

Hear The Clay Sing
Thinking Beyond Nature

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I sense, I think, I am

I have three ways of experiencing the world. One comes from my history, how I grew up and how that has affected my body/brain/mind. Another from how I was taught to think about the world, which was strongly influenced by my scientific degree in neuroscience. Lastly, through art I started to interact with the world in a more intuitive way, to sense with my body and to make *with* rather than *of* materials (in particular clay), allowing unconscious processes to be part of my work.

As a child I wanted to become an animal observer, as a young adult I wanted to understand the brain and as an artist I want to investigate our relationship with our living environment; all somehow have to do with the concept of *nature*. But what do we talk about when we talk about nature? As a biology student it was such a given that I never even asked myself that question. It did not start bothering me until I started working with clay. Clay is not dead, passive matter, it has its own way of being and a whole set of (hidden) potentials that you need to learn how to tease out. This is especially the case when it comes to porcelain, a fickle and strange clay body that has a strong tendency to be thixotropic, to warp, crack and shrink when you fire it, resulting eventually in the most delicate translucency. Clay can sing! When you open a kiln with glazed pieces a whole orchestra of high pitched ‘pings’ will meet you. Or when I make very dry clay wet again, it will sing to me in high whistles and low drumming sounds. Clay has an *agency*, the capacity to act, of its own. The clear boundaries of what I considered to be human and nature started to blur.

The realization that I have a worldview which colours what I think and do came later. Differences are all around us, the acceptance of heterogeneity is

part of my Dutch identity,¹ so it came almost as a surprise to me that views that I took for granted were far from universal. I have travelled and worked for longer periods in countries with very different attitudes towards nature. Though these fascinated me and made me question my own interactions with my environment, I never really touched upon my own relationship towards nature. It came to me a year ago when during a sustainable development course, fellow students and I were discussing environmental policies, but the 'nature' we were talking about kept changing. It seemed we were never really talking about the same thing, with differences in the interpretation of what nature is from person to person and from context to context. I turned out to be no exception.

My three modes of being, as a human, a scientist and an artist are not separate parts, they are what make me what I am. My history, education and practice all share a context: I grew up a white female heterosexual millennial in a western society. This has shaped my history in a certain way and thereby shaped my personal interactions with nature.² Though I have the capacity to see good in most people, I have different feelings about humanity as a whole when it comes to the planet we live on; humans tarnish and consume, extract and discard, while treating the world as a backdrop for our anthropocentric drama. Human presence in any place can only result in a negative influence as we unbalance systems that have found equilibrium for millions of years.³

1 At a young age I was exposed to different ideologies and cultures. I went to a mixed primary school and had close contact with refugee families in Dutch asylum camps through the work of my father.

2 Humans have a strong tendency to organise and to make sense of the world and I am no exception, so I have made a dissection into three parts. Which is problematic, as I argue in this thesis that things cannot be dissected this way. There are no naïve or simple bodies but it is useful for the purpose of focusing on the question at hand.

3 Five mass extinctions have already taken place, of which at least two have been caused by life forms themselves, like the great oxygenation. So tipping scales has happened before and will probably happen again. What is new about the changes we are causing is the speed at which it is happening. And also make no mistake: earth will continue to exist, the conditions for us to survive might not.

As part of the generation that grew up in the eighties and nineties, where white rhinos were going extinct and a hole in the ozone layer was growing, it is not strange to see where my feelings come from. As a former biology student I see humans as part of nature going back millions of years when life evolved in the oceans. We also reside in nature, as we live and breathe on this planet. But I also strongly feel that we are outside of nature, we are detrimental to it, a nature that is better off without us. With humans and their culture on one side and nature on the other. It turns out this nature-culture divide that I experience is part of a western worldview and history, which has far-reaching consequences as to how we interact with the world around us.

But before I go into those, I want to start with a look at the word *nature* itself. Philosopher Timothy Morton calls it a slippery word; 'a transcendental term in a material mask'.⁴ Etymologically the word nature comes from the Latin word *natura*, which, like *physis* in Greek, has the meaning to be born, to develop, to show your character in the way you grow and maintain.

In the Merriam Webster dictionary nature has the following definitions; Nature, *noun*.

1. Inherent character.
2. Creative and controlling force/inner force.
3. Kind or class.
4. Physical constitution or drives of an organism.
5. A spontaneous attitude.
6. The external world in its entirety.
7. Humankind's original condition/simplified mode of life.
8. Genetically controlled qualities of an organism.
9. Natural scenery.

4 Timothy Morton, *Ecology Without Nature*, p14

While the Oxford dictionary keeps it a bit more concise;

Nature, *noun*.

1. 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.
 - 1.1. The physical force regarded as causing and regulating the phenomena of the world.

2. The basic or inherent features, character, or qualities of something.
 - 2.1. The innate or essential qualities or character of a person or animal.
 - 2.2. Inborn or hereditary characteristics as an influence on or determinant of personality. Often contrasted with nurture.
 - 2.3. A person of a specified character.

Thus, nature can mean the material world, a normative framework, a resource, a process, a purpose, refer to one's genetic makeup or a pretty landscape. Some concepts deal with matter, others with abstract principles. In short, nature is quite an ambiguous and flexible word, which I find intriguing. but it can become problematic when institutions and parties are debating important environmental issues. The risk of every party talking about a different nature begs for a clarification of the concept of nature beforehand. I think problems with nature ultimately do not lie not with fuzziness of language but with *the way that the western concept of nature structures our relationship with the world around us*.

Why do I have the need to understand my worldview with regard to nature? Literary critic Katherine Hayles sees the importance of your location in a certain time, culture and with a certain history, or *positionality*, the following way;

“Although the framework does not uniquely determine the theories, it creates a matrix for thought that defines ranges of possibility.”⁵

As my work deals with relations between human and non-human and with values explicit or implicit in those interactions, I have a strong need to understand what it is that colours and shape my own interactions with the world. I want to understand my own position better and how that creates a certain focus or maybe blind spots.⁶ Science and technology can make me experience the world in a different way, really up close using a microscope or by creating time-lapses to reveal movement that is usually hidden to humans. Or with knowledge: opening up understanding of connections or inner workings. But I also feel it creates a certain distance. Science has the aim to be objective and find general laws of nature. As an artist I work with my subjective experiences in this world, which generates a different kind of knowledge.

In this thesis I want to explore the notion of how I am in this world focusing in particular on how I relate to nature. Next I will explore where the problems lie with the western nature-culture divide and I will end with how I might look or move beyond these problems.

⁵ Katherine Hayles, *Searching for Common Ground*, p58.

⁶ I was able to do a residency at the biological station of Kilpisjärvi, a town in the northernmost part of Finland. While there I saw wilderness, a scientist saw one square meter with data about plants that grow in the tundra, and the Sami, local reindeer herders, saw land that they and their reindeer had changed over thousands of years and in return had changed and informed them.

Understanding the problem

The problem I see with setting us humans apart from nature is domination; the position outside of nature is not below it, but above it. This can be traced back to ancient Greek times, where Plato (428-348 BC) was a great divider of things. Feminist philosopher Val Plumwood can see the divide Plato drew between nature and culture, back in all topics he discussed;

*“There are two sorts of being, two sorts of love, two sorts of equality, two sorts of knowledge, two sorts of causation, two sorts of art and even two sorts of music. In each of these cases the lower side is that associated with nature, the body, and the realm of becoming, as well as of the feminine, and the higher with the realm of reason.”*⁷

According to Plumwood here is not just a division but also a subordination happening; it moves from being a mere dichotomy towards a dualism. Dualism she argues is not just a relation of separation, but also of domination and exclusion. She sees it constructing a ‘higher and lower, superior and inferior, ruler and ruled’.⁸

Plato’s pupil Aristotle (384-322 BC) strongly influenced the natural sciences with his hierarchies. He was the first to group animals into orders and use the binomial system that is still in use today (first the type, followed by the species name: *homo sapiens*). His Scala Naturae, or Ladder of Nature, starts with minerals at the bottom, followed by plants, lower animal (invertebrates) higher animals (vertebrates) and on top, according to Dutch natural philosopher Matthijs Schouten, barbarians, slaves,

7 Val Plumwood, *Feminism and the Mastery of Nature*, p81.

8 Val Plumwood, *Feminism and the Mastery of Nature*, p48.

women, men, with the male philosopher at the pinnacle.⁹ In medieval times Aristotle's *Scala Naturae* was seen as a God-given ordering. Appropriated with a few minor changes, it was re-named the Great Ladder of Being; just above man now resided his spirit, which could potentially reach the kingdom of heaven, followed by angels and it ended with god on top.

“And God said; Let us make man in our image, after our likeness: and let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth. So God created man in his own image, in the image of God created he him; male and female created he them. And God blessed them, and God said unto them, be fruitful, and multiply, and replenish the earth, and subdue it; and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth.”¹⁰

Historian Lynn White, specialist in medieval Christianity, wrote a ground-breaking article in 1967 where he proposed that the mentality leading to our current ecological crises (this was in 1967 mind you!) has its roots in medieval Christian doctrine. According to him this mentality contained a strong nature-culture dichotomy and insisted that it was god's will that we exploit nature without any repercussions. The world was made for us in six days, like a palace waiting for our habitation and governance. As you can read in the passage of the Bible above, man is the only creature that is made in the likeness of god. This creates a dualism between man, in possession of a soul and reason, and the rest of Creation, which is thus inferior. White thinks that only when we reject the idea that 'nature has no reason for existing save to serve man', that we can start to approach a different attitude towards nature.

9 Lecture by Matthijs Schouten during the minor Sustainable Development of 2018 of Leiden University.

10 The Bible, Genesis 1:26-28.

Many Christians today would not agree with the interpretation of genesis as man having dominion of the world, but see man's relation to nature more like a *stewardship*; not the dominion of a dictator, but the work of a custodian that is needed to maintain harmony and balance.

An example of the stewardship mentality is present in the second half of the 19th century, which saw the rise of a conservation movement in America. With the rise of urbanisation and mass production people began to see the threat posed by human activity.¹¹ Henry David Thoreau, John Muir and Waldo Emerson were a few of the writers that inspired reverence of the wild, leading the American Congress to create Yellowstone Park in 1872 followed by Yosemite in 1890. A problem I see is that if nature is seen as wilderness that should be revered like an Eden and that we corrupt with our presence, the nature-culture separation stays in place.

With her book *Silent Spring* published in 1962, Rachel Carson popularised modern ecology in the United States. She unfolds a nature that is compromised by the effects of the pesticide DDT and became a strong advocate of environmental stewardship as a way to preserve ecosystems. From understanding elements of an ecosystem, how they function and making sure they are in balance, there should emerge a sense of care for that system. She thought this sense of care should also arise from the humbleness one feels when grasping humanity's position in the larger scheme of things. This sounds like a less naïve and idealised way of looking at nature than the 19th century's version and it will possibly ensure a public morale that can be more effective in protecting environments. Nevertheless it still comes down to a small entity in a larger whole that takes control over processes 'for their own good'. In the end both reverence

¹¹ Around the turn of the 19th century new settlers streamed into the land, the vastness of the west had a limitless feel to it, so exhausting one area was not an issue, one could just move on. This changed when the west coast was reached. Romanticism was on the rise in Europe and it spread the idea of nature contributing to human welfare to America. Nature started to have value in and of itself instead of only value in relation to us.

and care at the core of stewardship clash with its own attitude.

Stewardship is a step forward in many regards, but it remains problematic as it remains predicated on putting humans at the centre of things. As we are the ones that generate nature's value, it only has value in relationship to us. Writers on wilderness like Muir, Thoreau and Emerson experienced the value of nature as part of nature itself, but not everyone has this experience. Simply experiencing value is not enough, as it remains anthropogenic: the decision whether something has value rests with humanity.

What if we go in another direction and value all living things equally? This is called a *biocentric* worldview. The problem I see here is that my interests clash with that of the pigeon trying to steal my fries. We both want to eat them, so my interests of survival are not compatible with those of the pigeon. It is impossible to take heed of all ambitions; no one could eat anymore except for photosynthesizing organisms such as plants and phytoplankton! It becomes even stranger when applying value to ecosystems. When all is equally valued, are mountains or rivers to be granted the same rights as humans? ¹²

Here we touch upon an *ecocentric* worldview, where ecosystems or maybe even the planet as a whole has value. The parts in this system, the interests of pigeons or humans, are subservient to the preservation of the whole of the system. But if preserving the planet as a dynamic system, often referred to as Gaia, is to be valued most, and human activity is a threat to this balance, it might lead to the conclusion that humans should leave the stage. The principle that the good of the whole outweighs the good of a few or of parts, is at the core of intrinsic value in an ecocentric worldview.

¹² According to the Guardian (16th of March 2017), the Maori Tribe of Whanganui has fought for recognition of their river for 140 years and on the 15th of March 2017 the New Zealand court granted the Whanganui River the same legal rights as a human being. The river has always been treated as a whole, a living entity, by its Maori people, now two people will be appointed speak on its behalf as a legal body.

Regardless of whether this is a good position to take or not - though I would argue it is not, it leads to something called ecofascism - there is a problem that arises: I do not think that humans can understand the interests of other entities well enough to become advocates for them.

But then there is science: the subjective experience can be explained through scientific objectivism, right? In practice the rise of science has had the effect that a certain sense of reality has been suppressed. In the book *Death of Nature* from 1980, feminist scholar Carolyn Merchant explains how 17th century science is implicated in the current ecological crises; by the domination of nature through the creation of a *mechanistic* worldview. The mechanistic worldview can be likened to a clock, where all parts have a clear role and do not change. This universe does not produce anything, but simply moves according to its structure and the laws of nature.¹³

The enlightenment saw the emergence of Newtonian physics that strongly influenced philosophers like Francis Bacon and Rene Descartes.¹⁴ Merchant postulates that Bacon saw nature as something to interrogate in order for it to release its secrets, like a witch on trial.¹⁵ I think his famous phrase 'knowledge is power' makes his position towards nature very clear. The basis of thought for Descartes on the other hand was doubt; in order to know anything we must doubt everything that can be doubted. What follows is the only thing we can know is that there is an 'I' that is doing the doubting: *cogito ergo sum*, or *I think therefore I am*.

13 This also means that the initial conditions of a system determine its future development. By knowing the initial conditions, one can know all that can be; it is just a matter of unfolding of possibilities.

14 They each represent a way of thinking that can still be found in science today; Baconian thinking focuses on experimentation and pushing boundaries, while Cartesian thinking is more reflective and tries to find explanation by pure reasoning alone.

15 Carolyn Merchant, *The Death of Nature*, p168-172.

This creates a dualism between mind and body, which fits in nicely with Christian thought of a perishable body and an immortal soul that can reach the kingdom of heaven. But it is not just a mind/body dualism, he goes as far as dividing the whole world into two substrates; the mental or *res cogitans* and the physical, matter or *res extensa*. As we are the only beings that have both, all other things, animals, plants, are reduced to mere mindless things.¹⁶ The normative principles (what ought to be) that arose dictated that a life is best lived when there is as much distance between the higher (reason) and lower (everything else) elements.

This separateness and inferior status of the material world is similar to Platonic thought,¹⁷ but what has shifted in the age that saw the birth of our modern science is the confidence to control nature. A machine is designed for our benefit and when well made should contain no surprises.¹⁸

Going back to Val Plumwood, she thinks that the effects of Descartes new scientific paradigm were that nature could be seen as '*non-agentic, as passive, non-creative and inert, with action being imposed from without by an external force*'.¹⁹ If nature is seen in those mechanistic terms, lacking any autonomy and agency that would give it reason to be its 'own' thing, it can

16 The term he used for animals was 'bête machine'; animal or beast machine, which had no soul and could therefore feel no pain. They could have passions, but not conscious ones. According to Lex Newman, *Unmasking Descartes's Case for the Bête Machine Doctrine*, p389.

17 Where Plato would envision nature as a prison we struggle to escape, Descartes saw nature as something we could mould like wax or control like a machine. Instead of escaping or rising above nature by dying and leaving the body behind as Plato thought, Descartes sees reason as a means of exercising power over the natural world.

18 I feel this view strongly reflected in our modern day medicine; as long as we understand the machine that is our body, we can control its health and maybe even death itself. Descartes states it as follows; "*We could be freed from innumerable maladies, both of body and of mind and even perhaps from the infirmities of age, if we had sufficient knowledge of their causes and of the remedies provided by nature*". From *Feminism and the Mastery of Nature* by Val Plumwood, p110.

19 Val Plumwood, *Feminism and the Mastery of Nature*, p110.

be seen as merely our thing that we can do with as we please. It invites us to use it as an instrument for our own means.

By dividing nature and culture it either places man above nature so it becomes a mere thing for us to use, or we make nature into something with intrinsic value that we should revere. Which seems better but keeps the same domination in place. How can we challenge and change this western paradigm? How can we move from a relationship of domination to one that is balanced differently, so as to prevent humanity from pushing nature to its limits and beyond? The answer lies in an understanding of the interdependence and connectivity that underlie and mark our place in the world.

Challenging the dichotomy: a recipe

Add subjective experience

Sociologist and philosopher Bruno Latour concludes ‘we have never been modern’ in his 1991 book with the same title. With this he means that dividing nature and culture is a ‘modern’ distinction that has never actually existed but is merely a construct. In the following chapters I will argue the same by finding ways to understand and actually feel that we are not separate from our environment.

My mind is connected to my body in such intricate ways that they cannot be seen as separate things. My body is connected to the chair I am sitting on, that is connected to the tree it came from, the rain that fed it, the lumberjack that felled the tree, the sandwich that he ate and the parents that gave birth to him, and so on. It sounds vaguely hippy-ish even to my own ears, but I stand by it because it exemplifies the kind of interconnect- edness that I am trying to get at.

Alexander von Humboldt was a geologist and explorer, who also had a love for plants. In his ‘On the Geography of Plants, he did not just study plants, but plants in a specific place and context, taking note of altitude, soil type temperature, etc, but also how they related to humans and animals. His attention for these relationships is captured in his phrase ‘Alles ist Wechselwirkung’ which translates to ‘everything is connected’ or ‘all is *interaction*’. Nowadays the empirical study of the relationships between organism and their environment is called *ecology*.

Every organism has a different way of sensing its environment: some can see into the ultraviolet spectrum, perceive a single drop of blood miles away, sense heat or vibrations, can use high-pitched sounds to see or low-pitched sounds to travel around whole oceans. *Umwelt* is the term biologist Jacob von Uexkull created to describe this subjective world of an organism, which it experiences through its senses and can act upon with what he calls effectors. The perceiving body and its environment are not isolated from each other nor are they a seamless whole; instead they can be seen as an *assemblage* with complex feedback loops and relations.

Thus, no two subjective experiences will be the same: a tick has different senses from my own, therefore experiences a different *Umwelt*.²⁰ Even two organisms of the same species, with same senses, will experience their surroundings differently. This means there is a huge amount, a plurality of subjective worlds being experienced.

Understanding that a subjective sensory experience is not just something that humans have, I also think we need to look at who or what aside from us is able to act. Animals are clearly not Descartes's *bête-machines*, but can I go as far as ascribing a rock the capacity to act?

Add agency

Particularly now, with issues of climate change becoming more and more urgent, our material environment is no longer our passive background. Through climate change we are harshly reminded that soil and rain, plants and bees, oceans and currents, are all actors in our play. I personally became aware that materials have a capacity to act when I started to develop my artistic practice. When I work with clay I don't simply impose my will

²⁰ Tick is the example Uexkull himself uses.

upon it; there is a reciprocity happening.²¹ A part of my thinking takes place in the clay, in my fingers and body. Clay has a certain ‘capacity to act’, which is also referred to as *agency*.

For a long time, agency has been seen as something only humans have, as it was strongly linked with consciousness and intent, two things only humans are capable of when following the reasoning of Descartes. But Latour, and many others by now, point out that not just living things shape and alter the world, abiotic and chemical processes do too. Think of how bacteria influence everything in this planet, from the oceans, the soil, to our very own bodies. If you take intent and consciousness away, agency is opened up to many other entities besides humans in *vibrant matter*.²² Things act upon each other, transforming themselves and changing their surroundings in the process. In this action there is creativity: the capacity to make something new happen.

That all things have agency to some degree means things are capable to interact with one another in complex meshes, networks - or the term I used earlier and prefer: assemblages. Where a network implies static nodes between which interactions might take place, assemblages imply interactions between parts that are *constitutive* to wholes. To understand this it helps me to think of an organism that is both part of an ecosystem, but also constitutes it, or is part of the *creation* of that ecosystem. In other words, interactions between parts make wholes to what they are - which goes back to the same interconnectedness that Uexkull was getting at.

21 *Sympoiesis* or *making-with* as Donna Haraway calls it in her book *Staying With the Trouble*. It is one of the strategies she thinks will help in order to stay together in this world, as I will discuss in the final chapter.

22 By *vibrant* philosopher Jane Bennett means a certain vitality of non-humans. The capacity of things to help or impede the will or design of humans, but that also to act as agents with tendencies of their own.

The most elucidating example for me are ants. In science there has been a strong reductionist tendency: to understand the parts is to understand the whole. Translate this to ants this meant that if you could understand the functioning of a single ant, how its genes are expressed, the task it therefor executes, and you will understand the behavior of the colony. The role of the queen, soldier ant and workers are genetically mapped and fixed.²³ But the behavior of a colony is so complex, it can never be explained simply by the roles that genes dictate. If you approach a colony as an assemblage of ants, the interaction between ants can give rise to behavior on a colony level. This behavior might be way more complex than a single ant can ever be.

Take for example memory: a single ant does not have a long life span, let alone memory, but a colony as a whole is capable of memory over several years, sometimes decades. This is because a colony is an assemblage where the interaction between ants causes complex and dynamic behavior to *emerge*. In complexity studies the notion of *emergence* is very important; from interaction between (simple) parts, complex and dynamic behavior on another scale is generated. In this whole story the ant can be replaced with many other things, molecules and weather systems, neurons and brains, and so on. What also becomes clear is that for assemblages to work, the element of time is needed.

Add time

Clay, it seems like a simple thing, material that can be manipulated and fired to make bricks or mugs. But it has a history. Once, deep in the earth, it was liquid but cooled into a complex lattice of minerals that continued to form a mountain. Through complex systems like wind and rain, parti-

²³ E.O. Wilson with his nobel prize winning book *The Ants* is the best known example of this way of thinking in the study of ants.

cles eroded from the stone faces and got swept into a river, degrading ever further into smaller stacks of silica, till the river became wider and slower and it gradually dropped due to forces of gravity to the bottom with similarly sized particles of quartz, dolomite, kaolin and oxides and many others. Here it settled and condensed, only to be dug up many thousands of years later and sold at a craft store, a particle party in a plastic bag called KN123 Fingerling stoneware clay (that I prefer to work with).

The mineral composition of the mountains, the organic material mixed in the rivers, the oxides present, they determine the color, whether it will crack or sinter, whether I can throw a small pot with it or is it better suited to make a big sculpture. Clay is a complex matter existing of many components that all have a history and are parts of processes. To put it in assemblage terms again, it is a whole whose properties emerge through the interaction of its parts.

The clay-brain-tool-body-fingers assemblage with all its history of me, the clay, the wood of my tool, all have properties which might be visible or given and can be acted upon. But the capacities of this assemblage are not; they are possibilities that can be teased out. All the possible states of the sculpture-making assemblage can be seen as a space of possibilities, in the sciences referred to as *phase space*.²⁴ Most processes in the world are not linear, so the only way to tease out capacities is by interventions until a satisfactory sculpture is made (and I move on to the mouth-mug-stomach-tea-hot water assemblage).

24 Phase space is a space in which all possible states of a system are represented, with each possible state of the system corresponding to one unique point in the phase space. If phase space knows a singularity it shows the tendency of a system to be in a steady state. An attractor attracts the system to a certain point so it can influence the behavior in a system. An example is the soap bubble, it will always become a spherical form because it finds the minimum surface tension possible: a sphere. This is then a single point attractor in phase space. There are many other natural principles, like path of least resistance with currents, or the way crystals grow.

The wholes that emerge from parts in an assemblage at any level, be it at the level of the molecule, cell or society, are always the result of processes through time. While the resulting wholes are interdependent to their parts, every emergent whole is also something unique, which is called a *singularity*. A single cell, a human, or humans as a species can all be considered singularities, despite being interwoven and being a part in another assemblage.²⁵

Add value

A previous problem I encountered was the question of what to value. Do we value humans, (anthropocentric) all life, (biocentric) or Gaia (ecocentric)? Maybe this notion of singularity can help us out.

If we attach value to uniquely different things and go on to call everything unique, singularity becomes a meaningless concept, but not if we look at it through the lens of interdependency. If parts are interdependent then they are valuable insofar as they are part of the condition to exist for another part. Some parts or processes are destructive, while others will be *creative* and empower other singularities. This way the trap of ecocentrist ecofascism can be avoided, while also avoiding that intrinsic value flattens everything. It is a moral way of looking at how one's actions can transform the world, what singularities will be affected, created or destroyed. It is a mindfulness that decentralises humans while still valuing them and recognising that they are not the same, nor do they have the same agency as, lets say, a rock.

²⁵ Take our bodies for example. They are a whole that constitute a person, it has parts that interact and through constitutive processes a person is made. At the moment you read this, not a single cell that was alive during your birth is alive right now. It is the interactions between parts that make you you, but the parts themselves are interchangeable. A liver as a part has again its own parts. It's turtles all the way down.

So to attach value and to act in the best moral way, I need to be aware of perspectives that are not my own in combination with the consequences of my actions in the context of those perspectives. Not an easy task in a world with myriad perspectives and human short-sightedness. To overcome this short-sightedness through adding different perspectives, Latour proposed to let non-humans into our (political) debates in a Parliament of Things. It calls for careful consideration of all constituents of a particular situation and build concepts of the needs of all the parts.

Science can help in understanding the parts and actors in a context. An example is microplastic which are now found almost everywhere: scientists recently found microplastics in human faeces, which makes these hidden particles suddenly an actor on the world stage. And through (re) interpreting scientific data we might learn about the Umwelt of others, their desires to continue to exist and what conditions are needed for that. Latour sees that giving voice to non-humans also means war: by adding the needs of others, we create conflicts, as we cannot simply pursue human interest any longer but need to take other perspectives into account that might want different things.²⁶ I see a lurking trap of anthropomorphising with a Parliament of Things, but it should be an interesting tool for adding perspectives and arguments to otherwise human centered debates.

Add embodiment

Writing this thesis I was reminded of a paper I wrote on the *stereotypical* behavior of the polar bear.²⁷ Stereotypes are seen in many animals such as elephants swinging, birds' self-mutilating and big cats pacing in circles.

²⁶ Paraphrasing from Bruno Latour's lecture at Veem house in Amsterdam 2018.

²⁷ I went to three zoos to observe polar bears in varying conditions, from a small concrete prison to a big enclosure filled with actual earth, plants and copious amounts of water. It made huge difference for the amount of time the bears displayed stereotypical behavior. In Dutch 'ijsberen' has the meaning 'to pace up and down'.

Polar bears can wear a track in concrete by the continued repetition of a single or multiple moves, rolling their head, pace, pace, roll, pacepaceroll-pace. Theories are it discharges tension caused by the sensory deprivation they experience in captivity. My theory then was that an animal that was so far removed from its original behaviour due to habitat restrictions was not fully able to be itself. A polar bear in captivity is no longer able to express its polar-bear-ness. The real polar bear is not the polar bear in itself, but the polar bear in its *proper context*.

This is no different for humans. When I was born, I was in an almost fetal state, like all humans, we are born quite helpless. Though brains are highly adaptive and dynamic, early years are essential for the development of functioning structures.²⁸ All input is used to create a coupling or fit with our world. Sensory input is ingested and becomes us as much as food is. This is also the reason we have a 'lazy' brain. During our life we create a 'fit' with our environment, a process that makes our brain a prediction machine. We are not made to respond to all possible variables, we did not just wake up in a world: we have an evolutionary and personal behavioral past.

Cognitive biologist Francisco Varela argues that an organism 'brings forth the world' with its particular senses and interactions with its environment that others might be blind to. If you see the world as a huge amount of information, organisms have senses adapted to those stimuli that make a difference to their continued survival.

So we are not the disembodied reasoning engines that Descartes imagined. Modern neuroscience has helped break this particular dualism. Though at first the study of the brain progressed the notion of the brain as the seat

²⁸ Take 'Wild children'. Abused or abandoned, kept without stimuli during their childhood, they cannot attain same level of development as their peers in later life; despite the flexibility and adaptability of the brain, it is unable to establish the networks for normal cognitive functioning.

of reason, in recent years a different trend has set in. It turns out the brain does not 'drive' our body around with reason; our cognition is *embodied* and *embedded*. Again I will explain through clay. Working with clay is something hard to describe in words, usually it is easier to show what it feels like to center a piece of clay on a potter's wheel, how to knead the clay so it won't explode in the kiln or what the right stage of dryness is in order to attach two pieces together. There is a craft involved; a learning by doing that becomes an intuitive thing rather than an active conscious act. If you ask me precise questions about clay I often will not know the answer. These skills are embodied: brain, action and material together form knowledge I cannot express in words and they are only partly driven by conscious thought.

Let the ingredients simmer in your mind for however long it takes

How do I move on and actually implement these ingredients in everyday life? Feminist philosopher Donna Haraway argues through *making-with* or *sympoiesis* we can face the troubling times we are in head-on, and can build a future world *together-with*. She sees storytelling as a method to help us to understand the perspective or Umwelt of others and in effect help us to make *kin* with them.

Philosopher Felix Guattari also sees the subjective experience as an important part of being in the world. In his text *The Three Ecologies*, he thinks the way towards a more sustainable future is by seeing the interrelatedness of three registers: the social, where we find economics and politics; the environment, where we place our physical world; and the subjective experience. Though he leaves out the non-human subjective experience, I add it to his third category as I've been arguing that the subjective experience of non-humans should also be taken into account.

The three realms are distinct yet inseparable and one should not dominate and endanger the others. Guattari wants us to think *transversally*: always taking all three ecologies into consideration.²⁹ While each system has its own properties, there is an interactivity, a ‘codependent arising’ as neurobiologist Varela calls it, that makes it impossible to make a precise distinction between systems. This means you cannot address for instance environmental degradation as a purely material problem; you also need to address how we subjectively relate to the problem and how it is socially handled (influenced by politics or valued through economics) as well. Thinking this way reflects the trend in science that moves against reductionism and towards complexity theories: studying the interaction and interrelatedness between (simple) parts from which complex systems, behaviors or patterns arise.

More conventional methods that social activism or NGO’s use address either the social or the environmental register, while I see art playing a role in addressing and opening up the subjective experience.

29 Felix Guattari, *The Three Ecologies*, p43.

In conclusion

In this current epoch that since 2008 has been named the anthropocene there is no part of what the west considers nature that is not touched by humans.³⁰ Seeing myself as separate from the natural world creates an alienation that runs deep in myself and that I see reflected in many of my contemporaries. I have discussed where this sense of alienation comes from historically, and the negative effects it has in our current attitudes towards nature.

Seeing myself as part of and interdependent with my environment is not a direct recipe for feeling the connection, but the insight has given me much. It helps me to understand what mechanisms shape a worldview that is predicated on separation and domination, which might help to combat them. Through embodied cognition I learn to see myself as intimately part of my environment, one that is not passive, but that has agency and creative capacities of its own. Although we cannot subjectively know the Umwelt of anyone else, understanding my own Umwelt will give me insight and the ability for empathy for that of another. Also the notion of everything being a singularity in a network helps to understand value making as something other than monetary or as an instrument for my own needs. It puts into perspective our privileged place in the universe.

Science tries to eliminate the observer as much as possible and thus separates us from the world. This has a certain function, but cannot be the only form of knowing the world. By shifting the focus to connection and interaction with others in one big network or assemblage, it shifts knowledge values as well. Through interactivity we know and perceive the world. This

30 Paul Crutzen, *Geology of Mankind*, p23.

interaction has a position, a history (both evolutionary as well as personal) of a human living in certain times. Our particular embodiment matters as it determines our interaction and the experience of our Umwelt. So through interaction the body and embodiment is emphasized. As Katherine Hayles puts it;

Situated within our human perspectives, we move toward the unknown when we strive to comprehend how other creatures experience the flux. Although we can never completely or even adequately know that portion of the whole which they contribute, our attempts to make contact with it enrich our perspectives by hinting at how our positionality differs from theirs. We know ourselves by reaching toward the other.

Interconnectedness of and transversal thinking through different domains are things I find back in art. Art has the ability to create assemblages through which new capacities or novel complex wholes can emerge. It also has the ability to articulate concepts that can change ways of thinking, albeit tiny. As a part called artist, that moves transversally through different ecologies, I can alter my environment and interactions in small ways that will influence other agents and actors in the assemblages that I take part in and am part of.

Through writing this thesis I have gained insights in my position, my worldview and my practice. As a person I view my being no longer as separate from nature, but as a becoming with a multiverse of entities. As a scientist I understand that scientific knowledge has limits but can be the start of incredible creativity and innovation. As an artist I have gained a deeper understanding for the natural world that inspires me and a deeper understanding for the materials that I engage in interrelations with.

I end with a deep sense of wonder at the complexity of this world that I am integrated in, as a part that will generate or be constitutive of other parts and processes, that are each hopefully incredibly beautiful singularities of their own.

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