SUSTAINING LIFE
How can Architecture give Nature a Helping Hand

René Görtz
Abstract

“Sustaining Life” deals with the natural environment and the place of humans within it. The definition of life, sustainability, nature, environment, ecology and architecture are investigated. This is followed by the examination of the relationship between humans and nature, and the mainstream Netherlands sociopolitical attitude towards nature.

We are not alone on the world. We are part of a whole (interconnected umwelts) and should not just think only about ourselves. In order to sustain themselves humans have depended on nature’s biodiversity and the resources it provides. Nature in essence is a selfish act and for humanity this often equates to kill or be killed, a choice between life or death. However, there is increasing realisation that we need other species to survive. Architecture should not only be abstracted solely for the use of humans but should act so that other organisms can thrive within the same environment. Life is belief, beliefs are reflected in architecture, thus architecture is life.

This topic has relevance to new urban questions through the investigation of how architecture should respond to the environmental issues of the 21st century.
Introduction

This academic essay relates to the architecture course “New Urban Questions” at TU Delft. During the lecture series I was inspired by the lecture of dr. ir. Andrej Radman, which encouraged further investigation into the topic of environmentalism. This subject also offers the opportunity for greater understanding of my graduation project for Complex Projects “The Botanical Sanctuary”, positioned within the context of 2050. The Sanctuary will offer a place in which plants, animals and humans connect in harmony.

Environmental philosophy has relevance to architecture because it deals with the natural environment and the place of humans within it. This field of research is highly relevant to the challenges of the 21st century such as global warming, the depletion of earth resources and the damage to its ecosystems.

“Sustaining Life” will propose how architecture should deal with the environment. Why sustaining life is important for architecture and vice versa. Should we give nature a helping hand through the intervention of architecture? To approach this question the essay will define life, sustainability, nature, environment, ecology and architecture, followed by examination of the relationship between humans and nature, and the mainstream Dutch sociopolitical attitude towards nature.

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What is life?

There is no simple answer to this question. Scientists and philosophers have approached this question in different ways.

The dictionary definition is “The condition that distinguishes animals and plants from inorganic matter, including the capacity for growth, reproduction, functional activity, and continual change preceding death”. Thus both plants and animals have life, whereas inorganic substances do not. The opposite of living is dead. The German philosopher Friedrich Nietzsche said “what doesn’t kill me makes me stronger”. The underlying thought being that you create a resistance to something through a process of learning and adapting.

Plants are essential for life on Earth. Plants capture the light of the sun and use this for the chemical process of photosynthesis. Plants are an essential resource for food, breathable air, water regulation, habitats, medicines and the regulation of the climate. In essence all life is a sequence of chemical processes with a lifespan ranging between birth and death. In which case Earth could be considered as “living” rather than just supporting life. It underwent birth and will eventually die. In order for humanity to survive (be alive) beyond this point it will need to expand beyond the Earth. If mankind could create an environment that would artificially control the necessary biochemical processes it is possible but would this be a healthy situation, would we still have meaning in our lives?

Albert Einstein wrote the following in, ‘Ideas and Opinions’ “What is the meaning of human life, or, for that matter, of the life of any creature? You ask: Does it make any sense, then, to pose this question? I answer: The man who regards his own life and that of his fellow creatures as meaningless is not merely unhappy but hardly fit for life.” This suggests that for Einstein, “belief and meaning” are essential to human life. If you do not believe in anything, why would you then be motivated to take action?

He further wrote: “a human being is part of the whole, which we call the “Universe”. He experiences himself, his thoughts and feelings as something separated from the rest, a kind of optical delusion of his consciousness. This delusion is a kind of prison to us, restricting us to our personal desires and affection for a few persons nearest us. Our task must be to free ourselves from this prison by widening our circle of compassion to embrace all living creatures and the whole of nature in its astonishing beauty.” We should not just think about ourselves but also other species that nature has to offer. This is more simply said than done. If a human has to choose between the death of a human or a cow, the choice seems obvious, but what if that cow would eventually be the only option to keep you alive through it’s supply of food? This leads on to the next consideration of sustainability.

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What is sustainable?

The dictionary defines sustainable as “able to be maintained at a certain rate or level”\(^5\). The United Nations noted in 1987 that sustainable development meets current needs without compromising the well-being of future generations.\(^6\) The world population was over 7.4 billion people in 2016. In 2017 the United Nations estimated that the world population will reach 9.7 billion people in 2050 and peak at just over 11 billion people in 2100.\(^7\) Will there be enough resources (food, water and energy) for people in order to sustain themselves. In other words, what is the carrying capacity of earth?

According to Vivien Cumming our current level of knowledge does not allow us to predict whether such a large population is sustainable.\(^8\) Scientists have made a variety of estimates ranging between 2 to 1024 billion people. David Satterthwaite says “It is not the number of people on the planet that is the issue but the number of consumers and the scale and nature of their consumption”. He quotes Gandhi: “The world has enough for everyone’s needs, but not enough for everyone’s greed.”

Another threat is diminished biodiversity, greenhouse effects, depletion of resources, and over use of pesticides. Humans have always depended on nature’s biodiversity and the resources it provides. Global warming, as a result of the enhanced greenhouse effect, is causing shifts in the climatic systems of the Earth. This will have an effect on biodiversity in both natural and agricultural systems. The scale of these effects still has to be fully identified and understood.

According to Aaron Bernstein it is important to create natural awareness in order to sustain natures biodiversity, especially when you consider that people have very little knowledge of the natural world surrounding them and how we depend on it.\(^9\)


What is nature?

So if we depend so much on the process of nature, it is important to understand what nature is.

The dictionary defines nature as “the phenomena of the physical world collectively, including plants, animals, the landscape, and other features and products of the earth, as opposed to humans or human creations.”

An important aspect in this definition is that humans are not specifically included. So Nature is everything, without the influence of human and its creations. Why is it so important to make a distinction between being human and not being human, and between its creations? According to Darwin’s theory of evolution, humans have evolved from the same ancestors as other mammal species. This in essence would make humans part of nature too, although their influence is often viewed as anti-environmental and unnatural.

This is a conundrum. Humans evolved naturally and like any animal or plant they seek to manipulate and control their environment for their own ends – to survive and expand their colony. However, we are increasingly masters of this art, ranging from the manipulation and exploitation of the smallest particles to the largest landscapes. We can manipulate genes and change the nature of our species. We can cut down huge forests and replace with buildings and transport systems. We can mine the depths of the earth and pollute its surface. So we could in theory manipulate nature, or at least its processes, in diverse and significant ways. But do we really want to, and are we aware fully of the consequences? Is it ethical to take a gamble, without really being aware of what might happen to later generations? This relates back to the question of the human vs cow – do we kill the cow now or do we think about the future consequences of that action?

In an essay entitled “The Ethics of Respect for Nature,” published in 1981 and included in most collections of works on environmental ethics since then, Paul Taylor argues that wild living things possess inherent worth and should be respected as such.

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What is an environment?

The dictionary describes environment as “the surroundings or conditions in which a person, animal, or plant lives or operates.”\textsuperscript{12} This is important to appreciate because if the conditions are not suitable, a person, animal or plant will not be able to operate within its environment.

The German translation for environment is “umwelt”. German biologist Jakob von Uexküll explains in his book A Foray Into the Worlds of Animals and Humans, that organisms can have different umwelten, even though they share the same environment.\textsuperscript{13} The term is usually described as a “self-centred” world. However the subject is never really alone. The umwelt of each organism consists of functional components that have specific meaning to it. Important to understand is that environments are subject to change. Although the term is often looked at through a singular perspective, environments are able to interact with one another.

Buchanan Brett addresses this issue in his book. A single subject interacts with other things within an environmental setting and only by considering this does an understanding of the living organism emerge. He quotes Uexküll “We see here the first comprehensive musical law of nature. All living beings have their origin in a duet”.\textsuperscript{14}

The umwelt of a human is case specific and depends upon their direct environment and history. Something specific might have meaning for one person and not for the other. We could argue that the collective sizes of a humans personal umwelt has expanded. The realisation of the harmful impact we are having on the environment only began with the development of our scientific-technological civilisation.\textsuperscript{15} This has specific meaning to all of us because although our environments exist on different personal scales, they are all eventually interconnected and we depend on the condition of each environment for our survival. On a positive note humans have evolved as a result of survival through adaption to changing environments and we are able to exert influence on the environment to manipulate it to our advantage in a beneficial direction.

The functioning of an ecosystem is thus critically dependent on the biodiversity of its constituent species and populations, and it is this functioning that determines the ability of ecosystems to provide the essential goods and services that keep humans and all other species on the planet alive.\textsuperscript{16}

From this point this essay will focus on architecture its role in creating sustainable environments and how it can give nature a helping hand.


What is architecture?

There are many and varied definitions of architecture. The dictionary describes architecture as "the art or practice of designing and constructing buildings." This design and construction does not necessarily involve a professional architect and can vary in scale, for example, from a small simple shed in someone's garden to a large city like Amsterdam.

Architecture positions itself on the left side of science. Architecture as a profession is less exact, biology and science is in the middle, and mathematics is on the right being very exact. There is always uncertainty if something is the best design for a specific purpose. Often there are multiple solutions to a specific design question. This is the opposite to mathematics where only one correct answer is possible. A thorough approach to architecture can only be achieved by argumentation and a critical process of continuous adaptation. In this way it responds to multiple people each with their own believes and personal perception. This is especially important today, because we are moving to a world that is becoming increasingly intertwined. Architecture is also about context. In 1982 Gregotti wrote “the task of the architectural project is to reveal, through the transformation of form, the essence of the surrounding context”. However, the essence of a given context may vary per person based on their beliefs.

In the past, buildings were mainly constructed with building materials and techniques that were available in the immediate environment. In the previous section is was highlighted that environments differ from each other and are subject to change. This is one of the main reasons why there are varying built forms all over the world. Architecture is a reflection of our society and beliefs. At the same time, architecture can also act as a powerful tool that can influence people’s personal perception of how they think about the world, including the subject of nature and ecology. It could therefore be argued that architecture is an informative device that promotes a certain message or process of thought. In order to think differently, you have to feel differently. Architecture can act as a psychotropic device through provoking and induction of the environment. In the past architecture has been used for political purposes. There are multiple examples of monumental buildings positioned and designed in such a way that they are of a higher order in the hierarchy of other buildings in their immediate surroundings. Often a story is linked to these buildings that, depending on a person’s history, is perceived differently and has therefore different meaning. Because architectural built forms often have a longer lifespan than humans, surpassing many lifetimes, they can act as a sort of Time Machine of thought.

If we want to move towards a world in which we believe that we should be more eco friendly, more aware of our impact on nature and more sustainable, architecture can play a pivotal role in communicating this message. One example of this is the design and construction of many impressive botanical gardens and associated structures throughout the world. Such developments have been central in increasing knowledge and understanding of environmental issues, the conservation and preservation of fauna and flora and their reestablishment in denuded areas of the world.

The University of Padua has the first botanical garden (1545) in the world and has a rich history with plants. It describes the relationship between plants and humans as a source of sustenance and remedy to treat illness, a means of alleviating fatigue and supply of “simple” materials (to make clothes, objects, ornaments, musical instruments and writing implements), and the source of myths and religious symbols - these are plants in their daily relationship with man. Although the relationship between man and nature has changed through time, botanical gardens have


always responded to the values and interests of the day including; medicines, sciences, education, economics, aesthetics and a more recently for the conservation of plants. In the 21st century this will undoubtedly increase as people become more aware of, and concerned with, environmental sustainability.
What is the relationship between man and nature?

Firstly, humans (homo sapiens) are animals, originating from large apes through the process of natural selection. Just like other organisms, this process has been nothing other than a battle for existence between its natural competitors. Nature both gives and takes away.\(^{21}\)

It is known that early civilisations have created severe environmental damage, in principle this is no different than what is happening currently. The cultivation by the Roman Empire is an example of this. Drainage, cultivation, cutting down of forests, and even the introduction of new plants and animals, destroying some of the older, established species and altering the relationship between those that remain.\(^{22}\) Such changes allowed the human race to expand, however, we are increasingly aware that a change in attitude and practices is needed to allow for future development to be sustainable.

Wouter de Groot describes four main views of the relationship between Man and Nature.
1) Man as Master and Possessor of nature (From Decrates, ‘Discours de la Méthode’)
2) Man as nature’s Guardian (Genesis 1: 24-31)
3) Partnership with Nature (Ebenreck 1983)
4) Participation in Nature (Zweers 1989)\(^{23}\)

So if architecture is a reflection of our society and beliefs, this is also the case for politics, which plays a very important part in decision making concerning how we should sustain life, and thus how we should deal with nature, environmental problems, and its ecology. The following section investigates the Netherlands sociopolitical environment in this respect.


What is the mainstream Netherlands sociopolitical attitude towards nature?

The people of the Netherlands are masters of the landscape, especially from a historical perspective. According to the dictionary the word "landscape" finds its origin in the late 16th century from Middle Dutch lantscap, from land ‘land’ + scap (equivalent of -ship).\(^{24}\) Literally meaning floating on water. Early on the Dutch have cultivated the original peat landscape into lakes by excavating the peat for energy to heat their homes. This resulted in large peat lakes, which were later reclaimed into land with waterworks such as dikes, canals and pumping stations for the creation of valuable land for agriculture and living. Especially in the 16th century, this was a huge operation and required intense cooperation between the people. It is a well known fact that the strength of a dike is its weakest link. This tradition still exists today, where all building works have to be communicated and approved by several governmental bodies on both national and local scale. The Dutch literally took possession of nature through mastering the landscape with an attitude of man over nature.

The Netherlands is a compromise country. Following the Aristotelian principle, you will not successfully win an argument if you try to convince that you are completely right. The Dutch do not like ‘persuading’, an image is ‘sold’ by neatly arranging opponents on your left and on your right and placing yourself in the middle.\(^{25}\)

It is rare that political parties completely rule on their own, rather coalitions are formed. This means that there will always be some trading off in the decision making process. However, looking at the representation of political parties on both the national and the local level, you get a good sense of the mainstream sociopolitical attitude of the people towards nature. Both on the scale of the Netherlands\(^{26}\) and that of Amsterdam\(^{27}\) there is a majority in the following parties; VVD (conservative liberalism), CDA (christian democracy), D66 (social liberalism) and PvdA (social democracy).

<table>
<thead>
<tr>
<th>Party</th>
<th>NL Seats</th>
<th>NL Ratio</th>
<th>AMS Seats</th>
<th>AMS Ratio</th>
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<tr>
<td>VVD</td>
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<tr>
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Each of these parties have their own view "slogan" towards the topic of nature and the environment;


For years the CDA was the largest party in the Netherlands. They have the main attitude of “man as master and possessor of nature”. However, this has shifted with the social liberal party VVD being the largest representative party in the Netherlands. Although they say that it is important to take good care of nature, they do not properly define the value of nature or state precisely how this can be done. The party seems to like keeping things as they are and taking good care of it, as a guardian. However, when looking at D66, which is the major party in Amsterdam their message is much clearer. D66 recognises the importance of green growth and say that this is key for a prosperous future. This progressive attitude tends much more to that of partnership with nature. The development of a new botanical garden would fit with this line of thought. The underlying meaning of PvdA towards the topic of nature tends towards the recognition of ecology, and giving it more space to grow, with us participating in Nature. The overlap between the Netherlands and Amsterdam seems to be positioned in the political spectrum between D66 and VVD.

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Conclusion

Life is belief, beliefs are reflected in architecture, thus architecture is life. Nature in essence is a selfish act and for humanity this often equates to kill or be killed, a choice between life or death. However, there is increasing realisation that we need other species to survive. Architecture should not only be abstracted solely for the use of humans but should act so that other organisms can thrive within the same environment.

We are not alone on the world. Plants are essential for life on Earth. Just as believe and meaning are essential to human life. We are part of a whole (interconnected umwelts) and should not just think only about ourselves but also other species that nature has to offer. In order to sustain themselves humans have depended on nature’s biodiversity and the resources it provides.

Humans are able to manipulate natural processes, both on small and large scales. Humans are in a position to adapt environments to their needs and are therefore able to create their own umwelt, with things that have specific meaning to us. We can eradicate our predators and other organisms that do not seem to be of immediate benefit to us. However, such environmental changes have specific meaning to all of us, because we share our interconnected environments. Humans do not fully understand the full scale of nature as yet and thus consequences of our actions are largely unknown but are becoming increasingly apparent. Therefore it is necessary to create awareness to sustain the biodiversity that we depend upon.

Architecture is a reflection of our society and beliefs. It is a powerful tool that can influence people’s perception of the world, including the subject of nature and ecology and can be used effectively for communicating this message. Botanical gardens have always responded to the values and interests of the day, and can be an important tool to create awareness of, and interest in, the natural world. Architecture should also respond (and is responding) to environmental issues, including climate change, through innovations in construction processes and materials. Architecture, especially during modernism, has been about abstraction. Now designs should be more elaborated, not only serving direct human needs but also having a minimal impact on its surrounding and interconnected environment.

Political perspectives and actions are crucial. D66 holds the largest representation in Amsterdam, and VVD in the Netherlands. The sociopolitical attitude recognises in the importance of nature, but has different perceptions on the relationship between mankind and nature. This varies from humans as nature’s guardian to humans in partnership with nature. Sustainability could be achievable in the current political system if people believe that this could make a change to their life. In order to think differently, you have to feel differently. You have to be provoked through induction of your environment. The Botanical Garden could act as a psychotropic device to make people think differently and become aware of the natural environment.

The architecture of the botanical garden should deal with the environment in several ways. Firstly, it should be constructed through a sustainable built process out of eco friendly materials. Secondly, it should not only be abstracted to the “direct” needs of humans solely, but also stimulate understanding of the needs of other organisms the ‘interconnected’ environment. Thirdly, the design must allow visitors to immerse themselves in nature and divert their attention from themselves to the wider planet. These three steps represent an architectural design based on doing, perceiving and learning.
Bibliography of Readings

*Words and Buildings* examines the relationship between language and architecture. It is a essential reading to anyone concerned with architecture and culture in the modern era.

*Ideas and Opinions* holds a collection of Albert Einstein’s most important writings from his earlier works until his death. It includes a wide range of subjects including the of religion and science.

*Environmental Philosophy* describes our attitude towards the environment within their cultural and historical setting. The book reflects on acknowledged dichotomies such as man versus nature. Christopher seeks to conciliate rather than to confront.

*Onto-Ethologies* examines the significance of animal environments in contemporary continental thought.

*Images of Development* questions the dominant biological approach of explaining animal development as entirely genetic by exploring the explanatory value of investigating environmental influences. She provides perspectives from biology, philosophy of science, and ethics in an integrative way.

*Green History* traces the development of ecological writing through history. It is a critical review of green movements and ideas. It is reinforcing the importance of environmental concern and action in our own time.

*Sustaining Life* reveals how human health depends on biodiversity. It is the first book to examine the full range of potential threats that diminishing biodiversity poses to human health. *Sustaining Life* outlines the ecological, aesthetic, ethical, sociological and economical consequences of this loss.

Friedrich, Nietzsche (1889). *Twilight of the Idols or How to Philosophise with a Hammer*. Indianapolis: Hackett Publishing Company
*Twilight of the Idols* holds a compressed overview of many of Nietzsche’s ideas. The writings are translated by Richard Polt into contemporary English.

Jakob von Uexküll is a well known for his work in the field of biology and philosophy. *A Foray Into the Worlds of Animals and Humans* talks about the concept of *umwelt* and explores the unique social and physical environments that different species and individuals inhabit.

*Beyond Environmentalism* presents a philosophy of nature. It talks about humans place in the natural world and their responsibilities concerning it. This philosophy is based on the
fact that humankind is an integral part of the natural world. The author writes that humankind must seek its own destiny and that it cannot flourish unless nature flourishes as a whole.


*With Respect for Nature* explores how humans can take the lives of animals and plants while maintaining a proper respect both for ecosystems and for those who live in them.


This scientific publication presents a analysis, explanation and solution of environmental problems, regardless of their location nature or scale through a problem-oriented approach.