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Desiree Foerster

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Extending sensibility for metabolic processes in immersive media environments

Abstract. How can we experience the relation to our surroundings as processual and at the same time meaningful, and not from a perspective that is solely function-oriented but as the expression of meaning that lies in the nature of our relational being itself? In this paper I explore how an aesthetics of atmospheres in spatial installations can heighten our sensitivity for ecological interdependencies (external) and at the same time for the responsiveness of our bodies previous to semantic reference (internal). In this responsiveness I locate an openness towards patterns in the internal and external surroundings that allow a specific situation to make sense for a perceiving subject.

Desiree FOERSTER¹

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Introduction

The term atmosphere goes back to the Greek *atmos* (vapor, steam) and *sphaira* (sphere), and refers to the layer of gas that surrounds the Earth. Besides being the subject of scientific inquiries, atmospheres have also been the subject of philosophers and, in the last 60 years, have been increasingly explored as a theme in both art and architecture. One reason for the theme's appeal lies in its ephemerality. For philosopher Gernot Böhme, atmospheres mark the in-between of things - they neither belong to subjects nor the physical environment alone, which caused him to argue that they become the ontological principle par excellence (Böhme, 1993, 125). However, this way of framing atmospheres has been criticized as reductionist because it hinges on the dichotomy of subjects and objects (Schmitz, 1998).

This dichotomy returns in another context of negotiating the relation between humans and their environment: ecosystem services. This design principle understands processes of life forms as productive for the established economic system. Particular aspects and processes in the environment are managed and employed which are considered to be supportive of the well-being and security of human inhabitants. Vertical gardens in urban areas, or the use of materials and structures with additional properties for urban wildlife, are some examples that obviously come with positive effects on humans and other animals. However, it becomes problematic if one takes a closer look at the rhetoric of ecosystem services.

Terminologies typical of this discipline, such as *habitat enhancement techniques* and *resiliency infrastructures*, emphasize the focus on narratives that regard the human habitat as vulnerable in the face of external environmental influences - a distinction

1. University of Chicago, Cinema and Media Studies, USA, dfoerster@uchicago.edu

that seems inevitable and yet manageable. Despite the fact that the concept of ecosystem services can have positive effects on biodiversity, it remains selective and reductionist.

This paper explores an aesthetic that represents the relation of humans and their environments differently. A special focus lies on the articulation of the sharing of the atmosphere with others. First, I will look at an example from architecture where algae and their photosynthetic activity are represented as ecosystem services. I argue that this leads to a reduction of the nonhuman other to benefit human consumption. In contrast, I explore an art work in which the negotiation processes between algae and their environment are represented in a way that preserves their absolute difference, but still suggests a possibility of connection. Finally, I present a virtual reality (VR) project I co-developed as a part of my research practice, which proposes an experiential situation in which the sharing of metabolic pathways with a vegetal other can be experienced in different ways.

The Green Curtain: PhotoSynthetica

PhotoSynthetica is a system designed by Ecologic Studio to reduce carbon concentration (CO₂) in the atmosphere. It looks like a green curtain and combines three components: an urban carbon tool used to measure the CO₂ concentration in the air as well as the performance of the overall system, an algae species that metabolizes carbon into oxygen (O₂), and sensors that measure the microclimate to ensure the optimal conditions for algae growth in relation to the number of people in the space. The surrounding air is pushed into the system and enters the algae culture, where it is supposed to be filtered and then reintroduced into the atmosphere.

PhotoSynthetica can be seen as a typical case of ecosystem services: the metabolism of a living organism is embedded into a context of anthropocentric consumerism, the algae are bred, monitored, and controlled in order to ensure the best atmospheric condition for human needs.

Such a reduction of living organisms to forces of labor without the potential for spontaneous, unwanted, difference-generating process-development is typical of many approaches found in ecosystem services. The living organism is rendered *smart* and *adaptable*. What is needed to counter such a reduction of natural processes to a utilizable essence and economic terminology, I argue, is an aesthetics that highlights potential relationships with environments and others we are sharing environments with, without reducing them to manageable conditions.

The phenomenology of Maurice Merleau-Ponty offers a different way of imagining the relationship between the sensitive and sensual body and its surroundings. His concept of the “flesh” designates an intermediate zone of mediation, which interrelates bodies and their environments: “Expression is always a sort of schema of the carnal other side of the flesh of the intersubjective world, exposed for the first time to the public eye as a visible trace of the indirect, symbolic texture of the invisible reality which constitutes it.” (Merleau-Ponty, 1995, xxii). The human subject extends to this “other carnal side of the flesh” and thereby engages with an “intersubjective world” that constitutes a realm in which the distinction between the other, the not-me, and the me is momentarily lifted. This other is not only the other I encounter in the form of a person or object, but also the other that is me: my body, for Merleau-Ponty, is also always an object in the world, always transcends itself. Merleau-Ponty’s approach to perception as embodied and mediation as an embodied practice provides in the following analysis an alternative to the tool-based approach towards natural systems in ecosystem services.

This foundational embeddedness of bodies in the world means that they expand sensually into their surroundings, whereby they enter into relationships with other bodies. Bodies in this view would not be defined as having clear borders but are instead recognized in their openness to affect and to be affected. In *PhotoSynthetica*, the precondition for this mutual affection does not rely only on the metabolic capacities of the bodies involved but also the built environment, the atmosphere of the space, and the digital system that mediates those metabolic processes. A processual aesthetics has to account for both the similarities and differences that enable these involvements in the first place and how they become available to the senses.

One way to start such an aesthetic approach is with the sensual body itself. Merleau-Ponty explains the interrelation of body and environment with the notion of the lived body. The lived body is at once the sensing body, and the object of conscious reference in its sensing. As a medium, the lived body is not static but transformative: the way a subject experiences its world and itself as a subject changes because those experiences transform the lived body in turn. Meaningful reference, therefore, is enabled by the body, because it is at the same time sensorially extended towards the world and sensual in itself.

With the next two projects, I will explore how the effects of metabolic processes that register in the external environment can be re-contextualized aesthetically. I will use these examples to further specify this aesthetics as processual and atmospheres as the media used here to enable an aesthetic experience of difference within interrelations.

Attuning to Alien Rhythms: The Molecular Ordering of Computational Plants

The piece *The Molecular Ordering of Computational Plants* by artist Andreas Greiner and composer Tyler Friedman brings together algae, sound, and science fiction to create what Greiner calls a *living sculpture*. What makes the sculpture *living* is that it highlights processes instead of displaying a static object. When exhibited at *basis*, Frankfurt, in 2018, the installation featured an aquarium filled with *pyrocystis fusiformis*, an algae species that displays bioluminescence when disturbed. In response to sound coming from subwoofers mounted underneath the aquarium, the algae would illuminate rhythmically. The sounds were heard alongside a recording of a story describing a future in which humans enter into a symbiotic relationship with algae.

I will argue in the following that the bodies of the visitors in the exhibition participated in forming a resonant body for the rhythmical illuminations of the algae and audible vibrations. They entered, figuratively, the first phase towards a symbiotic relationship as described in the recording. This first phase, I propose, consists of the sharing of a rhythm. According to Merleau-Ponty, attuning to a shared rhythm suggests an intimate relationship with others. It stands in as sharing a “manner of handling the world” (Merleau-Ponty, 2012, 370). This observation lies at the heart of intersubjectivity, by which a subject extends its own intentions into space and time, thereby creating a rhythm that can be recognized and taken up by others: “[I]t is precisely my body that perceives the other’s body and finds there something of a miraculous extension of its own intentions, a familiar manner of handling the world” (Merleau-Ponty, 2012, 370). Intersubjectivity then relies on modes of perception that enable the perceiving subject to recognize a familiarity in the way others are handling the world.

But can intersubjectivity be extended towards nonhuman others while leaving their

difference in tact? Jane Bennett proposes with her notion of onto-sympathy a concept for a more extensive understanding of our account for otherness. Onto-sympathy renders the world “as full of propositions waiting to be registered by interested bodies” (Bennett, 2017, 91). In order to register those propositions in the world, we have to “become alert to nonhuman-human affinities” (Bennett, 2017, 103). Her way of doing so is in parsing the operational process of sympathy into phases: the *gravitation* of bodies towards other bodies, the *cooperating* of bodies whereby those bodies are transformed, and *annunciation*, the recognition of others.

If we translate the human experience of the installation into this model, the first phase could be a visitor leaning towards the algae, becoming aware of their specific light intensity and illumination patterns. The second phase is marked as transformation: the sound stimulates skin receptors that register vibrations, muscle receptors detect the rhythmical changes in force and pressure and can interoceptively be sensed. Additionally to the sound resonating in the visitor’s body in this way, the illumination of the algae is captured by the retina of the eyes, transmitted to the nervous system. The visitor literally takes the shared rhythm under its skin. The last phase might be similar to the becoming-familiar with the thus encountered body of the nonhuman other, the recognition of a mechanism of life as it responds to the environment rhythmically.

An approach that brings together the concept of intersubjectivity and onto-sympathy does not start from the human subject or the nonhuman other as an individual, nor their surroundings as a base for manipulation. Instead it regards the relations between organisms and their surroundings as processual - a process from which the human subject and the nonhuman other as individuals as well as their surroundings are continuously composed. The aesthetic situation of *The Molecular Ordering of Computational Plants* enables an encounter whereby the nonhuman other is not simply supplemented to a functional logic. Instead, the sharing of a rhythm offers ways of attuning to otherness, of becoming attentive to a resonance formed within the encounter. With the project to follow, I propose an aesthetic practice to explore the potential of digital media to facilitate such an encounter between the human and the nonhuman.

Sharing the Metabolism of Plants: Give and Take

The VR-project *Give and Take* was not developed as an art piece but rather as a philosophical tool to study how our aesthetic experience changes in immersive media environments. Over the course of five minutes, the user moves through a virtual environment consisting of plants. Particles of different colors float through the air. Some of these particles emanate from the plants, while others come from the user’s body, synchronized with their breathing. The particles that the user exhales enter the leaves of the plants, and the particle stream emanating from the plants becomes denser.

What we represent with this feedback loop is the basic process of photosynthesis: the plants turn parts of the CO₂ exhaled by the user into O₂. The particle streams that represent O₂ and CO₂ disperse into the air around the user and give it a light blue color. Besides the visualization of this atmospheric exchange, the user also sees the plants grow.

About halfway through the experience, a change becomes noticeable: the plants take in less CO₂ and give out less O₂, and the surrounding atmosphere changes as well: as it fills up with the particles exhaled from the user, its color turns red, slowly fading

to black. The plants start to wither and the temperature gets noticeably warmer. The last seconds of the experience leave the user in darkness, feeling the temperature increasing.

Give and Take is not about perceiving and interacting with a plant as a virtual object, but about experiencing an interrelation with an environment through different sense modalities. To integrate our sense of temperature, we use heating lamps, to integrate our sense of breathing, we use a microphone that captures the sound of exhalation and matches it with the particle stream that represents CO₂. In integrating these different sense modalities, we want to provoke a shift in attention, away from the visual sense to those other senses, which are usually not prominent in our every-day experience. Through this shift towards the ways our bodies register effects of changing atmospheric conditions, I propose we also shift to an aesthetic mode of perception (Seel, 2005): away from the perception of an object in its being-so and towards the way we perceive in that particular moment. The *how* of experience starts to matter, rather than the *what*. The lived body can thereby be experienced as being extended towards its environment via different sense modalities, which allow us to gravitate towards other bodies, cooperate with them and announce their co-existence.

Conclusion

My interdisciplinary research practice is concerned with novel ways to aestheticize interrelations between bodies and their environment and how the experience of the processuality of these interrelations provides an alternative to the understanding of subjects and objects as arising from a presupposed essence. Crucial thereby is an openness towards difference - as found in our own bodies as they extend towards their environments, and the bodies of others. In developing my own aesthetic practice, I have been able to explore articulations of self and other that do not necessarily put the human at the center of activity. Elements in the environment such as air and light, but also sensing technologies, can mediate and express different temporalities of actions in the space. Developing a processual aesthetics in atmospheric media, I propose, can highlight that meaning-making is not only reserved for conscious thought but happens on a pre-reflective layer as well. While design projects that employ ecosystem services emanate from a more or less given human subjectivity that comes with an array of needs, projects like *The Molecular Ordering of Computational Plants* and *Give and Take* might provide perspectives that move beyond our immediate self-interest, and provide a context to articulate human subjectivities and non-ordinary forms of representations of others. How such an aesthetics could be adopted for the design of our everyday environments remains to be explored further.

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