The Ecological Self

EXPLORING RELATIONAL ONTOLOGIES THROUGH DESIGN

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ABSTRACT

The paper questions the ontological separation of humans and nature on which the classical understanding of design is based and presents nature-culture models as an alternative in the context of global challenges such as the climate crisis. These models rest on relational ontologies and emphasise the entanglements and interdependencies of all human and non-human actors. To explore these entanglements, the human body, in both its material and experiential dimensions, is emphasised as an epistemological source. Using examples of Rockström's planetary boundaries model, the paper shows how humans, their bodies and their actions are connected to the environment and ecological cycles and how they themselves can serve as a resource and regenerative link in ecological networks. Following the concept of relational ontologies, a new paradigm for design that recognises these ecological relationships, and the interdependence of humans and nature is explored through an embodied approach.

KEYWORDS

- ecological design
- becoming-with
- humans as humus
- body resources

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EXPLORATORY PAPER

1 INTRODUCTION AND CONTEXT

1.1 FROM HUMAN-CENTERED TO PLANETARY-CENTERED DESIGN

Over time, the understanding of the design process has evolved. Instead of the traditional dichotomy between designers on the one hand and consumers or users on the other, participatory design approaches are now being pursued and aim to involve those affected by the design (Mareis, 2014). In this context, it is increasingly recognised that our actions and the shaping of our environment have an impact not only on humans, but also on the whole planet – as the concept of the Anthropocene illustrates[1] or as it is demonstrated in Rockström's famous planetary boundaries model (Richardson et al., 2023). The stakeholders to be considered therefore extend beyond the purely human sphere and other actors, both living and non-living, should be included in the design processes.

Expanding the understanding of design beyond the purely human realm requires an examination of the underlying assumptions about who or what is understood as human and what is understood as non-human, and what power relations are inscribed in such an understanding. As a «science of the artificial» (Simon, 1969) as opposed to the world of nature, the traditional post-war understanding of design is based on a nature-culture dualism that is being questioned and challenged by current discourses, particularly in science and technology studies, feminist theory, anthropology and environmental studies.

1.2 THEORISING THE MORE-THAN-HUMAN: NATURE-CULTURE MODELS

The experience of the anthropogenic climate crisis, but also recent developments in synthetic biotechnology, through which the human disrupts evolutional mechanisms,

raise fundamental questions about the role of an embodied human being in the world. They show that previous concepts based on an ontological separation of humans and nature do not do justice to the problems of our time (Braidotti, 2018; Escobar, 2018). Instead, environmental changes seem to suggest a «nature-culture» perspective, as proposed among others by feminist and posthumanist philosopher Donna Haraway. In her NatureCulture (2008) thought model, she emphasises the interconnectedness of these two spheres and shows that the dualism rooted in the thought traditions of the natural sciences and the humanities is untenable. This idea is also taken up by other posthumanist philosophers such as Rosi Braidotti under the concept of the nature-culture continuum, with which she critically questions the «categorical distinction between the given (nature) and the constructed (culture) given by the social constructivist approach» (Braidotti, 2013, p. 2). Theorists such as Donna Haraway and Rosi Braidotti therefore call for the boundaries between the arts, humanities, social sciences and natural sciences to be overcome to blur the boundary between nature and culture and to include their interactions.

Instead of an individual and autonomous «anthropos» – usually in the form of a white male figure who seems to be elevated above nature and considered the measure of all things – symbiotic and collective concepts come to the fore, decentralising humans and emphasising them as a «companion species» (Haraway, 2008), inextricably linked to other organisms. These produce themselves «sympoietically» (Haraway, 2016), i.e. together through a constant «becoming-with» (Haraway, 2016). Donna Haraway's approaches thus ultimately emphasise the ecological interconnectedness of all human and non-human agents. In her recent theoretical model of «humans as humus», described in her book *Staying with the Trouble* (2016), she conceptualises humans as part of the larger ecological system, using the organic component of soil as a metaphor. This concept emphasises the idea that humans are an integral part of the biotic community and have the potential and a «response-ability» (Haraway, 2008) to be a source of nourishment and regeneration rather than destruction in their interactions with the environment. The approach challenges traditional notions of individuality and hierarchy and promotes an affirmative, more relational, and collaborative approach to ethics, politics, and knowledge production, thus providing an alternative paradigm for design to operate from. A paradigm based not on controlling and regulating life, but on flourishing, belonging and thriving.

1.3 THE ONTOLOGICAL DIMENSION OF DESIGN

The abolition of this ontological separation between nature and culture calls for a reorientation of the discipline of design. As a discipline or activity «devoted to creating tools to (re)shape the world, referring to human practices of world-making» (Design Research Society, 2021), design has always an impact on and is an expression of a certain human-world relationship, thus has an ontological dimension. This aspect is also expressed by Anne-Marie Willies with her famous sentence: «we design our world, while our world acts back on us and designs us» (2006, p. 80). Ontological design can therefore play a key role in reshaping how we live in the world and how we produce, reproduce and consume ourselves and our material environment. As anthropologist Arturo Escobar describes, it can help to contribute to a «relational understanding of the material, as it aims to dematerialize society through a new awareness of materiality and through the innovation of new ways in which society can ‹resource itself›» (2018, p. 132).

1 Although the term Anthropocene was recently rejected by the International Commission on Stratigraphy of the International Union of Geological Sciences (IUGS), the term has now gained popularity and is referred to as the general massive impact of humans on the planet, from nuclear bomb testing to climate change and species extinction, and is used here in that sense (Zhong, 2024).

1.4 THE EPISTEMOLOGICAL BODY

To explore what it might look like to design from such an understanding of relational ontologies, I dedicate my research project to our most fundamental ontological condition of the world – the body. The body plays a key role in the relation and constitution of the world, as Tim Ingold puts it: «We do not [just] live inside our bodies, but […] continually and alternately gather the world into ourselves and release ourselves into the world» (Ingold 2015, p. 42). The human body thus becomes not only a medium for the projection of contemporary culture, but also a (bio)indicator of planetary health. Pervaded by pesticides and resistant germs, by radiation and microplastic particles that act as endogenous disruptors in us and other living beings, the body in the Anthropocene shows how closely we humans and our actions are connected to what we call «nature». At the same time, our embodiment is, as the philosopher Maurice Jean Jacques Merleau-Ponty notes, the precondition for our being in the world, it is what «gives us a place in the world of nature at all» (1966, V) and is «the condition of the possibility of perception» (1966, V), i.e. our epistemological access to it. The body is thus the basic precondition and the primary site of knowledge of the world. Merleau-Ponty thus challenges the long philosophical tradition that sees consciousness as the source of knowledge, arguing that the perceiving body and the world it perceives are inseparable.

In my work, I use this ambiguity of the body to experience the direct interdependence of the so-called self on the environment by embedding the self and my own body in ecological cycles that connect my metabolic processes with them of the environment. The body therefore becomes a source of knowledge both materially and experientially. In this way, this research approach follows the idea of the fundamental unity of being in the world, according to Escobar, «the primacy of practical understanding and the idea of cognition as enaction» (2018, p. 112). This approach also takes up Donna Haraway's concept of situated knowledge (1988), which highlights the awareness and responsibility for one's own research position.

2 PRACTICING THE DEBATE

2.1 THE BODY AS A RESOURCE

Following this line of argument, I focus on (bodily) materials that constitute us humans and other forms of life, and that lie at the same time in the field of tension between nature and culture. The focus is on materials in ecological cycles that are part of Rockström's planetary boundaries model, which describes limits to the impact of human activities that have been or are being reached by human influence and that are essential to our physical existence (Richardson et al., 2023). All the components and their cycles specified in these planetary boundaries model – from global freshwater use to carbon, phosphorus and nitrogen cycles to biodiversity and CO^2 concentrations – can therefore be understood as global commons. As such, they are also subject to the tragedy of the commons, as Hannes Bergthaller and Eva Horn write in their book *The Anthropocene* (2023), because although common life depends on these collective goods, the individual actors do not feel responsible for their preservation but are subject to the principle of individual profit.

Nitrogen-phosphate fertilisers, for example, are elementary components of the nutrient supply and are used intensively in agriculture. While phosphate is mainly extracted from mined phosphate rock, the sources of which are increasingly being depleted (forecasts vary between 100 and 300 years) (Netz, n.d.), nitrogen is extracted from the air using the energy-intensive Harber-Bosch process, which is responsible for around 1–3 % of global energy demand and is therefore one of the largest industrial energy consumers (Deutscher Bundestag, 2018). However, the intensive use of these substances on soils to grow crops that are mainly used to feed animals, disrupts nutrient cycles and leads to processes such as eutrophication of surface waters and terrestrial ecosystems, with long-term negative impacts on vegetation and species composition (Umweltbundesamt, 2023). While these phenomena point to non-regenerative approaches in in-

Figure 1: Recycling struvite fertiliser from urine with a DIY and Homelab approach

dustrial agriculture, problematic meat-heavy diets and environmentally and health-damaging mining, they also raise questions about the development of alternative sources (Heinrich Böll Foundation, 2017).

As part of the nutrient cycles, humans themselves can serve as a valuable resource for these substances, as they are absorbed through food. As humans excrete several grams of phosphorus and nitrogen per day, the recovery of these substances can cover part of the needs of the agricultural economy, thus saving large amounts of energy and partially replacing the extraction of mineral resources (Deutsche Welle 2020; Netz, n.d.). At the same time, the close interaction between our bodies, our lifestyles and the environment is also evident here, as the direct use of human urine on fields is prohibited by the fertiliser regulations due to possible pharmaceutical residues or germ contamination. Processes are therefore needed to separate the useful substances from the other substances in the urine.

What is now being tested on a large industrial scale for sewage treatment plants, I used as a case study to explore the underlying natural-cultural interdependencies at the micro level of my own body. Rather than transferring knowledge of these natural-cultural interactions to disembodiment and industrial plants, it was combined with an embodiment and personal experience approach. This involved recycling phosphate from urine in the form of struvite fertiliser, using a DIY and homelab approach. The project brought together professional scientists and DIY enthusiasts and combined open-source knowledge with interdisciplinary co-creation.

Taking this approach further, the project will incorporate other bodily materials into the design process through a practice-based research approach. For example, water – an increasingly scarce resource due to global warming, which is already leading to resource conflicts over water quantity and quality and is linked among others to the planetary limit of freshwater change, makes up to 75 % of our bodies and is necessary for several vital functions (D'Anci et al, 2010). However, an adult also loses up to 2.5 liters of water per day through urine, respiration, and skin, which can be replenished.

2.2 HUMANS AS HUMUS

By using bodily materials as a resource, the project transforms the notion of humans perceiving and using nature as a resource into a resource itself. In doing so, humans themselves become part of the global commons, the shared resources that are constantly and collectively reproduced, practising Donna Haraway's «human as humus» model of thought. As «Humans as humus» expresses a human-world relationship that is not based on isolation, separation, and individuality, but on relationality and interdependence, thus decentralizing humans by not neglecting their «response-ability» (Haraway, 2008) it is an understanding, that leads to a design approach that considers and uses the ontological dimension of design to help society to «resource itself», as Arturo Escobar describes it. By extracting, synthesising and recirculating materials from my body that can be reused to nourish other organisms such as plants, which in turn serve as food for humans, this ecological understanding of a cross-species relationship of kinship and dependence is explored and gets expressed. By designing with and through my body, thus using my own body, both in its material and experiential form as an epistemological source, new ways of learning and understanding are explored. This personal approach allows to translate the logic of the ecological relationships from a planetary to a personal scale and my own involvement to be understood.

Thereby the project follows the means of the Community Biotechnology Initiative (CBI) who describes their shared purpose as follows:

> *«to: Fundamentally transform life sciences & democratize biotechnology to inspire creativity and improve lives by organizing life science change-makers and bioenthusiasts to build an inclusive global network, cultivate an accessible commons of knowledge and resources, launch community labs and projects, and enable local educators.»* **(Community Biotechnology Initiative, 2018).**

Figure 2: Investigating the crystal structure of struvite fertiliser with a 3D printed microscope attachment for smartphones

Drawing on democratised and open technological practices such as DIY-bio, bio-making or bio-hacking, I explore not only my entanglements and relationships with materials and other species, but also the movement's transdisciplinary, inclusive and experiential approaches to knowledge production. By expanding traditional academic boundaries and pursuing a contemporary concept of the commons, the movement offers a promising starting point for thinking about traditional and new commons together.

3 CONCLUSION

As described at the beginning, in and through design there is a need to examine the assumptions about who design is for and what ontological assumptions about human beings and their position in the world underlie the understanding of design. Since the classical understanding of design is based on a nature-culture dualism that is no longer viable in the face of problems such as the climate crisis, which turns design into a «science of the artificial», nature-culture approaches were presented as a counter perspective, arguing for an interweaving of these spheres and an interplay of scientific, humanistic, and artistic approaches as practiced by design. Relational ontologies were presented as a guiding principle, representing an ecological understanding by emphasising the interconnectedness and interdependence of all organisms and decentralizing the human. As the body is our basic ontological precondition for the world, it was then described as a source of knowledge in both its material and experiential dimensions. The examples of the phosphate-nitrogen cycle and the freshwater cycle, which are linked to Rockström's «planetary boundaries» and can be understood as global commons, showed how humans, their bodies and their actions are connected to the environment and how they themselves can act as a resource and regenerative link in ecological networks. By reversing the concept of humans consuming resources to being a resource themselves, Donna Haraway's theoretical concept of «humans as humus» and Arturo Escobar's idea that society can «resource itself» are put into practice. By using the design process as a personal, embodied, and experiential approach, I open up these macro issues to a micro level that allows me to understand my own role in the whole. In this way, the project explores what it might look like to design out of a different paradigm – one that understands humans and nature as a unity that produces each other in a «sympoetically» way through a constant «becoming with» to put it in Donna Haraway's words. Drawing on democratised and open technological practices such as bio-making, DIY-bio and bio-hacking, the project also explored the idea of the commons in relation to new commons such as software and hardware.

Design in this case is not used to provide scalable solutions or answers to the complex issues surrounding planetary boundaries. Rather, the ambivalent and complex conditions and entanglements of the human-nature relationship are elaborated and made experienceable. Design in this case contributes to the translation of planetary scales into personal scales, thus creating a personal approach and opening the horizon for speculation on alternative possibilities of being, exploring the capacity of design to expand the possibilities of being through our bodies and materialities. In this way, the project unfolds the ontological possibilities of design in the tradition of Arturo Escobar (2018).

It is thus part of a more recent development in design that encompasses the fields of Critical Design and Speculative Design – as a subset of Critical Design – and has been propagated most notably by Anthony Dunne and Fiona Raby, among others, in their book *Speculative everything: Design, fiction, and social dreaming* (2013). This approach uses design methods and perspectives to critically question ethical, cultural, and social conditions (Critical Design) and to promote the imagination of alternative future scenarios (Speculative Design). As Claudia Mareis states in her book *Theories of Design* it is «a way of hypothetical and speculative questions to find out how things might exist and function in other ways» (2014, p. 216). In this way, the project contributes to a broader discourse on alternative narratives, methods, and practices for reshaping the human presence on earth.

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