

Article

# The Ontology of Becoming: To Research and Become with the World

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**Abstract:** This article aims to explore a perspective of the ontology of becoming, that makes it possible to study the emergence of phenomena and thereby broaden the understanding of how knowledge is created. It is written in close connection with research in posthumanism and new materialism. What has been lacking in these perspectives has been a clearer connection to ontological points of departure. It is therefore the purpose of this article to describe, based on ontological positions, both philosophical points of departure and methodology and research practice. The article is structured in three parts, where the introductory part describes basic ontological starting points. The second part describes how a research apparatus can be constructed and used to carry out analyses based on the ontology of becoming. A research apparatus where the body's senses and mobility are given a prominent role through a haptic sensorium. The third part describes examples of phenomena that can be explored with an onto-analysis of becoming. Among these, special focus is placed on the border phenomenon of sound. The result of the article is a perspective that can contribute to renewed insights into how phenomena are created with the world.

**Keywords:** ontology; the world; becoming; intra-action; affects; haptic sensorium; sound



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## 1. Introduction

This article aims to explore a perspective that makes it possible to study the emergence of phenomena, and thereby broaden the understanding of how knowledge is created. This is a perspective that is not based on goal-oriented, causal, or representative thinking, but which should rather be seen as an alternative to the theories that are often used today in educational science research.

The article is written in close connection with research in posthumanism and new materialism: perspectives within which several research articles and doctoral dissertations have been written in recent years. What was missing from these has been a clearer connection to ontological points of departure. It is therefore the purpose of this article to describe, based on ontological positions, both philosophical points of departure and methodology and research practice.

To give the perspective a name, I have chosen the concept of the ontology of becoming. This is a concept that points out how important it is in a research context to start from an understanding of the world and the phenomena that arises from it. How we choose ontology is crucial not only for how science develops, but above all, for our responsibility to each other and the future of the common globe. The ontology of becoming is based on the fact that ontology and epistemology are interconnected and therefore should not be seen as two separate units. Based on this assumption, the ontology of becoming aims to explore how phenomena are created with the world.

The article is structured into three parts. The introductory part describes basic ontological starting points: an ontology where the world is created in itself through an internal self-diffraction. This in turn enables phenomena to be formed and set in motion.

The second part describes how a research apparatus can be constructed and used to carry out analyses based on the ontology of becoming. In this context, the research

apparatus gives a prominent role to the body's senses and mobility through a haptic sensorium. Concepts such as boundary phenomena, boundary presence, and boundary zones are also linked to the research apparatus, which are used as strategies for exploring the emergence of phenomena.

The third part describes examples of phenomena that can be explored with an ontology of becoming. Among these, special focus is placed on the border phenomenon of sound. Listening to the sound of becoming phenomena opens up new possibilities for understanding how phenomena connect and come into being with the world.

The article concludes by summarizing how the ontology of becoming can contribute to renewed insights into how phenomena are created with the world. The questions that the perspective asks create new challenges for further development of future research.

### 1.1. *The World Is Created in Itself*

The ontology of becoming takes its starting point in the world through which we all necessarily become. An important inspiration has been what is called *internal realism*, which is described by the physicist Ulf Danielsson in the book *Världen själv* [1]. The important thing about internal realism is that there is a world, but the way we try to understand it is not unique [2,3]. The way we choose to describe the world can be done in many different ways. The advantage of internal realism is that it assumes that there is a difference between the world itself and how it is described [1]. Every scientific perspective is preliminary, as is the perspective presented in this article.

The ontology of becoming is based on the fact that the world exists independently of our existence, and that there are truths about the world that we can try to reveal. The world itself not only represents our consciousness, but it also presents itself. What we experience through our bodies and physical senses is the world itself in a concrete and physical sense [1].

The conditions for what we can know about this world are limited by the fact that it is something we cannot fully know anything about. What remains is to use our common language and refine this with linguistic terminology to communicate what kind of questions we have asked the world [4].

To clarify this, I have chosen to use the term *wor(l)ding*, taken from the physicist Karen Barad [5]. In this concept, language and the world are interwoven; we are dependent on language, but at the same time, there is a world that we are a part of and together create. This means that we, as researchers, become both participants and spectators at the same time. Language helps us to be in an ongoing openness and mobility in the exploration of and with the world [6].

The world that we become together with is like the waves of the sea, or like a constantly returning background noise; it is what is constantly going on and that which enables phenomena to be created by being formed and set in motion [7]. This world has three characteristics: firstly, this is a world that is within itself and thus cannot be grasped; secondly, it is a world that is created through internal self-differentiation; and thirdly, this is a world that contributes to phenomena being created through formation and mobility.

All phenomena are necessary in the middle of the world. This does not mean that we should stop asking questions or stop exploring how this world contributes to the emergence of phenomena. The world should thus not be seen as something passive. On the contrary, it is man, nature, and matter: the most important actor [7].

The philosopher Gilles Deleuze and the psychoanalyst Felix Guattari have pointed out how important it is to see what the world can do, its functions, and its effects. They assume that the world does not need anything other than what it has in itself; it is neutral and is its own cause. The fact that the world can be and is created in itself contributes to an internal principle, an inner self-differentiation [8]. A is non-A and A at the same time. It makes the world androgynous. It is the difference in itself, and has a recognition of itself by embracing itself.

It is a world that does not see itself as it is. Its inner principle cannot observe itself from the outside. To quote the poet Inger Christensen [9] (p 821), “the world wants to see itself”. The world should, therefore, be seen as a substance that has no cause outside of itself [10]. The effects of the self-differentiation of this substance can be likened to a repeated shock with which the world contributes to the forms of phenomena through formations and movements. This shock points out a direction that causes phenomena to occur [11]. This means that the world’s self-repetition should not be seen as a relationship between two units; it is the world itself that, independently of phenomena, encounters these through its inner activity.

This also means that in every moment there will be a contributing force whose effect will only become visible through the emergence of the phenomenon. In this way, the world creates both necessity and opportunity for the emergence of phenomena. The effect of the substance becomes in the phenomena a direction or path which orients the formation and movement of the phenomena. This dimension floods all phenomena as a surplus, as something “more”. This surplus cannot be grasped; it is inconceivable, indefinite, cannot be maintained, and is eternal as long as the world is repeated in itself. The direction that this entails is therefore latent and constant, which, at the same time, will enable the chain of the evolutionary emergence of phenomena [11].

To be able to form and move, phenomena are created with knowledge of various kinds. This means that the world cannot only be said to evoke phenomena, but also knowledge. Phenomena simply respond to the world with the knowledge they develop when they come into being with the world. They do this by creating connections and relationships with each other. According to Deleuze and Guattari [8,12], all this takes place on a flat surface that does not follow a given order or a linear development; rather, what characterizes it is that it expands and constantly becomes something new and more.

For Deleuze and Guattari, phenomena must be constituted and conditioned by the fact that this field is built up over time, where a given empiric cannot be seen independently of the conditions of possibilities that contribute to producing what emerges as specific phenomena. Everything takes place on an immanent plane, which is neither the given, nor something merely supersensible and transcendental. Nothing is hidden; there is no God or any pre-given uniform phenomenon such as nature, man, or consciousness [8,12,13].

That everything is created on the same flat surface marks an ontological position different from that which exists in philosophical orientations, such as phenomenology and hermeneutics. The philosopher Immanuel Kant claimed, for example, that it is not possible to know something that is beyond human ability to think. The science of man is therefore dependent on man’s experiences of the world. This means that he established a duality between two worlds: the world that man experiences, and the other world that man has direct access to. This leads to parentheses about things and matter. A parenthesis, according to Deleuze and Guattari, is not possible, as everything appears on the same immanent plane [8].

What happens on the immanent plane emerges from the world’s self-repetition, something that at first can be perceived as unoriented chaos. Phenomena will be created with this chaos as something empirical, something that, in one way or another, can be perceived and observed. They are created with the world, which at the same time means that they are created with the opportunities and limitations that this world offers [14].

### *1.2. The Phenomenon Is Created by Connecting*

That phenomena come into being with the world means two clear conditions. The first condition is that the world cannot be grasped, and the second condition is that the world’s constant self-repetition causes phenomena to be created in motion by a shock of the world’s self-repetition. The fact that the world cannot be grasped means that phenomena are referred to as differences in their becoming with the world, which means both necessities and opportunities. These differences within and between phenomena make it possible for them to be created with the world, and to be able to connect with other phenomena. It is also

with these differences that the world, through its self-repetition, contributes to giving the phenomena the shock that makes it set in motion. These two conditions can be summarized in the concepts of different formation and movement intensity.

One individual that inspired the creation of these concepts is the philosopher Jacques Derrida, who showed how thinking with language differences must be radicalized so that the difference not only appears as a structured form, but as a difference-creating process. By thinking together with the formation and movement of the signs, he shows that no linguistic system is finite, and that there is nothing that can guarantee its absolute beginning or end [15,16].

Similarly, since phenomena forms and sets in motion together with the world's self-repetition, it can be understood that all phenomena are created as forms of difference and with the intensity of movement. What enables such becoming is that phenomena *connect* with other phenomena. No phenomenon can survive alone; in one way or another, it must be created together with others. These connections between phenomena can become infinite in many ways, and can create structures and networks of the most varied kinds. Some phenomena will be created *near* the world's self-repetition, while others will be created with greater distance. Phenomena that arise that are created with clear boundaries to the world will still never be able to close their boundaries completely. In one way or another, all phenomena will constantly depend on the ontological conditions set by the world.

The emergence of phenomena is therefore always based on the world's self-repetition and their interconnection with other phenomena. Phenomena simply respond to the world by and together with other phenomena, which are formed and created in motion. This means that they can be a part of networks and demonstrate self-regulatory diversity of the most varied kinds. An example of this is the body, which consists of a complexity of entanglements of thoughts, cells, and genes that are in constant relationship with other biological bodies and with everything else that emerges on the immanent plane. This means that there are no clear boundaries, orders, or goals, but that the composition of each phenomenon is created as a result of the connections that constantly arise [13].

To show how intertwined the world is with the emergence of phenomena, it is important, as the physicist Karen Barad discusses, to point to the concept of *onto-epistemology* [5]. This concept describes that we cannot separate theories of being (ontology) from theories of knowledge (epistemology). These are intertwined in a mutual process, where they are constantly dependent on each other. Each particle and each cell is linked to another particle or cell. In the same way, the body and the brain are a complex composition of a series of connections that are constantly in motion and subject to change. There are, therefore, no visible boundaries, or any inherent boundaries, and what is both inside and outside is indeterminate.

Although Barad's thinking differs from Deleuze and Guattari's philosophy, connecting them can provide us with new possibilities of how phenomena will become with the world. Like Deleuze and Guattari, Barad points out that all bodies, including the body of matter, are created in ongoing performativity, or a constant doing. Performativity consists of the ability to influence a course of events or an approach. Matter should therefore not be seen as objects with inherent boundaries and properties, but as phenomena that are constantly in situations of variability [17].

This means that nature should not be perceived as a passive surface waiting for the actions of culture, or an end product of cultural perceptions. The fact is, according to Barad, that the world is not naturally divided into social and scientific spheres that are created separately [5]. There is no one group of material acts that creates science and another group that creates social relations, or one type of matter on the inside and another on the outside. The social and the scientific are created together. They cause us to be in continuous, open, and entangled material acts.

Barad therefore also uses the concept of *natural culture* to show how man and matter, and thus culture and nature, are in constant relationships and change. There is an ongoing connection between phenomena [18]. Both culture and nature can be, and are, co-created. They are actors who strive to be created, which means that self-organized structures can

arise [19]. When rocks in the water grind against each other, they act together. Together they produce something special, something that did not exist before. Matter, therefore, does not refer to an inherited, fixed unit of independently existing objects; rather, matter refers to phenomena in their continuous materialization. Matter is not an end product, but matter itself is part of an ongoing materialization [5].

Biologist Jesper Hoffmayer shows in his book *En snegl på vejen* how it is signs, and not molecules, that are the basic unit of life. Cells, tissues, plants, and animals emit and receive signals all the time. Hoffmayer believes that the signs have been there as long as there has been life. In this way, he contributes to creating a semiotic and meaning-oriented natural history, which has come to be called biosemiotics. For example, we cannot say that DNA means a code for the organism, but in the same breath say that there must be someone reading this code, and that is the cell. The complex cooperation that takes place daily in our bodies is based on a gigantic development of meaning-bearing signs [20].

To specify how connections are made between phenomena, Barad has chosen to use the term intra-action [5,6]. Here, she shows how the previous concept of inter-action presupposes that units are seen as individualized and separate forms. She believes that this is largely due to man's relationship to matter and nature. Therefore, she believes that it is high time to let matter become an active participant in dealing with the world, in what she calls an ongoing intra-action. When she highlights the concept of intra-action, it is to point out that all phenomena are created as a result of an ongoing intra-action. These intra-actions have an effect; they cause phenomena to arise and change [21].

What is partly missing from Barad is a clarification of her relational ontology. Here, Deleuze and Guattari's thinking can contribute to interesting connections. They can show us that there is a world in which all phenomena are created, and what we can do is try to understand how this world contributes to the connection of phenomena. Moreover, these phenomena are specific to the very circumstances that have been involved in creating them, and these circumstances are phenomena from previous intra-actions. The question we can ask is how phenomena come into being and emerge with the world [22]. As a result, we continue to take a closer look at quantum physics, in hopes of finding some interesting examples of how phenomena are created with the world.

### 1.3. Quantum Leaps

Until the end of the 19th century, classical physics had assumed that matter consisted of atoms and that all atoms consisted of two parts: dense, heavy nuclei inside the center and very small light electrons orbiting outside of them. It was assumed that because they had different electronic charges, they were drawn to each other [23].

What the physicist Niels Bohr discovered was that electrons did not move any distance towards the atomic nucleus as classical physics had claimed. He found instead that electrons are limited to moving in stationary orbits with a fixed distance to the atomic nucleus. Each of its orbits represent a certain quantity of energy. The farther away from the atomic nucleus an electron orbit was, the higher its energy level.

When the electrons are in their stationary orbits, the atom emits no radiation. However, an electron can jump, leap from its current orbit to an orbit with less energy, and thus release the excess energy in the form of radiation, a so-called light quantum. Bohr believed that the light emission took place through a sudden and inexplicable quantum leap. This contributes to the generation of nuclear energy [4,23].

It is not possible to predict where and when the electron will take such a leap, nor what the quantum had been when it disappeared from one place and reappeared in another place. It could be present in several places at the same time. The quantity is so small that nothing less can take place. Sometimes, this is achieved through a very small effect from the quantum, and other times through something much larger. There is a lower limit, Bohr said, for how little can happen in the world [4]. The quantum simply keeps the world going. It just happens, and it is impossible to perceive or see along the way.



Bohr, therefore, describes quantum leaps as events that are not possible to analyse in more detail. In such cases, it is not possible to see what is less than a quantum. It is therefore also not possible to calculate what will happen in an experiment from start to finish. This led Bohr to reject atom-centered physics based on units, where atoms were seen as the smallest unit that was considered solid and indivisible. Instead, he pointed out that particles have no boundaries or properties in themselves [4,23].

Quantum physics shows us that there is something “more” than a description of the causal chains behind what happens in an atom, which means that they cannot be explained with traditional physical knowledge. All of the data on which quantum mechanics are based are the result of experiments where there is a fundamentally uncontrollable world between the experimental apparatus and the object studied. It is not possible to predict what results from an individual measurement will have, but only the probabilities of possible outcomes. This makes it clear that we are constantly in collaboration with everything around us. There is no independently existing object or subject with inherent properties. The smallest unit is already included in the future [4].

What kind of world is the smallest unit in? It is here that the ontology of becoming can create an understanding that it is the world itself that is constantly self-repeated, and that in this way it enables the quantum to take a quantum leap. It is the world that enables an ongoing formation of atoms that contribute to constantly new and more connections. It is the electron's becoming with the world that contributes to the quantum being able to leap. The world precedes the smallest unit and enables the quantum leap. The discoveries made in quantum physics challenge us to see if something similar can also apply to other phenomena.

Through greater and greater exploration, according to Bohr, we may discover a larger and larger context. He meant that there could be endless harmony that we can only imagine, but never grasp [4]. Can this harmony be the world that constantly repeats itself, and that enables the becoming of all phenomena?

This example of how phenomena can arise with the world's self-repetition brings us further in the discussion of methodological issues. What significance will ontology for becoming have for the conduct of research?

## 2. The Importance of the Body for Research

The importance of how research is arranged has been discussed by many researchers, including Niels Bohr. He has pointed out that we can never stand outside and look at objective reality. With instruments and interpretations, we break into and change what we study. As a result, our observations of the world never turn out as we imagined [4,24]. How we observe will affect the discoveries that are made. Research instruments and methods influence the phenomena being explored. How reality is created and how this can be understood is determined by how the research is arranged, which means that the research will be materialized as something specific and unique for the context in which it takes place [6].

When Niels Bohr was active, there had long been a discussion in classical physics about how light could be understood. Was it a wave or a particle? In research, it was discovered that light with certain instruments created electrons and photons as particles. They were made by destroying the disturbance that distinguished them as wave and motion. They could then be located as units that appear in one place, and not in two places at the same time.

Other instruments did the opposite: they destroyed the disturbance that distinguishes them as particles and instead created electrons and photons as motion and waves. A wave has an extent and can move. It was not possible to completely observe light, but it is the choice of instrument that determines what is discovered. This shows that the important thing is our becoming with the world, according to Bohr, not our images of it [4]. The only thing we can therefore know something about is the connections that arise in the interaction between measuring instruments and what we explore.

In educational science qualitative research, the research subject has long had an important position, and has long been seen as an alternative to an objective positivist view of science. Experiences, perceptions, values, attitudes, and norms have long been in focus for qualitative research that sought specific and unique phenomena of various kinds. One criticism has been directed at starting only from sensible and rational thinking. Today, qualitative research has been carried out using post-qualitative methods [25–27]. This has led to an increased interest in using one's own body as an important part of the research method.

To broaden the understanding of how the body is created with the world, we can take the help of what Deleuze and Guattari call a "body without organs". Such a body without organs is permeated by unstable, formless matter, by flows, and by what Deleuze and Guattari call free intensities and nomadic singularities. This body is full of inexplicable particles and transitions [8].

By starting from a "body without organs", what Deleuze and Guattari want to point out is that the body is created with the world. This world causes the body's organs to be formed as differences in a multifaceted and complex way. This, at the same time as the body, is created through an ongoing intensity of movement. A body without organs is something that exists before the body is formed and set in motion by the connection of different organs. This helps us to understand that the body is constantly in the middle of the world, where its various organs connect in diverse and complex ways in order to be able to handle the body's becoming with the world. What we experience through our bodies and physical senses is the world itself in a concrete and physical sense [1]. This means that the body is particularly suitable for use as an instrument in research contexts.

### *2.1. The Body as a Research Instrument*

Another starting point when we use the body as a research instrument is that the body has no limits to where it begins or ends. This is because the body is made up of other living organisms that we would never be able to live without. This, in turn, makes the body particularly suitable for exploring the emergence of phenomena. The body helps the researcher to spread and expand themselves so that the focus is not on conscious and established knowledge, which tends to reflect and represent external reality [27].

The body is not limited to learned skills, but can be directly and concretely affected by what happens with the world. Could it mean that similar quantum leaps can occur in the body as in the electron? A term that has come to be used to approach this issue is "affect". The term affect comes from the philosopher Baruch Spinoza, and refers to the fact that we do not know what the body should do [10]. An affect is what is experienced before something is thought. This means that the body is always more than the knowledge we have about it, which means that consciousness is unable to register anything other than the effects of these affects. What we in everyday speech call emotions should therefore be seen as conscious experiences of an affect or combination of affects [28]. An affect is thus an impact, before this is given a subjective or emotional meaning. Emotions come later as a classification or stratification of the affect [29].

In a similar way to the quantum, therefore, emotions often arise unplanned and temporarily, and could therefore be described as affect leaps: a leap that is taken in the body without it being possible to know in advance when and where it will appear. This leap is made possible by the world and its self-repetition, which means that its affect can be perceived as both chaotic and erratic [30].

Affections usually include joy and sorrow, but also include wonder. For a researcher, it is therefore important to be curious about the phenomena that are to be explored by not having ready-made answers in advance, and, above all, by being able to marvel at what is happening. How is that possible? What is it about a phenomenon that makes me, the researcher, affected? What happens to my body when I touch and am touched by the phenomena being explored? What do the affects show me?

Questions of this kind may lead to insights into the ongoing evolution of the phenomena with the world. To refine the research apparatus, we will now take a closer look at how it is possible to be affected during exploration by using the body's many senses.

## 2.2. Haptic Sensorium

In order to explore this concept, we start by taking inspiration from the social psychologist Malou Juleskjær. From here, we borrow the concept of sensorium, which comes from the Latin term "sensus", and describes the place in the brain that perceives changing sensory impressions, which include sensation, perception, and interpretation of experiences, both in the body and of other phenomena [31]. Sensory impressions arise when the subject spreads and expands, and it is no longer the self that is at the centre of what is experienced.

To this sensorium, we bring the concept of *haptic*. Haptic means that the body is directed towards being touched and to touch. The haptic ability is important as it provides a physical opportunity to touch the phenomena being explored. Karen Barad also uses the term "touch"; she says that "touch" is to "already be in touch" [32] (pp. 206–223). To touch and to be touched by what is being explored provides an opportunity to make discoveries about the connections that take place when phenomena arise.

By allowing a diversity of the body's changing sensory impressions to be combined with touch, we arrive at the concept of haptic sensorium. It is with the help of such bodily becoming that we explore how phenomena are created with the world. The haptic sensor makes the body an active part of the situations and contexts in which it is included. This helps us to resolve established boundaries, and enables a broader experience of many different senses such as sight, sound, smell, taste, balance, pain, and feeling [29,33]. With the help of these senses, the researcher expands, opens, and spreads their self-awareness, which makes it possible to come into contact with and be created together with the diversity and complexity that characterizes both one's own body and other phenomena, thereby becoming with the world.

Instead of focusing on classifying and representing phenomena, a haptic sensorium enables the researcher to follow intensity, rhythm, speed, and tempo. This provides the opportunity to be affected by phenomena, such as difference formation (particle) and movement intensity (wave), which, in turn, can lead to unforeseen affect jumps. In this way, the research instrument creates a material practice, and what results from this exploration is what we learn from these practices [5]. Therefore, when collecting and processing data, it is important to use the many senses of the research body to detect the affect jumps that are created in the body as a result of unplanned connections between the body and the phenomena that are being explored.

Instead of describing how phenomena are represented by external reality, this research focuses on how the phenomenon's difference formation and movement intensity are produced. What connections are made? What path does the phenomenon take? For the researcher, it is important not to evaluate, but to follow, and to become with what arises together with phenomena. How does that sound? Where are they moving to? What speeds and tempos occur? What happens at moments and events? What is it about a phenomenon that causes the body to be affected? What happens to the body when it touches and is touched by the phenomena being explored? What do the affects show?

It is important to be both a participant and a spectator, separated but still, at the same time, in the middle of what is going on and becoming. In this way, the researcher retains his or her curiosity that something unexpected will sooner or later break out in interaction with what is being explored. It is important to wait, to not rush, to slow down, and to pay attention to what is coming. When something happens, the researcher should be prepared to discover when and how an affect leap occurs.

## 2.3. Three Strategies

To further refine research instruments, three strategies are added that are valuable for use in exploring the emergence of phenomena. These strategies are aimed at three different



phenomena. What characterizes this appearance is that in their becoming, they are close to the world. This means that in these appearances, there is a greater opportunity to explore how phenomena are created with the world. These are open, moving, airy, and volatile appearances that have in common that they do not join as fixed entities, but strive to be close to the world's self-repetition.

I have chosen to describe this appearance with three concepts: border phenomena, border presence, and border zones. Examples of border phenomena are sound and light, while a border presence is an event or a moment, and a border zone, in turn, is a void or a space.

#### 2.4. Border Phenomena

The philosopher Michel Serres has become particularly interested in the phenomenon of sound, or what he calls "le noise" [7,24] (p.158). He takes his starting point in sound as background noise, which can sound like an alarming noise, chaos, or to hear what is shouted at a football match or a festival concert. The secret lies in this alarm.

Noise is like a parasite, says Serres; it follows the logic of parasites [34]. It passes and dies away. Nothing has changed. Therefore, background noise in itself has no basis and cannot be attributed to any identity, but points to what lies behind and below everything else. Sound is simply a border phenomenon that can make us discover that phenomena are created with the world. In this world, every phenomenon must detach to emerge and become a phenomenon that is more or less complex and at the same time constantly in motion. Nowhere can we hear the background noise as clearly as at sea, writes Serres, who himself was once a sailor. Here, all possibilities are realized at once [7].

Similarly, we can approach other phenomena that occur near the world's self-repetition, such as light, air, wind, and water. What characterizes these is that in their formation, they retain much of the mobility that arises in their becoming with the world. They are created by spreading, which means that they can be created with the world in many places and at the same moment. Instead of ending up as unified phenomena, they remain open, with the ability to move in all possible directions without clear and finished goals or directions. This means that other phenomena can make use of the mobility of border phenomena in their becoming. Sound is therefore widely used for communication in connections between many phenomena. This means that the discovery of border phenomena can contribute to a broader understanding of how phenomena are created.

#### 2.5. Border Presence

Another important strategy in the ontology of becoming is the discovery of moments and events. Paying attention to moments can make the body discover that it is a part of becoming with the world. In moments, discoveries can be made of that which is "more," that which is the self-repetition of the world, and which encounters phenomena in their becoming. Through unexpected moments and events, the world encounters phenomena, and thus also challenges our habitual ways of creating knowledge and meaning. This, in turn, can help us discover where our meaning-making comes from, and what it is that makes knowledge come into being. Moments and events are reminiscent of being with the world.

Unforeseen events, sudden details, and moments that appear and result in affect leaps. Events that occur before the body and before conscious knowledge and meaning have been created. Suddenly we are approached by something we had not imagined, like a love that strikes without any premonition. In this way, an opportunity arises to think beyond an ego that is reflected in what the eye sees. Unforeseen events contribute to the release of bodily energy and power. This, in turn, can lead to renewed insights into how material the body is in its becoming.

In a literary context, these situations can be described as critical moments [35]. To be able to point to these, it is important to use a rhetoric that does not invite a reading with a conscious understanding. This can be done, for example, by an unknown word, a sudden detail, a turn, or a displacement of some kind. The specificity of these critical moments is that they enable a borderline presence in the reader, a door that opens to a forgotten world.

They also enable a becoming with the world, which for various reasons has been prevented by preconceived knowledge, and can now be activated and contribute to new insights.

The poet Inger Christensen believes that revelation is about to be affected by the conversation she has with the world, but also, conversely, the conversation the world has with her. "I disguise myself as the world and the world is revealed," says Inger Christensen [9] (p. 823). For this insight to take place, I cannot know what it is I am looking for. Only afterward do I know what I was looking for.

The philosopher Fredrika Spindler points to something similar when she writes that courage is to create conditions for thinking at every moment at the same time as thinking progresses. This can be done by daring to open thinking with something that can be likened to chaos, an unorthodox reality that does not have a stated goal and that does not necessarily have to follow a linear line. The idea is purely material and, most of all, an intensity with power and energy, or a difference-creating activity [36].

## 2.6. Border Zones

A third strategy in exploring the emergence of phenomena with the world is what Michel Serres calls "le blanche", which is the white that is metaphorically described as a purely virtual world, the joker, a white domino, or that which can occupy all values [7,24] (p. 158). An example of this is a coin that in itself is worthless but that can be turned into anything: bread, books, tickets, etc. "Le blanche" is the variable  $x$  of mathematics, the indeterminate one, that which is an empty place, a place for the not-yet-seen. It is the place where no opportunities have yet been realized, and a place that can be perceived as empty and filled with nothing but where it is in the world that is, and that enables the emergence of phenomena.

Such places can manifest themselves as spaces, empty surfaces, and transition zones, where no phenomenon has yet consolidated its position. Some examples of these spaces are, dawn, dusk, or twilight with fog in the air. Starting an exploration at such a place may be an appropriate strategy to be able to follow and study a phenomenon to come.

In *A Thousand Plateaus*, Deleuze and Guattari guide the reader in observing and producing the emergence of phenomena through what they call the rhizome [8]: a figuration that draws attention to a flow that moves in many different directions, and thus also to unlimited growth. Unlike the tree as a metaphor, the rhizome has no life nerve and no roots or synchronous growth. Instead, the rhizome moves in many different directions at the same time, and consists of openings that make it possible to create new connections.

A new rhizome can form in the middle of a tree or as a fold on a branch. It is then a matter of producing shoots and fibers that connect by penetrating the trunk and making them serve new foreign purposes. This openness means that the rhizome is surrounded by uncertainty because it necessarily contains aspects that, at least for a moment, are not possible to think about [8].

These three strategies, border phenomena, border presence, and border zone, in combination with the haptic sensor, can contribute to broadening the researcher's ability to explore the becoming phenomena with the world. This is a methodology that enables the discovery of how phenomena connect at places and moments that cannot be predicted or planned. This is a work that is far from complete, but which creates an opportunity to constantly improve and add something more to these strategies, which is why they should be seen here as the beginning of the development of an ontology of becoming. The next step will now be to take a closer look at the border phenomenon of sound to give another example of how this perspective can broaden our understanding of how phenomena come into being with the world.

## 3. The Emergence of Sound as a Phenomenon

That people have always been fascinated by sounds and voices is noticeable in the attention that continues to be given to the echo wall that is in the Temple of Heaven in Beijing, which is a stone wall in the shape of a circle with a diameter measurement of 61 m.

If you speak straight into the wall from one direction, the sound is passed on, and what has been said at the beginning can be heard by another person at the end of the wall. How is this possible, and where does the sound come from? This is a phenomenon that is as astonishing today as it was several thousand years ago. What is it that is so special about sounds and voices?

We have seen how Michel Serres places special emphasis on the phenomenon of sound and what he calls “le noise” [7,24] (p. 158). He points out that background noise in itself has no basis, and cannot be attributed to any identity, but points to what lies behind and under everything else. According to Serres, diversity, chaos, and noise should not be seen as something destructive, but as an opportunity for an insight into the phenomenon’s becoming with the world [24]. When a phenomenon stands out and leaves the noisy ongoing noise, it is done by hiding the alarm. In this way, it can appear in the world as something discernible. Therefore, it is important to rediscover the noise to understand that it is the world that passes away and that enables phenomena to be created. Sound is simply a border phenomenon that can make us discover that phenomena are created with the world.

This, in turn, means that sound can be used by phenomena to connect and create other phenomena. With the help of sound, phenomena can send out signals and thus create conditions for intra-action. The sound makes the other phenomena listen and respond. What makes this possible is that there is no boundary between the phenomena that transmit the sound and the phenomena that listen and interpret. This in turn enables the development of a community of interpretation between phenomena that have the same language. Sound, therefore, has a unique ability to contribute to connections between phenomena. Its electromagnetic waves have varying densities and can be passed through virtually any matter. Therefore, it is good to listen to the sound to discover how phenomena are created, and to listen to how it sounds when phenomena connect. Follow the sound to see where it goes. A sound is always there, even if our ear does not hear it. Listen with your body, slow down, follow the rhythm, and describe, with the help of the sound, what happens when phenomena are created with the world.

Let us take another step and try to broaden our understanding of sound. We begin by thinking about how the voice is created in the human body. Deleuze and Guattari have shown how noises from deep layers in the body become voices when they find the right conditions in cavities to be able to be articulated [8]. How does this work? That we can talk at all is due to the vocal cords being separated, but in speech, they manage to connect. What we do when we speak is that we fill the cavities between the vocal cords with air that becomes sound. In this way, the voice arises through connections. This is a fantastic ability, where the space between the vocal cords makes it possible for speech to be created.

For Serres, background noise is something that moves close to the world. The problem is that the non-solid has not been conceived and that light, air, wind, and water have similarly been forgotten [7]. The non-solid should not be seen in the same way as a disorder; it is not an anti-disorder or a chaotic counter-image. It is an even more exquisite order that we are not yet able to grasp, hidden as the world is in concepts and words, or, to quote Serres, “We extract, without thinking about it, our hope in the unforeseen” [7].

It is, as Michel Serres points out, to be a little ahead of language, between noise and music. The important thing is to train the senses and touch, and here, Michel Serres believes that listening is especially important. We hear without limits, he says [7]. The sound is better than the view of perceiving diversity and complexity. The eye separates and divides, while the hearing receives and is touched by a noise from the appeal of the phenomenon. Music and sound touch and flow through the body in a way that makes it easier to follow the emergence of the phenomenon.

### *3.1. The Sounds and Rhythms of the Words*

According to the poet Inger Christensen, part of the reason why some people become poets is the special sense of sound that poets have for the sound of words. To them, the

words have “sound, rhythm, sound, speed, and color”, and “it is only by listening to the words, to their rhythm and timbre, their whole music, as the meaning of the words is set free” [37].

Following sounds and the sounds of language means that something very special can be achieved with the help of poetry. It opens up an extra dimension that makes you hear a much larger space than what can be said in a conversation. The harmony between sound and meaning in poetry can lead into a space where we understand more than we think it was possible to understand. That is what is gripping about poetry. Here, it is possible with language to build up a universe where meaning, sound, and timbre can be intertwined.

Inger Christensen sees an opportunity to de-realize herself, because everything already exists in the world. If we have sat outside the world, it is because we have done it ourselves [37]. We must know that we are already in a becoming with the world. It is first by listening to the words—their rhythms, sounds, and their whole music—that the meaning in them is set free. This is what it means to wonder about the words. They constitute a world for themselves, and they express nothing but themselves. To discover this, we must, albeit temporarily, let go of the self and our self-awareness.

When Inger Christensen writes, she pretends that it is not she but the language itself that writes. She pretends that language and the world have their connections, as if the words outside her have a direct connection with the phenomena to which they refer, a sentence that is there in advance [37].

Now, this is just something she is pretending to do, but that she also feels is necessary. She feels compelled to find meaning in the world, because she is a part of the world and cannot fail to create meaning, or to discover a meaning that is already there. A feeling is evoked that signs can be gathered in the same way that nourishment is gathered; that we, as humans, can read a variety of signs from the movement of stars and clouds to the language of ants and water vortices. Of course, it can be so. Inger Christensen thinks that the ants also read and the trees also read, and know in a second when they should hang with the leaves if their flowering is in danger.

### 3.2. *A School for the Speaking Word*

In pedagogy, the Danish pedagogue N.F.S. Grundtvig highlights, in particular, the importance of sound and voice. With the speaking word, he wanted to create a school for life. What we know best is the school of death, he said. “Yes, we know it all too well, we who went to that school”, he states from his own experience [38]. The school of death begins with letters and ends with book knowledge. Listing which books to read and which words and rules to learn is not something that belongs to the development of life; on the contrary, the school of life must come to life as it is.

When Grundtvig is clear in pointing to the speaking word, it is because he is looking for ways to express meaning that which cannot be directly expressed with the written word. He has a will to shape energy, and a force that continues and that can be compared to the world’s self-repetition. Although he, as a theologian and priest, speaks of a spiritual force, he likens it to something as real as the electromagnetic force. The spiritual power is invisible and cannot be directly described [39].

Something can be written in the text that reminds the reader of life, but it is not a given that the person reading the text notices this. The speaking word is simply closer to the body, and that is why he likened the speaking word to bird wings that carry the light invisibly on the tongue. This is best expressed through song and poetry [40].

Grundtvig is looking for the world that, for him, is life itself. Rhythm and music become important ways to be enlightened by life, and therefore hymns and poems also become important. For him, there is in the body direct access to light and life, which there is not in scripture.

Voices thus become important for Grundtvig when it comes to reaching insights into what precedes and is a co-creator of knowledge and learning. Pedagogy should therefore not start with books, but with life. In Denmark, Grundtvig managed to make a mark in

both school and church, which meant that the living word was given greater priority. This is something that, among other things, led to the pulpit at folk high schools being given a symbolic charge [41].

Voice, song, and oral stories help to create rhythm and mobility. They provide space for the life that is constantly being created and that does not allow itself to be captured in dead letters. In this way, the speaking word creates an opportunity for students to discover how each phenomenon is created with the world.

If sounds and voices were given a more prominent position in pedagogy, this could increase our understanding of how phenomena are created with the world. This in turn can expand our ethical responsibility for how all phenomena are created in different ways through connecting. When such discoveries are made, it can lead to greater responsibility for a community that goes beyond the individual phenomena.

### 3.3. *To Listen to Nature's Deep Time*

A good example of how sound can be used in the exploration of the emergence of phenomena is Angela Rawling's Ph.D. and performance series *Sound of Mull* [42]. Rawling is interested in listening to what is called "deep time", which stretched along the geographical time axis when the earth was created, and when mountains and deep seas have been formed. She does this by moving along the North Atlantic shoreline, where she becomes several temporalities that have not only been created by humans. By following a geological time in matter, the body will be affected in a different way, which can also cause thinking to change. Greater care and presence for matter are shown through the realization of how everything connects, and is created with a world that is constantly repeated. A haptic sensorium can contribute to multisensory listening, which makes it possible to perceive phenomena without seeing them as objects named from the outside. When the researcher with the body listens to the voice of matter, it tells us something that we rarely notice. Listening to the becoming of matter involves a multisensory reconciliation that helps to increase our understanding of how our bodies are transcorporeal, and always more than just human [43].

A good place for multisensory listening is the beach: a threshold and a border zone where land and sea meet. Exploring the sound of a beach with sand, rocks, shells, water, wind, and plants provides an opportunity to create new insights into how matter and bodies connect. Here, we can understand that rocks dissolve as an effect of attacks from the sea and strong winds, whereby 2000-year-old peat is exposed and detached from the rocks and land in the sand. We can experience how nature and culture affect each other when plastic and other waste products enter the beach. As a result of this, different scales of time, space, matter, and (human and non-human) bodies will gather and intra-act at the beach.

The discovery of listening to "deep time" can lead to a greater responsible becoming with nature. By exploring the sounds of sand, rocks, shells, water, ice, fish, and plants, new insights can emerge about how matter and bodies connect [31], which shows how thin the walls are between the beach phenomenon and how everything has common conditions in the world's self-repetition.

To succeed with such listening, it is important to be open to what is to come. It is important to have border presence in the form of moments of bodily affects, when the sound of matter connects and becomes with the listener. These events in turn seek an embodiment of formation and mobility. It is important to explore trees and rocks by listening to different geological times with an attentive body and with an ear that is widened to what is created. To attach the body to the sound. To direct the listening to that which creates affect in the body. To do so by risk, to make oneself fragile. Not to give in because it is impossible to grasp the world. To take the vulnerable with an attentive body.

Man is not the ruler of either tree, rock, ice, or climate; this is something that is created through constantly ongoing intra-actions between man and non-man [44]. The sound of matter conveys a challenge to how its sounds can be read in new ways. It is as if the sound is striving to pass on insight into what it is that causes these phenomena to form and move.



The insight into a world that continues, and where sound is a borderline phenomenon point to the ontological conditions with which matter is created. Listening to sound can therefore be one of many ways to broaden the understanding of how phenomena are created with the world.

#### 3.4. *Outro*

It happens that I stopped in the middle of writing, and discovered that I have been reached by something I had not previously thought of, and wondered at a sentence that I did not understand at first. When we make such unexpected discoveries, we can be sure that there has been an affective leap and a connection in the body at the same time, which shows that something happens before knowledge and meaning are created. What this article has pointed out is that it is the world's self-repetition that enables the leaps and connections of phenomena. It is with the help of these that we can broaden our understanding of how phenomena come into being.

To reach insights on how this is done, the body becomes an important research instrument. By developing a haptic sensorium, and adding to this the three strategies of border phenomena, border presence, and border zones, one's own body can allow the researcher to explore the becoming of phenomena. This is not to explain or compare, but to create the phenomena and the movements of the phenomena. To succeed, researchers need to be able to receive, to be called out, and to be attentive. Researchers need to follow phenomena by creating for oneself what arises when these are spread out, connected, and intertwined.

Something is going on constantly with every little particle in the body. Something is created, phenomena take a leap, collide with each other, lie on top of each other, get into each other, and pull in different directions. All phenomena are in an ongoing flow, which creates an infinite diversity. Some of these phenomena consolidate already established territories, while others dissolve what has already been given and seek new places to produce themselves in new ways. The focus of the ontology of becoming is not primarily static phenomena with more or less fixed boundaries, but rather phenomena that are recognizable by their intensity and mobility.

What a becoming ontology can show is that the world's self-repetition is added to the phenomena as a shock, an added value, an addiction, or a line. Sometimes this occurs with a quick movement, sometimes slowly, sometimes forward, and sometimes backward. This means that there is no linear structure that can be followed. There are no fixed points or positions here, but here it is about lines and threads that are constantly created in different directions.

In the education sciences, the starting point is usually a distinction between the researcher and the world. What an ontology for becoming shows is that there is no such limit, but that all knowledge is created with the world. What we can do in educational research is strive to try to understand how this contributes to our understanding of what we study and learn. This also means that in a pedagogical situation, it is not possible to separate teachers or students from the world. There is a constant collaboration with the world in every situation of learning.

It is therefore important for both the researcher and the teacher to be reconciled with his or her desire, and not strive to grasp the world that contributes to the phenomenon being set in motion. It is rather about making oneself fragile and risking something of oneself by realizing that it is not possible to hold on to the world [45]. The world does not disappear; it was there before us, it is here with us, and it will be there afterward. What research can offer is to create the world's self-repetition, which enables everything to be constantly created and changed [5,6].

In this way, the ontology of becoming enables a revelation and re-establishment of the world where the researcher no longer puts himself at the center, a perspective that is critical and creative of our time. This concept can be referred to as anthropocentrism [46–48]. The ontology of becoming is not to reflect the world and make representations of an external

objective world, but to instead carry out our research with an ethical responsibility, with the understanding that we live in a world that enables our becoming. It is to discover how this world contributes to the creation of phenomena. The ontology of becoming brings us closer to the world, and thus also our ethical responsibility for the Earth's common future. This perspective may therefore be useful not only in research, but also in pedagogical contexts. This learning is advantageously linked to today's environment and climate challenges.

A person who researches and learns with the ontology of becoming thus not only expands the understanding of how phenomena are created, but also, to at least the same extent, is challenged to join the world. The ontological and epistemological are woven together, which means that research and one's own life are followed. This perspective allows the researcher to become a phenomenon, among other things, in that the exploration gives the world an answer, which in turn leads to new questions and a continued stay for the researcher.

We end with an observation from the book *Confabulations* [49]. Here, the artist John Berger describes how on one occasion, he swims on his back in a swimming pool with large glass windows. While swimming, he looks up at the clouds in the sky. Then, he sees a vibrant blue color among white cirrus clouds at an altitude of 5000 m. He sees a ripple that shifts slowly, connects, and separates, while the clouds move in the wind. The movement of the blue ripple appears to come from within the body of each cloud.

He stops swimming and floats on his back with his hands behind his neck. The more he looks at the clouds, the more it makes him think of the wordless stories that perhaps fingers can tell, but which are told here by a very small ice crystal in the silence of blue.

"The curls of the white cirrus are observing a man afloat on his back with his hands behind his head." [49] (p. 71).

It is no longer he who observes them; it is they who observe him. Both those who swim and the clouds that move are in motion, and are subject to change. Between them is a world that they both share and that brings them together, which makes them both spectators and participants at the same time. This is how it is constantly there, where the world that contributes to phenomena is created in an ever-changing flow.

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