also through the tracking of involuntary eye movement it is possible to analyse cognitive processes. Aleksandra Kaszowska explains how research could be done on emotional responses and clarifies the dark side of this.

> The most coherent overview would perhaps be provided if we put a person in an MRI, with an EEG cap and an eye tracker on, connected to a number of different physiological sensors and providing an ongoing self-report. But how real would their emotions be then? (Kaszowska, 2014)

Even though Manning (2014) emphasizes that information which comes in through the senses have direct relation to the emotion and thereby conduce to making decisions. This is important information if the goal is to influence the decisions people could make for a more sustainable way of living. According to Hanry M. Wellman & Jacqueline D. Woolley (1989, 246): "Desires motivate behaviours but beliefs frame them." Their view is that the perception makes us belief and next to that basic emotions make us desire, together they form a causal explanatory system for action. In a book edited by Thomas J. Reynolds and Jerry C. Olsen; 'Understanding Consumer Decision Making: The Means-end Approach to Marketing and Advertising Strategy' is shown that consumers could be persuaded through emotional triggers.

Even though emotions are very personal and hard to measure there are some general statements to make on the way man interacts with its environment and the emotional response that comes along with these stimulants. In the limbic system of the brain the amygdala is able to create negative feelings like fear, sadness, disgust and anger. Non-emotional mental tasks can keep the amygdala busy and therefor it can cheer up if one is working on simple tasks. The BBC advocates that: "Happiness is a combination of physical pleasure, not feeling negative and having a sense of purpose." So happiness

resides with a life purpose, but what if life does not have a meaning? Now that mankind has overcome – in most cases - the fulfilling of humanities primary needs, man has to create an imaginary purpose to be happy. Raised consciousness in the frontal lobe could mean that one knows to create a meaning to life or on the other hand finding out that there is no meaning or purpose to life.

Dopamine the chemical in the brain which gives it body a pleasurable feeling is a big factor in feeling happy, but how are these systems controlled? And what if the functioning of it is distorted. Others like Herman Pleij[69] believe that happiness is an ungraspable moment which is not possible to tame. Anyhow emotional reactions are motivating decision making in human life. (Orians, 1980) Would it not be wonderful to evoke emotion through architecture to create a sustainable desire? According to Elisabeth shove, a sociologist one needs 3 elements to transform behavior; the right matter, competence and meaning. Meaning in human life often collides with emotion; after all we are emotional beings. The Dutch architectural office of Albertsen van Huut emphasizes that.

> When architecture makes use of visual beacons to stimulate the human imagination, it encourages visual associations and makes them apparent. As such a meaning will be given to architecture that enables everybody to relate his or her images to. These images will not only please the eye, but also feelings, emotions and awareness. (van Huut)

On top of that Richard Sennet (2008, 70) says that being original arouses us and thereby creates emotions of wonder and respect. Serotonin is the hormone creating a feeling of wellbeing. According to Ray Sahelian (1998): "It has a powerful influence on the brain neurons are responsible for mood, sexual desire and functioning, appetite, memory, learning and social behaviour". It is generally accepted that one's mood, the natural light exposure, amount of exercise and certain kind of food are able to increase ones serotonin levels. Much can be said about this topic; little can be scientifically proven and on a lot of aspects can be done more research. Nevertheless I think – and others like Arjen Wals (2009) support that – humanity is able to say that to support the green movement there needs to be created an emotional architecture which encourages the transformation.

### Compassionate

The development of mass production and consumerism finds its origin in the industrial revolution. Cornucopia[70] chose quantity over quality and resulted in a wasteful society.

[69] Herman Pleij (1943) Dutch historian.
[70] The horn of plenty in classical antiquity.

Being in fashion and obtaining the newest products diminishes the tactile qualities of matter. (Sennet, 2008, 110) Even though in current society especially among the new generations there is a tendency that humans dislike ownership. Owning something comes often with responsibilities and tasks. Hence, people prefer to use shared property. By this shift in perception mankind is in my opinion losing an important basic principal at the origin of sustainable development. In the article Spiritual History of the Living Caretaking World – in a book of essays, Dwellings – , author Linda Hogan writes, "Caretaking is the utmost spiritual and physical responsibility of our time, and perhaps that stewardship is finally our place in the web of life, our work, the solution to the mystery of what we are." (Benyus, 1997, 295) Also emphasised by Janine Benyus (1997, 294): appreciating life lasting well-made products will make us value the resource and will let us take better care of it. Understanding how it is constituted is one way to create a personal compassionate attitude towards the object and makes one care more. Within this new development top down providers of goods will have a harder time to take in account the wellbeing of the earth, because the responsibility is taken away from the owner. On the other hand providers could have a bigger impact on the environment, if they do take care of sustainable development. Eventually the personal affection with the object will create an embedded feeling and makes people act more consciously and therefor creates less wasteful behaviour. Utilizing a participatory design strategy is another way to constitute a compassionate position within the build environment and thereby fulfil and ecological goal. This position gets reinforced by Warwick Fox (2000, 105) in his book: 'Ethics and the Built Environment. The same principal can be found in craftsmanship.

### Craftsmanship

The love for making something with passion creates a connection with the object. Spending time on crafting; effort, sweat and pain that goes into making something with a perfect objective gives human's satisfaction.[71] The outcome is shaped according to your standards and made in a way the crafts man likes it. Making something causes dopamine to release will keep us happy during the failures of the process. Intense physical labour will be made bearable by endorphins. The finished product can be admired releasing serotonin and the maker can be proud of it. In the aim for perfection, it takes time to critically reflect and come up with a coherent design solution. Hence the flow of matter and energy is slower, more natural and human. Due to the fact that ecological systems are able to respond and readjust the life is able to find a new

[71] Toby Faber , *Stradivarius* (London: Macmillan, 2004), 59

metastable state. Therefor it creates in principle less impact and damage to the environment.

Craftsmanship subject to digitalisation caused a disconnection between the nature of things and what is being made by humans. For the field of makers this has consequences, in the architectural profession for example this has impact on the design process.

> When CAD first entered architectural teaching, replacing drawing by hand, a young architect at MIT observed that "when you draw a site, when you put in the counter lines and the trees, it becomes ingrained in your mind. You come to know the site in a way that is not possible with the computer. (Sennet, 2008, 40)

Another aspect which is influencing the design is digital simulation.

> Simulation is an imperfect substitute for accounting the sensation of light, wind, and heat on site. The designers would perhaps have done better to sit unprotected in the midday Georgia sun for an hour before going to work each day; physical discomfort would have made them see better. The large issue here is that simulation can be poor substitute for tactile experience. (Sennet, 2008, 42-43)

Information from our senses processed by the brain evokes certain kind of feelings and emotions. The embodiment of knowledge during the process has value. Within the mind a multitude of connections can be made between different parts of knowledge – something which could not yet be done outside our brains – and give the designer an intuition for de right decisions.

Even in the building process digitalisation has extensive consequences. In the late nineteenth century blueprints started functioning as a document for claims in the eye of justice. The philosophy of a design being complete before it gets build creates an obstructing inconvenience. Constraining regulations within the build environment does not allow life – small businesses, spontaneous event and build enriching refinements – to flourish. (Sennet, 2008, 41-43) Off course we should use the digital capacities to enrich and ease our life, but we should definitely find new ways to release our self from the impeding effects. And next to that redefine human values and set realistic norms. As Richard Sennet (2008, 45) firmly states: "To the absolutist in every craftsman, each imperfection is a failure; to the practitioner obsession with perfection seems a prescription for failure". Humanity should accept variations, flaws, and irregularities and embrace the imperfect perfection. This is part of our human existence, contributes to diversity and is an enrichment of society.

When humanity is able to accept that nothing is perfect, we would have a more realistic perspective on life. Expectations are a recipe for disappointment. The Buddhist approach to life comes closer to a viable perspective. A traditional Japanese concept;

Wabi-sabi; expresses acceptance of perishableness. The aesthetical appearance could be described as imperfect, rough, asymmetric and incomplete. The philosophy: "appreciates the ingenuous integrity of natural objects and processes". This point of view finds similarities within the picturesque, a specific genre within the field of architectural landscaping. The style came into existence in the late 18th century in Great Britain, as a reaction to the inexonerably order of the Neo-classicists. Picturesque, means literally; the adoration of the picture in all its facets. Every aspect of the scenery; like variety, irregularity, asymmetry, and interesting textures has value and forms an equal addition to the quality in its totality. Natural influence got glorified and divine imperfection was seen as beauty. In the current architectural discourse a comparative new movement arose as a result of being subject to intensifying ecological complications within society. New materialism advocates ecological equality and reflects on anthropocentric heteropoiesis[72]. The architectural theory department of the TU Delft beautifully points out that: "According to this view, architecture does not represent a culture but is a mechanism of culture."

### The Temple of the Natural Delights

In Europe after 1100 a new phase of stability and prosperity commenced. With this development a new kind of religious architecture came into existence. Gothic architecture – even though it had many variations - could be recognized by ribbed vaults and pointed arches. The comparative – for this point in history - slender construction skeletons allowed natural light to come in. The expressive verticality and colored gloam of the tinted glass windows evoked divine feelings. The great gothic cathedrals got build all over Europe to win back holy terrain from Islamic spreading. (Watkin, 2008, 149) This period cathedrals in Europe got build to advocate, support and create a specific culture. Architecture is able to function as mechanism for culture. As humans we need to have these physical places to go to and thereby live the lifestyle that is lived within that community. Hereby we feel engaged and supported by all the others that think likewise. It physically binds people and thereby creates a mental connection. The feelings and emotions this brings up contributes eventually to the goal of the whole community and strengthens trust within the imaginary order.

Humans have been doing this since the history of civilization. The social impact of the Temple complexes of Karnak and Luxor in Egypt could be compared with the big cathedrals in medieval Europe. The old Egyptians build temples as dwellings for their

[72] Heteropoietic; artefacts with limited autonomy designed by man to organise transversal processes.

gods. Lots of people think a temple is only a building where religious gatherings take place which praise the god. However temples or temple complexes had more than one function at the time. Temples fulfilled a religious, artistic and educative role which looks most like the medieval monasteries although they did not serve a place for community. (Watkin, 2008, 16) In Buddhism a temple is a place where monks live and layman could go to, to ask for advice in a spiritual sense. In the classical antiquity temples had a complex religious, political, social and economic function. Temples had stock of cattle, land, forest and goods as possession, for example in the temple of Inanna in Erech.[73] It were the administration centres off agricultural and trade activities, functioned for urban planning and as employment scholarship, assigning personnel and chores for the whole area. Craftsman, farmers, shepherds, chicken farmers, fisherman and fruit cultivators got signed for their tasks. Everything got done in relation to the god. In Egypt people could even go to temple complexes for mental and physical wellness and health treatments. With this purpose there were thermal baths. Priests had extensive knowledge about the usage of herbs and minerals. The gardens had the functional propose to grow herbs, but on the other hand also served for comfort.

Current temples of society could be seen as bank buildings, stock exchange and market halls. It's in these buildings where money is divined, consumerism is the social code and everything is organized according to the capitalistic system. Nowadays humanity is living in the most critical period of time in the history of mankind. Conflicting religions, pollution and climate change are a threat to human wellbeing. This might be harsh to say, but I do agree with Heidegger[74] when he compared the holocaust to mechanized agriculture on a global scale. If humanity does not change its behavior, our species will get extinct by the consequences of temperature rise. Just like man changed its behavior from slavery to equality, it is time for man to grow up and start taking care of the environment. The adolescence of mankind is a necessity for sustainable development.

To contribute to transformation of society towards a more sustainable community I propose to develop a new kind of temple. The modern temple should respond to actual societal problems. Juhani Pallasmaa (2017, 241) mentioned: "We can argue likewise that even architecture is fundamentally not about architecture, but about our experience of the world and of ourselves in this world." The temple should, like it always did in the history of mankind fulfil a social goal. Establishing a new global culture by building temples all over the world, just like the great gothic cathedrals in Europe. The temple

[73] In Erech has been found the famous Warkavase where these scenes are illustrated on.
[74] Martin Heidegger (1889 - 1976) German philosopher a seminal thinker in the Continental tradition and philosophical hermeneutics. Widely acknowledged to be to most original and important philosophers of the 20th century. Best known for his contributions to phenomenology and existentialism.

will become an icon for sustainable life, to strengthen and spread this new philosophy about life on earth. Situated around the metropolises, they are able to reach lots of people that would never think in a sustainable manner. Attract them and show them the new way of living in such a manner that they will be seduced or even made addicts to this new way of living. Hence, people change life styles in their own living habitats. The nature of the universe - the interconnected structure of all elements - has to be divined in order to emphasize the humble position of mankind within the web of life. The human species is part of the whole and should act as mediators. Thereby we could together decide which natural delights – this includes also things made by humans, but also natural phenomena which could be used to satisfy our needs - are best for all of us. Therefor I call the modern centre of society the 'Temple of the natural delights'.

Despite of all development in technology, digitalization and the good things it has brought us, we are also prisoners of our own cage. Artificial lighting disconnected us from the natural day night rhythm and disturbed our sleep cycles. Humanity created the ability to socially connect always, everywhere and for everybody over the whole world. Hence, we almost never have the rest and time for oneself; with stress as a result. We are developing a robotized society which makes it easier for man, due to the fact that we not have to spend the energy ourselves. Although also move to little resulting in preponderate. Even a lack of chemical released in the brain when doing exercise which contributes to depressions. Eventually this will result in the quest for meaningfulness of mankind. We have designed a system based on capitalistic efficiency and not from the intrinsic needs of man. The human intrinsic system still works the same as these of the home sapiens who were hunting and gathering on the African savanna. The temple wants to reconnect to our intrinsic human needs en free us from the capitalistic prison. Everybody serves the capitalistic system but where are we going. Profit is used to invest in things which gain more profit without thinking about the environment. We are approaching a period in the history of mankind where we are able to play with the biological codes. What will be left of us humans when this starts to develop? And if things get build which are smarter, stronger and better than us; would this new species exterminate us? At least, if we did not pollute the earth so much that life is not even possible anymore. The Temple of the 21$^{st}$ century needs to be a place for debate outside of the dogmatic realm of capitalistic reality.

The mission is to inform, inspire and engage individual and collective participation for global transformation in harmony with all life. The temple does this by integrating nature and architecture. Serve the needs of man to the maximum with minimal needs now and in the future. Taking lesson from biology and using the forces of nature in a

clever way. Work for the stimulation of life; biodiversity, air quality and cleaning the world. Initiate the sustainable metabolism of the city. The complex is autarkic; growing its own food, providing in its own electricity and water. Reconfigure the relation between man, architecture and nature in order to maintain this diversity. It will function as a centre for conferences to raise consciousness about ecology and sharing transformational thinking and policy initiatives, aesthetic beauty and collective wisdom. The temple has to become an icon of the new life that has to be lived in the 21st century. Carried out as a new religion where everybody is able to contribute to this movement. It will give direction to human development and strengthen the sustainable revolution. Like in the movie from Nathaniel Kahn; 'My Architect' - about Lious Kahn - a citizen of Bangladesh said about the National Assembly Building of Bangladesh that: "He has given us the institution for democracy, from where we could rise." I think we should create an institute for sustainable development from where the world can rise.

**Grasp**

Humans have always used art in a sense to express individual and communal appearance. One could argue that there is no actual further primary need besides showing in which group one belongs or in which group you do not want belong. It is something which we are able to do, because we are so ‘well developed’ that we have the ability to worry about how something looks. Art could be seen as a luxury good. Although even our ancestors in the early existence of our species, have been involved in aesthetic activities. The decoration of life through shape, colour, texture, sound, rhythm and movement are part of our species existence. Art was not only used for self-expression or aesthetic pleasure it was also used for spiritual rituals and social identity. It is this social aspect about art which makes it an interesting tool for the transformation of society. The social identity we always want to express, in order to belong to a certain group. Fashion in general is not sustainable, because it contains an ever occurring creation of new styles and thereby a production of waste. On the other hand it could be used to fulfil an ethical goal. It is nowadays cool to be part of the green movement and if in right group configurations even embarrassing when you’re not. Life aesthetics contribute to the bonding of these people and the strengthening of the new imaginary order.

## Epilogue

For centuries humans have been trying to comprehend the universe. Our desire to know and the ability explain why arose from our ingenuity. The skill to make fire caused food to be processed more easily which left more energy for other actions. For instance to think, our cerebral processes consume the most energy of the physiological functions. The well-developed frontal lobe in the brain, the place where consciousness arises gave us the ability to observe and in combination with fine locomotion of the human body the capacity to create. Humans have also been creating beautiful theoretical constructions to clarify and explain our existence. The big bang, genesis of life in stromatolites, Darwin's-evolution theory, Copernicus's planetary system, Newton's gravity, Einstein's general relativity, Quantum mechanics and entanglement. Currently scientists are working on a theory which combines Quantum theory with Gravity; String theory, quantum gravity and a couple of others are in the race to find an abstract mathematical model which defines the physics of life. Due to the fact that the theory for the macro scale does not compare with the one for the micro part in our universe, an all-embracing theory has not been found yet. These describing theories are constructed from a specific perspective, the eye of the observer and therefor formulated in a specific sense. Perhaps that is the reason why these universal theories do not match, at least one could speculate.

The scientific developments we've gone through as a species caused in many cases comfortable developments. Security of shelter, health care, energy resources, food supply, transport, communication and many others. On the other hand the same developments have side effects which are not necessarily so good for human well-being. Only 10 per cent of our brain activity is being consciously aware. The far larger part of our brain functions through automatic chemical reactions creating action potentials. These transport information from different parts of the brain through the nerve system to our muscles creating certain kinds of behaviour. Due to the abstraction of consciousness, humans will never able to consider all effects of the developments we go through. Perhaps we shouldn't because most of the time the things that do not matter at all for the greater good, are the things that make us happy and is in that sense very human. Nevertheless the small part of our brain that is aware makes us think. This capacity should be used for the greater good. By debate and discussion it is possible together as a group to reveal all consequences of several acts and thereby be more deal with it in a more suitable manner.

The relative stable climate in which humanity developed caused our species to exponentially grow, transform the lithosphere and develop a vast amount of systems for life. You could ask yourself the question if this was the best scenario for our species and other living beings on earth. The geological history of the earth has known much larger disasters, causing several species to go extinct. Hence, climate change is still just a small incident compared to that. This does not exclude that it is a harbinger for a much larger catastrophe to come. The notion and our awareness of the possible consequences cause already the biggest threat humanity has had so far, because it is a concern to all of us. The fact that humanity has known this for decades and we are still not heading in the right direction to prevent an ecological disaster makes many legitimately worry. Perhaps the problems are to vast, manifold and indirect for us humans to take care for. Most of our decisions are indeed based on direct satisfaction. Due to the separation of the systems that support life, we can never actually see the consequences of our actions within these long chains of occurrences. Block chain tries to get hold of this problem but still it is so manifold that it is very hard to control all of it. One could speculate that the total organism of the earth is reacting against the explosion of human population and earth surface transformation, in order to Meta-stabilize the system as a whole. If the human species gets extinct through climate change it is certain that the earth and its remaining organisms will continue life until our sun has burned its last fuels and explodes. The forces of nature are so immense compared to our human influences that it is madness to think we are able to control. It is also too mysterious that humans will ever be able to comprehend. We called ourselves the Homo Sapiens; the wise man. Such an arrogant description, when you see the negative side effects of our innovations. The vast amount of pollution, the biggest mass extinction in the history of the earth, the largest destruction of natural landscapes, the cause of a change in the chemical consistence of our atmosphere and we have created a system which causes the biggest suicide rates in the history of mankind. Humanity is nothing compared to the bigger system which makes the world go round.

Nevertheless the drive and ingenuity to survive should be used. Humanity is constrained in by systems and regulations created by ourselves. Capitalism does not express values necessary for good biological life. This should be discussed and flaws in the system should be pointed out. Anyhow it is the system which should be dealt with. Sustainable development should incorporate this and technological innovations in order to make positive transformations. We cannot ignore these and go back because it is not an effective solution. Humanity should be aware of its consequences. When humankind comprehends the negative side effects, we should try to ban them from our society. This

will never happen through prohibition. We have to find ways to make sustainable development attractive for everyone, because we have to do it with them if we want to change the society as a whole. There is nothing to lose. We should at least try to make the world a better place for the sake of humanity like we always did. This is one of the reasons humankind became so big in the first place. The desire for a better life is an explanation for the upcoming green movement. Humanity has to incorporate new insights into our ways of living. Unfortunately man is constrained by motives that arise from different ideals. Individualism and capitalism evoke schizophrenic acts. This involves decisions of corporation between the short term satisfaction of creating stable incomes for themselves and their employees or the choice to transform policies in favour of the wellbeing of the environment, thereby humanity and all living beings.

If we want to create an environment which supports life on earth it has to considers natural systems it involves. Taking lessons from nature can help us to achieve sustainable development. Recycling waste is a temporary solution for our resource supply and pollution problems. Designing new materials that grow and in their chemical process take in carbon dioxide could benefit the consistency of the atmosphere. Integrating natural systems into the build environment will create more efficient systems. The visibility and direct confrontation with these systems - food supply, water, energy, production of goods – will create a more direct feedback and therefor the systems reaction is more suitable. The assembly of multiple species constitutes new possibilities to maintain a certain biodiversity needed for the health of the biological system. Even so the interaction with other species leads to empathy towards them which perhaps makes us more care for them. This al goes up for physical world, although there is such a vast amount of build environment it is very hard to transform. The implementation of new sustainable environment will not be enough to transform society to a lasting community.

People are led by myths, stories and social constructs about how life should be lived. These conceptions are solidified in the build environment, architecture, education, theatre, movies, art and other cultural expressions. The green perspective on life has on the one hand get physical places from where this can rise. Places that not only influence the behaviour of man on this specific location. They even have to change the way of thinking of its visitors and thereby influence their actions outside of these places to cause a snowball effect. Creating a collective belief that humanity is able to influence, because more people desire to live another life. In my opinion The Temple of the natural delights could have a major impact on society. It will create a place for exploration and a place where people who think likewise can physically bond to

strengthen our sustainable responsible intersubjective reality. Even if this project never comes in to realization it could have an impact, because of a certain belief and desire. As an architectural design it can inspire, evoke discussion and influence the discourse. On a much larger global scale if it finds it ways through different media, but also on the small scale through personal communication.

Perhaps there will be a solution to our problems in society, due to the fact that it might not be in the nature of humans to be good for our environment. Anyway the desire to do good; the genuine love and conscientious sincerity creates a stamina for life, maybe our human goal for the meaning of life. Even so I have the feeling that this approximation of the truth will find its way in the web of life, because it is stronger than false constructs. Our deepest desires can never be satisfied, because it is the longing itself that is satisfying. Follow your emotion and gut feeling and surrender to the wonderful experience called life.

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