Landscapes: the Arts, Aesthetics, and Education 33

Biljana C. Fredriksen
Camilla Groth *Editors*

Expanding Environmental Awareness in Education Through the Arts

Crafting-with the Environment

Springer

Landscapes: the Arts, Aesthetics, and Education

Volume 33

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Editors

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“Hīnaki Dress Activation with Human and the Wind, Sea and Sand of Karekare” 2018
(Photograph by Miranda Smitheram. Performer Frances Joseph)

Foreword

We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time.
—T.S. Eliot, from "Little Gidding," *Four Quartets*
(Gardners Books; Main edition, April 30, 2001)
Originally published 1943.

The book you hold in your hands beckons you to return: to first things, to beginnings, to unmediated relations and intuitive understandings of the world and its inhabitants. Interweaving academic theory, indigenous wisdom, and the perspectives of artists and teachers, the authors of the essays to follow urge us to reignite dormant capacities for wonder, to restore the "hundred languages" (Malaguzzi, n.d.) that are our birthright, to resume our dialogue with those who share our common world. As Deleuze (1994) reminds us, there is difference in every repetition: We are no longer the children who communed so readily with our companions in the natural world, who pondered as my granddaughter does, "What do you think this worm is thinking?" Educated as we have been to focus our attention above and beyond the ground on which we stand, to view the world as subject to human dominance and available for our use, we may find ourselves shaken by the ideas presented here. To begin to think so differently about the world and the place that humans occupy within it can be deeply disorienting. But has it ever been more urgent to reorder our vision and our priorities in ways that begin to repair the damage done by centuries of human dominion? Here, we encounter a squad of experienced guides, artists, researchers, and teachers who draw our attention to the responsiveness of materials, the ingenuity of small creatures, the reciprocity of the environment. This is a text rooted in the mess and mire of the present moment, crafted by authors deeply engaged with the world, intra-acting with the more-than-human realm of materials and environments, changing and being changed by the encounters they share.

The combined and cumulative voices of this international gathering of authors celebrate an emerging consensus, a movement coming to maturity. It is clear that these authors have been reading, thinking, and making *with* their more-than-human companions for extended lengths of time. The text makes vivid a cluster of contemporary theoretical work that may be elusive in its original presentations: It becomes clear, for example, what Donna Haraway's (2016) expansive concept of "staying with the trouble" might mean—and how much that concept may mean for our continued residency on the earth—through the examples provided in the text. Vocabularies that may be new or still unwieldy become tangible as they are attached to lived experiences of artists working with the materials at hand. We are lead to understand Karen Barad's (2007) concept of agential realism, for example, as we listen to the stories told here of materials understood as agentic, as offering their own affordances, resistances, and invitations. Greeting these materials not merely as inert "stuff" to be shaped and subdued by human imposition, we envision the experience of crafting as a dialogue, an intra-action, to which each participant contributes. And in this small, local, intimate way, we may begin to act more responsibly toward the materials at hand and the environment at large. The arts practices documented here are rich, contemplative, and inclusive, representing the traditional materials of craft—clay, wood, fiber, gifts of earthly provenance—and other transformative processes involving interactions with the earth, including walking, choreography, stone piling, and other ritual intra-actions with the environment.

Influenced by close reading of contemporary theory and well-honed sensitivities to the state of the precarious state of human habitation of this planet, these are art, design, and craft practices understood differently than they often tend to be. The practices of making here are not a matter of pushing materials to their limits, but of listening to what they require, responding to their insistences, becoming attuned to their rejoinders. The authors and editors of this text are quick to contest the novelty of their approach; they eschew the term "new materialism" as a way to describe their work. Recognizing that these ideas are deeply rooted in indigenous ways of knowing, they make no unwarranted claims to originality. Their work is steeped in traditions of feminist thought and practice, and understandings newly articulated, reemphasized, and revised in response to contemporary experience. While the text represents a reaction against the human-centered world view and the assumptions of superiority, dominance, and manifest destiny it entails, it revels in necessary subtleties, encouraging a more "ecocentric" view of human being, a more sustainable attitude toward material use, a recognition that we humans are not, in fact, so different from those other animate and inanimate creatures who share our tenure on this earth. Behaving response-ably toward them encourages us to cultivate attitudes of humility and openness, presence and reciprocity. We become capable of entering into an I-Thou relationship (Buber, 1937) with our fellow beings, more-than-human as well as human.

The call for "crafting-with" presented here mirrors the call for "research-with" children that has emerged in the field of childhood studies. Just as this altered sensitivity requires us to recognize how children have been used, objectified, ventriloquized, or silenced in much earlier research, the authors here call for increasing

reverential regard for their materials and the others who contribute to their production. This compels us to recognize the severity of the environmental crisis in which we have embroiled ourselves by acting recklessly as well as the entanglement of the degraded climate with other crises of our time, global pandemic, and political turmoil chief among them. The world described here is one closely observed, taking notice of what is happening, imagining from the perspective of another. It is a world where our teachers are not only human, where the experience of making and the residue it produces alert us to the necessary entanglements of humans, more-than-humans, and the environment we share, made closer and more tangible through the products and practices of making. The need to address these issues through curriculum and pedagogy, the necessity of expanding our attention to processes of cultural production throughout the curriculum, is the underlying message of this work: The responsibilities of education in the present moment, taken seriously, demand nothing less than a radical shift of attention and emphasis, an onto-epistemological revolution that is fully responsive to the seamless condition and perpetual motion of our being/becoming in the world.

Remarkable for the consistency of its perspective and the depth of its insight, the text that follows speaks in a gentle but insistent voice in the midst of ongoing global crises. It provides hope that small daily acts have the capacity to change minds and hearts and practices. Each chapter contributes something unique, a facet of an emerging and expansive whole. Together, the authors demonstrate the potential of craft to provide spaces and occasions for reflective intra-action with the more-than-human world.

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Editors and Contributors

About the Editors

Biljana C. Fredriksen is a Professor of Art & Craft at University of South-Eastern Norway, Faculty of Humanities, Sports and Educational Science. She has been a teacher educator for nearly 25 years, teaching mainly at early childhood teacher education. In her Ph.D.-thesis, from 2011, *Negotiating Grasp: Embodied Experience with Three-Dimensional Materials and the Negotiation of Meaning in Early Childhood Education*, from The Oslo School of Architecture and Design, she investigated young children's embodied, experiential forms of learning. From there, her research interests developed toward intra-actions with natural materials and eco-pedagogical perspectives in experiential learning among more-than-humans. She has been leading the research group LETS: Learning and Teaching for Sustainability at her university since 2016. She has been a co-leader of the Norwegian National Research Network for Sustainability and Education (NABU) 2020–2022, and her university's focal point in the International Partner Network of the UNESCO Chair on Education for Sustainable Lifestyles since 2021.

She has published number of articles and book chapters in English and Norwegian, with focus on, for instance, eco-creativity, pedagogical improvisation, posthuman perspectives in craft education, and interspecies pedagogy. She has also published two books in Norwegian: In 2013 a book based on her Ph.D.- thesis, and in 2019 a book about the emergence of rising teachers' ecological awareness.

Camilla Groth is a craft practitioner, researcher, and teacher with an M.A. from Royal College of Arts in London and a Doctor of Arts degree from the Aalto University in Finland. She has a background in ceramic and glass crafts and many years' experiences of studying, teaching, and working in the field of both design and creative arts. Her work has been exhibited in Tokyo, London, Paris, New York, and Helsinki and has been acquired by the Finnish State Art Commission. She has also worked as a designer for ceramic and glass companies in Italy, Switzerland, and Japan.

She defended her doctoral dissertation in the field of crafts and design, with the title: *Making Sense Through Hands: Design and Craft Practice Analysed as Embodied Cognition,* and in this work, she develops theory and research methods for design and craft practice. Her research interests revolve around experiential and embodied knowledge and materiality. In her role as Associate Professor at the University of South-Eastern Norway, she is leading the research group Embodied Making and Learning. This research group has around forty active members and the goal is to develop knowledge that can explain embodied making practice and understand its role for individuals as well as education in general.

She has published regularly on topics related to craft practice and craft education and has developed interdisciplinary educational models for higher education. Lately, she has studied especially human-material interaction in relation to sustainable transitions and education, and experiential knowledge exchange in interdisciplinary collaboration. She is an editorial member of the *FormAkademisk Research Journal of Design and Design Education* and an active reviewer and facilitator of several art, craft, and design research publications and conferences.

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Theoretical Perspectives

Towards a Changed View on Crafts and Materiality: An Introduction

Camilla Groth and Biljana C. Fredriksen

1 Prologue

An early spring morning, as my sight followed sparkling light playing with the tree outside my kitchen window, I noticed a black and white magpie on my lawn. "Busy with her own breakfast", I thought. But, a closer look revealed that she was busy with something else; with her beak she was repeatedly lifting and releasing an approximately 30 centimeter long stick. "Oh, she is testing out if the stick is appropriate for her nest", I thought. As she kept lifting it I wondered if she was exploring some other qualities besides the stick's weight and length, perhaps its' elasticity? I started to wonder about the way magpies build their nests - would it matter if the stick material was fresh or dry?

The magpie seemed quite immersed in her repetitive activity and did not notice me at all. I empathised with her absorbed state … while I was sitting there with half of my sandwich and a half open mouth on the other side of the window glass. I tried to focus my attention even more: Was there anything specific with her body movements? Could I sense where her attention was directed? Was this particular stick somehow outstanding? The stick seemed quite straight with no leaves or branches, but was slightly thicker on one end than the other, I noticed. I also realized that every time she lifted it she grabbed it in a slightly different place with her beak. She seemed to be looking for the exact spot where the weight was evenly distributed between the two sides. As I continued to observe her I realized that she was probably looking for the balance point. How remarkable, I thought at first. But in the next moment I understood that what was remarkable for me, probably was an everyday business for a bird, who has to fly with some building material in her beak. "Of course…! She had to make sure not to get off balance while flying", was not a thought that came 'naturally' to my mind. I had no experience of flying and had limited ability to imagine what kinds

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> of challenges come with flying. Still, the process of trying to understand the magpie's stick exploration made me realize how ignorant I have been to the skills of our fellow animals.
>
> From Biljana's notes spring 2019

While one is wondering how the world might look from someone else's point of view, be it a magpie or some other being, one might also learn something about oneself. Similarities between oneself and the other might become visible, and the other's struggles might even be sensed through one's own body. Thus, neither wondering, or noticing or sensing, come without effort, especially if one does not care (Fig. 1).

As teacher educators, artists, craft practitioners, craft researchers and teachers, we are aware that products of our actions (written on paper or chiseled in stone) will live on after us, in the future that, at the moment, does not seem particularly bright. The authors of this book invite you to try to imagine a world where not only humans can be our teachers. In the following chapters insects, squirrels, daylilies, oaks, and oceans, emerge so that we can learn from them and with them. This book is an invitation to care, a challenge to expand one's ecological awareness and a plea to re-negotiate human-centered values so that renewed ways of seeing the world can expose still invisible paths for the future.

The concept of crafting, central in this book, is generally understood as a process where physical transformations take place. The fact that such a process is observable and perceivable from the outside of the crafting bodies, makes it particularly valuable as an arena for nonverbal, embodied learning. Unlike many school-based

Fig. 1 Magpie and a stick. Painted by Gospodin Tsvetkov (Photo by Marika Mørkestø)

learning processes, crafting does not depend on exclusively human forms of verbal communication. For this reason, a crafting process carried out by an individual from one species can be comprehended by an individual of another species. Additionally, a process of crafting leaves traces; tangible objects, such as signs of actions that took place, cuts in wood, or holes in the ground, scars from material harvesting. These tangible outcomes of crafting, in objects and in the environment, have the capacity to endure and affect, for better or worse, long after their creators are gone.

2 Time for a Changed View

As the severity of the environmental situation has become clear to us all, especially educators have stirred the urgent necessity for a transition to a more sustainable relationship with the environment (Illeris, 2012; Jickling & Sterling, 2017; Lutnæs & Fallingen, 2017). As the complex entanglements between human activities and environmental degradation are becoming dominatingly evident, the need to consider them in curriculum development is clearly necessary. Not only is there a need to change behaviour, but also the whole relationship with materiality and other living organisms. Inducement of such a drastic change of lifestyle in new generations, demands profound altering of education from early childhood to higher education. Teacher education plays a considerable role in the process of long-term transition to more sustainable lifestyles.

As researchers in the domain of art & craft education, we, the editors of this book, believe that the connection between the human and the material is especially palpable through the aesthetic sensitivity that creative practices facilitate. Biljana C. Fredriksen is a teacher in the Norwegian educational subject of Art & craft and a teacher educator at early childhood teacher education. Her research interests developed from a passion for textile crafting, a love for animals and a curiosity for young children's tactile explorations of natural materials as a form of meaning negotiation. Camilla Groth has a background in ceramic crafts and design and is now involved in teaching in higher education. In her research she is focussing on experiential knowledge and the learning that takes place through longitudinal craft practice, embodied cognition, and interdisciplinary collaborations.

When choosing or sourcing material for creative practice, the process inevitably forces the practitioner to make choices. By manipulating material, one's own relationship with it grows through the experiential interaction with it (Groth, 2020). This interaction transforms the material and leaves traces of meaning and memories in the artefacts that have been made. At the same time, it also leaves marks on the practitioner. In this process, there are ample opportunities to reflect and to renegotiate one's own attitudes, behavior and relationship with and through materiality in general. Through the act of crafting in material, there is a possibility of becoming concretely aware of the nature of materiality and human dependence on the material environment (Groth, 2020). Craft practice can facilitate behavioural change towards

more sustainable and respectful ways of handling materials and the environment (Zhan & Walker, 2019).

The subject of this book is the development of a form of ecological sustainability, where the practice of crafting brings humans, more-than-humans and the environment closer to one another. Recent post-humanist thinking has inspired both creative practitioners and educators in this vein. Not all authors of this volume formally position themselves within a post-humanist onto-epistemology. Even so, in this introductory chapter we will present an overview of current discussions and central theoretical starting points that are topical in the field of post-human thinking, which several of the authors relate to in their reflections. By covering the most central theoretical concepts here, we aim to avoid repetition and give space to the individual chapters. This book deals with art education and sustainable pedagogy through a holistic perspective, where acts of crafting are not reserved for humans only.

3 Expanding the Concept of Crafting

The process of crafting holds the central position of this volume. Similar to the magpie, and many other species, humans also build their homes and shelters to protect themselves from the weather and predators. Humans are, indeed, "just a newcomer species resorting to building to protect ourselves in a threatening world", says Michael Hansell (2008, p. 1), a biologist enchanted by birds' nest building. Crafting is in this volume understood as an act of building something, transforming physical environments, moving materials, altering matter, assembling parts, creating new forms and recreating what was there before, but not necessarily only by human hands.

The concept of crafting is commonly understood as a process of making something in a skillful way. However, it is perceived differently, depending on the specific geographical, historical, cultural, and temporal contexts and languages. Craftsmanship, in a traditional sense, demands specific knowledge, and development of such skills demands longitudinal experience through practice (Niedderer & Townsend, 2013; Sennett, 2009). Good craftsmanship is visible, tangible or even taste-able, and it smells of patience and hard work. Some of the chapters in this volume exemplify their arguments through cases in either arts, design or crafts. Such creative practices share many qualities and the boundaries between them are not rigid nor clear. We have chosen not to draw clear distinctions between the domains of art, craft and design, particularly since the authors in this volume address them in individual ways and according to the particular context that they are a part of. The expanded view on craft activities that we present in this book encompasses human interaction with both animate and inanimate materials, beings and situations; including an interdisciplinary array of contributions dealing with collecting and manipulating wool, clay and minerals, earth and bacteria as well as gardening, walking practices, dance choreography, and many more.

The concept of crafting is further expanded by welcoming more-than-human actors. When the authors of this book assign crafting abilities to non-humans, we do not mean that non-humans craft in the same way and with the same conscious intentionality as humans. Rather, by acknowledging more-than-human 'crafting', and by learning to appreciate the transformative processes carried out by other-than-humans, we are supporting the restoration of a more balanced worldview and a more leveled power distribution.

Crafting as a way of improving and developing one's artificial environment is a necessary evolutionary process, vital for the survival of possibly all species, especially when environmental conditions change. Many animals, for instance birds, learn how to improve their nest-building skills and the development of their crafting abilities has had large consequences on evolution (Hansell & Ruxton, 2008). If we consider crafting as tied up with experiential learning, it might become more obvious how central the physical action of manipulating and transforming the environment is for life in general (Fredriksen, 2013, 2019, 2020).

The two editors invited contributions to this volume that consider craft education in relation to environmental issues. An openly distributed call was put out, mainly to the editors' Nordic network of colleagues, but also internationally to research contexts independent of theoretical and practical backgrounds. Due to the specified theme and a growing interest in the post-human idea, many of the authors embarked on a non-anthropocentric line of reflection. In the next section, we will give an overview of the main concepts and theoretical orientations that the authors use in their texts in relation to materiality, making and crafting.

4 A Reaction Against the Human-Centered Worldview

Anthropocene is proposed as the next geological epoch; denoting the period in which human activity has been the dominant influence on the climate and the environment of our planet. Traces of human activities are now evident across the entire planet and the Earth is irreversibly changed by humans—the anthropos—hence the name: *Anthropocene*. The term has been in use since the 1960s and has been more recently popularised by the atmospheric chemist Paul Crutzen and the ecologist Eugene Stoermer (Franklin, 2017). Today it is a term commonly used by geologists, climate chemists and stratigraphers (Gan et al., 2017), as well as researchers, educators, and artists in this volume. The uncomforting realisation and irreversible fact of the negative impact humans have had in the Anthropocene epoch, might hopefully motivate a behavioural change towards a more sustainable way of life, and a transition from anthropocentric (human-centric) to eco-centric values in education.

This awakening has initiated a reaction against anthropocentrism and initiated a post-humanistic and non-anthropocentric or even eco-centric socio-political and philosophical orientation (Barad, 2005, 2007, 2005; Braidotti, 2013; Guattari, 2008; Haraway, 1991; Næss, 2003). This is now influencing a multitude of other domains, including educators in creative practices; among many others (Illeris, 2012;

Fredriksen, 2020; Mäkelä, 2019; Rosiek, 2018; Cutter-Mackenzie-Knowles et al., 2020). The material manipulation, central to the arts and crafts domain, concretises the role practitioners and educators have in promoting a sustainable attitude to material use (Aktaş & Groth, 2020, 2021). In the next section we will present examples of how a changed attitude to materiality is forming, in which the human-centered orientation is balanced with an emphasis on the role of the ecological environment and non-humans, including other species, fauna and inanimate material.

The renewed view on materiality challenges traditional dichotomies of animate-inanimate, organic–inorganic, nature-culture, subject-object, material and immaterial etc. (Bennett, 2010). (Wo)man's role in the ecological system is repositioned, from having a superior and dominating role, to one of many other creatures. Many philosophers in this tradition have come from those who hold feminist perspectives (see e.g., Haraway, 2016); thus also inter-human power relations are renegotiated during this repositioning process. Animal rights and ethics are themes that undergo re-evaluation, and new concepts are developed that try to bring about more justice and fairness in unequal and hierarchical fixed relations, such as the concepts of other-than-humans or more-than-humans.

The concepts 'other-than-humans', 'more-than-humans' and similar word constructions, emerged from efforts to reduce human-centrism and empower non-humans. 'Other-than-humans' excludes humans and refers to every other species or individual, whereas 'more-than-humans' is more inclusive. 'More-than-humans' refers to humans, other animals, plants, microorganisms and sometimes also non-organic materials. Some authors apply this concept to address living organisms only, as for instance David Abram (1997), who addressed perception and language in a more-than-human world. However, in his later work related to arts education Abram (2007) writes about a stones' capacity to call for human attention, as if he was suggesting materials' agency. Tim Ingold used the concept more-than-humans, to address living organisms in his book from 2000. Asdal et al. (2017) refer to Foucault's term 'biopolitics' (from 1976) as a forerunner to their application of the term "more-than-human condition" in the field of geography. When the concept of more-than-human is applied in the chapters of this book, it sometimes refers to humans and other animals, and sometimes also includes plants, organic matter or even non-organic materials.

Post-humanist thinking in relation to materiality is linked to the way materials are seen in a social context and in which the general and unavoidable entanglement of materials and things in human life is acknowledged (Hodder, 2018). Socio-material theories originate in Wanda Orlikowski's and Susan Scott's (2008) studies on the role of technology in organisational life, inspired by Bruno Latour's (2005) Actor Network Theory (ANT). This in turn has inspired many other orientations within the socio-material umbrella, for example, neo material orientations developed by Manuel DeLanda and Rosi Braidotti (Oliveira de Moura & de Sousa Bispo, 2020). While different socio-material orientations have varied origins, they share common approaches, such as, that practices are modified by the dynamic interaction between human and non-human elements and that all humans and non-humans are viewed as

effects of connections based on the existence of a "web" of relationships (Oliveira de Moura & de Sousa Bispo, 2020, p. 352; Fenwick et al., 2011).

Important in these contexts is the acknowledgment of an embodied mind and the rejection of the Cartesian division between mind and body that reflects a hierarchical approach to materiality. Material engagement theory (MET) is similarly the rethinking of materiality in the light of the enactive understandings developed in cognitive sciences (Malafouris, 2013; Renfrew, 2004) in which cognition is understood as a process of interaction between the person and the surrounding social and material environment (Noë, 2004) ascribing a central role for the body in this process. The ecological approach to visual perception, especially affordance theory developed by James Gibson (1986) is elemental in the development of this understanding.

5 In Dialogue with Materials

The properties of materials play an important role in crafting. The process of crafting depends on a material's hardness, viscosity, density, volume, strength, elasticity, weight and plasticity etc.—qualities that afford different types of interaction. Gibson (1986), in his theory of ecological perception describes the concept of 'affordances'. In this work, Gibson considers organisms' (human and animal) information pickup processes as guided by the affordances that the environment offers that particular individual. This is dependent on the physical and psychological conditions: "The *affordances* of the environment are what it *offers* the animal, what it *provides* or *furnishes*, either for good or ill" (Italics in the original) (Gibson, 1986, p. 127). Naturally this process is different for different kinds of organisms, and for different individuals within the same species, but the general principles are the same for all. Organisms also strive to either adapt to their environment or to change it into a preferred one.

Sense-making is a key concept in the enactive approach in cognitive science and is described by philosophers Thompson and Stapleton (2009) as: the organism's (animal or human) activity of transforming the world into an environment that has salience, meaning and value for it. They further express: "Sense-making is behaviour or conduct in relation to environmental significance and valence, which the organism itself enacts or brings forth on the basis of its autonomy" (Thompson & Stapleton, 2009, p. 25). In that sense, we as humans are not different from other-than-human co-habitants of our planet when it comes to designing, building and manipulating surroundings into preferred ones—an activity based on crafting the environment.

Gibson's theory of affordances is directly linked to the idea that meaning is made by the sensory input of the environment in a direct and un-reflected manner that invites us to act upon situations accordingly. The properties of the materials invite certain actions and prohibit other actions—this is experienced as the 'voice' of the material. The craft practitioner may experience that a material "wants" to be treated in certain ways and not in others. For example a tree branch may allow the carver to carve the wood along the fibers, but not across them. When carving across the

fibers, the wood seemingly opposes this behaviour and reacts by splinting the fibers, leading to a disruption in the carving process.

This material interaction that craftspeople experience is often referred to as a "dialogue" with the material (Aktaş & Mäkelä, 2019; Brink & Reddy, 2019; Mäkelä, 2019, Mäkelä & Aktaş, 2022). However, this dialogue is qualitatively different from what is usually meant by the word i.e. a conversation between two partners in the same language. The inanimate partner will not respond with intentionality, rather the experience of having a dialogue will be mainly with the human partner. It has been necessary to introduce new words for this type of interaction that involves inanimate partners and for this reason both Ingold and Barad oppose the use of the word interaction when it comes to human contact with inanimate material. The concept of 'intra-action' stands in contrast to 'interaction', which presumes the prior existence of independent entities (Barad, 2005). These entities might be more-than-human, matter, substances and objects that actively contribute to an ongoing performative process of mutual becoming (Barad, 2005). The concept of intra-action is based on the philosophical position called 'agential realism', where agency is assigned to objects, matter, materials, as well as to living bodies. Ingold differentiates *interaction* and *correspondence* (Ingold, 2013, p. 107) conveying that interaction is static and lacks a bridging operation in which partners may be more closely connected and aligned. Ingold offers 'Correspondence' as a concept that allows for such bridging actions, exemplified by lines that are wrapped around each other.

The concept of material agency, developed by non-anthropocentrically oriented writers, is controversial (Knappett & Malafouris, 2008; Myers, 2015). Political theorist Jane Bennett (2010, p. 108) acknowledges that using the word agency in this context is problematic and needs to be reconfigured, thus, she develops a new expression that she calls vital materiality (Bennett, 2010, p. viii). In her book *Vibrant Matter* (2010) she argues that even inanimate materials carry a *vital energy* that has the power to affect people. While doing so, she opens up to animating inanimate material; a natural inclination for humans that natural sciences have been fighting against for hundreds of years (see Myers, 2015). Thus, she invites a fierce opposition to the concept of material agency coming from the science field.

Bennett is aware of this as she aims to induce an aesthetic-affective openness towards materials vitality (2010, p. x) through a methodology that allows imagining new approaches; "What seems to be needed is a certain willingness to appear naive or foolish (…) "(Bennett, 2010, p. xiii), thus inviting patient attitudes to counter cultures. Through this venture, she wishes to point out the imbalance in how materials are treated by humans on a socio-political, ethical and even psychological level. She writes: "Why advocate the vitality of matter? Because my hunch is that the image of dead or thoroughly instrumentalized matter feeds human hubris and our earth-destroying fantasies of conquest and consumption" (Bennett, 2010, p. ix).

Lambros Malafouris (2008) argues for distributed agency, where the material is an acting partner in the general flow of activities. For example, potters need tools, such as the throwing wheel and clay in addition to using their own hands and intentions to be able to turn a ceramic pot on a throwing wheel. Here also, the centrifugal

power together with gravitation and the muscles of the potter all have their role in the successful completion of a ceramic vase (Malafouris, 2008).

Thinkers in this vein are thus engaging their interest in the effect that the material and the environment have on the creative process. In arts and design, the idea or concept often leads to the creative process of developing an artefact that is implemented in material form at the final stages before completion (Cross, 2011). In Craft practice, the process is often material-led, in which the material is the main inspirational source and also sets the boundaries for what can be made (Laamanen, 2016; Mäkelä & Aktaş, 2022). Artist and theorist Barbara Bolt (2007) invites artists to consider the effect the materials, the environment and tools have on the emergence of the artefact, instead of reducing materials and tools as a means to an end. While controversial, the idea of the material's active effect on the creative process has nevertheless become important in contemporary artists' and creative practitioners' process of reflecting on their material interaction, and many of the authors in this book use this understanding as a metaphor in their texts. At the same time, the distributed or shared nature of co-creating, and the understandings that emerge in this process, are central to many of the contributions.

The experienced material 'agency' is not considered constant, and the experience of the material response might differ depending on how familiar the material is and our skills in manipulating it. For example, when the material properties are breached, it may be experienced as material resistance, the material does not act in a predicted way and we must re-evaluate our intentions for it (Brink & Reddy, 2019). Through repeated interactions with our environment, we can become more skilled at making more accurate predictions of material behaviour. We learn what to expect and how we should prepare our actions next time we meet similar situations. This knowledge becomes 'embodied' in us, and we are able to interact with the materials without having to reflect consciously over the actions we make. When we have learned about materials and their affordances, we are able to make more accurate predictions of what will happen and are less surprised over the materials properties and its behaviour, its "voice". Learning how to work with the material is a sign of developing expertise. Novices will experience more resistance with materials than expert crafts practitioners—thus, the experience of material agency and material "voice" is likely to be higher in novices (Aktaş & Mäkelä, 2019).

While material agency is a disputed concept, it nevertheless encourages an empathic behaviour towards the environment and materials. When attempting to understand how to behave with, and respond to, the materials we engage with we simultaneously need to consider our behaviour towards them. This is a step towards being dialogical and responsive rather than dominant in this relationship (Brink & Reddy, 2019). We understand that by forcing ourselves on the materials we cannot proceed—the materials will not collaborate if we ask too much (Groth, 2020). Through learning to respond appropriately we can learn to act responsibly with materials also in contexts outside the craft studio (Aktaş & Groth, 2020).

6 Towards an Empathic Attitude to the Environment

Animism, that is to say the belief that inanimate objects have agency, will, soul or spirit, may be considered naïve, nevertheless, it opens up for empathy, understanding and care for others, including other species and even fauna. Arts and crafts have a long tradition of animating the environment and giving human characters to other species. Storytelling, and visual culture build on fables in which animals, trees or ghosts speak and act like humans and in which spirited inanimate material, such as carpets can fly. Eisner (2002) wrote that in the arts, imagination has a "licence to fly". Creative practices draw on imagination and are free to go beyond natural laws. This is even encouraged as the arts provide us with abilities to escape from the ordinary into the unimaginable and alternative worlds. Artistic language often draws on a poetic and intuitive way of presenting themes; a language that uses metaphor to draw closer to the embodied and sensory experience of situations, rather than being clear and precise. Seen in this light, it is intuitive for creative practitioners to connect their visual analogy and associative thinking with the offered possibilities in the post-human thought and animation of inanimate materials.

Animism is a common belief in many Indigenous cultures, maybe all (Descola, 2005). Indigenous cultures also have much to teach us when it comes to respecting the environment and living in a mutual give and take relationship with it. Several contributions to this book are drawing on these aspects and worldviews that give room for artistic creativity and imagination, but also for reconnecting with nature in a way that modern life often hides from us. The way of connecting with nature through animating it, also brings with it the controversial side of anthropomorphology; by giving animals human characters we are again drawing on our own interpretation of what the animal thinks or does, making them human-like. This turns well-meaning intentions of trying to empathise with other species into an act of anthropocentrism—the very contradiction to what was intended, which might even form a breach of animal ethics (Lindgren & Öhman, 2019, p. 1206). In contrast, eco-feminist and philosopher Val Plumwood (2002), claims that the myth of anthropomorphism has been designed to justify the exploitation of animals. She suggests that the concept of anthropomorphism is based on the assumption that humans are different from other animals, which led to the conclusion that one should not compare humans with other animals. However, by attuning to the environment and its various inhabitants in ways that Indigenous cultures have done for centuries, we may learn to empathise, listen to and care for the environment, and to take responsibility for our actions accordingly.

Sustainability educator Stephen Sterling (2014) presents the term 'response-ability' as a step towards a participative consciousness in the progression towards a sustainable transition in our way of living. By this he suggests an extended ethical concern and awareness, and the ability to take integrative and wise actions that are fit for the context (Sterling, 2014, p. 7). The concept of response-ability, originally introduced by eco-environmentalist Martin Buber (see Vogel, 1970), is often attributed to Haraway. Haraway further developed the concept and writes about response-ability as "a praxis of care and response" (Haraway, 2016, p. 105). Response-ability can

be understood as an ability to respond appropriately to the specific challenges in a specific context, as in knowledgeable improvisation (Bresler, 2006). Ability to respond during an ongoing, ever-changing reality is central in a process of crafting as well as in a process of teaching; both are full of surprises and require responsible decision-making. Equally, in contemporary life on our planet, which is full of emerging ecological challenges response-ability is vital.

7 Crafting-*With*

The concept 'crafting-with' draws inspiration from a number of similar constructs within the post-human turn, such as for instance Donna Haraway's (2016) 'thinking-with'. Donna Haraway's feminist work on the situatedness of knowledge (Haraway, 1991) includes the understanding that knowing and thinking are intertwined with other relations in the world and that they are inseparable. Haraway (2016, p. 34) describes thinking as "tentacular", where "players pass back and forward to each other" and where their knowing and doing are collective and part of the same "ecology of practices". In this sense, thinking is always thinking-with. It is "supported by passion and action, detachment and attachment" among the players, and is in itself a process of "cultivating response-ability" (Haraway, 2016, p. 34). The concept of *thinking-with* can additionally be understood in the light of Haraway's (2016, p. 35) frequently quoted utterance: "It matters which thoughts think thoughts". This means that thinking is always thinking-with thoughts, words, knowledge, relations and stories that were there before and are determining what we are able to think, understand, experience or tell. Similarly, social anthropologist Tim Ingold develops this understanding in his book *Making: Anthropology, Archaeology, Art & Architecture* (2013) through the idea of becoming and changing with the materials and situations that arise in the human-material correspondence over time.

Some of the contributions to this book include such correspondence with more-than-humans and forces of nature that affect the process of crafting. The process of crafting is therefore described as carried out *with* them (with wood or rocks) in a dialogical vein rather than in a human dominated manner. The materials that are being crafted are not simply exposed to the process, but they contribute to the process, through their properties and the affordances they present the crafter, whether human or more-than-human, with opportunities. As mentioned earlier, crafting can be seen as a way of artificially augmenting our immediate surroundings to better facilitate our needs, whether we are humans or animals, but instead of considering mainly human needs, we need to take responsibility for our actions in the long term. Especially important in this time of ecological crisis: crafting is a form of negotiation with more-than-humans that facilitates continual re-examination of conditions, qualities and therefore calls for increasing awareness and response-ability for the ever-changing conditions of our planet.

8 Education for Sustainability

The United Nations have declared education to be one of the most powerful driving forces, with the capacity to change the existing consumer cultures and raise the level of awareness and environmental responsibility in the upcoming generation. As Irina Bokova, Director-General of UNESCO, puts it: "Education has the power like none else to nurture empowered, reflective, engaged and skilled citizens who can chart the way towards a safer, greener and fairer planet for all" (UNESCO, 2016).

Education holds both power and responsibility. Thus, the task of preparing new generations for the future is much more difficult than anticipated. One of the reasons is that education is rooted in human-centered values and in itself contributes to the maintenance of the dualisms established in Western societies (Pedersen, 2010). According to political scientist Helena Pedersen this means that education in itself is an obstacle to development of ecological awareness and transition to less human-centered lifestyles, since teachers and teacher educators have developed blindness for the skewed power division between humans and other species during the years of their own education (Pedersen, 2010).

The prevailing legacy since the beginning of the Eighteenth century in Western countries has been that the main purpose of education is to prepare young generations for work and economic prosperity (Feinberg & Soltis, 2009; Foucault, 1997). In addition to this, the structure and organisation of knowledge in schools, by division into subjects, often undermines a holistic understanding of the world and obstructs interdisciplinarity, which is necessary to grasp one's own relationships with more-than-human others within the global ecological system (Jickling & Sterling, 2017).

The recent developments in post-humanist thinking have provided an 'onto-epistemology', where non-human animals, matter and objects are welcomed as collaborators and have potential to not only provoke our relationship with materiality and other living organisms, but also to urge us to re-evaluate our attitudes and practices. Teacher educator and artist researcher Susan Finley writes: "The primary solution to the environmental crisis is to transform what it means to be human, to reinvent the relationship between self-and-nature and self-and-others" (Finley, 2012, p. 215). As we are becoming more aware that human "development cannot happen without a healthy planet" (UNESCO, 2016), and that it is us, who are to blame for many of her diseases, the need to reinvent our personal relationship with nature, with our environment and with our more-than-human others is becoming more urgent. The authors in this book are doing just this; sharing their experiences with their own processes of reinventing such relationships.

As some of the contributions also point out, there are similarities between Indigenous ways of thinking and the values and practices put forward in the posthuman ideology. With regard to education these Indigenous cultures might inspire new/old ways of practicing and learning in a balanced relationship with the surrounding environmental elements. To show their respect, some of the chapter authors acknowledge the land, the ancestors and their cultures and knowledge in the beginning of their chapters.

The First Nations Education Steering Committee (FNESC) is a Canadian policy and advocacy organisation that represents and works on behalf of First Nations in British Columbia (see: http://www.fnesc.ca/about-fnesc/). FNESC has developed the first people's principles of education that build on Indigenous ways of thinking. The Principles are the following: (http://www.fnesc.ca/first-peoples-principles-of-learning/).

- Learning ultimately supports the well-being of the self, the family, the community, the land, the spirits, and the ancestors.
- Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships, and a sense of place).
- Learning involves recognising the consequences of one's actions.
- Learning involves generational roles and responsibilities.
- Learning recognises the role of indigenous knowledge.
- Learning is embedded in memory, history, and story.
- Learning involves patience and time.
- Learning requires exploration of one's identity.
- Learning involves recognising that some knowledge is sacred and only shared with permission and/or in certain situations.

As these principles reflect, learning, if seen as a holistic activity that is embedded in society and involving experiential learning, teaches us to take responsibility for our actions in a way that gives hope for a change towards a more sustainable future. Combined with interdisciplinary efforts across several domains, education could move towards an approach that has a better understanding for shared responsibilities and mutual respect. As sustainability educator Stephen Sterling writes:

> We need to do what we can to cultivate as far as possible an ecological consciousness. This involves a shift away from relationships largely based on distinction, separation, control, manipulation and excessive competition and consumerism, towards those based on such values as participation, appreciation, synergies, community, self-organisation, and equity, recognising that we are co-creators of the world. (Sterling, 2014, p. 9)

The inclusion of diverse actors in the process of education and the appreciation of more-than-human collaborators can facilitate a broad interdisciplinarity that can remind us of this interconnectedness among species and the continual process of re-shaping and re-crafting one another. We believe that such reflections are essential in times when ecological relations on our planet are out of balance. Two essential questions we ask here are: How do we change our behaviour towards nature through the study of human–environment coupling in craft processes? Could in-depth reflections on our embodied experiences with materiality affect our relationship with the environment and change our behaviour towards a more responsible way of interacting/intra-acting with nature? These are questions that we as educators believe relate to future curricula development and the direction we would like this to have.

The claim that it is the journey itself, and not its destination that matters has become a cliché, and we assume that many readers are familiar with it. Still, in the

context of this volume, published in a series that focuses on the arts, aesthetics and education, the significance of the process cannot be emphasised enough; learning through crafting does not exist without a process! Post-human perspectives offer an opportunity to re-evaluate human relations with the world and challenge the existing human centered points of view.

A/r/tography is a research methodology, where the roles of an artist 'A', researcher 'R', and teacher 'T' merge, interweave and mutually influence each other during the process of living inquiry. Several of the authors in this book refer to this methodology in their writing. A/r/t-ography (or artography) is "concerned with the creative invention of concepts and the intensities experienced in relational, rhizomatic, yet singular, events" (Irwin, 2013, p. 198). Since the time this methodology was developed by Rita Irwin at the University of British Columbia in Vancouver twenty years ago, it has been adopted by arts-based education scholars in many regions of the world and has constantly been developing and evolving—living (Irwin et al., 2018). Most recently, a number of a/r/t-ographic studies are drawing on matter as agentic and environmental arts pedagogy "that combines the speculative imagination with embodied, sensorial, and empirical experiences" (Rousell et al., 2018, p. 2).

Most of the contributions in this volume are founded on the authors' own experiences with phenomena they are trying to understand and landscapes, matter and more-than-humans they are connecting with. Focusing one's attention and investing effort in order to connect is the first step one willingly takes. Facilitating leeway for non-human actions often requires attempts to reduce one's own position of power. As a result, one can discover a door to amazement, feel humbled for not taking other-than-humans seriously enough, not caring enough. As Puig de la Bellacasa (2017, p. 21) states: "Engaging more substantially and deeply in telling stories around experientially observed and researched terrains makes the complexities of thinking with care even more intricate". Many of the contributions portray artistic or creative processes, including collaborators that are inspirational and offer methodologies for research practices and further investigations in new contexts. Not all of the contributions in this volume can be defined as educational, but each of them contributes with narratives of subjective learning processes that have power to awaken, remind, motivate or surprise the readers.

9 The Thematic Sections of the Book

The book is organised in four thematic sections. The first part, *Theoretical Perspectives* gives the theoretical backdrop that has inspired many of the contributions. Including this introduction along with contributions that touch on belief systems and artistic practices that prompt the sort of questions that are highlighted in the different chapters in the book.

The second theme is called *Human Crafting*. This section includes contributions about the human–environment dialogue that takes place in the manipulation of material. In this part, craftspeople, artists and Arts & Crafts-teachers, who engage with

natural materials in their crafting practices, reflect on how they connect with materials and seek to become ecologically aware. They focus specifically on manual crafting and relationships with the environment, as well as embodied forms of learning. Several of these contributions also involve collecting and processing the natural materials required for the craft process.

The third section we call *More-than-human Crafting*. In this section we present contributions that deal with the ways animals or plants change their environments. Some of the contributions deal with direct non-human crafting or transforming of environments, while other chapters present more-than-human crafting as an indirect process, where, for instance, insects through videos of their specific movements inspire the choreography of human movements. Several of the contributions reflect on more-than-humans' processes in nature that change over time and how these events interplay with their own crafting and creative practices in different ways.

In the last thematic section, entitled: *Crafting-with Other-than-Human*, we include contributions that address processes of environmental change, where natural materials are moved, reshaped or transformed by forces of nature and chemical processes, thus, not without human influence. Some of the authors are more concerned with the process of crafting-with them, others are letting the natural forces guide them, and some are concerned with geological, chemical and biological processes and how they provide, not only pre-conditions for crafting, but also for life.

The most valuable contribution of this book is, perhaps, in the chapter authors' educational reflections over a synthesis of contemporary ideas and theories in the area of arts and craft education and their implementation into practical examples of crafting with the environment. While defining crafting widely, we still maintain that the concept of crafting always includes a close, intimate and slowly evolving relationship with materials and environments in which our ability of making sense of our skills and ethical standpoint in relation to the material is central. Crafting as a way of negotiating our own relationship with the environment, is relatively unexplored in the context of educational literature. However, we feel that such crafting is key in the transition towards sustainable material practices in general, and therefore this topic is relevant not only in the arts or in education, but in any context involving human-material practice.

The practices and reflections posed in the book give insight into ways of leveling out human and material hierarchies and reflecting critically on one's own behavior and material relationships. They also offer concrete ways to deal with our own uncertainty over the environmental crisis and the helplessness that many of us feel in the face of this. Ultimately, we hope that the book might inspire educational practices and ways to implement actions and reflections that translate into content that may bring about a change towards more ecologically sustainable ways of life.

10 Epilogue

No one knows what the future will bring. The future is not out there waiting for us, but undergoing a process of making as we speak. What we think, feel and, above all, how we act, is not insignificant, because "everything is connected", as the Norwegian eco-philosopher Arne Næss claimed (Næss et al., 2008). This somewhat naive utterance suddenly became meaningful when I (Biljana) watched Youtube videos about reintroduction of wolves in Yellowstone National Park. In a video produced by Sustainable Human, George Monbiot's (2017) explanation of "How Wolves Change Rivers", we learn how the wolves were eradicated from Yellowstone National Park, between 1930 and 1995, and as a consequence, the park suffered loss of vegetation and species diversity, and geological degradation. When 31 wolves were reintroduced in 1995, and left with no human interference, the condition of flora and fauna improved, and the entire ecosystem and the landscape recovered. The wolves' hunting not only reduced the number of grass-eating animals, but also changed their behaviour, since they did not feel safe to occupy the river banks. The carcasses left behind gave nutrition to a number of other species and to the soil. Increased vegetation stabilised the rivers and attracted beavers—described by Monbiot as "ecosystem engineers". The remarkable transformations that were taking place much faster than imagined are addressed as a "trophic cascade" that is "an ecological process, which starts at the top of the food chain, and tumbles all the way down to the bottom" (Monbiot, 2017, 28s in the video). The example from Yellowstone National Park is an example of successful ecosystem rehabilitation, where the process of re-crafting the environment was done through crafting-with wolves, and without humans (Fig. 2).

It is remarkable how much can be achieved by taking a step back. When awareness of the poor condition of our planet suddenly strikes you and us, and we realise that there is no escape—that we have to stay with the trouble as Haraway (2016) reminds us, it might be comforting to know that our efforts to feel and care count. We (humans) *are* already "being ecological" because we have never been disconnected from our ecological community (Morton, 2018). You might be unaware that you are expanding your ecological awareness at *this* moment—you are reading this book, aren't you?

Fig. 2 A wolf in Yellowstone National Park. Painted by Gospodin Tsvetkov (Photo by Marika Mørkestø)

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Fredriksen has published number of articles and book chapters in English and Norwegian, with focus on, for instance, eco-creativity, pedagogical improvisation, posthuman perspectives in craft

education and interspecies pedagogy. She has also published two books in Norwegian: In 2013 a book based on her Ph.D- thesis, and in 2019 a book about the emergence of rising teachers' ecological awareness.

Everyday Animisms

Lisa Meaney

1 Everyday Animisms

I roll my tongue around my mouth
to remember
that I am made with,
and always making with,
water.

Our sense of ourselves, in relation to the wider material world of animals, plants, gases, water, is part of our way of being—our ontology. This is expressed in the language we use, the power dynamics we do not question, how we conceive of our own bodies, and how we treat all the other beings and materials of the world.

Creative practice is presented here as a way to explore and remake ontologies, as a vital part of addressing the climate and biodiversity crisis. Water becomes the material companion of this text, which first locates the time we are in, and positions the dominant ontology of the west, amongst other ontologies. Through reflections on a personal experience of trying to 'make-with' water, my own way of being—established through a British, Roman Catholic, capitalist upbringing, to assume a division between nature and culture—is challenged, as is the relationship between my practice as an artist/designer/maker and my work as environmentalist. The thinking and philosophies offered by posthumanism, psychology and anthropology lend confidence to the idea that alternative ways of being could emerge through making, and that makers may have a role to play in negotiating the environmental crisis.

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2 A Nature Narrative

The dominant ontology in the western world is expressed through the idea that nature and culture are separate. In a western everyday way nature is conceptualised as existing independently of people. The rivers, the rain, the dew on the grass, whether admired or ignored, are ultimately externalised. In this context, whilst nature is understood as being outside of the human body, culture is its everyday opposite, and is focused on all that humans do and think that defines us as exceptional and apart from the natural world.

In the western world the idea that nature and culture exist as a dichotomy frames the unarticulated, unchallenged truths of our lives, and is in turn "truth making". This divide propagates the ability to objectify, measure and define nature, even as we recognise our dependency on it. Through the lens of science the environmental crisis is quantitatively measurable in CO2 parts per million, as a tiny but potent change in the number of degrees Celsius, and as percentage of species lost. This way of understanding and speaking about climate and biodiversity dominates the global discourse. It creates the narrative that nature as other—oceans, species, the air—is in crisis, and conceals other ontological truths, or new truths and ways of being, being made.

Writer Ben Okri, in his meditation on the role of the artist 'A Way of Being Free' asks 'How can we, in the presence of irreducible being, view life from only one perspective…?' (Okri, 2015, p. 16), he describes how it is the role of the artist to agitate, to think against the grain, to continually extend the boundaries of the possible and reveal new perspectives. For Okri, poets 'remake the world in words' (Okri, 2015, p. 3). This chapter explores whether makers, the artisans who work in daily intimate physical dialogue with the stuff of the world, can extend the boundaries of western environmental discourse, and help to remake our human relationship with the world through making.

3 Where We Are

We, anthropos—artists, makers, scientists and mothers, educators and activists, are often described as living in the Anthropocene—a new geological era with altered climate and biological systems, created by human (or anthropos) activity. Emerging like many things from the water, the concept of the Anthropocene was, it seems, first presented in 1980's by expert in algae, Eugene Stoermer (Haraway, 2016, p. 44), and later used in relation to the fossil fuel induced warming and acidification of the oceans. In an everyday sense, the term has become synonymous with a realisation that something enormous and deeply troubling is happening to our planet, and that we are accountable.

How exactly we arrived in the Anthropocene and its environmental eventualities is a complex and slippery story. One could find origins in the 'fertile crescent' of the

Middle East, when 10,000 years ago, the abundance of water and fertile soils provided by the Tigris, Euphrates and Nile rivers enabled the first agricultural revolution and a turn away from the reciprocities of hunter gathering (Quin, 1992, p. 152). Others hypothesise that Christian theology, by facilitating broad cultural patterns of human mastery over inanimate nature, created the context we now find ourselves in (Jenkins et al., 2018, p. 3). The industrial revolution of seventeenth century England, and the concept of 'utility' that evolved in the eighteenth century and became tied to our daily consumption of water, gas and electricity, are both alternative starting points. The more recent ascendance of the scientific method is also understood as an Anthropocene force—it has enabled the objectification and translation of nature into material formula, transforming for instance, our understanding of the diverse 'waters' of the world into a single expression: H_20 (Linton, 2010).

Some scholars within the social, earth and economic sciences argue that the word Anthropocene with its focus on the shenanigans of anthropos at large, is misleading. All of humanity is not responsible for the crisis we find ourselves in. Environmental historian Jason Moore (2019) argues that we are where we are, because of the economic model of capitalism. He points out that this model has been propagated by particular humans in particular political contexts, and to acknowledge this accountability fairly 'Capitalocene,' is a more fitting title for our times (Moore, 2019). Others argue that the powers of particular humans, turned towards the subordination, enclosure, extraction and exploitation, of the more-than-human world (and other humans), should be made explicit as the driving force of this epoch, and offer 'Plantationocene' as an alternative (Haraway, 2016, p. 100). Indigenous scholar Zoe Todd advocates for a greater focus the on perspectives of those who are least responsible for the crisis of our times "rather than engage with the Anthropocene as a teleological fact implicating all humans as equally culpable …we should turn to examining how other peoples are describing our 'ecological imagination" (Todd, 2015, p. 252).

4 Ways of Being

The western discipline of Anthropology explores the various ontologies existing in the world, and presents broad and comparative reflections on how different human—non-human (or more-than-human) relations manifest themselves. These interpretations of the different human relations with water, animals, trees or other 'natural' phenomena, also offer a way to reflect on the human-material relationships of making.

French anthropologist Phillipe Descola describes how, in the western world and in countries developing along a western trajectory, human—non-human relationships, play out within broad but specific ontological category: 'Naturalism' (Descola, 2005, pp. 172–174), which in its most basic, unnuanced interpretation, refers to the assumption that 'nature', as a phenomena independent from humanity, exists. Only where there is a human—non-human divide, or a separation of culture and nature, can nature become nameable.

Naturalism represents the dominant lived and material truth in western cultures, it's inherent disassociation of humans from non-human entities enable nature to be understood as a resource to be manipulated or used. Naturalism also engenders the idea of human exceptionalism—that humans are distinct from all other organisms through our ingenuity and freedom of will. Together these things construct and continuously reinforce a power dynamic where humans assume or seek control over non-human beings, systems and matter.

Whilst, to those of us that have been raised within it, Naturalism can seem like a universal truth, it is just one of many ways of being that are manifest in the world. Descola (2005), describes Animism, Totemism, and Analogism, as the key expressions of multiple other ontologies, that are, and have always been, contemporary to Naturalism.

Animism, Totemism and Analogism do not recognise a human/nature or natural/cultural divide. In these ontologies, non-human beings, water, trees, animals, rocks, landscapes… can have their own intentions and agencies. Together these ontologies offer alternative ways to be in the world and in the Anthropocene, and present the reality that 'we humans are not the only ones who know the world,' (Descola, in Kohn, 2009, p. 146), or the only ones thinking and being in it.

With firm acknowledgement that ontologies can exist in paradoxical and overlapping ways, Descola offers a way of understanding them in comparison to each other. He describes each ontology in terms of its related manifestations of *interiority*, and *physicality* (Descola, in Kohn, 2009, p. 141). *Interiority* describes how beings share or don't share an interior experience—such as the ability to communicate or have intentions. *Physicality* describes how beings share or don't share external forms or physical anatomy, such as bones, feet or hair. This model is crudely summarised in Fig. 1.

Ontologically, we are all located somewhere, and our embedded sense of ourselves, in relation to the wider material world frames and restricts our ability to understand and articulate ontologies lived by others. With this in mind, and through my naturalist lens, I offer a description of the way Descola's categories engender different human—non-human relationships, as a way to emphasise Naturalism as just one ontological 'story' amongst others.

4.1 Analogism

Analogists can live within a dense network of analogies that link together intrinsic properties of entities through similarities and resonances (Descola, 2005, pp. 201–203). The North Island indigenous Whanganui Iwi Maori peoples of Aotearoa New Zealand, could be described as expressing aspects of Analogism. The Whanganui River the Whanganui Iwi Maori belong to is for them 'a figure of co-becoming, a matter of care, an entangled extension of revered being -in-place' (Adams, 2020, p. 133). Their relationship with the Whanganui River is part of a wider Whakapapa,

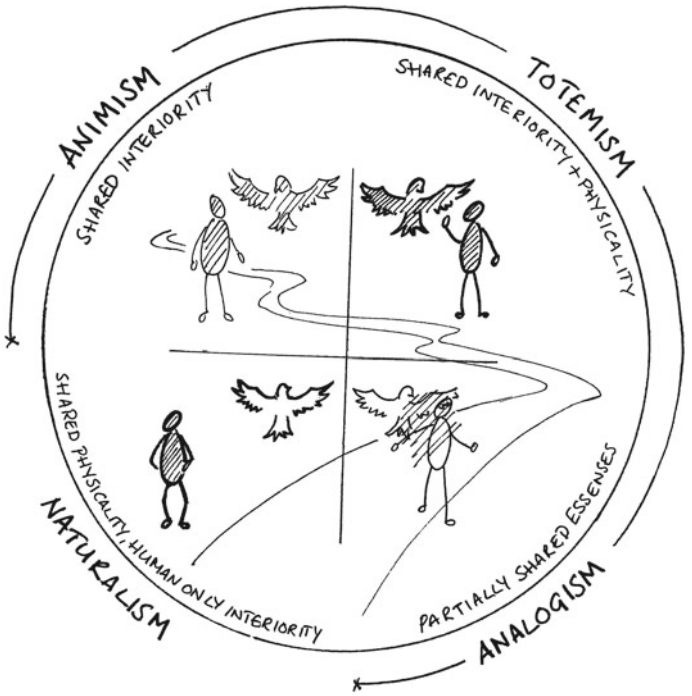

Fig. 1 Diagram summarising Descola's ontological categories and his concept of interiority and physicality. Animism, totemism and analogism are sometimes collectively described as 'Animisms'. Diagram by Lisa Meaney

a 'framework that links all animate and inanimate, known and unknown phenomena in the terrestrial and spiritual worlds' (Taonui, 2011, p. 1).

4.2 Animism

The Amazonian Achuar peoples live either side of the frontier between Ecuador and Peru, in isolated riverside homes. For the Achuar, all things depend on an ability to create an 'intersubjective ambience' (Descola, 2005, p. 5) in which relations in the forest flourish. This happens in waking and sleeping. The Achuar connect to the bodies of the animals they hunt, and receive communication from, and are influenced by, the forest beings in dreams. They are aware that the animals that dwell there—their relatives by marriage, talk amongst themselves (Descola, 2005, pp. 5–6).

4.3 Totemism

Totemism is a belief system in which humans have a close relationship with a particular animal or plant—this is their totem. It is practised in many parts of the world, including in Australia by Australian Aboriginal peoples. The totem interacts with a group or individual and is also their emblem or symbol. For Australian Aboriginal peoples totems are believed to be the descendants of the dreamtime heroes, or totemic beings (Australians Together, 2022) In New South Wales, the Wiradjuri people have lived alongside the Wambool, Calare and Murrumbidgee rivers for over 40,000 years. Their totem is The Gugaa—a large lizard that lives in dry climates (Bathurst Regional Council, 2021).

4.4 Naturalism

Naturalism is the prevailing ontology in the Western world (Descola, 2005). In Great Britain, naturalists have a broad moral sense of stewardship and care towards what they describe as 'nature': this includes animals, watercourses, trees and plants. The positive effects of nature on human wellbeing are broadly agreed. Simultaneously, nature is described and consumed as a resource, and sometimes measured in terms of 'Natural Capital'—a term that relates the value of nature directly to the current economic paradigm. Nature is understood to a molecular level of detail, and taught, though objective scientific study—rather than relationally.

Many of us in the west may hold the idea that indigenous peoples have a better sense of how to maintain planetary integrity than we do. It might seem attractive, even urgent to try to occupy something of a totemist, animist or analogist ontology as a way to avoid the environmental consequences of Naturalism. But the divide between naturalist and other ontologies can seem unnegotiable, and the dangers of appropriation too manifold, to allow even a softening of the boundaries of Naturalism.

Descola, aligning with Okri's sense of artistic possibility, says that 'art, or certain kinds of reflexive thought, or philosophy, enjoy a certain degree of freedom, which affords the possibility of stepping into different ontologies, divorced from the one in which you were born.' (Descola, in Kohn, 2009, p. 142). If this is the gift and responsibility bestowed upon the artist then now is surely a time to explore it fully—and makers with our habits of working closely with the matter of the world, may be uniquely able to participate in this.

5 Water

My own attempts to think with other thoughts, to travel ontologically, started off some years ago, as part of a practice of making tents. Influenced by art and design and a desire to make by hand, these spaces, I had imagined, would through their

structure and carefully selected materials, cultivate a greater connection to 'nature'. However, unexpectedly inspired by the writings of feminist science philosopher and biologist Donna Haraway (1998), and feminist theorist and theoretical physicist Karen Barad (2003), the work took a posthumanist turn. I began to focus not on the creation of temporary architecture, but instead, like posthumanism, on the deeper unacknowledged entanglements of human—non-human relationships. In the context of my practice, this meant investigating the human relationship with the material that confounds and enchants anyone sheltering outdoors: water.

Whilst science, and Naturalism, depend on an assumption that water is inert and can be objectively understood, Haraway (1998) argues that species, even matter, meets humanity with an independent liveliness and capacity to create meaning. In this sense, when water pounds the fabric of the tent as rain, collects inside as condensation, and escapes the warm body of the camper as sweat—it is creating meanings and material experiences. Drinking, swimming, even rowing a boat, are not just things we humans 'do' but instead are part of fluid, unfurling, unbounded interactions of agency across humans and water, and any other matter, beings and forces involved. Gravity gives the boat its water line, the glass traps water to make it consumable. Meaning and matter are folded into each other and are always in play. Haraway describes this as '*sympoiesis*'—an ongoing making-with (Haraway, 2016, p. 58, p. 125). Barad, from her position within the scientific discipline of physics, also describes the ongoing and mutual metabolising of meaning and matter. For Barad, this 'intra-active becoming [is]—not a thing, but a doing, a congealing of agency' (Barad, 2003, p. 828). Together these philosophies offer a way to think and do outside the assumptions of naturalism. They challenge scientific discourse with the possibility of non-human agencies and shared human—non-human becomings, in this way they relate to the ontologies of Animism, Totemism, and Analogism.

It is difficult to think outside the ontology one has inherited—especially when it is all one has ever had to think with. But in spirited uncertainty, and through physically 'doing', with Barad's and Haraway's philosophies in mind, I attempted to enact posthumanist theory with-water. At first, we (water and I) did simple things like spending time together gurgling. One thing led to another, and with my attention, water began to show me what it makes possible. I noticed the heaviness that rose through my body as the bath drained, and contemplated the wider power dynamics of needing a wee. I observed water's response when offered shapes and folds and weaves of different fabrics, and, listening under various roofs, heard the rain meet materials to form different messages. Some sort of 'undoing' of material assumptions began, but for a long time understanding water's effects as agency—even intention, with parity to my own agencies and intentions, felt confusing and wrong footed.

Months went on and uncomfortable play continued…in my home, on camping trips, in swimming pools and spas, on ferry boats at sea, with my children, and anyone else who was willing to join in on some seemingly nonsensical re-imaginings of waters already settled status. I slowly sank into a material-semiotic playing field where the fact that nothing was certain seemed less and less of a problem (Meaney, 2013, p. 7). It began to feel like very fertile ground.

Fig. 2 Pre-dinner water slugging in a pub in England (Photo: Tom Cox)

Sympoiesis, gradually and playfully brokered, produced unexpected prototypes. When water began an escape from tap to sink in determined plops, I offered a quieter landing on some densely weaved yarn in my hand. Here, to my surprise, it gathered its sparkly-self up into a large and speedy slug, which when lifted to eye level made a frivolous attempt to leap at my face. This shared moment led to the creation of water sluggers, and dribbly pre-dinner 'slugging' rituals, performed in humble recognition of our ultimate lack of control of water—before we raise our glasses and settle into consumption (see Figs. 2, 3).

Whilst returning to more architectural explorations, I tried to further break my ontological habits by embracing geographer Jamie Linton's 'hydro-social' ideas (Linton, 2010). Linton proposes that hydrological processes and human processes are inevitably intertwined. For Linton, the infrastructure we create: dams, sewers, even guttering, effect and are part of the water system, as much as oceans and rivers, evaporation and precipitation. This means that objectifying the hydrological cycle is impossible—instead we must admit to our agency within a hydro-social cycle. In recognition of this, charcoal roof slates that adsorb atmospheric contaminants harboured in the rain, were modelled as a friendly hydro-social intervention. The slates point upwards to meet and purify an earth bound downpour, and offer something to and for water, and other earthy beings, from humans, as we dwell together in hydro-sociability (see Fig. 4).

A further exploration of hydro-social relations led to the creation of a 'Rain Door'. The Rain Door is a panel that zips into a tent. Initially pitched on a family holiday in Weymouth on the south coast of the UK, the door has multiple fabric petals sewn into it. These collect and funnel precipitation directly to the campers inside. For this to work, campers are required to anticipate and embrace the rain by pitching

Fig. 3 Water sluggers (Photo: Lisa Meaney)

Fig. 4 Model of tent with charcoal roof slates (Photo: Lisa Meaney)

their tent with the rain door facing it. The door subverts normal defensive camper-water relationships. Wet weather, often understood as camping saboteur, is invited to become camping partner, and provide potable water to those dwelling beside the saline sea (see Figs. 5 and 6).

Embracing water as a lively, intentioned collaborator led to creative acts one would not have considered alone (Meaney, 2013, p. 6). As we made and experimented it slowly appeared that water might have intentions not only within but beyond me: sweat, the transfer of subtle minerals into the atmosphere? Tears, perhaps part of water's bigger plan for ongoing global emotional balance? Other more multi-species and bodily revelations emerged: whilst bouncing a toddler's spaghetti floats on the side of a pool as extensions of my arms, I understood that whilst we humans fall through water, it is always a silvery flowing solid to the pond skater (Meaney, 2013, p. 3), (see Fig. 7). What substance is it to the eel, or to blooming algae?

As the months went on some long held meta-narratives were on the turn. The idea of water as something to consume and utilise gave way to the sense of an

Fig. 5 The rain door (Photo Lisa Meaney)

Fig. 6 External rain door close up, from above (Photo: Lisa Meaney)

Fig. 7 Understanding multispecies relationships with water (Photo: Tom Cox)

omnipresent, multifarious, and always animating substance, and I understood my physical and imaginative (if relatively limited) ability to reciprocally animate water. Haraway's assertion that the more-than-human world is "a coding a trickster with whom we must learn to converse" (Haraway, 1998, p. 596), began to sound like everything I knew but couldn't find the words to say. As a maker, this way of being-with, of making-with felt life affirming and full of creative potential, consequently, Naturalism began to feel extremely limiting. The idea that water is wholly understood by humans and is simply a resource to manipulate, was exposed as full of dead ends and predicable processes and objects, and a completely unnecessary sense of bodily isolation.

6 A New Sense of Self

Anthropocene writer Mathew Adams describes in his book 'Anthropocene Psychology' that the "holism without boundaries" (Smart & Smart, in Adams, 2020, p. 163) advocated by post-humanists, and that I perhaps began to find with-water, can be compared to the Maori ontology. It is a sense of being that finds its identity

in relation to and together with, the experience of other beings and matter, across species and place. By these associations the agencies of non-human matter, become part of one's own identity, and one becomes more than one's naturalist self.

Scholar of eco-cultural theory, Stacy Alaimo, created the concept of 'trans-corporeality', and offers another way of thinking about human—non human relations. For Alaimo bodies are materially porous to each other, and nature, far from occupying a different realm to us "is as close as one skin—perhaps even closer" (Alaimo, in Adams, 2020, p. 150).

Lucy Attala, anthropologist and author of 'How Water Makes us Human' describes how water "flows with and as people as much as it does as clouds and ocean and glaciers" (Attala, 2019, p. 46). Attala (2019) advocates a 'new-materialist' perspective: we humans must come to see ourselves as materials in relation and dependency with all the other stuff of the world, and with all the other beings that share the stuff of the world. In relation to water this means "…recognis[ing] ourselves as watery bodies among other water bodies, all sloshing around in a watery world" (Neimanis, 2012, in Attala, 2019, p. 45).

The propositions of shared materiality, trans-corporeality, non-human agency and intra-activity begin to collapse the boundaries between humans and all that is non-human. This means we must reckon with ourselves, not as consumers or controllers, but as the "very stuff of the emergent material world" (Alaimo, 2016, p. 8).

In some fluid assemblage, these concepts inform what endures as the bodily known, and deeply transformative effect of my own posthumanist experiments: whilst the utilities around us every day—the tap and the kettle, the washing machine, might try to train us to forget…water becomes us. A journey through uncomfortable unlearning and play, with Haraway and Barad as guides, led to a new lived truth…on its never ending multi manifesting journey through all that lives on earth and through all time, water only briefly lends my jellied eyes the liquid needed to see. On its way to somewhere else, or to be something else to some other non-human earthling or matter, it flows the blood to my hands to make, and floats my thinking mind. I meet water now, as a substance with its own intention, agency and purpose. No longer only a naturalist—I understand, in my days, and work and being, that my liveliness resides in water, I have a different sense of self as internally connected to its flows.

7 Making New Worlds

For Haraway "[i]t matters with which ways of living and dying we cast our lot rather than others" (Haraway, 2016, p. 55). "It matters what ideas one uses to think other ideas (with)" (Strathern, 1992, p. 10). The thoughts we think with in part create—and are part of, our 'worldings': the ongoing, active ontological process of the 'setting up of' the world, through words, acts, and relationships (Palmer & Hunter, 2018). In this troubled time of species decline and climate change "[i]t matters what worlds world worlds" (Haraway, 2016, p. 35) and we need new worlds to world with.

Whilst there are many strong arguments and poetic incitements for re-imagining our human—non-human relationships, how to 'do the doing' of this, is an area relatively unexplored. Attempting to enact post-humanism with-water is one method. Post-humanism's emergence through a tenacious and informed critique of science, means it is ironically rooted in Naturalism, and for those that insist on academic rigour, this lends the approach credibility. However ontologies are not in themselves rigorous, but instead full of paradox and nuance. In this sense, beyond overt explorations of post-humanism, western makers already exist in a uniquely complex ontological relationship with matter. Schooled from childhood in a naturalist knowledge-based objectification of the world, and living naturalist lives, we are also beguiled everyday by the limits, intentions, and permissions of matter and other worldly agencies as we make. Every maker knows that the best work lets the material speak. To make, is to collaborate with the stuff that is in your hands, to let the material change your ideas and actions, as you in turn try to influence the material. To make is to already acknowledge relations across matter.

In this sense, making, in some new-materialist fashion, holds the un-actualised inklings of more-than-human ontologies. The shared interiorities and physicalities of water are revealed not only by posthumanism but by the practices of intelligent, haptic play, of material curiosity and responsiveness quotidian to the disciplined creative. These everyday agential intra-actions and non-naturalist relations, are the rarely articulated, paradoxical and currently powerless, thin un-naturalist storylines within the thick story of naturalism….the quiet signs that other worldings are possible and already present, and that material creative practice is a ready place to re-world from.

8 Business as Usual

Feminist environmentalist Eileen Crist describes how naming an era after ourselves "accepts the humanisation of the earth as a reality" (Crist, 2013, p. 141). The term Anthropocene focuses us on our own power and exceptionalism, this encourages us to forefront technological solutions to climate change and scientific understandings of biodiversity loss. For Crist, the term Anthropocene works to conceal the possibility of exploring other ways of being. One can experience this in environmental work. There is no room for questioning the ontological status quo in the ongoing community discussions around 'Greening' the Oxfordshire town I live in. We speak in objective terms about the state of the river our town is named after, but not about how we and the river are animated by the very same substance. At work my colleagues are dedicated to conserving the rare chalk streams of the Chiltern Hills—whilst we regularly share our enthusiasm for enhancing ecosystems, I instinctively keep my watery re-worldings to myself. At global climate summits too, goals for clean water and sanitation, although ambitious and commendable, are expressed in firmly naturalist terms (Global Goals, 2022). Even in places of great care and concern or

political action "[t]he freedom of humanity to choose a different way of inhabiting Earth is tacitly assumed absent" (Crist, 2013, p.138).

It is hard to argue for new realities of water as self, or the vitality of the material knowledge in the crafts person's hands, when there is so much to practically do. It is tempting also to secure the deep material relations of making, and the tangible objects it produces, as some sort of reprieve or distraction from environmental work and uncertainty. However if as some suspect, the Anthropocene is less a confirmation of our human ability to frame an epoch, and more a 'parenthesis of infinitesimal brevity' (Kerns, in Adams, 2020, p. 6)—where western society has become the axis between one manifestation of life on earth and another, the ontological future could be up for grabs, and it may be time for makers to break cover.

9 Making Friends by Making Trouble

Post-humanist's embrace the Anthropocene, not as an era, but as an invitation—to acknowledge and express loss, and to 'stay with the trouble' of the now (Haraway, 2016). This means getting involved in difficult conversations, challenging the language, the power, and the positioning of humans amongst other beings and matter, and questioning the narratives of Naturalism. For makers, re-framing our already established deep material relations within new materialism, intra-activity, or as sympoiesis, will take us quickly towards the trouble. Arguing for one's right, to be understood for instance as water, as well as human, will take us into the thick of it.

Any creative practitioner that has been reshaped by the more-than-human relationships of their practice might also see the Anthropocene as an invitation to speak up for the colourful lives and multiple agencies of matter, but outside of their community and artistic discipline. Could we bring to unfamiliar places the realities of our own material becomings? Could we begin to advocate, through our re-discovery of material relationships, for more-than-humans who are also uniquely in relation with-matter, with-water, with us? Could this alternative story interrupt the 'business as usual' conversation, offer an inkling of common ground to those who have always lived as non-naturalists, and a relatable way for naturalists to recognise the beginnings of other possible worldings?

When the parties of the world convene to discuss the future of our planet, the peoples that Descola (2005) might describe in animist, analogist and totemist terms, fight to weave their relational worlds into the fabric of possible futures (Lakhani, 2021). A new-materialist, posthumanist way of thinking also "realizes that the perpetuation of any notion of separation is materially false, damaging and unsustainable" (Attala, 2019, p. 61). If new post-human relationships, new material relationships, are essential for a sustainable future, the maker's ability to experience "a distinct softening of the boundary between the world and the self" (Rushdie, 1996, p. 8 quoted in Pallasmaa, 2009, p. 19), is worth asserting. Crafters, artists, designers, who have been brought up in Naturalism, and also understand through our thinking hands, and

curious minds, the agencies of water, wood, clay, metal, fabric, wool, and the forces of heat, atmosphere and gravity…that act upon us as we make, can also insist on our right to bring our truths to the discourse of climate change and biodiversity loss. But this depends first on daring to think that the quiet stories in our hands and hearts, the new ontologies and worldings that intimate, playful, material practices enable, that water enables, seriously matter. As Okri (2015, p. 18) reflects, "…sometimes the biggest tasks are approached tangentially, with a smile in the soul."

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Kinship Assemblages: Human and Non-Human Dialogues Through Materiality

Miranda Smitheram and Frances Joseph

1 Introduction

The Phenomenal Dress project developed between 2017–2019 through collaborative engagement with the ecosystem of Karekare, an ironsand beach on the west coast of the North Island of Aotearoa/New Zealand (see Fig. 1). This collaboration was developed through a scaffolding of relational kinship assemblages, made up of heterogeneous 'things' in this environment and the liaisons and formations that grew from their intra-actions. Here the term 'thing' refers to objects, phenomena, materialities, and physical bodies, and the relations between those things, with each other and with humans (Tompkins, 2016). The frameworks that informed this research, in particular Posthumanism and Indigenous Māori perspectives, brought distinctive framings and approaches to enable human-environmental engagements through reciprocal processes of making-with, rather than extractive ways of making-from, things in the ecosystem. Knowledge and insights gathered through researching the entwined bio and socio-cultural histories and traditions of people, place, and matter were extended through sensing and responding to the vital materiality of phenomena. This was a tracing of kinship and whakapapa (lineage, genealogical descent of all things) between human and the more-than-human in Aotearoa/New Zealand.

The location of the project and its engagement with the environment may suggest an alignment with earlier site-specific forms such as Land Art, the movement that developed in the United States during the 1960s and early 1970s. Parikka (2015) recognises the relationship between geology and aesthetics in relation to Land Art and

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Fig. 1 Karekare Beach, © M. Smitheram, 2018

the new ontological and aesthetic vocabulary, developed through experimentation, that extended the materialities in which art making was employed. Parikka associates this shift from "a poststructuralist ontology based on language" to a "terminology of geology, embedded in this way of understanding the nature of the material" (2015, p. 50). We recognise this genealogy of geological aesthetics, especially in relation to the works we discuss in this chapter, produced with mineral processes of sand and salt. However, the Phenomenal Dress project brings distinctive understandings and approaches that question and extend beyond the western, human-centric frameworks of Land Art. Centring a decolonized and situated response to matter, Phenomenal Dress frames an approach of ecological collaboration founded on a post-colonial equality between human and more-than-human lifeforms (Demos, 2016). Through prioritising and respectfully engaging with knowledge and ways of knowing culturally situated within and surrounding place and matter, the project is attentive to the agential histories of material beyond artefact and object. This post-colonial design approach critically centralises socio-cultural ontologies of material, moving from anthropocentric design and making approaches to highlight relationality between things.

The Phenomenal Dress project was initiated through a connection with place, through our respective histories, experiences and relationships with Karekare, and a shared love of making. At its beginning, the project was speculative and as it developed, raised many questions which provoked and guided the creative work and our understanding: How can we make-with matter as subject and collaborator to explore the vitality of non-human materiality and its interconnectivity? The project's specific context of place led to questioning how theories of Posthumanism and Indigenous Māori perspectives relate to or inform this project of making-with Karekare. In evaluating this process of co-constitution within the project, we pay attention to how decisions are made and outcomes judged in a collaboration between human and non-human agents. Following the cues and insights in this analysis we question whether agency can be made visible and interactions extended and traced in a taxonomy based on a whakapapa, or lineage, of action? These questions cannot be answered definitively, but the assemblages discussed here refract and articulate some of our responses to them.

1.1 Whakapapa and Kinship

Whakapapa is a foundational concept in Te Ao Māori - the Māori world. Whakapapa can be translated as 'to lie flat, to place in layers one upon another', and is commonly understood as described by Roberts et al. (2004, p. 28):

> in reference to human descent lines and relationships, where it functions as a family tree or genealogy. But it also refers to an epistemological framework in which perceived patterns and relationships in nature are located. These nonhuman whakapapa contain information concerning an organism's theorized origins from supernatural beings, inferred descent lines, and morphological and ecological relationships.

Throughout our project, understandings of whakapapa guided the research, and tracing the ontological pathways across these layers led to discoveries of relationships, behaviours and dynamics in matter. Whakapapa is relational—it extends from and surrounds a thing as interconnecting layers, as traditional stories and oral histories, and can be understood as "both a genealogy and a geological layering of people, places and things" (Smitheram & Joseph, 2020, p. 295). Whakapapa as an ontological approach revealed the strata, striations, folds and layers of kinship networks within the mineral phenomena.

Foundationally, the concept of whakapapa recognises a vitality to things and places, to the seen and touched, as well as the unseen and phenomenal. At the centre of this, is the concept of mauri, or life force. Mauri is the vital essence of things, and everything has a mauri, not just humans, plants and animals. Within the project, we have been informed by these cultural and philosophical perspectives, changing the focus from human subject to an engagement with the vital materials that make up the lifeworld.

This perspective of tracing the whakapapa of matter within the project encouraged our connection, understanding and knowledge of the nature of the material. It emphasized our relationship with place, beyond the viewpoint of matter as a resource. As a design approach, we noticed that these ways of knowing generated a different relationship to matter, one of care. Through attending to the non-human, we came to know more of our collaborator's histories, patterns and relationships and a sense of deepened connection was fostered within us. Perhaps this mutual impressioning best demonstrates the collaboration: we not only affect but were palpably affected. Our conversations with each other shifted deeper into discussions on the nuances of the behaviour of minerals and phenomena. We noticed differently. Rosiek et al. (2020) describe that the "… alternative to extractivism is deep reciprocity. It's respect, it's relationship, it's responsibility, and it's local" (Rosiek et al., 2020, p. 340). Through centring whakapapa within our research and approach, we begin to engage with ideas of what post-colonial design actions could be within a contemporary Aotearoa/New Zealand context.

1.2 Post-Colonial Design Actions: Assemblages and Collaboration

Scaffolds, as framing structures, support the building of things. Assemblages, as collections or gatherings of heterogeneous things, are inherently relational. Rather than forcefully trying to gain "mastery over materials" (Morton, 2007) our approach was textilic, whereby the process of making follows the "pathways or lines of becoming into the texture of material flows comprising the lifeworld" (Ingold, 2010, p. 91). This process of collaboration through "making-with" (Haraway, 2016, p. 58) recognised the entanglement and reciprocal engagement between designer and ecosystem manifest through material assemblages.

The process of collaboration is normally considered as working in conjunction with another or others (Kester, 2011). Collaboration implies mutuality, but, unlike related terms such as co-design or correspondence, it can also suggest duplicity and betrayal. Reminding us of the long history of human separation from and exploitation of the environment. This stands in contrast to the connectivity and ethics of 'making-with the environment' that guided the project. We recognise that within a collaboration, differences of role, perspective, culture and experience are fundamental intercultural issues that need to be negotiated between members of a group as well as with other agents. In recognising the whakapapa and the entanglement between human and more-than-human things we understand collaboration, in the context of this project, as an emergent process of making across scaffolded, textilic, kinship assemblages. Whakapapa recognises a deep genealogical/geological connection between different things in the world. Through the conceptualization of whakapapa, relationships are complementary and interrelated rather than oppositional: there is no nature/culture divide (Roberts et al., 2004, p.4).

The co-creation of material-aesthetic activations and assemblages in the project developed through the relational emergence of phenomena at Karekare beach, rather than the imposition of a human concept upon a landscape. The diverse artefacts produced through this process were initiated, formed and connected within an ecosystem rather than made or presented in a geographical location as a physical site. While these works emerged through engagement with particular phenomena at Karekare, they were not 'site specific.' Their meaning was not reliant on an audience experiencing the work in a specific location. Rather, through mediation, the temporal and sensual intra-actions (Barad, 2007) that produced these assemblages emphasise or reveal the vitality of matter as both subject and collaborator.

The transformational potential of this approach acknowledges that emergence and change are fundamental to the natural world, and that ordinary, human-made items (such as garments) can exceed their status as human-centred objects, to reveal the aliveness and vitality of materiality. Recognising diverse forms of embodiment and relationships, the project was realised through processes of sensing, responding and redressing the environment.

2 Discussion of Works

Here we describe and reflect on two bodies of work made-with particular mineral phenomena in relation to concepts that informed and guided the project. These include notions of kinship and materiality through sand; and of assemblage and performativity through salt. In describing the development of these works and their relationships with other material and immaterial things, a poetic form of narrative is used, voicing the dialogue between the various human and more-than-human collaborators at Karekare.

2.1 Sand Works: Kinship Through the Materiality of Ironsand

In coming to know ironsand as a collaborator, we encounter the layers of kinship that are embedded within its materiality. These investigations began with our feet tracing the pathways of the sand. Ironsand appears dense and solid and heavy when wet. Its granularity is finest when it is dry and it slips through fingers, impossible to hold. Later, through a scanning electron microscope, we see a single grain of ironsand magnified. These haptic and visual encounters reveal its fundamental qualities. Ironsand is mainly titanomagnetite, along with silica, manganese, calcium and traces of vanadium. The density of titanomagnetite varies across the beach and dunes, affected by water flow, wave and wind action. Ironsand glistens, warms and shimmers in the heat haze of sunshine and through the refraction of water, its colours changing from black to purple to flashes of iridescent blue. Its colour is unreliable.

Ironsand is ancient. It originates from deep inside volcanoes which erupted 2.5 million years ago. Gradually, it washed down rivers, out to sea. Each grain of sand made its singular journey hundreds of miles up the coastline of the Tasman Sea, eventually to reform on the beach today. Yet wind and tide constantly alter the structure and form of the ironsand beach. It is in perpetual flux.

Ironsand is history and narrative. The volcanoes that it originated from so long ago, are ruled by Rūaumoko, who lives in the belly of Papatūānuku (the earth mother). Rūaumoko is the god of volcanoes; of shimmering light caused by the effect of hot air; and the deep rumbling of seismic activity. Ironsand retells this story in every single grain. Through the eye of a scanning electron microscope, we glimpse the mighty volcano echoed in miniature.

This matter, when reformed as materials and textile, evolves its story of the urgent vitality of push and pull, the macro and the micro, the coming together of elements, the forging in heat deep underground. Ironsand is encoded with the dynamic materiality of together and apart. It remembers the shimmer of light and heat rising. Ontologically, ironsand is a cultural-historic matter. Its origins traced through Māori narratives link back through relationships directly to volcanoes. This genealogy traces the geology of this matter, and in turn dictates its materiality and essential behaviours.

Fig. 2 Sand works. Left and right: Punga experiments/activations, iron sand and latex bio composite, © M. Smitheram and F. Joseph, 2019. Centre: Ancient Punga anchor, stone, © M. Smitheram, 2019

The artefacts developed from ironsand were speculative. The dynamic qualities of ironsand influenced the material configurations. Experiments with adding sifted ironsand to a flexible wet base such as agar bioplastics and latex, resulted in sculptable mediums and forms. The 'collective behaviour' of sand conformed into cohesive new surfaces that whilst solid, retained the flexibility and mutability of the granular parts. One sand work was informed structurally by the form of a Punga—a traditional anchor stone used to secure waka (canoe, small boat). These were heavy stones with a smooth ovoid hole for rope (Fig. 2). Our experimental punga was made of heavy calico cloth, coated in a sand/latex bio composite. Hollow, its dimensions inflated through different activations in situ with air, sand and seawater. The sand/latex bio composite formed a waterproof seal, and the water and air were temporarily contained, anchoring the performer to place.

2.2 Salt Works: Assemblage Through the Performativity of Crystallisation and Evaporation

At Karekare, we first encounter salt through bare feet. Crossing the beach, crunching through salt crusts formed by the evaporation of seawater from wet tidal sands. Salt crystals formed from sea spray grow on driftwood, leaves and rocks, dissolving back to the sea when it rains (see Fig. 3). The freshwater of the stream increases in salinity as it meets the sand and makes its way to the sea; plants growing in and near the stream change with this increasing salinity.

Assemblages, as collections or gatherings are relational, made up of heterogeneous things and the liaisons between them, across different states and natures. The processes of crystallization and dissolution are dynamic. The salt works grew at different rates depending on temperature, humidity, the season, the substrate and form they anchor on. In winter the crystals formed slowly over several months, in summer they grew profusely in a matter of weeks. The process was performative,

Fig. 3 Salt works. Left: Detail of salt mask, © M. Smitheram and F. Joseph, 2018. Centre: Salt crystal and spinifex experiment, © F. Joseph, 2018. Right: Salt dissolve, © M. Smitheram and F. Joseph, 2019

requiring sustained attention, ladling brine, topping up tanks of solution, ensuring warmth and stillness. The wet cloth drapes, then hardens into bejewelled forms, finding affordances with rocks, branches, sandbanks and human beings. Eventually, the saltworks were dissolved. In water, the texture and form of the cloth dissipates as the ionic bonds of the atoms in the crystalline structure break apart. Salt once again becomes-with the sea.

Through these intra-actions, assemblages were produced and presented in various formats and media, including samples, artefacts, in and ex situ installations, performances, photographs and video artworks (see Fig. 4). The flux between crystallization and hardness, dissolution and fluidity, the paradoxical process of salt formation and disassembly that is both physical and chemical, was intrinsic to these various assemblages. These mutable entanglements of salt and stuff; cloth, wood, leaves, sand, water, flesh and fibre, established territories as they emerged and worked together, blurring boundaries as they continued to change, break up and reform.

Worn on driftwood and human limb, the salt sleeve covers and connects; bark to skin, phloem to bone (see Fig. 5). In stream currents it dissolves and deforms, salt to sea, cloth to unravel and decay. Dress becomes action and connective capacitor, performative rather than representational, fashioning relationships between things: dress as a material-discursive form and action, rather than a human-centric artefact.

3 Analysis

In co-constructing the dynamic kinship assemblages of Phenomenal Dress, we recognise, and have been informed by, the cultural and philosophical layers that shift focus from a human-centred perspective to a deepened engagement with the active materials that make up the living world. Māori ontologies always assume a relationality and recognition between the abilities and sensibilities of objects and humans (Jones & Hoskins, 2016), whereby the self is *part of* the environment: “the self’s

Fig. 4 Activation between rock, salt crystals and performer Tanu Richardson, © M. Smitheram and F. Joseph, 2019

Fig. 5 Salt sleeve activation, © M. Smitheram and F. Joseph, 2019

Fig. 6 Diagram of the layered strata of kinship, and relationality of matter + place + action, © M. Smitheram, 2021

uptake of anything—emotion, feeling, cognition, even physical attribute—is dependent on the interplay of whakapapa with the natural world" (Mika, 2012, p. 1086). For the researchers, this was part of a gradual and reflective unfolding through sensing, noticing and observing the mineral phenomena and experiencing a new reciprocity with the materials.

In considering these works and their relationships, we developed a taxonomy based on a whakapapa of action, a scaffold where agency is made visible and intra-actions can be extended and traced (see Fig. 6). This is presented here as an ontological cross section diagram of relationships between matter, place, agents and actions, that are informed by geological and genealogical interconnections.

Through the ontological diagram, we trace four processes of extraction and colonisation, assemblage and mediation. We identify the agents as human, non-human, matter and place. These agents all possess mauri or lifeforce, and are critically linked through kinship. The relational agencies that exist here are social agencies and natural agencies, these tangle and unravel across processes through histories and culture. Colonisation and associated extraction processes rupture the strata of kinship. Extraction can be seen as social agency imposed by humans on matter and place. Colonisation operates in this ontology as a process of violence applied by humans against other humans, sovereignty and land, that causes catastrophic ruptures through histories and cultures, resulting in the commodification of matter and place through the construct and imposition of social agencies.

In thinking through the relationships within the project, we identify two other critical processes that also incorporate doing and undoing. Mediation is traced as a human cultural process, applied to matter flows and materiality through technologies.

We also observe mediation as strands of connectivity between non-human, human and place through interaction in the environment and its impacts on place. Assemblage is sensed, noticed and witnessed as a process of binding between matter and place, through histories, cultural actions and liveliness between things and places. Assemblage, as collections of heterogeneous things rather than hierarchical categorisations, and mediation as matter flows, bind and entwine with the strata like plant roots.

Through this exploration of how we might make-with matter as subject and collaborator, we have come to recognise this vitality of non-human materiality and its interconnectivity. This was initially revealed through processes of sensing, through observation, haptic and proprioceptive engagement with matter and forces: for example, the power of the west coast wind and the way it billowed and compressed clothes to bodies and sent the spinifex seed heads dancing like tumbleweed along the beach. We noticed the tenacity of spinifex plants clinging and binding to the sand dunes, resisting the forces of air and sea (see Fig. 7). This dynamic and agency was also disclosed through socio-cultural histories and narratives that gave accounts and introduced very different perspectives on human inter-relationship with the living world we are part of. It also emerged through the aesthetic decisions made in co-creating assemblages, informed through processes of formation, mediation and change, entanglements refracted through the strata of kinship.

In considering these assemblages co-constituted through the Phenomenal Dress project, we pay attention to the sensory engagements that informed responses and decisions, and outline an ethical practice of inquiry that recognizes the interrelationships with materiality. We do not claim consensus between human and non-human collaborators, but, in analysing these works, we recognise a reciprocity that contests extractive, individualistic processes, including human-centred approaches to

Fig. 7 Mediated assemblages: Making-with forces in the environment. Left: Detail from Hīnaki Dress activation, © M. Smitheram and F. Joseph, 2018. Centre: Sand dune with spinifex, © F. Joseph, 2018. Right: Detail Spinifex Dress, © M. Smitheram and F. Joseph, 2019

artistic expression. This engages place, matter, human and non-human agents through cultural practices of mediation, assemblage and embodied processes of sensing. It recognises the ruptures and fissures that have been imposed on the strata, striations, folds and layers of kinship networks, the fracking of interconnection and reciprocity. In working diffractively, we recognise the cause and implications of these ruptures, and engage with the flows of other forces that connect, reform and reposition our sense of place in the world.

This research through human–environment co-creation questions *who* and *what* validates knowing and knowledge. In examining how we come to understand things within the project, we are reminded of the perspective and spatiality sketched out by Linda Smith and co-authors, who state that

> "there is a seascape, landscape and mindscape that has informed and constituted the legacies of language, the storying of peoples and the understandings of human endeavour and survival that is written into the veins of what we now know as māturanga [Māori knowledge and ways of knowing]" (Smith et al., 2016, p. 134).

We do not have the cultural background and hence the depth of understanding required for this project to be firmly anchored in māturanga Māori, although it was guided by some protocols and an ethics of care. Our approach was hybrid, reflecting the bicultural and situated heritage of the researchers. Through the processes of assemblage and scaffolding, of being in-situ, being-with and making-with place, ways of forming new understandings and knowledge have emerged.

We conceive reciprocity, rather than material artefacts, as the most significant outcome of this project. Rosiek et al. recognize that "showing respect for the earth, of reciprocity, and of the importance of observation and attentiveness in learning as knowledge is transmitted through kinship relationships" (Rosiek et al., 2020, p. 340). Our approach, while informed by theory, was not governed by intellectual constructs, rather the practice and material manifestations led us through embodied understandings to an awareness of our kinship with the living world.

Our experience of the outcomes are personal and creative, informed by the researchers' own positionality and different cultural backgrounds. It is also difficult to claim shared knowledge or consensus between human and more-than-human collaborators here, but perhaps a mutuality of understanding grew during the exchange. Certainly, the consideration of matter from the human point of view was expanded through the sensorial and haptic approaches to matter flows, suggesting that "when it comes to knowledge making knowledge, it is though subject and object cocreate one another" (de la Cadena & Blaser, 2018, p. 24). For the human collaborators, a common thread could be a deepened appreciation of phenomena through perception and mauri, whilst recognising that any propositions of truth about things was secondary (Mika, 2015), and the nuances of interaction with the other were glimpsed in that horizon line of seascape, landscape and mindscape.

4 Conclusion

While the geological language of Land Art resonates with aspects of the project, including the stratified ontological diagram of relationships, the explicit framing of Phenomenal Dress as a situated, collaborative process is ethically, methodologically and aesthetically distinct. Informed by theories of Posthumanism, decolonisation and Māori perspectives, this project of making-with Karekare developed through a dynamic relationship between human and non-human agents, place and matter. Tracing the ontological pathways and ruptures across the layers and fissures of the project led to discoveries of relationship, behaviour and change through matter flows. The ethical grounding, based in reciprocity rather than extraction, informed an approach to ecological collaboration between human and non-human ways of being. The selection and placement of material flows within and across these various groupings spoke to the kinship between these lively forms of matter.

Mihi/Acknowledgements The unique ecosystem of Karekare beach has an ancestral and living relationship with Te Kawerau ā Maki, who are the tangata whenua (people of the land) who hold customary authority or manawhenua within the region. We acknowledge and pay respect to their care and kaitiakitanga of Karekare. Ngā mihi nui (our thanks) to our colleagues Dr John Perrott (Mātauranga Māori research advisor and Institute of Applied Ecology, Auckland University of Technology) and Dr Valance Smith (Te Ara Poutama, Auckland University of Technology) who advised and guided us in relation to mātauranga Māori protocols. Tanu Richardson and Jasmin Canuel from Atamira Dance Company activated, explored and performed with us, sharing their wairua (spirit) and aroha (love, empathy) with the environment, we are forever thankful- ngā mihi maioha.

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Three Contemporary Artists' Collaborative Crafting with Non-human Living Organisms

Jing Yang

1 Introduction

In this chapter, I will introduce and analyse the processes of three contemporary artists' work with non-human living organisms: Antero Kare's sculptures and installations created with microbes, Liang Shaoji's transformation of the silkworm's life cycle in his fibre and sculptural works, and Ren Ri's honeycomb sculpture resulting from his interaction with honeybees. Working with living organisms, the artists integrate the metabolic processes of microbes and animals into their creative processes. The crafting is neither solely human nor solely a non-human endeavour, but a joint effort between the artist and non-human living matter. I therefore tentatively call it collaborative crafting.

Before going deep into their work, I'll first clarify what I mean by the term craft. Craft is a process of making and understanding materials in their most fundamental form. Due to the re-materialization of contemporary art, the art world today is 'brimming with what could be characterised as craft' (Bryan-Wilsons, 2013, p. 7). However, as contemporary artists' re-appropriation of crafts is not presented as any functional object, craft in the context of contemporary art has deviated from the term's conventional meaning that the 'importance of function' is essential to the 'identity of craft' and 'it is around function that form, material, and technique revolve as a constellation of elements necessary to bring the craft object into being' (Risatti, 2007, p. 281). Although the works of the artists presented in this chapter may not be seen as real craft, their relationship with materials and the processes they go through shows their relationship with materiality in the context of craft.

Craft making always involves the artisan's familiarity with the materials, that is, with their physical properties, and the mastery of unique techniques to deal with those

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materials. But in collaborative crafting, what the artists employ to make art are living microorganisms and insects, which are very different from the clay, fabric, iron, glass, bamboo, wood and other materials commonly used in craft making. Living organisms have often been seen in numerous bio art practices which are "comprised partly or entirely of living, non-human organisms" or 'created in association with non-human organisms' (Gessert, 2010, p. 191). Instead of being called objects, or materials, these non-human organisms are more dynamic and even sentient beings. The interaction in art making between these actively collaborating non-human organisms and the artist is more sophisticated.

Through emphasising the role of non-human agents, new materialism and posthumanism radically problematize the binaries of subject/object, human/non-human, cultural/natural, and mind/body, and challenge the superiority of the human (Barad, 2007; Bennett, 2010; Braidotti, 2013; Coole & Frost, 2010). Since a process of crafting always requires immediate contact with materials—with human and non-human entities—the study of crafting enables a more affective and inclusive understanding of the encounters between human and non-human entities and forces, 'taking account of the entangled materializations of which we are a part' (Barad, 2007, p. 384). The exploration of contemporary artists' collaboration with non-humans with specific focus on their process of interaction is dedicated to revealing the vitality of non-human bodies and generating new thinking about our complex interconnectedness and interdependence with other co-beings and entities.

In this chapter, I will focus on a series of issues in relation to the collaboration with living matter in the processes presented, such as: how they choose and prepare materials, how they solved the technical challenges in the production process to achieve desired artistic effects, such as shape, colour and surface effects, and how they perceive the interactive relationship between themselves, and the living materials used. The answers to these questions come partly from my interviews with them and on-site observations of their works and work processes, and partly from the artists' earlier statements and articles about their work.

2 Antero Kare's Living Pieces with Microbes

Finnish artist Antero Kare is a pioneer in the field of bio art. It is hard to explain his long and rich career in a few sentences, however, for him, "art became a means for travelling in time and place, the aim being to reach the primary sources of the genesis of life' (Sakari, 2013, p. 21). Out of his deep interest in historical knowledge, he embarked on a fascinating journey back to the past. Being conscious that history goes far back beyond the cultural history created by human beings, he asserts that if we want to travel back to an older history, cultural history must change to natural science (Kare, 2013a). The attempt to reach the origins of life led him to fossils, to the era of trilobites and ammonites, and finally to the genesis of bacteria and viruses some 3.8 billion years ago.

Since 1983, Kare has concentrated on working with microorganisms. He has created a large number of paintings and sculptures covered with a network of living bacteria and moulds and later categorised as living pieces with microbes. In my conversation with Kare, he provided a detailed explanation of his collaboration with microbes, which was less mentioned in previous essays and articles about his art. He said: "As the microbes are all around us—in the air, water and soil, and inside me and you—they are my colleagues and collaborators" (J. Yang, personal communication, January 16, 2021). Kare considers microbes as 'the symbols of the essence of life, as the indicators of the whole history of life', so for him, microbes are the basis of identity—they identify our biological self (J. Yang, personal communication, January 16, 2021).

> We people are like a bag of water which is filled up with proteins and primitive bacteria so that the bacteria in our bodies outnumber the cells 10 to 1. We people have developed from this primeval world and in our mitochondria, we have the cellular machinery we inherited from these first forefathers of ours. (Kare, 2013b, p. 101)

The first task in his work is to choose what kind of microbes to use. Kare recollected his collaboration with the Institute of Microbiology at the University of Helsinki.[1] Working with microbiologists there provided him with easy access to the samples of more than 3000 microbe species that microbiologists had collected and stored in laboratory tubes. He obtained direct experience of the growth pattern, surface structure and colour of every species as well as abundant data for their cultivation, such as the required nutrition, temperature, PH value and moisture level. After that, he needed to have a well-developed plan of the colour scheme and the time schedule of various microbes that would appear in his work because he often uses multiple microbe species in one work. Since each microbe species has a different growth pattern, surface structure and colour, he needed to perform many preliminary tests on different microbes, to examine their rate of growth, the prevalence of the microbial population, the potential interactions of the species, and the humidity and nutritional requirements, in order to select the ones most appropriate for cultivation. For example, the rate of growth of each species is different: for some the growth is perceptible within a few days, while for others it takes a few weeks.

In his famous *Swan*, (see Figs. 1 and 2) the surface of the swan body was the result from the cofunction of different microbes. The preparation of the microbes began weeks before the exhibition through a calendar which he had scheduled according to the growth expectations of different species. Some species were cultivated on prepared petri dishes two weeks before, some a week before, and others four days before. Then the artist transplanted the grown microbes onto the swan's body from one day to a few days before the exhibition. The growth schedules of different microbes were also changing the surfaces and colours of the piece over time. After about three weeks, the vivid and quick change in colours gradually stopped and

[1] Kare's other collaborators in different projects included the Technical Research Center of Finland VTT; the University of Vienna, Austria; the University of Wisconsin, Appleton, USA; the University of Turku; the Middle East Technical University, Ankara, Turkey; the Exploratorium Science Center, San Francisco, USA.

the strongest species began to dominate the surface. In his large-sized installation *Hunting Dogs* (see Fig. 3), Kare made a pack of eight wild dogs and his collaborator Kaarina Sivonen and her colleagues helped to plant microbes on each dog to create different surface colours. The eight dominant microbe species used in the making of *Hunting Dogs* include Fusarium oxysporum, Allomyces javanicus, Sordaria fimicola, Coprinopsis cinerea, Aspercillus flavus, Saccharomyces cerevisiae, Eurotium chevalieri and Rhodotorula rubra.

In our conversation he explained how he formed his work. First, he made a skeleton in wood or styrofoam and then covered it with plenty of agars, the nutritional material for microbes. Different microbes need different types of agars, which for use in laboratory conditions is produced from seaweed. He also grew microbes on ordinary household materials: potato, carrot, leak, cheese etc. Another interesting issue in his work is the control of the life cycle of his living pieces. The artist controls how long these living pieces can live by controlling the food, temperature and moisture level depending on how long he wants them to live for his particular plan. At the end of the exhibition, he can decide whether they continue to live, or die.

Fig. 1 Swan, Contemporary Art Museum Kiasma, Helsinki, 2000 (Photo: Antero Kare)

Fig. 2 Detail of Swan (Photo: Antero Kare)

Fig. 3 Hunting Dogs, Contemporary Art Museum Kiasma, Helsinki, 2003 (Photo: Antero Kare)

Among his numerous living microbe pieces, the one displayed in 2000 at the Kiasma exhibition *Kapova and the Dogs (Kapova ja koirat)* is perhaps most representative of the coexistence of cultural history and natural history and the final triumph of nature over culture. From his research on the Permian casts that were made by ancient Finno-Ugric people between 200–1000 CE, he noticed an interesting motif of two martens facing each other, as if reflections in a mirror so that their heads, feet and tails touch each other and the two are represented as one. After a series of tests with different microbes, he finally found one group of microbes that can create a red surface, and another that can create a white surface. In this work titled *Pair* (see Fig. 4), he carved a figure with two martens combined together and cultivated the microbes on one to become white and on the other to become red. During the course of the exhibition, the white microbes kept growing into the red, and the red microbes into the white, which he explained he regarded as an analogy for couples that live together for a long time and started to resemble each other. The work's own microclimate produced a visible moisture and served as a test of the moisture-producing quality of microbes, which reminds him of the unity of our climate, how all creatures and organisms depend on one another.

3 Nature Series: Liang Shaoji's Collaboration with Silkworms

Chinese artist Liang Shaoji has been working intensively with silkworms for almost 30 years. Transforming the life process of the silkworm into an artistic language, his art practice under the title of *Nature Series* has become a unique phenomenon in contemporary Chinese art.

His meetings with the silkworms began in 1988 when he first used the silk and dried cocoon to make the hexagram symbols of the *I Ching* in his installation series *Yi*. One day when this work was put in the exhibition hall, a beam of sunshine shed on the hanging silk tissue and the flowing light and shadow in the dark space created a surreal impression that made it seem as if the dry cocoons on the silk cloth were wriggling. It reminded the artist of what Lao Tzu says in *Tao Te Ching* that 'indistinct and shadowy, yet within it is an image; shadowy and indistinct, yet within it is a substance',[2] which became the genesis of his desire to breed and use live silkworms in his work (Zha, 2011).

He started to rear silkworms in the spring of 1989 and soon established his studio in Taizhou, a substantial sericulture base in Zhejiang. In 2001, he moved his studio to the foot of Tiantai Mountain. Liang's intimate interaction with silkworms is a process for exploring and mastering the Tao of the silkworm through

[2] Lao Tzu, Tao Te Ching, Chapter 21, translated by D.C. Lau, 1963.

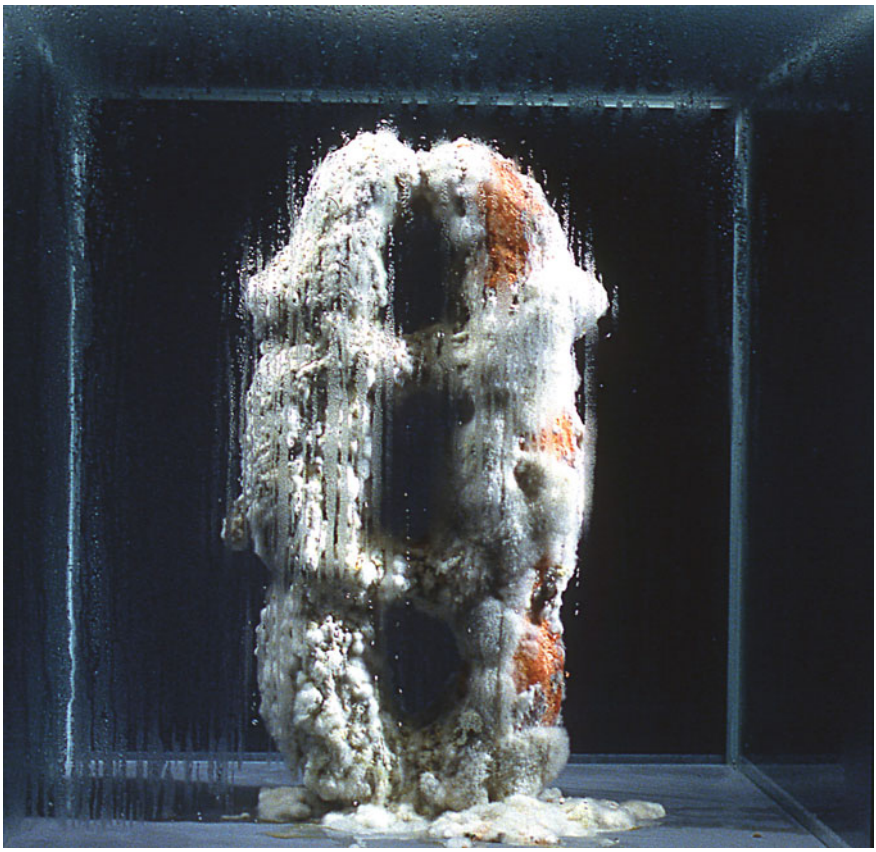

Fig. 4 Pair, Contemporary Art Museum Kiasma, Helsinki, 2000 (Photo: Antero Kare)

observation and meditation.[3] First, in the sericulture laboratory—Liang's studio—the artist carefully observed, from a morphological perspective, the silkworms' egg-laying, growing, spinning, cocooning and becoming moths, and he made a detailed record of the process. Observation helped him to accumulate empirical knowledge of the silkworm's appearance and habits and every detail of their life cycle. Second, profoundly influenced by the teaching of the Tiantai School of Buddhism, which in Sanskrit Dhyana can be translated as 'void and stillness', Liang considers meditation as another important aspect in his work. He calls it poetic meditation, which takes him out of his current state of existence and allows the mind to roam freely over time and space (Yang, 2018). Through observation and meditation, the experience and knowledge of silkworms are transformed into poetic and symbolic ideas.

[3] The term Tao in the context of Taoism—the ancient Chinese philosophy and religion—can be roughly understood as the natural order of the universe, some essence or pattern behind the natural world that keeps the universe balanced and ordered.

In his interaction with silkworms, he often follows the unexpected changes that happen during the biological process of silkworms and adjusts his concept and method. He mentioned in an interview that one day he noticed a silkworm fall down from the roof and luckily a filament secreted from its gland saved its life (Yang, 2018). That moment when life hangs by a single thread inspired the creation of *Chain: The Unbearable Lightness of Being/ Nature Series No. 79* (see Fig. 5), in which he wrapped heavy iron chains with silk as if they grew endlessly. Unexpected and accidental occurrences reflect the experimentality of the artist's interaction with nature, and the richness, complexity, and uncontrollability of the natural process, wherein lies the fascinating charm of eco art and bio art.

In addition to engaging with the silkworms' spinning of silk and using silk for modelling in his work, Liang introduced sounds, movements, odours, and even excreta in the life of silkworms into his art. Meanwhile, the bamboo and wood associated with silkworm breeding also became modelling elements in his work. He is inspired by Wassily Kandinsky's argument about the spiritual meaning of point, line, and shape, but he believes that the spirituality of material needs to be discovered from experiments and cannot be bound by preconceived ideas. Only in this way can the objective materials be sublimated into the Tao (Yang, 2018).

Standing in front of Liang's work, the spectators often marvel at the beauty created by the shape, colour, texture, and space of the silk and cocoons. Consequently, how he makes his work and the technical issues involved stimulated great interest not only in researchers, but also in other audiences. He compares his method to ink

Fig. 5 Chain: The Unbearable Lightness of Being/Nature Series No. 79, 2003 (Photo: Wang Wenlong)

splash painting: beginning with a rough idea, he makes adjustments according to circumstances after the silkworms begin to spin. He made it clear, however, that he tries to avoid excessive intervention and makes the most of what he calls the 'factors' that can grow into art so as to achieve the effect that 'though it is the work of a human being, it looks as if it is from heaven' (Yang, 2018).

In *Broken Landscape* (see Fig. 6), an installation he first displayed in 2008, Liang raised silkworms on this huge piece of silk, letting the larvae hatch from eggs, then grow, eat mulberry leaves, excrete, moult, pupate, develop into moths, copulate, lay eggs, and finally die. The countless yellow and black dots and stains marking the traces of their life course remain intact on the silk roll and form natural textures and patterns, creating the effect of a Chinese landscape scroll.

He recalled his experience dancing with silkworms and pointed out that silkworms show affinity to lignin-containing materials, such as wood and paper, so the first challenge he faced was to overcome the silkworm's resistance to spinning on lignin-free materials such as metals, glass, and plastics surfaces. Liang conducted a large number of experiments to improve the immunity and adaptability of silkworms by means of selection and crossbreeding until he finally cultivated a silkworm breed that can adapt to various materials such as human bodies, discarded metals, plastics and glass. The second challenge was the mastery of the flat cocoons. In addition to oval cocoons, he often uses flat ones. The making of flat cocoons actually results from

Fig. 6 Broken Landscape, Exhibition view at ShanghART Gallery Beijing, 2008 (Photo: Liang Shaoji)

human control. As flat cocoons can be used to make certain delicate fabrics, they have economic value in sericulture. When the silkworms are mature for cocooning, if the silkworm breeders put the silkworms on a flat plate, the silkworms will change their spinning habits, and start to weave a flat piece of cocoon. Liang regulated the biological clock of the silkworms by adjusting the humidity, temperature, brightness and the slope of the spinning plate so as to control the spinning direction and speed, inducing the silkworms to produce flat cocoons with an expected structure and thickness. According to Liang, it comes from mastering the laws of the life processes of silkworms, which means a long period of devotion. In the past decades he has reared at least 900,000 silkworms and the silk he has used would go round the earth more than 10 times.

4 Ren Ri's Honeycomb Sculpture Collaboration with Bees

In Chinese contemporary art circles, Ren Ri is a fast-rising artist. He started beekeeping in 2006 and this collaboration with bees has lasted for more than a decade. Until now this has resulted in a large number of art pieces made entirely of beeswax, based on the artist's research on the self-organizing structure, psychology and behaviour patterns of bees as eusocial insects.

In an essay titled 'Interactive Shaping—On the Engagement of the 'Third Party' in Artistic Creation', Ren (2011) elaborated on his idea of collaboration with bees. For many years he has focused on the way his honeycomb sculptures are generated, and he enjoys the meaningful relationship with non-humans in the process. He began to try 'through the intervention of a third party in the creative process to make sculptures and diminish the sculptor's absolute control over the object in the working process' (Ren, 2011, p. 40). This third party involved in art making 'has a harmonious symbiotic relationship with people, or people can use it, but it should be its own system, independent of humans' (Ren, 2011, p. 40).

The bee species he worked with is the European honeybee (Apis mellifera). Before starting to work with bees, he made a self-imposed rule not to interfere with the bees' nest-building process, but instead he must allow the bees' autonomous construction to comply with the bees' own biology and behaviour. In our conversation, Ren further mentioned that honeybee society has a high degree of coordination, order and sociality, with each colony having its own stable system which is not easily disturbed or changed by outside intervention:

> If the system of bee society is regarded as an algorithm, my intervention becomes a variable of the algorithm under which bees will generate a new algorithm and evolve, which is similar to a cellular automaton. Once the checking between us begins, everything will go on fully automatically. This is also an important reason why I choose honeybees over other species. The high rationality of honeybee society has the potential to confront my irrationality as an artist. The creative process for me is actually a gradual exploration of the possibility of the future form of the bee's sociality. In a word, I hope to co-evolve with bees, and all kinds of sensory interactions with bees are based on this goal. In this process, based on the understanding of bees, I can imagine the possibility of a future human society—which is

> what attracted me most in the first place to the bee's world and is an important reason why I chose to work with bees. (J. Yang, personal communication, January 18, 2021)

Ren's most famous work includes a group of works under the title of *Yuan-Su*. His first series, *Yuan-Su I: The Origin of Geometry* (see Fig. 7), incorporates several beeswax maps. In *Yuan-Su II* (see Fig. 8), he created a series of geometric sculptures. According to him, 'Yuan' (元) refers to the foundation and origin of things, and 'Su' (塑) refers to the part of human's participation in shaping; therefore, *Yuan-Su* can be interpreted as his understanding of the process of the construction of things (Ren, 2015, p. 44). The artist believes his sculptures represent the way of how humans interact with nature, which involves harmony, destruction, moulding, and interference, often with unpredictable outcomes. *Yuan-Su I* is a series of large-size maps of about 140 cm × 110 cm × 10 cm and small-size maps of 64 cm × 46 cm × 6 cm and the size of *Yuan-Su II* is 40 cm × 40 cm × 40 cm.

The Yuan-Su I series is made of relief works. He made this series between 2007 and 2011. Bees are masters of relief, building their nests on flat surfaces. Their preference for the hexagon is rooted in their genetic code, and through its simple structural iteration they build extremely delicate and complex honeycomb buildings. A mass of hexagonal prismatic wax cells is arrayed together to form a horizontal sheet of honeycomb, and then many layered sheets of honeycomb form a large hive. The compression of the three-dimensional space in making the relief is close to the honeybee's behavioural mode of constructing honeycombs. Ren designed a series of reliefs of the world map and the maps of various countries using honeycomb

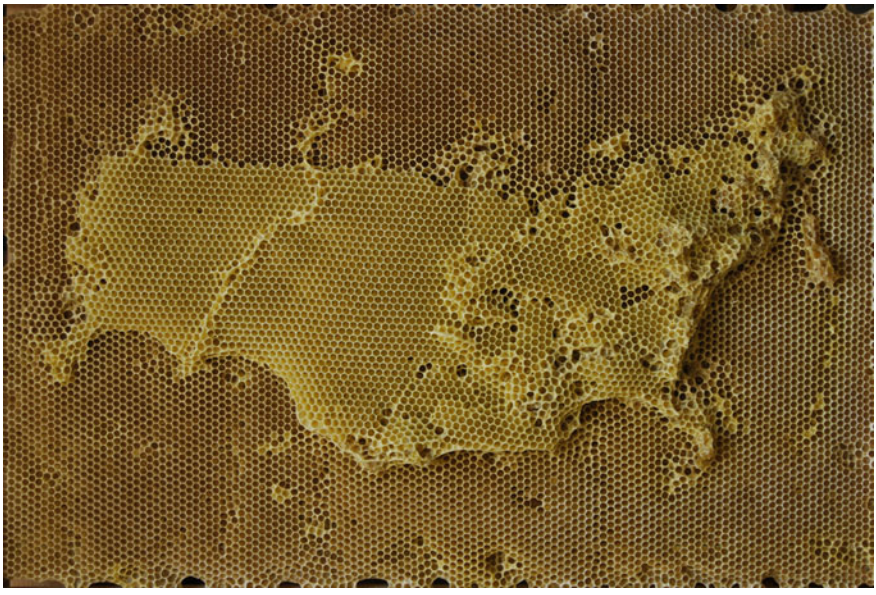

Fig. 7 Yuan-Su I: The Origin of Geometry—Russia, 2011 (Photo: Ren Ri)

Fig. 8 Yuan-Su II: #2, 2015 (Photo: Ren Ri)

foundation as the basic modelling material. Maps embody human beings' abstraction of the world, including various objects and shapes, which he perceives as the origin of geometry resulting from human abstraction and logical analysis. Then he let bees build their hive on his work, re-shaping it and finally forming a new interactive result. Ren understands it as the 'geometric origin' of honeybees, which is similar to human's abstraction of the world, and which embodies a co-construction and isomorphism between bees and human beings.

In 2012, he started to create *Yuan-Su II*. This series is a group of sculptures formed by natural honeycomb under the action of gravity. The artist placed the queen bee in the centre of the regular polygon, and the bees began to build honeycombs around her, consistent with the direction of gravity. Inspired by the Creation story in the Bible, Ren turned the direction of the hive every seven days, following the principle that the new direction of the hive should be perpendicular to the previous one, so the new centre and direction of gravity of the hive always formed a ' + ' relationship with the previous one and bees built more complex honeycomb structures with the passage of time.

We also talked about practical challenges he faced when working with bees. Ren attaches primary significance to becoming familiar with bees. The 'personality' of

each honeybee colony is different: some colonies are more interactive with people than others. Instead of forcing them, he induces honeybees to build their nests only by following their natural habits, and to do that requires great patience and concentration. His work takes a long time to produce, one batch of work usually takes two springs and two summers with variations according to the level of cooperation of each bee group, as well as in the external environment such as nectar sources, flowering and weather. "I used to stay with bees all day long", he said, "as bees are aggressive insects, not fully domesticated or intimate like other animals, I often had to endure the pain of bee stings as I worked" (J. Yang, personal communication, January 18, 2021).

The transformation from planar relief to three-dimensional sculpture reflects Ren's deepening thinking of the interaction with the bees. In his earlier statement on *Yuan-Su I,* he described the participation of the bees as the 'third party' factor. Later, in his statement on *Yuan-Su II*, he had a new interpretation that the bees and the beeswax that they secreted constitute the original relationship between the first and the second forces, and the artist intervenes as a 'third party' factor: "In this way a new relationship between bees, me and beeswax (the hive) is generated, a new 'symbiotic' relationship, and a new life form is produced at the same time" (Ren, 2015, p. 44).

5 Discussion

The vitality of non-human bodies in collaborative crafting in contemporary art challenges the ontological uniqueness of human beings as the sole creator of art objects. In this kind of new collaborative and participatory work, the professional artists transfer a significant amount of their power in the creation of art—power that has traditionally been completely dominant—to the non-human collaborators, who now become actively engaged in the conception and execution of the work, giving them the status of co-creators. Grant Kester emphasizes the artist's openness to accept 'a position of dependence and intersubjective vulnerability relative to the viewer or collaborator' (Kester, 2004, p. 110). In collaborative crafting, the non-human participants, such as microbes and insects, are active collaborators. Looking into these practices that are entangled with diverse fields and forms of knowledge led me to an aesthetic-affective openness to material vitality and consequently develop an affective ethical engagement with others (Bennett, 2010).

The three artists' work also raised the issue of the controllability of the collaboration. Neither the artists nor the non-human creatures had absolute control over the process. It is noteworthy that the level of control varies between the artists. Antero Kare was almost in full control of the life and death of the microbes through which he displayed rather strong dominance over the collaborative process, while Liang Shaoji and Ren Ri had much looser control because the natural instinct of silkworms and bees was utilized, increasing the power of the non-human collaborators. Of course, non-human creatures, even if they have sentience, are unable to make judgements,

or communicate with artists about their role in the collaborative processes. Therefore, we have no way of knowing whether these non-human collaborators are willing participants or if they derive any benefit from the processes.

The artists' collaboration with non-human living organisms reflects a contradiction between the emphasis on the vitality of non-human and the artist's control over them. For example, Liang's dedicated research into and his control over the biological cycle of silkworm contrasts with his claimed Taoist idea of following nature and no intervention. Ren's ambiguous definition of the third party suggests his changing level of human intervention with bees and control over their biological and behavioural mode. Similar, in Kare's living pieces with microbes, his belief in the homology and intimacy between microbes and humans, contrasts poignantly with his arbitrary control over the growth and life cycle of microorganisms.

Their collaborative crafting is actually a struggle to find a balance between controlling the natural process and passively following nature. This contradiction between the anthropocentric and the anti-anthropocentric endows their works with a strong aesthetic tension, and reveals the ethical and pragmatic complexity involved in the coexistence and cooperation between human and non-human beings in Anthropocene art. These artist's aesthetic practices provide a critical perspective and refreshing way of re-imagining our understanding of the complexity of our physical, spiritual, and ethical connections and communications with the Earth and its non-human denizens, avoiding oversimplification and reductivism.

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Human Crafting

Slow Spun: Connecting to Ancestors, Fibre-Producers, Fellow Humans and the Land Through Handcrafting of Wool and Alpaca Fibre

Lorrie Miller and Biljana C. Fredriksen

1 Introduction

> The day I begin writing this chapter, there are three pots on my stove: one pot contains alder bark, leaves and cones that have been soaking in rain water, and in the other two pots there are fleece from local Romney sheep in an experimental batch of carrot-tops and beetroot. The scent is somewhere between tea and barn. Through my window, I can see the tips of the fir trees in the forest and yet smell the ocean down the hill from my home on the unceded and ancestral territory of the Musqueam people. My mind wanders from project to project, while my hands work away moving each of them along bit by bit.
>
> Lorrie's reflections, Spring, 2021

1.1 Critical Questions

This chapter is an undertaking of technique, of being with our own local materials, while engaging in fibre preparation and textile crafting. We turn to others who have laid out their processes before us, whether in print, on-line, or in person (Burgess & White, 2019; Furry & Viemont, 1973; Leechman, 1969) while engaging in embodied learning that includes the care of process, others, materials, environments, and that takes time.

In the times of "turbo-capitalism" (Murray, 2009) where "time is money" and the value of efficiency seems unquestionable, pursuing slow crafting might sound

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unreasonable, if not ridiculous. Why would anyone willingly use more time than necessary in walking, learning, crafting, or any other aspect of life? Many educational systems have been affected by the same attributes of efficiency (Murray, 2009). In an image of industrial production, "knowledge" is imagined to be produced in an assembly-line-manner (Robinson, 2016), but true knowledge comes from experience (Dewey, 2007 [1938]) and "is everything but efficient or instrumental" (Fredriksen, 2020, p. 4).

As teacher educators in Art & Craft, with specific enthusiasm for handcrafting, we believe that *time* is of essential importance for the process of crafting and learning that follows with it, however, our forms of valuing time resist the 'turbo-capitalistic forces' (Murray, 2009). Attuned with many others who are promoting slow learning (Holt, 2002), slow research (Berg & Seeber, 2016; Menzies, 2005; Menzies & Newson, 2007), slow food (Honoré, 2013) and so on, we acknowledge the power of slow crafting and how it can affect one's relationship to oneself and the world one is a part of. In addition, this practice is also in line with First People's Principles of Learning (Government of BC, 2021), where learning is expected to have transformative power that guides learners to recognize consequences of their own actions (Leddy & Miller, 2020).

We explore how our own individual processes of hand processing fibres from sheep and alpaca have initiated deeper understanding of consequences of our crafting practice. We recognize that this exploration is one of privilege, where leisure time to craft is possible, and crafting for sustenance is not needed. Yet, we can begin to understand the knowledge, patience, demands of those before us and others who rely on land-based knowledge and textile skills for daily life. The idea of time being finite may be true in the 'clock' sense of time, but quality of living within the frame of a day, a week, or a life is not relegated to a quantity of 'more' but a sense of quality of experience. We examine the influence of the pace of making, on our material engagements, the relationships involved, and on our whole selves.

1.2 Personal Grounding

To best follow our lines of thinking it is important to know who *we* are within this context and text, as *we* do not claim an objective or sole authoritative voice on this matter. By uncovering our own subjectivities, even though it is impossible to know them all (Stake, 2010), we can provide transparency of our situated understanding and become answerable for our actions and choices (Haraway, 1988).

I, Lorrie, am from settler roots that connect both to Northern Europe, and to the prairies and the coast of British Columbia. I am the birth mother of four, two of whom are half Cree (Indigenous), and a grandmother to one wee granddaughter who, like her father, has Indigenous roots. I am a teacher, researcher, writer, spinner, weaver, and knitter. I am following a path laid out before me by others, Elaine Lipson (2012) with her Slow cloth Manifesto, and Rebecca Burgess and Courtney White (2019) with Fibershed, have deeply both informed my practice; Shannon Leddy

and her insights to Indigenous pedagogies (Leddy & Miller, 2020), and the Greater Vancouver Weavers and Spinners Guild.

The trees and the life in the Pacific Spirit Park give me rejuvenation, inspiration, and to connect to my greater than human relations. Lyle's (2020) *Identity Landscapes* has helped me to articulate this deep and personal relationship with my local environment. It is here in the woods that I watch the life cycles and symbiosis of plant life thrive and decay, the nurse log feeding her relatives as she returns to soil. There, the fungi, moss and lichen blanket branches and logs. The textures, colours and scents from the forest remind me that we are all part of nature, not separate from it. I try to bring this awareness into my practices.

I, Biljana, am a teacher educator, Art & Craft teacher, tailor, and a novice farmer. Similar to my ancestors, who as traveling craftsmen, over the centuries moved from village to village, from South to North of the Balkan peninsula, I moved from Balkan further North and settled in Norway three decades ago. Then, three years ago my husband and I along with our two horses and a donkey moved to an old farm with fields and woods, streams and mud, deer and foxes. Eight alpacas joined us two years later. With all my companion species, from inside and outside the fences, I am learning to listen and to adjust my pace. I am becoming-with them, as we are all connecting to the land. Learning to process alpaca fleece is a part of our mutual process of "biosocial becoming" (Ingold & Palsson, 2013).

As co-authors, our voices have inter-twined during the collaborative crafting of this chapter. Here we shift from voice to voice, and use *I* equally, but identifying the speaker at the beginning of the passage. Yet at other times of analysis and discussion we converge and write with the first-person plural, *we.*

2 Theoretical and Methodological Framing

2.1 The First Peoples Principles of Learning

In British Columbia (BC), *First Peoples Principles of Learning* (First Nations Education Steering Committee – FNESC, 2021) have been incorporated into the BC Curriculum (Government of BC, 2021) as part of a continuum of learning and being. These principles are:

- Learning ultimately supports the well-being of the self, the family, the community, the land, the spirits, and the ancestors.
- Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships, and a sense of place).
- Learning involves recognising the consequences of one's actions.
- Learning involves generational roles and responsibilities.
- Learning recognises the role of indigenous knowledge.
- Learning is embedded in memory, history, and story.
- Learning involves patience and time.

- Learning requires exploration of one's identity.
- Learning involves recognising that some knowledge is sacred and only shared with permission and/or in certain situations.

These principles are not unique to just First Peoples of Canada, but their resonance can inform questions around teaching, learning, research in general and beyond Canadian borders. One of the principles says that learning is lived—it is "holistic, reflexive, reflective, experiential and relational". It may take on various forms in relation to culture and heritage. It need not be compartmentalised into only one's head and hands, but is holistic throughout one's being. The First Peoples Principles are in accord with our understanding of learning as a process that transforms the learner so that she/he starts thinking, feeling and acting differently. For Biljana, who has previously not been familiar with the First Peoples Principles, the need for a deeper connection with alpaca fibers emerged in the continuum of her research of young (age 3–5) children's material explorations, and of her students' and her own practice of crafting. Her doctoral study led to discoveries that in many ways coincide with the First Peoples Principles of Learning (see Fredriksen, 2011a).

Recognizing *how* one's own actions have consequences for others and *which* consequences these might be, is integrated in the process of learning, thus, not easily achieved because such recognitions are tightly tied with personal and cultural values. The First Peoples Principles are challenging the cultural values represented in most of the Western school systems. We are ourselves parts of those hurried systems and we wonder where our own desires to spin slowly, and from local materials, come from.

Across many cultures and over time, crafting functional objects by hand was necessary for survival: tools for hunting and food preparation, clothing and agricultural equipment, shelters and furniture. One *had to* use locally available materials, and knowing that one's survival depended on these materials thus required respect, conservation and care for the environment. Today, we can get cheap industrially produced products and obtain materials from all around the world. Perhaps it is because of our collective distance from the manufacturing processes, and raw material gathering, that leads one to think that environmental concern seems more of a choice than a necessity. But if we consider the damage to our environments caused by overconsumption, prudence in use of natural materials is, indeed, becoming a necessity in global terms. Handcrafting demands concerned handling and "caring attention" which in the next turn leads to "new understanding and deeper sensibility for our surroundings" (Niedderer & Townsend, 2013, p. 5). Crafting in an old-fashioned, or traditional manner, is an act of care that can lead to new insights, and can also motivate even more care. The concept of "response-ability" (Haraway, 2016) comprises abilities to care, to notice and to respond to what has been noticed. Response-ability demands constant attention and sensitivities to the ever-changing reality in order to respond appropriately to all kinds of challenges that emerge during a process.

In addition to response-ability, the fibreshed[1] (Burgess & White, 2019), is integral to the local environment like a watershed. Our fibreshed is comprised of the local fibre producers, the land, waters and creatures in that same ecosystem, along with the farmers, crafters, and consumers. The work of Burgess and White is vital to raising awareness, engagement and conservation in the Pacific Northwest.

2.2 Principles of 'Slow' and Caring in Crafting and Learning

Principles of *slow* stem initially from the slow-food movement (Honoré, 2013) and into a plethora of contexts including slow schools (Holt, 2002). Slow is also implied in First Peoples' Principles of Learning: "Learning takes time and patience" (Government of BC, 2021). The features of *slow* that connect with Lorrie's current practice with wool include an ethic of care, a natural pace of doing and being, attention to one's experience, physicality, and the material. Biljana's earlier research led to development of a concept of 'meaning negotiation' that illustrates how holistic a learning process can be when young learners are given the time they need to negotiate their own understandings: to touch, wait, listen, think, remember, sing, play, observe, smell… or run with materials (Fredriksen, 2011a, 2011b, 2011c, 2012, 2016).

S*low* is place-conscious, relational, and connected to one's inner-self (Lipson, 2012). Slow research (MacRea, 2020) and slow scholarship (Cutcher & Irwin, 2017) are tied up with the flow of experiential learning, like active curriculum, currere (Irwin, 2006; Pinar, 1994). Research that investigates one's lived experience is untidy and complex. Yet, the slowness and care of such a process, as in research, facilitate prolonged engagement, that can lead to unexpected insights (Bresler, 2006). Then further to sudden affects that come before emotions and connect bodies (human and non-human) "through love as sensations of spontaneities and intensities" (Waterhouse et al., 2016, p. 207). The value of crafting seems to be particularly connected with intimacy of physical handling and the multisensory experiences awaken in such intimate relationships (Niedderer & Townsend, 2014).

Traditional crafting methods are slow and may be scorned as 'old-fashioned', but they can open our eyes for connectedness between living forms and call for our care. Even though such small acts of care do not seem as much, "Care for ecology begins with doing what we can in the microsphere of our lives" (Stake & Visse, 2021, p. 113).

[1] This notion of a *Fibershed* came from lower Cascadia from the Fibreshed movement out of Northern California (note that in Canada this is fibre while it is spelled fiber in the USA).

2.3 A/R/Tography

While we engaged in our practices with wool and alpaca fibre, on each side of the Atlantic Ocean, our processes of crafting and writing are, just as Sinner et al. describes: "interconnected and woven through each other to create additional and/or enhanced meanings" (Sinner et al., 2006, p. 1224). As textile artists, researchers and teachers, a/r/tographic approach is a good fit for our work. A/r/tographers seek to be aware of how they apprehended, comprehended, and generated data and how to render their discoveries (Cutcher & Irwin, 2017). We recognize the blurring of lines between research, the life of the researcher and telling stories.

Stories are the oldest form of passing knowledge (Egan, 1999) and, as stated in the First Peoples' Principles of learning "Learning is embedded in (…) story" (Government of BC, 2021). In the following section, we tell stories from our slow encounters with wool and alpaca fiber. Writing of the stories is in itself a means of slowing down—it requires dwelling with each sentence and by doing so demands from us to be "more fully engaged with the aesthetics of place, of experience, and of movement" (Cutcher & Irwin, 2017, p. 2).

3 Our Stories

3.1 Lorrie's Story: A Request from My Son

My youngest son was approaching his 17th birthday, and for this occasion, he asked me to knit him a sweater. This request might appear straight forward on the surface, but this is not the case. The caveat to his request is that it be 'made from scratch' natural wool from local sheep. Fortunately, he asked this two months before his actual birthday, and I had the fleece from a family farm in the Cowichan Valley on Vancouver Island. Over the previous months, I washed and prepared the fleece and finished carding/combing it into spin-ready roving. My feelings about his request are of both happiness and surprise. I am assuming that few teens want a label-free mom-made garment of any kind. He went on to specify further: no added colour, unless a natural dye, but with preference for the colour of the sheep fleece. My son's birthday sweater will be knit primarily with yarn spun from Romney sheep, with a bit of yarn from Galiano Island that are a blend of Finnish and Icelandic sheep, and a tiny bit of fleece from our little woolly Havanese dog, named Jasper. My purpose for the craftingis is grounded in this gift.

I am inspired by the stories of the Salish weavers (Salish Sea Sentinel, 2020), and how they kept their own woolly dogs to supplement the goat wool and cedar in their weavings (Olsen, 2010). Their spindle whorls and enormous weavings are likewise inspiring, both with the historic artisans and those practicing today, like Angela George and Debra Sparrow (1998). In keeping with the concept of the *fibreshed*, (Burgess & White, 2019), I consider the lives of the animals, the livelihoods of the

farmers, and the impact on our planet. I try to procure local fleece that can be traced to a particular farm, and at times even to a particular sheep. Once, I bought Cotswold fleece that was from a loved ewe named Ethel. In another instance, a small-scale sheep farmer on Cortez Island, Joy S. sent me a pound of processed fleece after I contacted her through the local artisan shop. Joy shared with me a story of how she came to acquire her 'girls' from another farmer who had a flock of long-haired sheep in the back of his truck on the way to slaughter. She bought them on the spot and loaded them into her truck. They live their quiet lives on a bucolic island and share their fleece annually with the local textile artists.

3.2 Lorrie's Fleece Preparation

To process means to take the steps in the alteration of raw materials into a more refined or preserved form. In Fig. 1, the raw fleece shows the natural crimp of the fibres, and the variegation of the natural tones of the fleece. While my hands are engaged with the processing, I sense how my emotions accompany my physical actions. Springgay (2019) reminds us of our relationship between sensory and emotional feeling during wool felting. Indeed, I find that my emotions become connected with the materials I craft with.

Tips of the fibres are more sun-bleached, and the darker tones are where the fleece was shorn. The oils, or lanolin, in the fibres gather more in some areas of the fleece than in the others. Likewise, the fibres from the belly of the sheep or at the rump, are more likely to have greater amounts of debris or vegetable matter such as burrs, grasses, seeds and bits of bramble. I feel more connected to this material when I can touch, smell, and examine the fibres, than when using pre-processed fibres from a store, even if it is a very reputable store with local fibres.

Transforming fleece into yarn is a multi-step process, and spinning is not to be rushed. Fleece is patient and will wait. The spinning wheel will go as leisurely or swiftly as one's feet. Likewise, one cannot hurry through the processing of the fibres prior to spinning.

Like many good things, processing fibre begins with a warm bath. The temperature should be maintained, and the fleece should be left undisturbed or risk unwanted felting. A soapy warm bath for the fleece loosens earth from the fibres and dissolves some of the lanoline. One fleece will take several days to wash with a small-batch process. Once cleaned and dry, pick out remaining vegetable matter, and then either hand-card or comb, or both (Fig. 2).

I comb bit by bit and then spin it as I go. I return to the tenets of 'slow' with the deep ethic of care—for others, for the planet, and the artisanship and quality of making, the natural pace and attention to the experience, the willingness to take the time necessary to produce the desired work. I sit on my sturdy three-legged spinning stool and card wool, filling my basket with lovely soft nests of roving ready for spinning. My hands long for the fibres, their soft and yielding texture. I inhale the scent of wool and I feel a part of something bigger than me, connecting me to my

Fig. 1 Galiano fleece from crossbred Finnish and Icelandic sheep (Photograph taken by Lorrie Miller, 2019)

other-than-human relations, to a tradition of makers that extend across cultures and time. My studio/office, is also home to my three spinning wheels (ranging in age from 40 to 240 years), bags of wool, bins of yarn, and assorted textile bits and bobs. I listen to my body telling me to rise from my chair and knit for a while, as a break from carding. So, I pause from one task, and turn my attention to the next.

Fig. 2 Romney fleece in mini-combs (Photograph taken by Lorrie Miller, 2020)

3.3 Lorrie's Spinning

Spinning in the orchard (Fig. 3) for me is like meditation, a multi-sensory engagement with material and place. Spindles are a portable choice for spinning wool into yarn. The summer of 2020, I took spindles with me to a marine park on Jedediah Island, where a shell of a homestead is still overlooking the bay and an orchard has overgrown and gives shelter to the undulates that roam freely in the former fields: rogue sheep, goats, and deer. The bulk of yarn production needed for a large sweater is spun on my Frank Herring wheel, a bent plywood beauty from the 1970s. Its oversized

bobbins accommodate about 150 g of yarn per spool. So, plying two full bobbins together, I can make about 300 g. When spinning the first singles, the wheel or spindle runs clock-wise, resulting in a 'z' twist in the yarn. When spinning two singles together, plying, I spin to the left, counter-clock-wise, creating an 's' twist. The birthday sweater will be primarily two-ply with some specialty strands of chain plied variegated yarn from brown sheep and naturally dyed fleece. The yarn is not perfectly even, varying from 'dk' (double knit) to *worsted weight.* This adds texture to the fabric. Though I seek decent quality with my work, I do not try to emulate factory produced yarn.

Fig. 3 Lorrie Miller spinning with a drop-spindle in the orchard (Photograph taken by Graham Coleman, 2020)

Fig. 4 Finn in his birthday sweater (Photograph taken by Lorrie Miller, 2021)

Once my yarn is spun, set, and wound, I cast-on the needed many stitches and knit. I find a pattern that I begin with and modify as I go (Fig. 4).

3.4 Biljana's Story: Processing Leo's Fibre

I have been knitting, sewing, felting and embroidering for many years, but only recently learned to spin. I cannot recall any childhood experiences with this exotic, 'old-fashioned' craft from close range. I had never even held alpaca fibres in my hands until they literally landed in my arms while I was helping professional alpaca

shavers to shave my first alpacas. The experience was colored by the alpacas' crying and the stressing atmosphere as we (4–5 people) were trying to finish the shaving as quickly as possible in order to minimize the alpacas' suffering. Most alpacas hate human touch and a shaving machine in human hands does not make their experience any better.

The experience was traumatic for me, too. I kept telling myself that the alpacas needed to get rid of their heavy, hot coats before the summer. Just now, while writing, I am realizing that the sense of guilt might have been an unspoken force behind my determination to do something meaningful with the fleece. To compensate for their suffering, the least I can do is to value their fibres. Alpaca fibres have exquisite quality, they are thin and strong and valuable in terms of money; but I am mostly concerned with inter-personal values, values that cannot be measured in money.

One of the rooms in our 280 years old house is full of large paper sacks with alpaca fibre, from the last shaving. I am looking for the sack with Leo's fibre and am curious what yarn made from it will look like. Leonardo, Leo, is the first cria (baby alpaca) born on our farm. When he was born, he had orange flames around his eyes, and warm chestnut shine in his silky coat (see Fig. 5). To my surprise, he changed to black when he was shaved. As I am bending over the sack with Leo's fibre, I sense the pleasant, warm smell. I grasp a handful and immediately recognize his flame-like curls hooked up into each other. But they do not shine any more, and are withered and lifeless. The sense of dryness between my fingers may be exaggerated by the amount of vegetable matter: pieces of hay, straw, and moss mixed in the fleece.

When I start processing the fleece, the volume of foreign materials entangled in the fibre is discouraging. I start picking out the largest pieces and imagine where and how they got stuck in Leo's coat. Knowing Leo, I am not surprised how much debris from his surroundings had managed to find its way into the paper sack. He has always liked rolling on the ground, and the tips of his fibres, like Velcro, collect everything in their way (see Fig. 6). In the last months before shaving (before the pastures became green again), he had been extremely eager to roll in hay. When I arrived with large bags of hay to feed all eight alpacas gathered outdoors behind the barn, he waited by the gate and was eager to jump on and roll over the bags. Perhaps this was his clumsy way of expressing his teenager-stallion attitude. The rest of the flock tolerantly waited until he moved away so that they could start eating.

The thickness of my fingers limits how much debris I can pick and separate from the fibre with bare hands. When I processed fibre from Leo's sister, Lotta, I used a carding machine (drum-carder) that cleans and lines up the fibres between its two spiky drums. I then rolled them into small rolls (rolags), and they were ready for spinning. In Leo's case, the carding machine was not able to untangle the high coalition between hay and fibre. Tiny pieces of moss complicated things further. When I tried to rotate the handle of the carder, I must use my strength, but not too much power, or the carder will tear the fibres rather than sorting them out. This reminds me of brushing my long hair too quickly, and it somehow hurts my ears, my hands and my feelings. I must take a step back and comb the fibre slowly before carding (Fig. 7).

Fig. 5 Alpakino's Leonardo (Leo) one day old (Photograph taken by Biljana, June 7th 2020)

Fig. 6 Leo after rolling in moss (Photograph taken by Biljana C. Fredriksen, April 2021)

Fig. 7 Leo's fleece before processing (Photograph taken by Biljana C. Fredriksen, spring 2021)

I use two combs with double rows of teeth. From one hand to another, I pull the fibre between the metal teeth and blow gently to eliminate the unwelcome bits of vegetation. The tiny pieces of moss are evidence of Leo's and his coeval's, Raphael's, favorite form of play before the spring shaving. Now, when preparing the fibre, the miniature tentacles of the moss do not want to let go of the orange fibre tips. I struggle and am tempted to take a pair of scissors and cut off the fibre tips.

When I finished combing two handfuls of fibre, I place them in the carding machine, and I crank the carder handle. As minutes pass, the pieces of vegetable matter fall out, yet some of them remain. I try to pick them out with a long needle. I have to acknowledge the limitation of my sight. I wonder: *How clean does the fibre have to be?*

I am impatient to see how the orange flames are going to appear in the finished yarn. Instead of combing larger amount of fibre first, then carding it, and finally spinning, I only process it bit-by-bit and start spinning immediately. I can see how tiny orange fibres get swallowed by the black fibre, but I know that they are still there. Beige particles stand out more clearly against the dark background. From time to time, they run between my fingers. There is no doubt that they are still in the yarn I am making. Particles of soil and sand that Leo has been rolling in, and his dry skin cells are probably also there, merged with the crafted yarn. I sense how this fine-grained mixture slowly fills indentations of my fingertips.

The soil and sand will wash out from the yarn when it becomes a hat or jumper, but pieces of hay and straw will not. I suddenly realize that what occupied me the

most during this process of processing the fibre has been the fear of not cleaning the it enough. I imagine that there are rules for spinners about fibre purity. I suppose that garments for human use are not supposed to stick and poke, but what if I want to be reminded of Leo' playfulness when I throw a Leo-scarf around my neck? What if I do not want to separate the fibre from his life, the land and the materials he has lived with? How about: 96% alpaca fibre, 1% hay, 1% moss, 1% soil and 1% of some other invisible matter? My decision to keep the hay and other elements is not taken in order to save time, but in order to save Leo—"save" like in computer saving, not life-saving.

4 Awareness About Consequences of Our Actions

4.1 Consequences for Humans and Non-human Fibre-Produces

The process of spinning is more than making yarn from fleece; it is a practice grounded in tradition, history, place and time, but also coloured by the spinner's personal experiences, desires, attention, sensitivities and care. I, Lorrie, spin with a purpose and a project in my mind, often with a person in my heart. I, Biljana, spin with the producer of the fibre in my mind, with the specific alpaca close to my heart. Our a/r/t-ographer sensitives during the process of processing and spinning made us more aware of which consequences our spinning practice might have for the quality of what we are crafting, for people, for animals and plants (as fungi). However, we also became more aware of how other people and animals, plants and the land impact what is possible for us to make.

Each of us found our motivations and inspirations for crafting with different roots. When the processes started, neither of us knew in advance exactly what would emerge during such intimate meaning negotiations. The uncertainties about what could emerge from the processes, were results of our limited anticipations of what each of the participant brought to the process; It was in the interactions among human and non-human actors that specific material qualities or human emotions were actualized. We believe this to be so, because each individual and each material bring with them very specific qualities, memories, senses and emotions (see also Fredriksen, 2011a). No one can know in advance in which ways affect could emerge from close encounters (Waterhouse et al., 2016), and what it could lead to.

While discussing our individual motivations for crafting, we discovered differences in our goals, our connections with the fibres, and the roles we embodied during the crafting processes. Sometimes, our human-centered focus on making a product for human use, challenged us to consider which consequences our (human) desires might have for the sheep, the alpaca, the dog or the land. Questions of ecological ethics constantly emerged. If Leo, for instance, was prevented from rolling on the ground, his fleece would have been much easier and faster to process. In order to

make fibre processing easier, some alpaca owners clothe their alpacas before shaving, or shave their cria a month after birth in order to remove the short curls with Velco-effect. This possibly does not bother the alpacas, still in both cases, alpacas' needs are considered second, after the human needs. Human choices have large consequences for the animals they own. *Owning* other beings emerged as an issue in Lorrie's story about Joy's sheep, that were saved from slaughter and from Biljana's story reminded us that animals' life quality depends on those who own them.

Human-centered thinking and acting might not be as eminent in handcrafting as it is in industrial production. Anthropocentrism—human-centeredness—prominent in "modern" industrial value-systems, is not a characteristic of Indigenous' relations to the world. Care for the land, and the species that inhabit it, is embedded in The First Peoples' Principles of Learning. Likewise, handcrafting does not hurt the environment as much as big scale industrial exploitation of natural resources does. It could be said that old-fashioned handcrafting in itself exercises a mild form of anthropocentrism (Fredriksen & Sørum, 2021). Additionally, during the practice of handcrafting, a craftsperson's closeness to natural materials leads to more humbleness and appreciation, and to development of commitment, patience and love of nature (MacEachren, 2004).

4.2 The Significance of the Slow Approach

Slow was not just the pace of doing; it was a lived and engaged pace untethered from the demands of a clock-driven time (Menzies, 2005; Menzies & Newson, 2007). For Lorrie, slow spinning came more "natural" as a consequence of long experience of practicing slow. For Biljana, slowness did not come by itself, but demanded a conscious decision, scheduled time and attunement of body and mind. But, when the time void was entered and the activity started to flow, the slowness conquered the time–space. Slowness was a way of reclaiming time for genuine experience (Shahjahan, 2015).

The sensory experiences and inner calling were critical to the crafting, whether it was to spin, to weave, to dye or knit, or to wander in the forest. Our senses linked us to our place and time in the particular contexts, and in the world. When reviewing our narratives we found our crafting processes to be characterized by gratitude, care, and joy (see also Conner et al., 2017) that gave us purpose in our work the motivation to translate our experiences into textile work. Motivation was also needed in order to overcome the challenges of the process. Some of the challenges were related to the materials' specific qualities—affordance (Gibson, 1979), including the fibres' cleanness, entanglement and amount of debris—which was connected to lives of the sheep and the alpaca.

When we take time to sense, we can feel how fibres twin around each other between our fingers and take with them tiny pieces or hay, and sometimes even our hair. We are present in the moment where something from an animal becomes something for a human. The transformation depends on our activity of producing rotational motion

and aligning the fibres by pulling them. The process of yarn making is tied up with our ongoing attention—our response-ability to notice when the yarn is too thin and is going to break, or where a piece of debris has passed between fingers and the rotation has to be stopped if the debris is to be taken away. When a spinning wheel is in use, the entire body is active, from toes to finger tips, and a number of nuanced movements has to be coordinated (Fredriksen & Sørum, 2021).

During the prolonged engagement with animal fibres, "lingering caress" as described by Bresler (2006), invited personal discoveries. For Biljana, the most significant discovery was that she *wanted* Leo's personal signature on the yarn from his fleece. For Lorrie's, the jumper she was making was signed by the sheep, the dog and her son's specific request. Inside the "dialogic space for creation of meanings" (Bresler, 2006, p. 59) 'mutual absorption' found place, not only between the fibre and the maker, but between the maker, the fibre, other humans, fibre producers, vegetable matter and the land. Our relationships with the materials, the animals, other humans and the land were not static in nature but fluctuated and developed, urging our (small) personal transformations.

5 Consequences for Teaching and Ecological Sustainability

At the beginning of this chapter, we posed the question: How can slow processing of wool and alpaca fibre lead to deeper awareness about consequences of one's own actions? We have in this process focused on our individual journeys, but what we have learned connects well to our practices of teaching arts & craft. We are now convinced that we have to keep encouraging our students to engage in the process of crafting beyond the "mechanics" of a particular technique.

We claim that it was the *slow pace* that contributed to enhanced sensitivities to the specific qualities of the materials in hands, as well as urged us to connect with our more-than-human companions (donors of the fibres) and to the land. Our process of crafting became *crafting-with* when we were slow, engaged, thoughtful and sensitive to nuances of our practices. This is consistent with the research by Conner et al. (2017) that investigates the connection between arts and well-being, and concludes that the impacts of the creation of 'positive art' include: sense-making, enriching experience, aesthetic appreciation, entertainment, and social bonding.

Our work connects to relationships with others, whether they be family, friends, mentors, students, or the producers of fleece—both farmer and animal alike. When one connects with others, slow processes have the capacity to increase awareness of one's own local area, for instance by engaging with a fibreshed (Burgess & White, 2019), and capacities to developed awareness and intent on nurturing the local biosphere. Lorrie's connections with the fibreshed provided her with inspiration and knowledge from artists and teachers from various Indigenous' and settler traditions and with slow cloth practices (Lipson, 2012). And both Lorrie's and Biljana's experiences made Indigenous' forms of crafting and learning more vivid. We are now better aware of how Indigenous' forms of being in the world and learning from the

land are valuable today—not valuable in terms of money, but of essential value for the global ecological system.

If "we rush through each present moment with blinkers on, grabbing things by their most familiar and convenient handles" (Higgins, 2007, p. 391), so much passes us unnoticed, unappreciated, unloved. On the other hand, by attending to our materials in slow and sustainable ways, we may find a life-balance that is possible and not simply aspirational. Thus, in the times of emerging climate challenges we have to think beyond ourselves. Educators need to be more response-able. Through an improved teaching, both teachers and students may slow down and better connect with the nature we are an inseparable part of. However, living in tune with our surroundings requires an ability to adapt to different paces, some are slow—as in the life of a rock—others are rapid. Perhaps being more in tune with our place here on this earth, we can defy, resist and to counteract the accelerating changes of our ecosystem.

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Entangling with Materials: Crafting as a Way of Repairing Our Relationship with the Environment

Bilge Merve Aktaş

1 From Sheep to Felt

Wool has been one of the main raw materials of several textile crafts thanks to its fibre-based structure. When wool fibres are under various forces, such as pressure, friction, and heat, they tangle with each other, creating a mixed-up mass (Fig. 1). Although wool's ability to entangle is undesirable for some craft practices, such as weaving or knitting, it provides the main conditions for felting. Essentially, felting is an act of manipulating the entangling of wool fibres into the form of an intended artefact. While creating this planned entanglement, makers first disentangle the fibres by carding and lining them in a parallel direction, later to re-entangle them into a felted mass and the desired shape.

Although there are systemic ways to make felt, the tangling of fibres can occur even from the everyday wanderings of sheep. Indeed, felting as a craft practice was probably not invented but discovered. Although this history is unknown, one of the myths suggests that people started inserting wool into their shoes to keep their feet comfortable and realized that the wool became felted after they walked for a while (Thompson, 2011, p. 56). The warmth and the friction from walking provided the right conditions for fibres to be felted. After humans recognized this transformation and realized that this experiment could be repeated, the perception of wool in daily life changed, and it initiated our current relationship with sheep hair as a textile material. Early attempts to make felt might have been mimicking these forces by rubbing the wool between the palms to unify the fibres and create a surface. Over time, humans have also developed tools to facilitate and quicken this process, resulting in variations of relationships with wool and felt making.

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Fig. 1 Different wool types: (1) uncarded, uncleaned short wool with big curls from Finnish sheep, central Finland, (2) uncarded, cleaned, long wool from white Karaman sheep, southern Turkey, (3) uncarded, uncleaned short wool with small curls from Finnish sheep, central Finland, (4) carded, cleaned wool from white Karaman sheep, southern Turkey, (5) uncarded, cleaned, curly wool from purple Karaman sheep, eastern Turkey (Aktaş, 2020)

By observing the behaviour of wool and engaging with it in different ways, humans could explore its various capacities. Being with materials in different conditions and situations revealed multiple behaviours of the material and brought various possibilities for maintaining and developing relationships with them. In this chapter, I will present the human–material relationship with examples of felting to discuss how the ecologies of making and material merge while making. The four studies present different kinds of coupling between the maker and wool that can lead to creating the form of an outcome, discovering wool's natural environment, reviewing everyday material engagement, and understanding the material's impact on developing one's own craft practice. Through these findings, I propose that when humans entangle with materials and follow their flow, they can gain a mindset for participating in the world in harmonious and responsible ways.

2 Being with Materials

Materials, or things in the world, can act differently under various conditions as a result of their properties. These properties sometimes facilitate certain actions while limiting others, thus creating resistances. For instance, while cold water only wets the wool, hot water shrinks it. In a way, when wool is rubbed with cold water, there is a resistance towards felting since the cold opens the intermolecular space insufficiently for a strong hooking among fibres. While making an artefact with a preconceived

idea, one way to accommodate these resistances is to redirect the goals of humans as the interaction continues, as sociologist Andrew Pickering (1993, p. 579) suggests. The change in goals can lead to changes in thinking about materials that can affect human activity on general levels. Through discovering ways to accommodate these resistances, knowledge, technology, and interactions have been constantly emerging (Pickering, 2005), increasing the capacities of humans to control materials. However, these enhanced human abilities and capacities have over-empowered humans and enabled them to override the capacities of other things that exist on earth, including organisms such as animals and plants, as well as mineral-based forms such as rocks and soil. Currently, we have become the species that dominate the world, one that utilizes other entities from the perspective of merely human needs. One reason for this is that the relationship between humans and other things has become a hierarchical one. With their over-empowerment, humans have exploited those entities that are beneficial for them while destroying others that they cannot relate to immediately. By experiencing the material resistances and struggles as an intrinsic value for co-existence this relationship can be reviewed, and our relationship with the material world can be repaired. This repair is needed to maintain not only human life but any life on earth.

Recognizing material behaviour and resistances is one way to reflect on the relationships with materials. Cognitive archaeologist Lambros Malafouris (2013) proposes that humans shape how they think in the extended physical space where they engage with materials and the environment. Theories related to human cognition, such as embodied cognition, propose that although the human brain is in the body, the mind is extended to the environment and shaped through interactions in and with the environment. The environment and what it contains actively and causally affect human cognition and behaviour (Clark & Chalmers, 1998, pp. 8–9). Through affecting and being affected by it, the human mind and the external world constitute each other (Knappett, 2002, p. 88). The mind and our actions are shaped through constant interactions between the environment and our perception.

In the context of artistic experiences, pragmatist philosopher John Dewey (1934/2005, p. 22) proposes that interactions with the environment provide communication between self and the environment. Therefore, we think along with the environment and what it contains. Through thinking with materials and recognizing their intimate relationships with things and materials, humans can treat them responsibly rather than merely instrumentalizing them for producing artefacts.

Materials exist independently of humans. For instance, wool exists through sheep and it has biologically evolved to facilitate its interactions with the world. Thus, wool gained its properties in relation to sheep, and this leads to various behaviours when a maker felts with it. Similarly, other materials also embed vitality, and their movements create causal consequences, independent of human actions (Bennett, 2010). By understanding the material, how it exists and what it can do, humans can develop versatile ways of thinking and interacting with materials and generate various experiences with them. For instance, wool can be felted to create a compound surface by pressuring the lump, or it can also be turned into yarn and woven into a surface with holes by spinning the fibres around each other. These two forms of wool

are results of the material's flexibility and at the same time its sturdiness. Although these two capacities are intrinsic to the material, they might be recognized at different times depending on the condition of the fibres, whether they are lined up in the same direction or entangled randomly.

Recognizing the existing features in the present moment brings new perceptions and builds a basis for further understandings of materials or things (Dewey, 1934/2005, p. 50). Our intentions and ways of understanding the craft practice, or even the world, are constantly shaped and conditioned by our interaction with materials and non-humans. This also brings ever-changing relationships with materials: as we start thinking with them we start recognizing various possibilities. Building conscious relations can be perceived as caring for the participants of the relations. Maria Puig de la Bellacasa (2012, p. 198), feminist theorist and environmental humanities scholar, proposes that caring and relating "involves material engagement in labours to sustain interdependent worlds". This togetherness affords multiple ways to co-exist.

This renewed understanding can facilitate a desire to repair a broken or injured human–environment relationship. Having direct contact with materials and experiencing their movements and resistance can facilitate a shift in our relationship with the materials, from a dominant and human-centred way of thinking to finding harmony between various components of the world, such as humans, other animals, plants, and wool (Aktaş & Groth, 2020). In this togetherness, the agency of the human, such as their actions and intentions, entangle with the movements of the material and their ability to transform and make a change in their surroundings. To exemplify the argumentation, I will present four studies in the case of felting and discuss how crafting can influence the human–material relationship.

3 Examinations of Wool and Felt Making

In my recent doctoral research stemmed from felting processes (Aktaş, 2020), I presented ways of co-existing with wool from four angles: moving the body with the material, ideating for an artefact with the material, relating to the world with the material, and participating in a craft field with the material. The studies were designed in different settings and were therefore conducted via different methods. These methods included practice-led research and ethnographic methods such as participant observation (for a detailed explanation of how these methods were implemented, see Aktaş, 2020, Chapter 3).

In the first study, I observed how expert felt makers move their bodies as the material transforms. While felting, the fibres move in various directions. Often, the shape of an artefact is initially unsymmetrical or in a form other than that desired. The maker needs to evaluate these shapes in the process of making and move their own body in the right direction to create the desired form (Fig. 2). A step-by-step examination of this process revealed that it resembles negotiation: while making, the

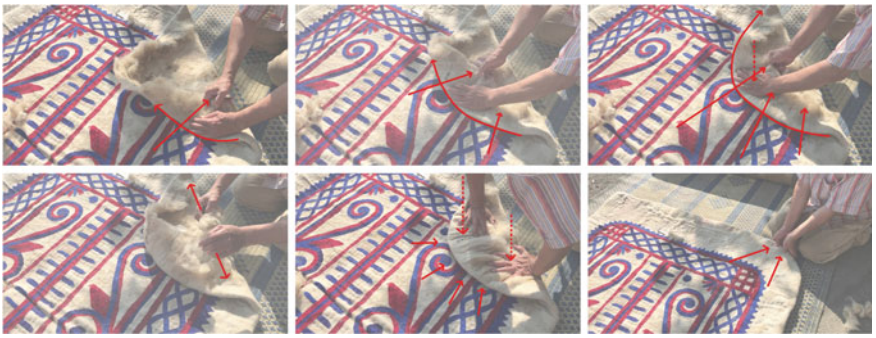

Fig. 2 The maker follows the movements of the material (Aktaş, 2019)

maker needs to re-evaluate their initial ideas to find ways to accommodate the material's movements. This evaluation continues during the making process by changing the maker's intentions-in-action in contact with the material. The first study revealed the process of accommodating the material's resistances and presented the embodied material thinking of makers by revealing the steps of dialogical making. This examination also re-defined the practice of felting by already acknowledging the material's movements before making began.

In the second study, I examined my own making process as an emerging felt maker and followed the material's movements and qualities to make an artefact. After recognizing how my thinking was changing with the movements of the material, it became an ethical concern for me to visit where wool comes from. By visiting a sheep farm, I began the dialogue of making from the origins of the material rather than from the design studio.

Being with sheep reminds us that wool is part of a living creature (Fig. 3). Hearing the names of sheep and how *their owners* care for their wellbeing changes the idea of material as dead matter stored in the shops. This visit positioned sheep as an important partner of the practice, despite them often being invisible.

Although different breeds grow different amounts and types of hair, on average sheep can grow 1.5 kilogrammes of wool per year. The wool typically is allowed to grow during the winter to protect sheep from cold weather and is shorn during spring to be collected as material. The year-long process of growing the 1.5 kg wool can be purchased online in a few minutes and turned into a small rug in the size of 0.75 m^2 with 2 mm thickness through wet felting by hand for approximately 10 hours (for different scales see also Aktaş & Valle, 2021). This comparison shows the regenerative timescale of wool and the timescale of using the same amount of wool for making an artefact. Recognizing this slow process of material growth allows understanding that this material is not endless, but it grows together with the sheep, and in order for us to make felt we need this slow process of waiting and care. During Study 2, building a relationship with sheep and recognizing the lifecycle of the material changed my attitude as a craftsperson towards the material, allowing me to appreciate its vitality and its life cycle, as well as to question the exploitative system

Fig. 3 Getting to know wool by being with sheep (Aktaş, 2021)

humans have created around it that can produce tonnes of wool per year, most of the time for human benefit only. Furthermore, by visiting the origins of the material, I could grasp the ecology of the material fully, and gain a basic understanding of its existence, independent of humans, in a way that can change the meaning and value we attribute to it.

As I was becoming more aware of wool's life, I also began to pay attention to its features by studying the curls, lengths, and forms. Following the entangling of fibres, I made artefacts with felted and non-felted parts. I worked with wool not as a chunk of fibres but focused rather on each individual fibre to sense their movement in my hands and study the various colours and curls of wool that different sheep breeds grow (Fig. 4). Examining this singularity and observing its transformative change into plurality provided a new perspective on the material.

Another important insight concerned the role of the working environment where felting was performed. Spaces are arranged or organized in certain ways to afford certain actions or practices while limiting others. After Study 2, I extended the understanding of the making process that starts from the material's environment. This restarted the dialogue with the material and allowed me to acknowledge the natural properties of wool, such as lanolin, the wool oil. This dialogue provides a lens that does not diminish the unwanted qualities but embraces them in getting to know the material better. Accordingly, the material became a partner, one that I as a maker needed to stay in contact with while making and developing ideas.

Fig. 4 Experiencing movements of each fibre with a hand-carding tool (Aktaş, 2018)

As a further step, I examined how *making with materials* can become a method to bring new insights to everyday material engagements. For this examination, I collected data in a course that a colleague and I had created called the human–material interaction course. In the course, we asked the students to explore the behaviour of wool and clay. The study participants, university students who were novices in working with those materials, were asked to study the materials' movements and to reflect on their experiences with the material in their process diaries. During the course, they made test pieces and artefacts to explore various behaviours of the materials and what can be done with them. The participants followed a dialogue-like relationship with their materials rather than starting their processes with preconceived ideas. Their changing perspectives related to materials and their resistances made them question established human-centred attitudes towards materials as only used for meeting an expected end. Also, through theoretical discussions, the participants explored the human dependency on materials and expanded the meaning of material in a way that could be applied to other everyday material engagements. During the study, the participants began reviewing their other daily experiences to reveal how materials were shaping certain situations that they were part of. Correspondingly, they started pondering upon collaborating with materials and recognizing their resistances as ways of building more sustainable relationships with materials in their everyday engagements. This was proposed by students on the personal level, such as how they changed their understanding towards their material interactions, and on the environmental level, such as how they understood the scale of the environmental impact that everyday personal material interactions create. These are values that can potentially lead to behavioural change in other contexts, too. This brought the idea of 'being *with* the world' that relies on being with materials in more interactive ways to critically review everyday material engagement from personal, societal, and

environmental perspectives (Aktaş & Groth, 2020). The notion of 'being with the world' suggested understanding ways of interacting with materials to find a more responsible way of participating in continuous changes (Fig. 5).

In the fourth study, I examined ways of participating in the field of felting by investigating felt makers' processes in their working life and their use of various wool types. Following the material's impact upon felt makers' everyday practices and decisions demonstrated the material's power to shape the entire domain of felting

Fig. 5 One student worked with the soundscape created by her movements and the material together (Aktaş, 2019)

and ways of participating in it. This study shed light on the maker-material unity besides the actual practice of felting. After interviewing eight felt makers about their experiences related to their felting practice, I mapped how they identified their practice in relation to various elements, such as material, the marketplace, collaboration between other makers and stakeholders, and attachment to the practice. This examination showed that the meaning of the material, processes, outcomes and the experiences of the maker develop over time and are constructed as the interaction with the material continues alongside the actual making process. By looking at various ways of being a felt maker, such as having an artistic orientation or following family traditions, this study revealed the multiple possibilities that the material proposes. For example, several felt makers stated that they started practicing felting in their father's studio by working with local wool with thick fibres. This wool kind creates a harsh feeling on the skin and is therefore mostly used for carpet making. However, through collaborating with designers, many craftspeople familiarized themselves with thin fibred wool. Recognizing the softness and better sensorial experiences that thin fibres provide encouraged many of them to discover more possibilities with this kind of wool in the local context. This experimental approach led some makers to start a new practice of material generation through selecting thin fibres from local wool, while some of them started making finer and thinner mats and garments with the newly available soft wool. This change in their practices also changed their target group. This also showed that the field, the practice, and the material are fluid, and that they are constantly becoming their other versions.

The findings from the studies were related to different aspects of interacting with materials. Although they can be grouped for focused explorations, all four studies and their findings were interwoven and informative for the development of the following steps. Building upon these findings, in the next section, I will discuss the dynamic relationality between materials and humans and propose crafting as a way of repairing our relationship with the environment.

4 Discussion

Although the findings from the studies are all interwoven and a clear separation is not entirely possible, in order to have a structured discussion they can be grouped into four main themes based on their relation to the practice, material, perception and environment (Fig. 6). The grouping also helps to highlight the abilities of the maker and the material and how the coupling of these abilities can propose ways of participating in the world more responsibly.

Practice-related findings proposed re-defining our abilities and actions in more flexible ways. Through crafting and experiencing different ways of engaging with materials, humans have enhanced their agency. By recognizing that human actions are shaped by non-humans, both creative and general practices can be defined more widely and inclusive of this continuous interaction. For instance, in this research, the definition of felting was changed to *dis-entangling wool fibres first to re-entangle*

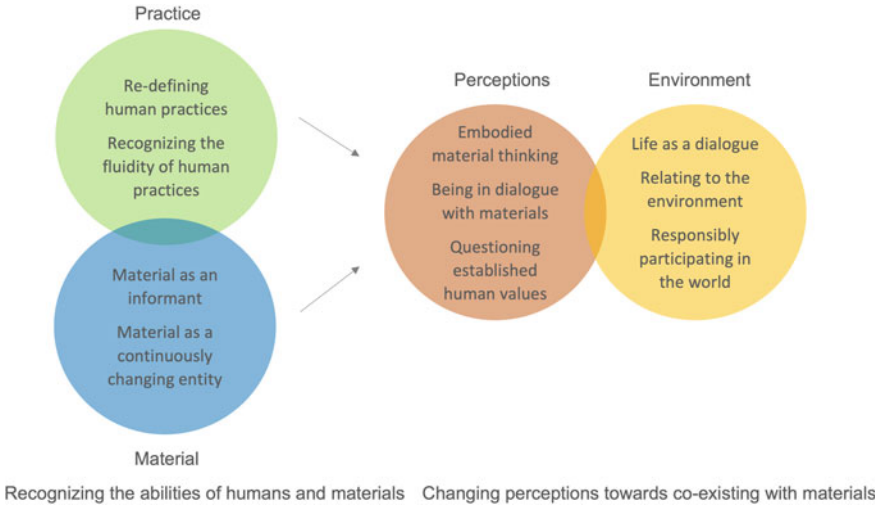

Fig. 6 The findings from the studies propose new understandings of practices and materials which can change perceptions towards co-existing with materials (Aktaş, 2021)

them into another form (Aktaş, 2020, p. 78). Studying the origin of the material showed that wool is already tangled while it is still part of the sheep. However, this tangled mass has no organization, which limits the creation of a unified surface. To be able to manipulate the fibres and create a felt artefact, the maker needs to first dis-entangle the fibres and then re-entangle them. This understanding recognizes that the material is already in a process of forming even when there is no human contact. This renewed definition brings an understanding that acknowledges the material's ability to act without humans and to shape human behaviours.

Material-related findings similarly proposed re-viewing the role of the materials. The research began with the case of felting. As focused examinations continued, first I focussed on the wool as a whole, then later the fibres. Recognizing the small units of an entity presented different ways of being for the material, such as wool wandering on sheep or being in the studio. The studies propose that materials and things participate and lead humans in situational ways. In relation to their environment and the changes in human perceptions, materials propose various potentials to work with them. Recognizing this brings a new perception of materials that is defined not necessarily based on human actions but based on interdependent processes that emerge through human–material entanglement.

How we understand and identify our practices, knowledge and experiences is not only biological but also cultural and social (Haraway, 1991, p. 102). Thus, observing how our relationships are changing presents crafting in new ways for adapting to changing situations and letting ourselves *become* with those situations instead of fighting against them.

Embracing a *crafting with materials* attitude introduced new ways of understanding the practice and the material. These realizations reveal ways to relate to

the world by challenging the existing ***perceptions*** and by re-conceptualizing ideas about experience and co-existence. Often, an experience delivers an outcome; yet, how we reach an outcome and how we perceive it, for instance as a fixed product or as an ever-changing unfinished partial entity, can significantly affect the perception of the world and our place in and with it. For Dewey (1934/2005, p. 45), an experience is a process with a beginning and end that "continues until a mutual adaptation of the self and the object emerges".

Since we are constantly in communication with materials, our entire existence can be seen as an experience that unfolds like a dialogue between humans and the environment. Therefore, not only our making processes but also everyday engagements with the world resemble a dialogue forming mutuality. We become a part of ongoing movements for a certain period, which is our lifetime. The movements of things that are not human continue before and after human participation in it. Therefore, we need to listen to what the other parties are saying to bring about a productive exchange. This requires entangling with materials and the environment that they come from to form a unity with them.

By changing the perceptions of practices, materials, and interactions, we can develop a new sense of caring for the material and its ecology in order to renew our ***relationship with the environment.*** When working with materials as active entities, makers can begin perceiving the materials in their situatedness, in their own ecology. This can present ways of merging the ecology of making with the ecology of the materials. Ecology is the "interconnected series of parts" that are constantly changing as a result of the movements of its elements (Bennett, 2010, p. 97). In this conceptualization of ecology, the organism evolves following its environment (Pickering, 2005, pp. 180–181). Thus, reflecting on human–material interaction reveals that we share our ecology with materials, and the making process is not separated from the origins of the material. Recognizing our intersecting ecologies can extend the dialogue of making to a dialogue with the environment and the world.

5 Entangling with Materials

When we craft with the attitude of *making with materials*, we can recognize that neither practices nor the material are static. Rather, these entangle dynamically and can emerge differently depending on the ways of engagement. This recognition requires an understanding of the materials in their context. For instance, understanding that wool is a part of a sheep, that it protects the sheep's skin from sunlight, and that it possesses the ability to absorb UV can suggest wool as an excellent filter also for humans (Millington, 2006). By understanding materials in their own context or ecologies, we can perceive our relationship with the material and the environment through the non-hierarchical lens of togetherness, rather than ownership. This togetherness can start from first-hand experiences of crafting and be extended to everyday engagements with the material world. Craft practice provides concrete experiences of how the harmony between humans, materials and the environment is found and

relayed to our general conception of the world. When making is distanced from the materials, as in industrial production, alienation occurs towards the environment (Annusas & Ingold, 2013). Small scale crafting can overcome this alienation as it offers direct engagement with the materials in their situatedness.

Building an intimate relationship with the material through crafting also builds an intimate relationship with the ecology of the material and the environment. Due to this relationship, a form of care emerges: the maker cares about the material, where it comes from, how it was collected, and what happens to it after it leaves the studio. The care-*ful* relationship can entail taking action to get closer to the raw material and to repair our dialogue with the world. The closer we get to the raw material the more entangled we might become. I wrote in my research diary after working with raw and processed wool that:

> While working [with the raw wool] I realized that in every step of selecting, carding, cleaning, felting the wool, … in the artefacts that I made I touched every fibre … This communication doesn't exist in [industrial] design. … the feeling that the wool leaves on the hands is interesting, especially in the cleaning and carding phases. You feel like your hands are dirty since they are covered with a thick oil layer. The oil of wool. … So, you stay with [the raw] wool. This doesn't happen with the processed wool. Since that wool is cleaned, there is only the feeling of wool, not necessarily the feeling of its natural properties. That's why I could think about other stuff when making. With the raw wool I couldn't, even the studio had its own personality and existence, and you were adapting to it. (From field notes 13.09.2017)

Being in contact with the raw material enables building a direct relationship with the material's environment: for instance, the bio-waste and sheep oil build a sensorial relationship with its world (Fig. 7). Anthropologist Tim Ingold (2007, p. 15) suggests following the *history of the material* to understand how it has been becoming with its surroundings. In a way, the raw material presents its history with the things that it contains. Parts of this history, or parts of the wool's world, are usually overlooked and easily discarded without even taking a moment to ponder on what the ecology of wool contains (Fig. 8). Although reflecting on the *waste* might not change an artefact, it can change the process of making it and the experience of being with the material by fully grasping the ever-transforming existence of the material. Thereby, the material is not displaced from its history or ecology, but it is understood together with them. This approach can connect people with the material's environment.

Through entangling, a meaningful unity between humans and materials is generated and we become one with them. Human abilities are put into action through this unity. Although I discuss humans and non-humans as separate notions, they are inseparable entities that to a large degree require each other's existence for their own existence. However, employing the notion of non-humans highlights the strong kinship and the shared ecology that continues with the involvement of humans, sheep, wool, sunlight, air, and many others.

The discussion on humans being dependent on non-humans and not being independent on their own raises questions about the roles and responsibilities of humans. When discussing the continuity of experiences, Dewey (1934/2005, p. 15) proposes that a meaningful interaction occurs when continuous stability is found in flux. I

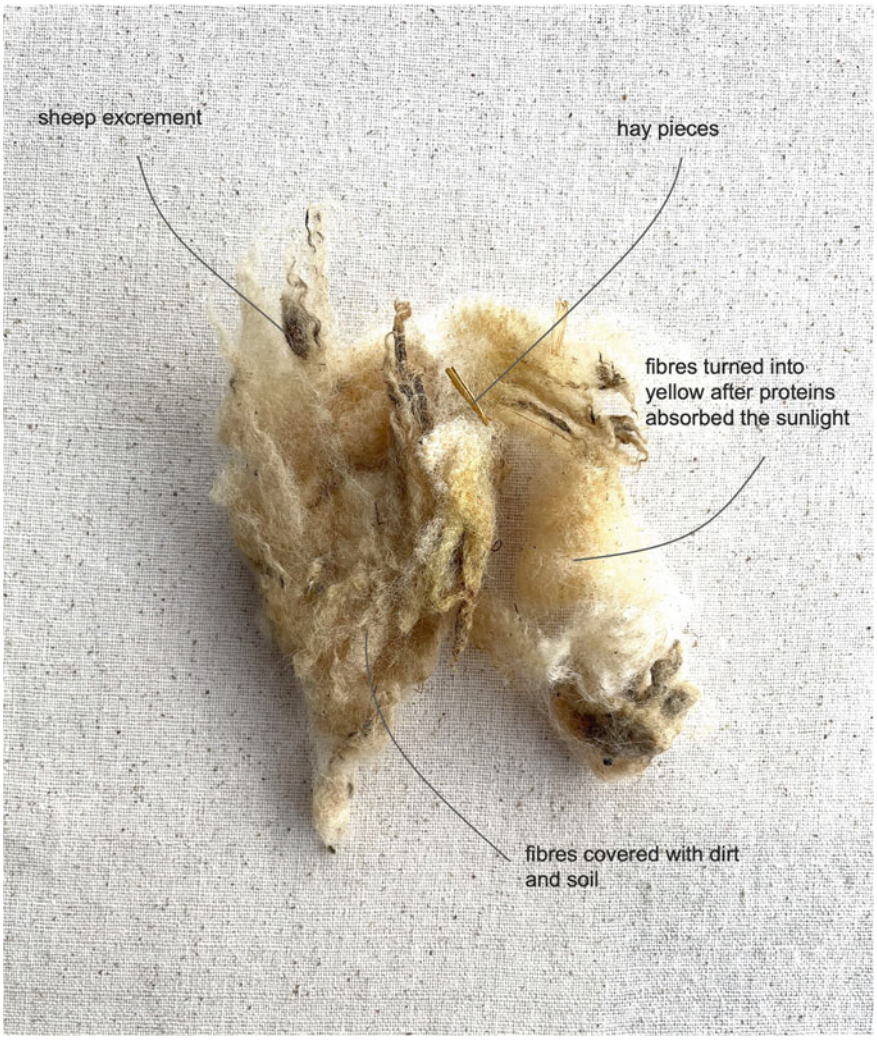

Fig. 7 Wool comes with its own world (Aktaş, 2021)

understand Dewey's proposal of stability as the *harmony* between human and material: leaving room for the material expressions brings a level of balance, harmony, or stability in our coupling with the world. This harmony in the flux occurs when human beings are acting *with* materials, rather than acting *on* them.

Studying craft making processes as building caring relationships with materials and their ecology proposes that the process of making begins even before the participation of humans. Craft making can be understood as a reflective act of the unity between humans, materials and the environment to participate in a worldly dialogue. The intimate and close relationship that crafting builds between craftspeople and

Fig. 8 What is lost from the wool's world after being washed and hand-carded for felting (Aktaş, 2021)

ecologies of materials provides the right conditions for critically thinking about the extent of our behaviours and their impact. By highlighting this unity and through concrete experiences, the reflective practice of crafting can become an act of caring that can repair our relationship with the environment: we are the environment, and disregarding what happens with it means disregarding what will happen to us in the future. Repairing as an act of care is also a way of showing empathy towards the things that need to be repaired. Thus, through crafting, we can repair our broken relationship with the environment and recognize that dominating the material or the environment is not the only way to exist in the world.

Acknowledging active changes and positioning the self in relation to others can bring an entangled perspective and can result in developing (personal) behavioural change towards a repair of our relationship with the environment. Acknowledging the entangled relationship between humans and materials brings an ethical consideration

and requires a renewed sense of responsibility towards the environment and our place in the world. In an entangled situation, fibres, or the things that entangle, form a unity. They act together but can move separately. Sometimes they are in individual forms but not disentangled from each other entirely.

Implementing this renewed role of crafting within arts, crafts and design education can also change the approach of future professionals to their practice and its influences. Instead of merely focusing on outcomes, acquiring an attitude of *making with the material* can move the practitioners' focus from what is merely beneficial for humans to what is right for humans, the environment, and its many ecologies.

Finding harmony in the human–material relationship promotes responsible participation in this entangled situation, thinking with materials and caring for the environment. Working with materials in their own ecology contextualizes our dialogical and caring relationship. Through crafting, we can gain ways of participating in this dialogue to create a better future.

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Bilge Merve Aktaş is a designer, researcher, and educator. In her creative practice, she works and experiments with raw wool as a thinking tool. In her doctoral research (Aalto University, 2020), she examined human–material interaction from the perspective of material with studies in felting. She is continuing her research with wool by focusing on material's performative power and its role in relating to the environment and the world. With her research, she is promoting crafting as a way of thinking with materials to offer new ways of approaching bigger societal and environmental problems. Some of her research interests cover topics such as materiality, textile crafts, nonhuman agencies, the human–environment relationship and practice-led research. Currently, she is working as a post-doctoral researcher at the Department of Design at Aalto University, Finland.

Crafting in Dialogue with the Material Environment

Maarit Mäkelä

1 Walking with the Environment

I walked along the secret beach to which the local ceramist had taken me: he wanted to show me a special place that was part of the environment he lived in. The beach was constructed from volcanic soil matter of varied forms, sizes and colours. When I touched it, I sensed its solid structure and weight. The colours varied from different hues of white to grey, and from yellow through red to purple. I was speechless due to the beauty of the place. At that moment, I understood the aesthetic quality of the environment from which the aboriginals had sourced their iron-rich red colour ochre that they used extensively in art and craft making. I could also relate to the dialogical relationship with the environment that has always been an elemental thread of their life.

This was an experience some years back that laid the ground for my creative practice that was about to take place in Australasia, specifically Tasmania and New Zealand. As a Finnish ceramic artist, this new environment opened up inspiring new avenues for my practice. During the year I spent there, I started a dialogue with the local environment and materials that were essential to my professional practice as a ceramist. Because of their volcanic nature, Tasmania and New Zealand offered diverse raw materials that could be used for ceramics. The mineral composition of these materials varied depending upon the place from which they were gathered. The core of my creative practice was the natural environment and the earth samples—sand, stones and clay—that I gathered during my walks. The materials were processed further in the studio and then used as raw materials for ceramics.

During my formal education at Aalto University (formerly the University of Art and Design Helsinki) in early 1990s, I gained deep knowledge about soil-based

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matters and related techniques. Following the traditional teaching methods in the field of ceramics, I conducted systematic experiments on the melting behaviour of different material mixtures and the resulting surface transformations (Mäkelä, 2020). During these studies, I was already exploring natural materials in their surroundings and subsequently testing their suitability for ceramics. Since then, I have taken the practice further by refining and adapting the systematic experimenting approach in different locations and contexts.

While in Tasmania, walking emerged naturally as an elemental part of my everyday life, subsequently constituting the core of the creative practice through which I began to explore the local surroundings. Walking created a solid, multi-sensory experience via which the moving body perceived its surroundings through seeing, hearing and smelling (see also Triggs et al., 2014). This was also a movement that stimulated the entire body, letting the mind follow unexpected mental routes (Mäkelä, 2016). Aptly, walking has been understood as a deeply meditative practice: a journey in the mind as much as on the land. This journey is enabled via our senses, which maintain a constant traffic between the terrains of the mental and material (Ingold, 2010, p. 18).

In my case, walking resulted in 'discoveries' and sample gatherings, but walking with the environment was also a way of thinking-in-movement (Springgay & Truman, 2018, p. 130). In this way, walking intertwined an elemental part of my creative practice, generating inspiration as well as materially-related philosophical ideas and concepts (Mäkelä, 2019; Mäkelä & Aktaş, 2022). Richard Long, one of the pioneering artists whose practice has revolved around walking, connects walking to creative thinking by voicing that "a lot of ideas come while walking, or when sitting down to rest. The landscape puts them into your head" (Fuchs, 1986, p. 43). Walking is also a means to acquire intimate knowledge about the place, much more deeply than one would arrive at by merely looking. In this sense, walking can also be conceived of as an intensification of perception (Fuchs, 1986, p. 99).

In this light, it is not surprising that Social Anthropologist Tim Ingold (2004) conceives of walking as a form of circumambulatory knowing and, as such, a highly intelligent activity. It is specifically through our feet, in contact with the ground, that we are most fundamentally and continually 'in touch' with our surroundings. Accordingly, he believes that it is both the hands and feet, augmented by tools, that mediate the historical engagement of the human organism with the world around it (see also Mäkelä, 2019).

In the following, I further the dialogical relationship between human and environment in the context of my own craft practice back home in Finland. As explained above, the seed of the practice was already laid down some time ago in Tasmania. Lately, I have also applied a similar practice when working with soil that has been contaminated by human acts. In these endeavours, I have handled processes where the natural and cultural spheres of life have intertwined in diverse ways (Latva-Somppi & Mäkelä, 2020; Latva-Somppi et al., 2021). Thus, the focus of the making has revolved around the complex and entangled relationship between human and nature via crafting in the context of soil. In my current practice, I extend my collaboration with non-human actors by sourcing soil matter from under fallen trees. These

Fig. 1 Gathering soil under a fallen tree, Sipoonkorpi, Finland, 2020 (Photo: Pertti Mäkelä)

are the trees I have recently encountered around the place where I live—that is, the Greater Helsinki area, Finland (Fig. 1).

By discussing the creative practices I have lately conducted, I am in fact evidencing a subtle transformation in my creative thinking and making. The realisation of widening perspectives to include more-than-soil has shifted the focus of attention from the solely mineral composition of the soil to more holistic perspectives. In this chapter, craft making is understood as an embodied practice through which to profoundly (re)consider the relationship between human and non-human realms: a sensitizer that helps us in realizing and appreciating the non-human actants around us. In this respect, crafting is seen as a catalyst in realising the importance of the caring acts we need to take and persistently maintain towards the non-human world.

Next, I will discuss on a general level the relationship between a craftsperson and the material world, especially how the maker is able to identify the types of matter that might be productive for her creative practice. After that, I will provide an account of my own creative practice, through which soil matters are processed further and used as part of the ceramics making. Finally, I will relate the case to the wider discourse whereby humans are understood to play a critical role in planetary wellbeing and survival.

2 Encountering Creative Materiality

The political theorist and philosopher Jane Bennett (2010, p. 56) discusses the concept of materiality at the interface of the human and non-human physical world. She proposes that, instead of a formative power detachable from matter, a craftsperson

encounters a creative materiality with initial tendencies and propensities, which have the capacity to be combined in a variety of ways. The direction in which this power takes the creator depends upon the types of other forces, affects, or matters that are present in the process, or bodies with which they come into close contact. Through her writings, Bennett challenges the perception of materials as inert substances and proposes that materials can significantly influence human thinking and actions (see also Mäkelä & Aktaş, 2022).

Philosopher Ingar Brink and psychologist Vasudevi Reddy (2020, p. 13) take the idea seriously, claiming that the craftsperson's emotional and dialogical engagement with materials constitutes a primary means for making sense of the animate and inanimate, and the world at large. To be able to develop a deep understanding of the specific material, the craftsperson has to be sensitive to the non-human material world. In such a creative process the craft person perceives the material as having an active role. As cognitive archaeologist Lambros Malafouris (2008, pp. 22–24) proposes, the question does not concern a property or possession of humans or non-humans but the relational and emergent product of material engagement that has to be realised.

Craft researcher Glenn Adamson (2018, p. 4) discusses the dialogical engagement by using the term 'material intelligence' which he defines as "a deep understanding of the material world around us, an ability to read that material environment, and the knowledge required to give it a new form". When describing the act of crafting, he describes how the person puts her whole self into it, relying on whatever skills she has acquired over the course of her life (Adamson, 2018, p. 16). Furthermore, he conceives that the very concept of materiality can be understood as a meeting point, where raw matter and human purpose align. In fact, *matter* becomes a specific *material* only when its potential is realised and put into action (Adamson, 2018, p. 155).

My own creative practice rely on a strong conceptual idea and artistic expression. It is based on a modest amount of local materials and a selection of simple tools, such as a wine bottle that acts as a roller, knife, sticks and brushes. For me, the primitive way of working has been an ethical choice as in this way my craft practice leaves the smallest possible ecological footprint in the environment. I conceive this to be in line with the emergence of craft heritage and indigenous people's knowledge: the time when humans started to make artefacts from the materials they found around their local surroundings.

Ecological matters have also become central within the entangled field of art and research (Arlander & Elo, 2017), where the discourse of moving beyond the human centric perspective has become one of the fundamental issues. Until recently, the world has been distributed into mineral, plant and animal kingdoms—the chain of beings where stones are conceived as being at the bottom and humans at the top. The traditional layered hierarchy has consequences also for how we understand the relationship between organism and environment (Arlander & Elo, 2017, p. 340). I recognise that even if I try to act as a conscious and caring craftsperson, this is the very attitude that I am applying when sourcing materials from nature.

Currently, the anthropocentric narrative that has underpinned our view of human-in-the-world since the enlightenment—a view that posits humans as makers of the world and the world as a resource for human endeavours—is profoundly challenged. It has become evident that the idea of the world as a passive resource for use by active humans is no longer sustainable (Bolt, 2013, 2–3). The shift is accompanied with critique of global capitalism, including its instrumental manner of dealing with planetary resources and other things that share their resources with humans (Arlander & Elo, 2017).

During recent years, the discourse around the relationship between human and non-human actants has become more complex. Many who contribute to the discussion from critical or speculative perspectives (e.g., Haraway, 2016; Puig de la Bellacasa, 2017) agree that there are no clear answers, instead new perspectives and questions that need to be considered properly. Via my creative practice, that sits in the intersection of art and research, I contribute to this urgent discussion—even though I apply in my making practices that (still) follow the human-centric narration. This concern is one of the complex issues that will remain without answer in the chapter, but, to use the wording of science scholar and feminist theorist Donna Haraway (2016), I am aware that I just have to stay with the trouble.

Since encountering that soil matter in Tasmania, I have used walking as a method to dwell in the environment, to sense the aesthetic quality of the local environment and to understand what kind of potential soil based materials can offer to my craft practice that is based on the manipulating of soil matter. As already explained, walking has slowly become an elemental part of my creative practice. Especially when walking in nature, I tend to observe soil matter inherently as I go. In the autumn time, I tend to go to certain forests to pick mushrooms. Recently, I changed my site slightly and perhaps because of the new environment, my sensitivity towards the place around me was deeper than usual.

When visiting the new place for the first time, my attention was directed towards the fallen trees that populated the forest. By looking at them carefully, I could see that the roots had revealed the soil that usually remains hidden under the trees. I found the soil matter—or to be more explicitly the combination of sand, stones, clay, plants, sticks, roots and mycelium—extremely captivating. After my second visit to the site, I documented the event in the diary as following:

> I was picking mushrooms in Sipoonkorpi, the outdoor district that is next to Gumböle and Storträsk. I was in the area for the first time two weeks ago. Already then I was struck by the trees that the wind had torn from the earth. They lay fallow in the ground, and the roots revealed the soil beneath that once had provided ground for the trees to grow in. These trees were left in the forest to decompose, following their own natural life cycle. (Maarit Mäkelä, working diary 11 October 2020)

I examined the fallen trees more closely—or, to be more specific, the soil underneath their roots—and ended up taking samples from the clay and sand-bearing soil that I found in this unexpected place. The two visits to Sipoonkorpi were followed by three visits to Haltiala (Fig. 2), near my home. During the subsequent trips, the main purpose of the visits was to investigate the features of ecological life that take

Fig. 2 Root system underneath a fallen tree, Haltiala, Finland, November 2020 (Photo: Maarit Mäkelä)

place around roots. In the working diary, I reflect upon the first visit to Haltiala as follows:

> The mixed forest that grows in the area can develop at its own pace, unaffected by humans… In a primeval forest it is forbidden to gather any samples or materials, thus I concentrated on scrutinising the fallen trees, especially the soil that I found around the roots—or in fact the ecosystem that was built up from different organisms… Compared with Sipoonkorpi National Park, the trunks are remarkably greener and their surface is populated by a huge amount of polypore and fungi. According to info table, 50 species of polypore and 200 beetles inhabiting the area, of which many are dependent on rotten wood. (Maarit Mäkelä, working diary 18 October 2020)

After leaving the small primeval forest area in Haltiala, I gathered some soil from under the fallen trees that I found nearby, outside the protected area (Fig. 3). These collections were taken to my studio, where they were processed further to be able to see how the soil might serve as a part of ceramics making. In the following section, I will discuss in greater detail how the materials were processed in the studio context and, finally, how they were used as a part of craft practice.

Fig. 3 Soil under the fallen tree, Haltiala, Finland, November 2020 (Photo: Maarit Mäkelä)

3 Crafting with Soil Matter

Because the interaction between any living creature and environmental conditions is involved in the very process of living, experience is understood to be occurring continuously (Dewey, 2005, p. 36). Accordingly, the experienced practitioner's knowledge of the properties of materials grows from a lifetime of intimate gestural and sensory engagement in a particular craft (Ingold, 2013, p. 29). As already explained, my personal interest in ceramics making is linked to the longstanding interaction with nature and the various matters that it offers one to work with.

Recently, three decades after my formal studies, I established the *Soil Laboratory* with my study mate Riikka Latva-Somppi. The laboratory was located in the context of the *Soil Matters* exhibition in the Design Museum, Helsinki.[1] The laboratory was surrounded by eight experimental design projects, each of which offered a different perspective on the relationship between humans and soil. The laboratory enabled ceramic artists and soil researchers to reflect on the impact of anthropogenic activity on soil ecologies through their various practices. The aim was to create a space that would aid in understanding the materiality of soil and, furthermore, how it

[1] The *Soil Laboratory* was open from 4 September 2020 to 10 January 2021 at the Design Museum in Helsinki, Finland. The entire *Soil Matters* exhibition was co-curated by Maarit Mäkelä and Riikka Latva-Somppi. See also https://www.designmuseum.fi/en/soil-matters/ (Accessed 18 March 2022).

Fig. 4 A selection of unfired and fired (1000 °C middle and 1020 °C bottom row) test pieces made at *Soil Laboratory* from local soil December 2020 (Photo: Tzuyu Chen)

is entangled with larger, complex systems. During the exhibition period, the space provided a context for three collaborative interlocked projects to emerge: *Soil Stories, Critically Endangered Species* and *Un/making Soil Communities*. In the following, two of the first-mentioned projects will be presented in more detail, as they are both closely intertwined with my own creative practice.

The *Soil Stories*[2] project was a collection of soil samples that were sent to the *Soil Laboratory* by the public from around Finland. The samples were accompanied by information related to their locality: notes, maps, photographs or stories of the place. In the exhibition space, the samples were displayed in the form of a large map that shows their origin in Finland. In their material formation, the soil samples acted as a kind of archive of the Finnish soils, their localities and properties. In addition to the public, craftspeople who worked in the laboratory brought in soil samples to be treated. I assume this was the reason why I ended up collecting the soil samples under the fallen trees: as the practice of treating soil samples was an ongoing practice at the laboratory, it was a good opportunity to get test pieces from the soil samples I encountered—even as an unplanned action as discussed earlier.

[2] The *Soil Stories* project was a collective contribution involving the participation of the public, a geologist, artists and designers, the Geological Survey of Finland (GTK), and the Finnish Association for Rural Culture and Education (MSL). The soil samples were treated and made into the form of ceramics test pieces by designer Tzuyu Chen. See also: https://doi.org/soil-laboratory.aalto.fi/3-soil-stories/ (Accessed 18 March 2022).

With the help of a hammer, ball mill and water, some of the soil samples were transformed into slips. The small test pieces were formed from the local clay that was sourced from the Somero area, Kultela clay pit—the place that has supplied Finnish ceramists with clay throughout history. Each of the test pieces was named according to the place where the sample was sourced (Fig. 4). After that, they were dipped into the slips and fired up to temperatures of 980 °C, 1000 °C and 1020 °C. The results presented the colours and tones that emerged in the firing of these materials. From the samples I gathered from Sipoonkorpi (Fig. 2) and Haltiala (Fig. 3), one sample from each location was transformed into slips. Thus, the slips embody a material marker of the place from where they were sourced: in this case, they consist solely of soil gathered either from Sipoonkorpi or Haltiala, and water.

Soil Laboratory also provided space for the project entitled *Critically Endangered Species*,[3] which was deeply affected by the above-introduced practices related to *Soil Stories.* The starting point of the project was a set of big vases that were built in the laboratory from Finnish earthenware using a traditional coiling technique. The vases were formed by an experienced ceramist, Catharina Kajander, using the same clay that was used for making the test pieces. The moist vases were painted using mainly the slips that were made in the laboratory. The concept of the project was developed together in a group discussion before the *Soil Laboratory* opened.

When starting to develop the motif for the paintings, I made the first prototypes from clay. The result was two coiled vase forms typical for my work: the small bottom of the pot grows dynamically, ending finally in the large mouth. The forms had clearly two equal surfaces, inside and outside. With rubber stamps, I printed the title *Critically Endangered Species* on either the inside or outside surface of the wet form (Fig. 5). The title was later picked up as the title for the entire project that was based on vase making and painting. In the concept developing phase, when reading about the related survey of endangered species (Hyvärinen et al., 2019), I noted in my diary:

> The new theme is circulating in my mind. I would like to paint and… engrave various species that are connected to each other. I do not yet understand the relationships between the species, but it would be good to comprehend the entangled relations of species more in depth. When a certain plant disappears, do the animals whose nutriment this plant is go extinct as well? The CE category (Critically Endangered) is the most critical category of the six categories. Before this was only the RE category (Regionally Extinct), ergo the category indicating those species that have already regionally been extinct. (Maarit Mäkelä, working diary 16 July 2020)

When working in the premises of the *Soil Laboratory*, the concept was applied and developed further with the group: all the motifs for the paintings were selected from those Finnish species that are currently identified as critically endangered. According to the survey (Hyvärinen et al., 2019),[4] the decrease in numbers of specific species

[3] The main contributors of the project were Maarit Mäkelä, ceramic artist Catharina Kajander and Tzuyu Chen. See also: https://soil-laboratory.aalto.fi/critically-endangered-species/ (Accessed 18 March 2022).

[4] The book presents 36,604 species, of which 22,416 were identified as currently threatened. Among these threatened species, 489 species have been listed as critically endangered.

Fig. 5 The first prototype (height 40 cm, unfired) in my private studio with an abstract painting inspired by the critically endangered lichen species *Acarospora oligospora*, August 2020 (Photo: Maarit Mäkelä)

is caused by changes in their habitats. The species that were selected as inspirational sources for the paintings were related in one way or another to land and land-use, such as construction or mining activity.

In addition to coiling the vases, Catharina Kajander also painted many of them. She carefully planned her decoration and sketched the selected species, insects and plants, on the form. She depicts the contour line of the species with delicate details, also applying various decorating techniques interchangeably in her paintings. I painted three of the vases, and their motifs were selected from among the species that enabled me to work with abstract forms: lichen and two types of fungi (Aphyllophoroid fungi and Gasteroid fungi). On the vases, these species are expressed through abstract patterns. When painting, I applied various layers of soil, which creates unique textures on the surface of each vase. As the firing process changes the structure and colour of the clay, the test pieces were used to anticipate the expected final outcome (Fig. 6).

The main point of the *Soil Laboratory* was an open, collaborative creative process during which various research and making practices evolved simultaneously. During the period, eight big vases were finished, although only some of them were fired. After the laboratory was closed, the rest of the vases were fired and transported to EMMA—Espoo Museum of Modern Art where they were exhibited as part of the *Ceramics*

Fig. 6 Painting the first vase in *Soil Laboratory* using the same motif that I created in the first prototype. The name of the lichen species, *Acarospora oligospora*, was also printed with a stamp on the outside form, September 2020 (Photo: Tzuyu Chen)

Facing the New exhibition.[5] For the EMMA exhibition, we also collaborated with the Finnish Museum of Natural History. From their collection, they loaned the original selection of preserved endangered pieces for our installed display—mainly the ones that we had used as inspiration sources for the paintings (Fig. 7).

Through the creative processes described in this chapter, my professional interest has slowly shifted from certain earth-based materials to considering the meaning of the soil from a more holistic, wider perspective. The different meanings related to soil have intertwined in my mind as a complex web that includes social, political, ecological and cultural perspectives. Instead of paying attention solely to the mineral composition of the soil, the creative processes have thrown me towards ethical and

[5] The exhibition *Ceramics Facing the New* was on view at EMMA from 3 May 2021–7 August 2022. The exhibition presented twelve artists and two artist groups. In the exhibition, we worked under the group name *Working with Soil*, which included the authors Özgü Gündeşlioğlu, Catharina Kajander, Riikka Latva-Somppi and Maarit Mäkelä. See also: https://emmamuseum.fi/en/exhibitions/ceramics-renewed/ (Accessed 18 March 2022).

Fig. 7 Critically Endangered Species, 2020–2021. Species Specimen, soil samples and ceramic test pieces painted with processed samples, hand coiled Finnish earthenware painted with slips and soil samples which are collected from various areas in Finland (Photo: Ari Karttunen / EMMA—Espoo Museum of Modern Art, 2021)

caring considerations of the environment we are part of. Because I see this as an important transformation in my thinking and making, I will end the chapter by shifting the focus from my own craft practice to the wider discourse concerning the critical role of humans in planetary wellbeing.

4 Human Caring of Non-Human Matters

The understanding that humanity is an intrinsic part of the environment has recently received increasing attention. The discourse has taken place on different scales: on the one hand the role of humans has been considered to play a critical role in survival and planetary wellbeing (Haraway, 2016; Puig de la Bellacasa, 2015, 2017), while on the other hand the discussion has addressed different scales, matters and forces that together constitute the realm of life (Bennett, 2010; Ingold, 2013).

Jane Bennett (2010, p. 31) reminds us that human agency has always been an interfolding network of humans and non-humans but today this mingling has become harder to ignore. In addition, the geographers Owain Jones and Paul Cloke (2008, pp. 86–87) bring up the need to move away from treating the human realm as separate, privileged and ontologically unique in terms of agency. They propose that we need to appreciate the very differing forms of beings and processes in which they are

articulated, and the very differing velocities and rhythms they might be operating in. Such appreciation could make it possible to acknowledge the different types of agencies displayed by nature and materiality. Bennett (2010, p. 108) adds that we also need "to devise new procedures, technologies, and regimes of perception that enable us to consult nonhumans more closely, or listen and respond more carefully to [non-humans'] outbreaks, objections, testimonies, and propositions". This is since these offerings are profoundly important to the health of the political ecologies to which we belong (see also Mäkelä, 2019).

Due to my background in ceramics, the discourse that has taken place in this chapter has revolved around considerations related to soil. Maria Puig de la Bellacasa (2015), a scholar working at the intersection of science and technology studies, feminist theory and the environmental humanities, understands soil as endangered living worlds. In her recent studies, she has examined conceptual reorientations in the soil sciences and conceives of soil as a living, interdependent community. She is interested in moves that conceive soil as a multispecies world. This is because the shift in the perspective could affect the nature of soil itself, as well as "the ways humans maintain, repair and foster soil's liveliness—that is, the agencies involved in a politics of care" (Puig de la Bellacasa, 2015, p. 12).

Puig de la Bellacasa encourages us to (re)learn traditional farming methods since what may seem slow or old-fashioned can help us see living in an interdependent community with soil as a way of life worth fostering. This will enable humans to reconfigure themselves from soil consumers to soil community members. Via these thoughts, she invites us to rearrange and rebalance the relations between a diversity of coexisting temporalities that inhabit the worlds of soil and other interdependent ecologies (Puig de la Bellacasa, 2015, p. 19).

When thinking through the entangled relationship between the human and non-human world and their shared agencies, craft making can act as a sensitizer that helps us in realizing and appreciating the non-human actants around us (Fig. 8). In addition, crafting can help in understanding the importance of the caring acts we need to take and maintain towards the non-human world. Craft making can be also conceived of as a philosophical space that enables us to think through the ethical and ecological concerns related to the environment. It can also provide an opportunity to practise and nourish the dialogical relationship with a specific environment. Thus, it is an embodied, slow practice through which to profoundly (re)consider the relationship between human and non-human realms (see also Mäkelä, 2019).

Fig. 8 Melanogaster broomeanus (Ryytimantumukula) from the collection *Critically Endangered Species* (2021). Form by Catharina Kajander, painting with earth colours by Maarit Mäkelä. Finnish Earthenware, height 60 cm x diameter 53 cm (Photo: Anne Kinnunen)

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More-than-Human Crafting

Managing Conflicting Desires in a Garden Plant: Crafting with a Variegated Daylily

Tina Westerlund and Katarina Saltzman

1 Introduction

In the historic garden of the Mårbacka manor in Sweden, a particular daylily is silently "talking" to the gardener, letting her know that she needs to act if she wants it to keep its odd appearance. This perennial plant with variegated foliage and semi-double flowers is known as Kwanso Variegata and has a long history of entanglement with humans and their crafting activities. In this chapter we will look into the complex interactions between gardeners and this specific variety of daylily to highlight how plants and people co-create values. By examining the different roles in a plant-human relationship, we reflect on Natasha Myers's warning that a "singular focus on human agency forgets both that we are not one, and that we are not alone" (Myers, 2017, p. 299).

We, the authors, are researchers in the field of conservation. One of us is a gardener and craft researcher, and the other one is an ethnologist and landscape scholar. The following discussion will be based on our ongoing research on the role of gardening in the making and marketing of heritage. In this research we explore processes where plants, places, objects, and activities are defined as cultural heritage (Saltzman et al., 2020). In contexts such as gardening, plants are often regarded as objects, and their lives are assumed to be more or less controlled by humans. However, the practical work of managing a garden soon reveals that gardens are formed through processes that involve non-human as well as human actions and constantly transgress the boundaries between what is commonly understood as nature and culture. This

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craft practice is in many ways comparable to other crafts. Gardeners work with their hands using embodied knowledge and sensory assessments when crafting a material. At the same time, the matters of a garden are living and ever-changing. We will approach the relationship between crafting and the more-than-human from the gardener's point of view by asking the following questions. What is the daylily telling the gardener, and how? In what way is the gardener co-creating the white-striped leaves that are so typical of this plant? And in which ways are the gardener's crafting activities simultaneously conflicting with the desires of the plant itself? Attributing human abilities, such as desire, to plants, certainly implies the risk of humanising the non-human world, but we still see it as a fruitful way of exploring the mutual communication between people and plants.

Our discussion is inspired by emergent perspectives on human-plant relations that forefront the capability of plants under labels such as "the plant turn" (e.g. Hartigan, 2019; Myers, 2015) and "critical plant studies" (e.g. Aloi, 2019; Woodward & Lemmer, 2019). Increasingly within the social and cultural sciences, the specific nature and "shared capacities of one grouping of beings called plants" (Head et al., 2015, p. 399) are acknowledged as essential for understanding the world we share. Such perspectives make it clear that the lives of people and plants are interconnected in numerous ways, and not only because plants quite literally make our food and the air that we breathe. This chapter is particularly influenced by anthropologist Natasha Myers and human geographers Lesley Head, Jennifer Atchison, and Catherine Phillips. Myers has explored how people learn to "conspire" with plants (Myers, 2017, p. 299) while discussing how plants enrol other creatures, including humans, in their care and propagation. Head and her colleagues have drawn attention to the collaborative work of plants and people in the making of landscapes and indeed in making the world a habitable place while also acknowledging that conceptualisations of agency and subjectivity in human-plant relations have often been human-centred (Head et al., 2015). In the following discussion, we attempt to apply such perspectives to the case of the Kwanso Variegata daylily.

2 The Nature of Kwanso Variegata

The story, or rather *one* of the (written Western) stories about this daylily starts with colonial endeavours in the name of science and enlightenment (e.g. Crosby, 1986; Martinsson & Ryman, 2007). With roots in the late Renaissance around the second half of the sixteenth century, an interest in non-native plant species developed among scientists, which successively led to an increased diversity of plants in gardens (Hobhouse, 2002). This history is reflected in the development of botanical gardens which have a long tradition of sending plant experts to different parts of the world to collect specimens for research and education. Their work has played, and still plays, an important role in the spreading of "new" plants to a wider audience as well as in the preservation of species and varieties (Drayton, 2000; Paton et al., 2020).

In the middle of the eighteenth century, as the Swedish botanist Carl von Linné (Linnaeus) described an orange-coloured daylily originating from the central and northern parts of Asia, including the north-east islands, he named the plant *Hemerocallis fulva.* A few decades later in 1776, one of his pupils, Carl Peter Thunberg, was travelling in Japan, where he found the daylily that Linnaeus had described. He also found something more peculiar: a double-flowering orange daylily plant where the green leaves were striped white (Stout, 1934). This appearance was acknowledged as something special, and when Thunberg published his *Flora Japonica* in 1784, he listed this flower (Thunberg, 1784).[1] Ever since Thunberg's days, clones of daylilies with variegated leaves have spread from Asia to Europe and America with the help of humans. One of these clones was introduced to the market in 1864 under the name Kwanso Variegata (Stout, 1934), and it is still possible to buy daylilies with this name (see Fig. 1).

Ever since we humans began to cultivate plants, we have learned to use the cross-pollination of plants in our search for plant varieties with desired qualities, such as increased harvest, improved taste, attractive appearance, etc. Over centuries, plant breeding has developed into a horticultural craft in which the gardener conducts a controlled transfer of pollen from the anther to the stigma of two selected plants and then seals the flower head on the pollinated one to hinder the natural pollinators (or, for certain species, the wind or the water) from doing their job. The plants that grow from such controlled pollination are then evaluated by the gardener, and some may be identified as improved varieties. Through such a chain of interactions, horticultural plants are veritably co-produced by gardeners and plants in collaboration.

To maintain the special characteristics of such a new cultivar, gardeners must ensure that this particular gene set is preserved. This can be done either by planting the cultivar at a sufficient distance from other plants of the same species so that no new hybridising can occur when the flowers are pollinated or by propagating the plants with so-called vegetative methods. While the sowing of seed is a very powerful metaphor for reproduction, vegetative regeneration has been essential for maintaining and passing on a biocultural heritage. As anthropologist Roy Ellen has noted, the value of vegetative propagation methods throughout human history has largely been overshadowed by the discursive hegemony of the seed (Ellen, 2021). To some extent, vegetative propagation occurs naturally, while in the horticultural craft, the gardener uses the propagation capacities of different plant parts to control the process. A root piece, a bulb, the top of a shoot, a leaf, a rhizome or shoot that runs along the ground are all examples of plant parts that the gardener can manipulate so that new roots and shoots develop and thus form new plants. Which parts can be used for such propagation; which methods work for each species; and *how* and *when* the job is done: all these components of craft knowledge have been developed and passed down through generations of gardeners (see Fig. 2). Although this propagation practice is governed by the biological conditions of each plant, there is also a great deal of

[1] In fact, this was not the first time that variegated daylilies of Japan were described by a Western botanist; the first time was in 1712 (Mervart, 2009; Stout, 1934).

HEMEROCALLIS.

(*Day Lily.*)

Very ornamental hardy plants having elegant foliage and handsome flowers. they are of the easiest culture in any ordinary garden-soil, and form admirable clumps. The flowers are somewhat ephemeral but are produced successively and in great abundance. Although perfectly hardy, they bear forcing well in a temperature of 50 degrees. Height 2 to 3 feet.

(*Ready in November.*)

Flava. The old favorite "*Yellow Day Lily*," flowers bright yellow, delicately perfumed. 20c. each; $2.00 per doz.; $15.00 per 100. (*Postage 5c. each extra.*)

Kwanso fl. pl. Splendid large double flowers of orange red, with crimson netting, fragrant. (*See cut.*) 30c. each; $3.00 per doz.. (*Postage 5c. each extra.*)

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VARIEGATED GLADWIN

Iris Fœtidissima fol. var.

HEMEROCALLIS.—
Continued.

Kwanso fl. pl. folia variegata. Magnificent variety with large beautifully variegated foliage, very ornamental even when not in bloom; flowers large double crimson and fragrant. (*See cut.*) 35c. each; $3.50 per doz. (*Postage 5c. each extra.*)

IXIAS.

The Ixia, is a beautiful little winter-flowering bulb, with low slender, graceful spikes of bloom The colors are rich, varied and beautiful, the centre always differing in color from the other parts of the flower, so that the blossoms expanding in the sun's rays, present a picture of gorgeous beauty. (*See cut.*)

Crateroides. Bright scarlet, the earliest of all, and g and for forcing. 4c. each; 35c. per doz.; $2.50 per 100.

Wonder. A new double variety. Very deep pink, sweetly perfumed. Extra. 10c. each; $1.00 per doz.; $7.00 per 100.

Mixed Varieties. Containing many beautiful colors. 4c. each; 25c. per doz.; $1.50 per 100.

Hemerocallis Kwanso fl. pl.

6 sold at dozen rates, 25 at 100 rates, postage free excep

Fig. 1 A description of the variegated daylily Kwanso in Peter Henderson & Co's sales catalogue from 1892. Besides this special daylily, they also highlight other plants with variegated leaves

Fig. 2 A skilled gardener at work dividing a perennial flower to produce saleable plants (Photo: Tina Westerlund)

variation in how people perform this craft, ranging from professional nurseries—where thousands of cuttings are developed into saleable plants – to home gardeners digging up plants in a flowerbed and detangling pieces with roots and shoots to share with a neighbour (Saltzman & Sjöholm, 2019; Westerlund, 2017, 2022).

Both plant breeding and plant propagation are craft processes, although in recent decades they have become more specialised and industrialised. Today, for example, many of the horticultural plants sold on the market are propagated through so-called micropropagation, a method where extremely small parts of tissue constitute the propagation material. With micropropagation, the initial part of the process occurs under sterile conditions in laboratory-like environments (Preece & Read, 2005). Micropropagation ensures that the new plants are as free from disease as possible, but the main advantage of the method is that it enables the rapid production of large quantities of plants. Admittedly, the methods for micropropagation are in themselves a kind of horticultural craft, even if they differ in many ways from the crafting methods that have been used for centuries. Due to micropropagation, the use of traditional vegetative propagation methods has decreased significantly over the last decades.

Despite the fact that the Kwanso Variegata daylily has a long history, it seems to be this special variety's aesthetics and odd appearance that are considered valuable rather than its origin. The look of this daylily, with its semi-double flowers and striped leaves, has biological causes. In nature, so-called double-flowered plants appear

due to a mutation where stamens and pistils are transformed into petals (Preece & Read, 2005, p. 51; Widén & Widén, 2008, p. 419). The result is a flower with more petals than usual. In some other groups of plants, such as roses and dahlias, flowers can form a ball-shape full of petals. Gardeners have often appreciated these so-called double flowers and have developed them further through breeding. However, a transformation of stamens and pistils into petals often results in sterile plants unable to reproduce with seeds (Persson & Oskarsson, 2012). In these cases, reproduction can only take place in a vegetative way, for example, through spreading by side shots or through horticultural propagation methods like division or cuttings. A transformation into double flowers often also leads to either little or no pollen production, and thus, without pollen, these double-flowering plants will not benefit insects. This particular daylily has just a few extra petals, and the form of the orange-brownish flowers is not particularly spectacular; indeed, the flowers have been described as "rather dull" (Lorentzon, 1989, p. 280, *our translation*).

Today, comments in garden blogs, for example, show that it is the white stripes in the green foliage that attract the most interest. The white-striped leaves are also the result of a mutation, in this case in the plant's cell layers. This phenomenon is called *variegation* (Taiz & Zaiger, 2006, p. 406). Why variegation appears in daylilies and many other species is not totally known (e.g. Chen et al., 2018; Dow, 2011). Variegation in leaves can emerge in different patterns and colours; the variegated pattern is often white, but other colours also occur, such as yellow, pink, and different shades of green. Unfortunately, the whitish parts of the leaves do not support the plant with energy to the same extent as the green parts (Chen et al., 2018). Simply described, this is due to the lack of chlorophyll in the non-green parts, which results in a reduced photosynthetic process. In other cases, variegation can be caused by a leaf structure that contains air spaces, which create a reflection. These give some parts of the leaf a light-looking colour even though photosynthesis is still occurring in these non-green parts (Sheue et al., 2012). However, the white-striped appearance of our daylily actually seems to affect the plant in a negative way.

3 Crafting with the Daylily

The market for daylilies is governed by aesthetic ideals, as these species are today principally understood as ornamental plants. Until today, about 89,000 daylily varieties have been registered. People's preferences concerning the choice and composition of plants have since long been governed by trends regarding style, colour, and shape in combination with the availability of plants. The multitude of varieties has been created through the crafting processes included in breeding and propagating done by gardeners in close collaboration with plants. Unlike "new" varieties, Kwanso Variegata has not been deliberately modified by humans through breeding. Nevertheless, the cultivation of it still requires crafting skills.

Advanced craftsmanship in gardening not only includes practical handling skills but also includes the competence of judging. To become a skilled gardener, one

needs to develop a sense for how plants look, feel, smell, etc. The living material is ever-changing, and the conditions differ from garden to garden and from one year to the other. Therefore, decisions constantly need to be based on interpretations of how individual plants are developing and interacting and on what kind of adjustments are needed and when. A plant showing signs of, for example, leaves that are too dark green or crinkled or the scent of the soil changing may be signs to a gardener. The skilful gardener has learned to interpret such signs and assess what can be done (Seiler et al., 2021). To determine, for example, whether a plant's vigour is strong enough to constitute a suitable material for vegetative propagation, the gardener needs to combine a number of sensory impressions (Westerlund, 2021). Thus, gardeners rely to a large extent on their senses and their capacity to "read" how plants will respond to their actions. The plant will show and tell the gardener what is right and wrong and what works and what does not work if the gardener is a competent interpreter of such signs.

The interaction between people and plants can be clarified by further examining the gardeners' hands-on work in the heritage garden at Mårbacka (see Fig. 3), when they are caring for and thus maintaining different kinds of perennial flowers, including the Kwanso Variegata daylily. Daylilies usually are very long-lived in Swedish gardens once established in a flowerbed. Similar to, for example, peonies, they are perennials that can manage by themselves for many years without much care, and they can even be found in abandoned gardens. Thus, if daylilies in Swedish gardens need special care, it is generally not to keep them alive. On the contrary, to have daylilies thrive, it might be necessary to limit their spreading. That is the case in the management of the flowerbed at Mårbacka, where the gardeners need to look out for unwanted spreading, so that the plants neither spread outside the flowerbed nor take too much space from other perennials. This task is performed by digging up the peripheral parts of the plant and separating these from neighbouring plants. Natural spreading does not always correspond well with human ideals concerning composition, which often imply that each plant should grow in a certain place.

An inspection of the newly emerged shoots of Kwanso Variegata in one of the oldest flowerbeds at Mårbacka showed that only some of the leaves showed white stripes (see Fig. 4), while most of the side shoots were green. The gardeners realised that, if they would let the plants grow unattended, the plants would soon become completely green. To stop this unwanted transformation, something needed to be done. The head gardener decided to dig up some of the white-striped shoots and cultivate them one by one in pots. The pots were placed in a part of the garden where the gardeners could take care of the plants under more controlled conditions. By doing this procedure, the gardeners gave the plants their own space to develop without competition. If they were kept in the flowerbed, there was a risk that the more strong-growing green shoots would take over. The head gardener chose the shoots that had the most variegated foliage. A few months later, these shoots had grown into plants large enough to plant out in the flowerbed without the risk of being overgrown by other plants, and all the leaves on the new plants were variegated. In general, interventions of this kind, where plants with desired features are separated so they can be given special treatment, are common methods within gardening crafts.

Fig. 3 The head gardener at work in the gardens at Mårbacka manor, Sweden (Photo: Tina Westerlund)

Fig. 4 Daylilies in the large flowerbed at Mårbacka with mainly green foliage (Photo: Tina Westerlund)

In this specific horticultural process, the gardener can interpret the gradual changing of the foliage's colour as a sign. The process includes a wordless communication where the plant tells the gardener that a crafting action is needed to maintain its special look. This communication between plant and gardener is profoundly dependent on the gardener's ability, as a reflective practitioner (Schön, 1995), to understand what is happening to a plant, both in the short term and the long term. While the digging and the manual handling of the plant in itself might not be considered to require advanced skills, it is in combination with the gardener's attentive presence and close interaction with the plants that this proves to be advanced craft knowledge.

To draw conclusions about the effects of specific crafting actions, the gardener needs to be present over time to follow up on the outcome of a certain measure. Craftsmanship is thus also about one's ability to compare results from previous cultivation experiments, both one's own and others', like how philosopher Donald Schön has described how the reflective practitioner "has built up a repertoire of examples, images, understandings, and actions" (Schön, 1995, p. 138). Based on such a repertoire of examples, the gardener can apply combinations of experiences into new situations. The human-plant relationship encompassed in the story of the Kwanso Variegata daylily is in several ways an ongoing process of crafting that includes the growth of the plant and the assessments and actions of the gardener.

The plant not only tells the gardener to take an active role in the making process but also invites the gardener to be active in the process of spreading. To some extent,

this communication can be seen as the plants telling the human what to do. In Myers's words, plants "have the know-how to entrain others in service of their rhythms, their wiles, and desires" (2017, p. 297). While the desire of Kwanso Variegata seems to be to get rid of its white stripes, it is simultaneously suggesting to the gardener what to do to maintain the mutation that is obviously desired by humans. To some extent, the gardener's efforts to maintain the plant's variegation could perhaps be best understood as crafting *against* the daylily rather than crafting with it, as the inherent desires of the daylily are conflicting with the aspirations of the gardener. Simultaneously, however, the actions of generations of gardeners have helped Kwanso Variegata survive and spread.

4 Conflicting Desires

Like many other old garden plants, Kwanso Variegata is still cultivated, shared, and moved from garden to garden in Sweden and in many other countries. Assisted by humans, including more-or-less-skilled gardeners, this daylily has travelled over the seas from Japan to Europe, America, and elsewhere. Today, this daylily's journey has continued in the world of blogs and exchanges on the internet. Plants, in contrast to animals, for example, are generally understood as immobile, tied as they are to the ground by their roots (cf. Head et al., 2015). In gardens, however, we are constantly reminded that plants can indeed also move, with or without the help of humans and other co-actors.

The empirical basis for this study, a variegated daylily, may seem a bit narrow, but in its simplicity, it gives an insight into how we, as humans, are not alone as acting subjects in the garden. The history of this plant-human relationship shows how a plant can induce humans to move it around the world because of a special capacity. In this case, a mutation had caused a special form of the flower and a striped pattern in the leaves which aroused people's desire for collecting, keeping, crafting, and experiencing the variety. The initial mutation happened without human interference. As Head, Atchison, and Phillips note, the capacities of a plant "pre-dat[e] humans and chang[e] in interaction with them" (2015, p. 410). However, without people's aesthetic appreciation of the white-striped foliage, this variety of daylily would not have moved around the world, and it might not even have survived into the present.

Natasha Myers describes relations between people and plants as "projects of co-becoming", and we have approached the crafting with the daylily as such a project. In Myers's view, projects of co-becoming are part of an overarching process of *involution* (in contrast to *evolution*, meaning how species slowly diverge from one another). Involution captures "the ongoing, improvised, experimental encounters that take shape when beings as different as plants and people involve themselves in one another's lives" (Myers, 2017, p. 297). People's involvement with Kwanso Variegata is a project of co-becoming. Through crafting interactions with these plants, gardeners have learned that this daylily strives to counteract the change that the mutation entails. They have learned that, the maintenance of their appearance requires the

repeated propagation of the desirable white-striped shoots. To preserve the qualities generated by a natural mutation, the care needs to manage the fact that the plant slowly strives to return to its original appearance. In this case, the crafting relationship is a precondition for the preservation of a specific gene set. The example of the Kwanso Variegata daylily shows that a gardener must be attentive, "listen" to the plants, and act in relation to their inherent processes and capacities.

This relationship can be seen as an example of the "collaborations and conflicts of many kinds" between plants and humans as "influential co-producers of the biosphere" (Head et al., 2015, p. 399). The craft practice that the gardener is carrying out in collaboration with the plant when selecting and transplanting certain shoots of the daylily is the co-creation of the white-striped leaves that are so typical of Kwanso Variegata. At the same time, the gardener's crafting activities conflict with the desires of the plant, as the daylily is inherently striving to overcome the very qualities that gardeners, in Mårbacka and elsewhere, have seen as particularly interesting. The awareness of such a conflict leads to questions on more-than-human ethics (cf. Puig de la Bellacasa, 2017). Should we perhaps pay more respect to the desires of the plant? However, the effort to maintain the white-striped leaves is just one of many examples of human-centred approaches in the co-creation of gardens. Even when done in the most respectful way, the craft of gardening inevitably includes collaboration and conflict with the lives and desires of the non-human others involved.

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Crafting Stories with Birds' Crafting: An Eco-Ethical Mixed Methodology

Venke Aure and Biljana C. Fredriksen

1 Introduction

The sky is changing colour on a mid-summer day. We can hear and smell the rain as it draws closer. The birds have stopped singing. We collect our comfy outdoor cushions and move inside the house to watch the rain fall through the window. Our house will protect us from all kinds of weather. The birds are hiding some place too...

Animals have always known how to hide from all kinds of weather and from predators—we, human animals, "are just a newcomer species resorting to building to protect ourselves in a threatening world" (Hansell, 2008, p. 1). Still, we often assume that building is something only humans do. If we consider how enormous the consequences of the development of constructing abilities have been in terms of evolution (Hansell & Ruxton, 2008, p. 76), we might also better understand how important crafting skills are for birds and other species. If in addition we consider the impacts of climate change, we should be able to understand why the ability to adjust to changes is so important today and for the future.

In this chapter, we; a professor of theory of science and methodology and a professor of Art and Craft education, are addressing birds' building activity as a form of crafting. Rather than considering human crafting to be fundamentally different from what other species are capable of, we address birds' crafting as a mindful activity where a number of surprisingly complex decisions have to be made during the process. We acknowledge that some of the building processes are driven by instincts,

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whereas other processes involve an individual bird's choices and experiences with material properties. Some birds build by moulding mud, some by weaving with sticks and some even sew with long strips of leaves. Birds are excellent builders and their nests are tangible evidence of their behaviour (Hansell, 2008) and of their learning about material properties that further leads to changes in their building attitudes (Hall et al., 2015). Sometimes, their building behaviour changes according to the available materials, which again depends on vegetation and weather conditions, sometimes even influenced by climate change and by human activities.

Individuals from three bird species play important roles in these texts: a Malleefowl, a Bowerbird and two Sociable Weavers. Our descriptions of their activities; nest building, crafting of places for courtship and incubators, are based on photography, documentary films and scientific articles. Our aim is not necessarily to understand the birds' decision-making processes, but rather to sensitise ourselves to and let ourselves be affected by their crafting skills. We do this as a starting point to interpret and illustrate the birds' behaviour in a mixed method-based narrative text. Following Donna Haraway's (2016, p. 7) advice, we are *thinking with* these birds as other beings in order "…to elaborate the possibilities of ecological evolutionary developmental biology and non-hierarchical systems theories for shaping the best stories". We are not only allowing ourselves to think about non-human builders in hierarchy-free terms, but also encouraging the readers to wonder about the remarkable manners in which crafting skills can manifest themselves across the animal world. Ultimately, we intend to inspire the readers to admire the birds, and to care for them; the birds' stories that we have constructed can potentially enlighten our planetary consciousness. We hope that this can inspire methods in education that strengthen the connectedness between humans and more-than-humans in the world we inhabit together. The question we are addressing is: *How can an affectionate investigation of birds' crafting support development of an eco-ethical mixed methodology?*

2 The Approach to Birds

When we address issues related to birds' behaviour, we are entering a realm that has mainly been the concern of natural scientists. However, in this text, we are exploring possibilities for presenting birds' behaviour through an affectionate aesthetic approach we call eco-ethical mixed methodology. We are viewing representations of birds made by natural scientists and, in a way, "re-painting" these representations and images in an expressive manner. We are aware of the need to choose our paintbrushes and words carefully; Our forms of imaging the birds' position through our human bodies, and our use of anthropomorphisms, might contradict the initial aims of the articles and videos that we refer to. Since neither we nor the natural scientists are able to experience the world *as* a bird, this is our best option to try to empathically connect with them. Nevertheless, creative approaches as well as anthropomorphisms can be sources of ideas and "stimulating lines of investigation",

as Michael Hansell (2008, p. 9), a scientist with great interest for birds' building behaviour, puts it.

In natural sciences, questions about what animals think and feel when they build are never asked (Hansell, 2008, p. 9). In humanities, social science and arts-based research, scholarly rigour is not about objective representation of a single truth, but about transparency, depth of investigation, creativity, contextuality and emerging new questions. We acknowledge the scientific efforts invested in objective investigations and representations of birds, however, applying a metaphoric and poetic language in order to describe a natural phenomenon, is not an exceptional approach (see for instance Von Frisch later in this chapter). In a similar way, we push our interpretations of the bird's crafting "to the limit and speculate on how our understanding could be extended" (Hansell, 2008, p. 9).

Our study is structured as a multiple case study (Stake, 2006), where each case represents one of the three chosen bird species. A case study is not a method in itself, but rather a form of framing *what* is being studied. Gary Thomas (2011) emphasises the possibility for a holistic and multifaceted approach that a case study can facilitate, and suggests possible strategies through Foucault's concept *polyhedron of intelligibility.* "In looking [at a phenomenon] from *several* directions, a more rounded, richer, more balanced picture of our subject is developed – we get a three-dimensional view" (Thomas, 2011, p. 4). In this chapter, we apply a similar multidimensional view when we, through our imagination, invite the birds to tell their narratives. In doing so, we are "constructing" the cases we study—tailoring our cases (Stake, 2010). As Brian Gran (2011) emphasises; construction of cases can be an appropriate approach when "… a researcher sees a case as a theoretical construct. In such a situation, a case is neither empirical nor given" (Gran, 2011, p. 673), but constructed, or co-constructed as we tried to do with our fellow birds.

The birds we have chosen are selected on the basis of their characteristic behaviour. The *Bowerbird*, common in New Guinea, is selected based on the male bird's communication with the opposite sex through an ingenious way of crafting; inviting places for courtship. The second bird, the *Malleefowl* common in Australia, has been chosen because of the advanced technical structure these birds apply when crafting nest mounds, or egg chambers, to protect and incubate their eggs. The third bird we have chosen is *the Sociable Weaver* common in the Kalahari region of southern Africa, because of their solid sustainable nests that can house an entire colony, as well as future residents. We use the documentation of these birds' distinct ways of crafting in order to *think with* them, and to craft narratives through this activity. In these narratives, our human voices echo the voices of the birds when we try to inquire into their lived experience through our human understanding. We do what Patricie Mertova and Leonard Webster (2020, p. 2) suggest; "In narratives, our voices echo those of others in the sociocultural world, and we evidence cultural membership both through our ways of crafting stories and through the very content of these stories" (Mertova & Webster, 2020, p. 2). Through such narrative inquiry, we employ a methodological approach, where imagination and care play a significant role, but we also apply references in order to show whom our choices of words are inspired by. We combine

visual and verbal modalities in order to create narratives that intend to illuminate a "more-than-human" onto-epistemology.

3 The Bird Stories

*3.1 The Bowerbird (*Ptilinorhynchus nuchalis*) as an Aesthetic Semiotician*

This narrative is constructed from following, analysing and sometimes recalling the BBC (2015) National Geographic television programmes presented by David Attenborough (1998a) and articles by Martinelli (2010), Kelley and Endler (2012, 2017), and Endler et al. (2014).

The mating season for Bowerbirds has started, and a bachelor Bowerbird is busy preparing his place for a romantic visit (Fig. 1). His expectations are high, but he is also aware of the numerous competitors he has to outshine in order to win a female's heart. He knows that the way to her heart goes through her eyes - she does not care for food or lodging, but for his artistic skills (Attenborough,1998a, 0:28–0:30).

First, he interlaces twigs to build a large and round pergola (a bower) which is neither a home nor a nursery, but more like an art gallery (Attenborough, 1998a, 0:59–1:05). The monotonous colours of the gallery will make a perfect background for the objects he plans to exhibit, and if he had managed to place the entrance on a gradient ground, this could create an illusion of the increased size of the objects he plans to display (Kelley & Endler, 2012).

He has, already for some time, been paying close attention to the resources available in his environment and collected thousands of colourful and shiny objects; be it wings from dead beetles, or lids from plastic bottles. He knows that he must be creative in his object choices and the way he arranges them if he wants to attract a female's attention. However, he also needs to hold her attention in order to gain time to mate (Kelley & Endler, 2012).

He feels lucky to have found a bush with beautiful orange flowers. He puts each of the flowers in a specific place and takes a few steps back: Hmm, does this look right from this perspective? He goes back to rearrange his composition and spots a withering flower: This could be a disaster! He hurries to replace the flower with a fresh one (Martinelli, 2010), and reviews the composition again: The flowers are beautiful, but what if she prefers dark-bluish colours, like the last girlfriend? Should he (again) find the blueberries, chew them to make a paint and decorate the wall of his gallery using a chip of wood in his beak? When he is satisfied with his creation, he calls for her.

His heart jumps when he sees her coming. He welcomes her with a fresh flower in his beak, and picks yet another decorative element from his composition to tempt her. It really matters to him that she is impressed. And then he starts dancing for her…

Fig. 1 Bowerbird, painted by Gospodin Tsvetkov (Photo by Marika Mørkestøl)

3.2 Studying the Bowerbird Through a Zoosemiotic Lens

This narrative shows a busy male Bowerbird. He builds with hopes that a female Bowerbird will be attracted by his construction. His anticipations influence his building choices; the choice of appropriate ground to place his bower, his considerate choices of materials for the main structure and of decorative elements with appropriate colours, shapes, quantity and location. He seems to be aware that the bower he is crafting can communicate something to the female bowerbirds. In addition to attracting the female by calling and by dancing, he also communicates through visual aesthetics.

In semiotics, communication is described as a process where a sign is coded from a sender to a receiver, and this is exactly what happens when the male Bowerbird communicates through colourful elements to invite the female Bowerbird into his aesthetic construction for mating. However, in order to address more-than-human communication, we apply perspectives from the research field called 'Zoosemiotics'. The research field of zoosemiotics combines approaches from biology, philosophy and linguistics. It was first introduced by Thomas Albert Sebeok in 1963. Zoosemiotic inquiry deals with questions relating to how different animals make sense of each other and their environment. In his book *A Critical Companion to Zoosemiotics*, Martinelli (2010), a specialist of Semiotics and Musicology, specifies that "the focus of zoosemiotics is not simply communication (which is what people

normally expect to be the actual goal of semiotics), but rather the broader *Semiosis*, i.e., following Charles Morris, the process in which something is a sign to some organism" (Martinelli, 2010, p. 1).

Bowerbird's crafting behaviour has impressed many others than ourselves. Martinelli, also writes about Bowerbirds' crafting and aesthetic choices: "The fact that the male is so precious with the qualities of each element in his construction signify that the qualities he is concerned with are not just functional, but of aesthetic or communicational importance" (Martinelli, 2010, p. 118). Here, the value of aesthetics and quality of communication are addressed as different from the functional value. However, from our point of view, the aesthetic qualities also exercise a functional role in the process of communication; it is through the aesthetic qualities of his creation that the male would be able to impress and persuade the female. The Austrian zoologist, Von Frisch who shared the Nobel Prize for Physiology or Medicine with animal behaviourists Konrad Lorentz and Nikolaas Tinbergen, in 1973, also viewed Bowerbirds through an aesthetic lens. Martinelli refers to von Frisch's poetic way of describing these birds' aesthetic behaviour:

> Every time the bird returns from one of his collecting forays, he studies the over-all colour effect. He seems to wonder how he could improve on it and at once sets out to do so. He picks up a flower in his beak, places it into the mosaic, and retreats to an optimum viewing distance. He behaves exactly like a painter critically reviewing his own canvas. He paints with flowers; that is the only way I can put it. A yellow orchid does not seem to him to be in the right place. He moves it slightly to the left and puts it between some blue flowers. With his head on one side he then contemplates the general effect once more, and seems satisfied. (Von Frisch 1974, pp. 243–244, quoted in Martinelli, 2010, p. 117)

Theodosius Dobzhansky**,** a geneticist and evolutionary biologist, has also observed Bowerbirds. Even though his approach was scientific—he is known for the development of the modern evolution theory and for his book *Genetics and the Origin of Species* from 1937; where he writes the following regarding the Bowerbirds: "it is undeniable that a well-decorated pergola gives the bird a pleasure that can only be defined as aesthetic" (Martinelli, 2010, p. 119). Seeing the Bowerbirds through a zoosemiotic lens strengthens our belief that aesthetic choices during crafting are shared among more-than-humans in un-hierarchical systems. Impressed by the Bowerbird, Deleuze and Guattari (1994) wrote: "Perhaps art begins with the animal (…) This emergence of pure sensory qualities is already art" (Deleuze & Guattari, 1994, quoted in Porter, 2009, p. 73). The Bowerbirds' aesthetic choices are of essential importance for the survival of their genes … which is, after all, not much different from humans.

*3.3 The Malleefowl (***Leipoa ocellata***) as a Protective Constructor*

The Malleefowl narrative is created on the basis of two documentaries, one by Wierd-Square (2018) and the other by ABC News (2018) with photographer David Wells.

The narrative is additionally informed and inspired by an article written by Hall et al. (2015), and an article by Marc Irvin (2014). We start the narrative by our own interpretations of one of the documentaries and continue building on it through the other resources mentioned.

It is the beginning of summer in the Australian desert and Malleefowl eggs, buried in a gigantic ground nest, are hatching. Cracking the shell that had been squeezing her growing body for 50 days demanded use of the young bird's muscles for the first time. But it is not enough to get out of the egg case, she also has to dig her way through the mixture of sand, soil and decayed vegetation as she intuitively searches for fresh air. As her head breaks through the surface layer, she looks around her: No one else is there (WierdSquare, 2018, 0:17–0:20). Some of her 19 (or so) siblings are probably still incubating, while others have found their way out a few days earlier. When her entire body is free from the heavy mass, she can finally shake her wings and feel free, but she has nobody to share this extraordinary experience with.

As she shyly slides down the tiny slope of her mound, she can see her father's footprints, the signs of moving tons of nest materials to regulate the egg temperature (ABC News, 2018, 0:50–0:53). First, he had to dig for days to make this large and round depression in the ground (WierdSquare, 2018, 0:1–0:20). Then he had to collect available organic materials, such as sticks, leaves and bark, and to mix them together (Hall et al., 2015). The sandy soil recorded his backwards movements over the area as far as 50 meters from the mound (WierdSquare, 2018, 1:12–1:24). He has been mixing and turning the organic mixture for days and days in order to encourage the decay of the composting material that produces heat for egg incubation (Hall et al., 2015). And he kept adding more soil on the top as if he was snuggling his unborn children, while they slept. But the hard work itself was not enough. He would have been helpless if the rain did not come when it should. The amount and level of humidity in his magical mixture had to be precisely adjusted in order to achieve the desired temperature for the offspring to survive.

She survived, thanks to hardworking parents that she never met. The word goes around amongst humans that Malleefowls are incapable of parental care, but all this young bird can see when she looks back on the enormous mound is how much her parents cared for her. Her father, and sometimes her mother too, have been constructing and maintaining the mound for months (Fig. 2); digging, moving the mass, waiting for rain and measuring temperature by sticking their heads into the mound (ABC News, 2018, 1:19–1:25).

From where she now stands on her own feet, the future does not seem bright. Will she survive to lay her own eggs one day? This heavy responsibility rests on her frail shoulders. Will there be any places left for another mound? Will she ever meet a skilful male constructor, who is able to build a functional nest despite the contemporary agricultural challenges and climate changes? Oh, she would be so lucky to find someone as persistent, punctilious and hard working as her father – someone with skills of a crafter, a meteorologist and a chemist! However, exquisite skills might not be enough if the climate change and the declining conditions that affect these birds' habitat continue in the Australian low rainfall areas (Irvin, 2014).

Fig. 2 Malleefowl, painted by Gospodin Tsvetkov (Photo by Marika Mørkestøl)

As she moves into a ray of light, she notices large oval prints on the ground. Someone else, besides her parents, has been stomping around the mound (Irvin, 2014). She might later learn that these were compassionate humans, who helped her parents move the magic mixture around. They also cared for her survival and will have to continue with caring and extensive management if life is to be sustained in the gigantic mound nests.

3.4 The Malleefowl Through a Protective Lens

The Malleefowl narrative presents these birds' complex physiological competence in nest construction. Their closed nests, built from sand, protect their eggs from predators. The large mound nest construction that can measure four metres in diameter and as much as a metre high, is also protective in terms of insulating and maintaining a constant accurate temperature for the incubation of the eggs (WierdSquare, 2018). The temperature control is performed by the parent Malleefowl sticking their beaks, or even their entire heads into the mound. Jenniffer Ackerman (2020), is fascinated by Malleefowels' sophisticated temperature manipulation. In her book "*The Bird Way. A New Look at How Birds Talk, Work, Play, Parent, and Think*", she writes the following:

> …malleefowl employ both microbes and then the sun to heat their mounds. In spring, it's fermentation. In summer, its solar heat, but the bird must prevent overheating in the hot months by piling the mound high with sand. In autumn, when solar heat diminishes, a malleefowl keeps its mound warm by spreading the sand out during the day to warm it and then piling it back up at night. Each time the bird opens its mound, it has to move close to a ton of material. (Ackerman, 2020, pp. 263–264)

The Mallefowls' intricate crafting process is an example of a phenomenon that has interested researchers both from science and humanities. Phenomena that deal with interaction and relationships between humans and nonhumans, have become an interest for scholars from various fields, such as anthropology, sociology, biology, history and philosophy.

Biosemiotics is an interdisciplinary research field that challenges anthropocentric forms of research and promotes a more holistic view that acknowledges "the symbiotic interconnectedness between different types of beings on this planet" (Albrecht, 2019, p. 136). Yet another contemporary approach to human, non-human and animal studies is emerging under the name of Anthrozoology (Krøger et al., 2018). However, the interconnectedness between more-than-humans has a long tradition in indigenous cultures. As Albrecht (2019, p. 6) describes, Aboriginal peoples in Australia "saw human life as originating from common ancestors that consisted of human and non-human life in shared destiny". From an indigenous point of view, through the concept of Kinship, the Malleefowls' lives are related, connected and interwoven with the lives of other more-than-humans as they all share the same environment (Ridges et al., 2020).

A similar interweaving of Malleefowls' and human lives takes place in the Rangelands, where the birds and Aborigines share their habitats and are included in the forms of "eco-cultural thinking", which, according to the anthropologist William Stanner, builds on the "common ancestry of all life and species" (Albrecht, 2019, p. 4). Aboriginal people hold the Malleefowl as their totem; as a symbol for living together in care and empathy. They refrain from eating the Malleefowls and protect the birds and their habitats (Albrecht, 2019, p. 5). Many organisations in Australia have adopted these *Aboriginal core values*. Ridges writes: "If culture is viewed as a tool to reinforce core values – rather than just being a by-product of human society – then engaging in culture is itself a learning and reinforcement process" (Ridges et al., 2020, p. 250).

The story about the Malleefowl is also a story about multiple forms of protection and care; on one side, the Malleefowls' care for the eggs, on the other, humans' care for the socio-ecological systems around this bird. However, the most important sign of protection is perhaps what Philippe Dubois and Elise Rousseau state in the last sentence of their book *A Short Philosophy of Birds*: "The day we decide to protect birds will be the day we decide to protect ourselves" (Dubois & Rousseau, 2019, p. 157).

3.5 *The Sociable Weaver (*Philetairus socius*) as a Social Protector*

The narrative about Sociable Weavers is based on three articles; one is written by van Dijk and his associates (2013), another is written by Covas et al. (2008), and the third by Maclean (1973). Additionally, three documentary films have played a significant role in the narrative construction: First *5050 Community* (2014), another by Ryan Olinger (2018) and a documentary called *Social Weaver Birds Nest in a Tree in Africa*, by Attenborough (1998b).

While the temperature is rising to reach 45 C degrees (Olinger, 2018, 12:10–12:20), two Sociable Weavers are hurrying to finish their morning work, before they take a siesta in their large communal nest. Weather conditions in the Kalahari desert are harsh and the two birds are already late to seek shelter from the heat in their chambers on the colony edge. Their apartments are not as well insulated as those in the centre, but they don't complain – they are happy that older and breeding birds have taken the chambers with the best thermoregulatory properties (van Dijk et al., 2013). These two birds are so-called 'helpers' this year: she is a helper, because she has given up trying to breed, and he, simply because he is too young to breed (Fig. 3).

The snakes are very hungry this year. They are almost unstoppable when they climb up the tree trunk to the massive 1000 kilo nest (Olinger, 2018, 1:10–1:13), slide from chamber to chamber and swallow both eggs and chicks. The females' eggs were taken by snakes three times this year (Olinger, 2018, 4:45–5:05), and when the

Fig. 3 Sociable weavers, painted by Gospodin Tsvetkov (Photo by Marika Mørkestøl)

fourth round of eggs finally managed to hatch, the drought made it difficult to find food and the chicks starved to death. And she gave up trying. Both birds are now helping with feeding the chicks of others and repairing their common nest.

The baring acacia tree is almost invisible under the "haystack" (Attenborough, 1998b, 0:24) six meters wide and three meters tall. The tree used to be strong when the nest was first built, half a century ago, but has been weakened by the weight of the nest (Attenborough, 1998b, 0:26–0:32). The nest has also suffered under weather changes and use, and it needs constant maintaining. This is the helpers' job. They know that the quality of the nest is of essential importance for the survival of their colony. They have to pay attention to what parts need to be improved, be thoughtful with regards to material choices and generally hand-y (or "beak-y") in their weaving skills.

The quality of the nest includes both the interior of the chambers (their softness and comfortable temperature), the structure of disconnected chambers (that matches the weavers' social structures and needs) and the exterior of the whole construction. The outer wall of the structure has to remain resilient to rain, sun and other rough conditions. The roof is therefore built with coarser materials, sometimes even thorny twigs (Maclean, 1973) that could also obstruct predators. Thick thatch, that over-arches chambers, also keeps the apartments cool (van Dijk et al., 2013). The walls of the nest are built by intertwined grass straw, not woven in a systematic way, but by pushing a straw into the construction and *occasionally crossing other straws (Attenborough, 1998b, 0:57–1:02). The walls need to be thick and have appropriate density in order to secure and provide the insulation necessary to slow the process of egg-cooling, when parents are away (looking for food), as well as to shorten the time for reheating the eggs to incubation temperatures (van Dijk et al., 2013). Choices of materials for the chambers' interior are important, especially for functional nurseries and adult bedrooms, since the weavers like their beds to be soft and cosy.*

The male bird has found some soft meerkat fur that will be perfect for the chamber interior. He peeks in some of the hundreds of chambers with hope to find one that is in need of some makeover. Then he flies to a half-broken branch of the acacia – that bears the home of his ancestors and descendants. Everyone else has sought shelter, but he endures the heat as he sits there alone for a while and looks around. Through the blurry evaporating air, he can see her struggling to fly with a twig in her beak. The twig is longer than her own sparrow-sized body. As she is getting closer, he can see the long thorns of the twig, and he understands that she is heading for one of the main entrance tunnels. She seems occupied with her own task and he is a bit afraid that she will not notice him, but she does. Was there an acknowledging nod? Now she knows that he is not pretending to work (5050 Community, 2014, 8:32–8:42). The second she gives him a short glance, he flies into the chamber he has chosen to refresh with the soft meerkat bedding. With the corner of his eye he acknowledges her hardworking efforts, too. Her idea to attach protective "barbed wire" might, indeed, save some of the colony's offspring.

Caring for the present and future residents of their nest and for their colony is a part of the weavers' social lifestyle. Still, the helpers' hard work pays better off

when their efforts are seen, acknowledged and appreciated by their fellows (5050 Community, 2014*, 9:04–0:20).*

3.6 Studying the Sociable Weaver Through an Environmental Hermeneutic Lens

The Sociable Weavers' nests are, in many ways, the most complex and spectacular structures built by any bird (Collias & Collias, 1977, p. 50). One nest can contain more than 60 nest chambers. Zoologists and ornithologists Nicholas and Elsie Collias, who have been studying social birds, compare Sociable Weavers' building style to human ways of building in urban areas—they address Sociable Weavers' nests as a "gigantic apartment house arrangement" (Collias & Collias, 1977, p. 50). The Sociable Weavers' collaborative construction work, illustrated here through the helpers' narrative points of view, exemplifies these birds' well-developed cooperation skills and care for each other. Dubois and Rousseau (2019) suggest that humans have much to learn from these birds about collaboration, and claim that "…most birds consider sharing the task to be the best solution" (Dubois & Rousseau, 2019, p. 14), since sharing the tasks taking care of their nests and offspring, and of each other, facilitates the best conditions for the survival of their colony.

The discovery of the Sociable Weavers' collaborative skills served as an eye-opener for researchers interested in bird behaviour, and challenged the "traditional views of how birds conduct their lives, how they communicate, forage, court, breed, survive" (Ackerman, 2020, p. 3). According to Nimmo (2012), growing evidence in the sciences of animal behaviour, supports an understanding that forms of cohabiting that exist among nonhuman animals are very similar to what we call culture.

Our construction of the Sociable Weaver narrative for this chapter, urged us to find new "articulations and interpretations that more adequately give voice to moral experiences that underlie any of our relations with the natural world", as environmental philosopher Martin Drenthen (2017, p. 171) describes when he writes about 'environmental hermeneutics'. Such discovery of new ways of articulating our human relations with the natural world demands reflections and confrontations of the dominant interpretations (Drenthen, 2017). The process of searching for alternative forms of articulation, can lead to more respect and humbleness towards our non-human companions, and hopefully might empower them by articulation of their seldom heard voices.

4 Towards an Eco-Ethical Mixed Methodology

Traditional scientific research most often aims at generalisations, universality and reductionism (Haraway, 1988, p. 580). Rather than generalising about bird behaviour,

we have tried to shed light on individual birds and imagine their points of view. Focusing on birds as individuals makes it possible to notice aspects of their lives that are similar to our own. Acknowledging their subjectivity is the opposite of generalisation. "Knowing others—human or nonhuman—is inescapably an iterative process of interpretation in mediated and embodied interaction, rather than a matter of somehow gaining objective knowledge of what is inside the mind of the other" (Nimmo, 2012, p. 188).

Our approach is inspired by contemporary environmental hermeneutics, which "examines the role of interpretation in human relations with environments, but often combines this fundamental philosophical perspective with more empirical approaches" (Drenthen, 2017, pp. 162–163). We have not studied the chosen birds empirically—our choices of bird species located at a geographical distance from where we are based has limited our possibilities of direct observations—but we build on the empirical work and knowledge developed by other researchers. The birds' narratives are created as pieces of "virtual reality" (Bresler, 2006) that emerged from the collision between our embodied understandings, and observations made by scientists and film makers. They are coloured by our own lived experiences and understanding that guided us in this mixed-methodological research method. By this we mean the *bricolage* of the data we have used and produced.

We are seeking to expand understanding through an eco-ethical mixed methodology. Here, "[c]onventional methods based on criteria such as generalization and verifiability are replaced with more exploratory and inquiring perspectives" (Aure, 2020, p. 149). Our own approach of narrowing the focus on individual birds has indeed helped us to expand our understanding. Through the narratives that addressed individual birds, we aspired to meet them on a flat, non-hierarchical ground, through a process where interspecies ethics are taken into consideration as a kind of process that Haraway (2016, p. 29) describes as "complex worlding". Establishment of a more symmetrical view amongst more-than-humans, calls for hybrid knowledge that is without contradiction and where knowledge can cross disciplinary boundaries in order to be assembled into new constellations (Nimmo, 2012, p. 189).

Who we are as researchers is essential for how we understand what or whom we study, which kinds of questions we ask, what kinds of agendas we have and through which words and concepts we communicate our discoveries. Our words shape our worlds (Hache, 2020, p. 113) and our vocabularies convey our epistemological positioning. Our anthropomorphisms can, for instance, support "stimulating lines of investigation" (Hansell, 2008, p. 9), as well as highlight similarities between birds and humans. We become narrative beings *through* the stories being told *with* the birds (Drenthen, 2017).

Posthumanism welcomes more-than-human forms of being, learning and acting/performing in research (Ulmer, 2017). Our concern for birds' crafting is eco-ethically grounded and related to "multispecies justice" (Haraway, 2016). The eco-ethical mixed methodology is framed within a post-humanist reflection that underlines that more-than-humans have their own will and agency, and rejects the understanding that humans are the only species capable of purposeful transformation of their environments.

While we were creating the narratives, based on documentaries and scientific articles, we were assembling different ingredients, and, like Malleefowls, tossing and turning, pressing and kneading what we had at hand, with hope that this 'mixture' will be able to nourish some new understandings. Ultimately, we hope that the mixing of perspectives will draw attention to the phenomenon of birds' crafting, and invite the reader into the more-than-human ontology. Our tiny efforts to speak out for the birds' building skills might be a small contribution to the post-humanist project of "de-centering the humanness" (Malone, 2016, p. 394). Grasping how much there is to admire and learn from birds' crafting, might impress us, make us more humble. It might make us take off our hats and rethink our relationship to our fellow birds and the interdependencies between all more-than-humans on our planet.

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Insectography: A Choreographic Crafting of Insects and Us

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1 The Hatching of Motivation and Previous Research

Our insectographic process emerged from environmental worry that did not, and still does not, want to let go. It further evolved from our curiosity for insect movements and behaviours, as well as critical choreographic explorations that followed. Three of the authors of this chapter have dance backgrounds (Tone, Rose, and Arnhild) and we feel a need to engage more with insects: to really see them, study them, understand them, and value them. The acquaintance with co-author, Helena, a biologist, offered that possibility. All three authors with dance backgrounds have previous experience of choreographic encounters with and explorations of biological and physical phenomena, such as water,[1] the universe[2] and decay.[3] Helena, being an

[1] Fluid City (2012–2014), https://www.auckland.ac.nz/en/creative/our-research/urn/transforming-cities/fluid-city.html.

[2] SPACE ME/Inclusive Dance Company (2012), https://www.dance-company.no/space-me-2012.

[3] 200 BILLION AND ONE/Inclusive Dance Company (2016), https://www.dance-company.no/200-milliarder-og-1.

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insect chemosensory biologist, has a deep awareness about and lifelong relationship with insects. She has spent years observing and studying insects and has deep understanding of their embodied ways of moving, living, and working.

Over the last 400 million years insects have evolved in symbiosis with plants and animals, acquiring diverse shapes, colours, developmental strategies, and behaviours that inspire and shape human and non-human life (Smith & Kennedy, 2009). Having conquered all types of habitats and varied niches, they are by far the most numerous and diverse group of organisms on land (Stork, 2018). Humans cannot live without insects, nor can the human body decompose properly after death. We need insects to fertilize the soil where we grow our food to sustain us, and to bury us and make our corpses ready for new life. We are also indebted to insects for the aesthetics they produce on Earth: flowers, sounds, constructions, shapes and dances, as well as human pain, irritation, fear, and humour. An estimated 1% of insect species interact with humans direct or indirectly (Gillott, 1995). Although humans have long recognized the importance of insects for their wellbeing, negative interactions have granted insects the reputation as relentless pests, competitors for food and fibre, and as threats to health, economy, and comfort. Humankind's preoccupation with survival has led to a focus on efforts to neutralise insect competition and harm, ranging from turning to religious authority requiring the excommunication of insect pest in the Middle Ages (Evans, 1906), to the use of insecticides and DDT (Dichlorodiphenyltrichloroethane)—especially after World War II. However, the hopes of the later approach proved unrealistic with time because of increased insect resistance and negative impacts on ecosystem and human health. The reassessment that followed the frustrated hopes of chemical control led to the concept of integrated pest management that relies on ecological principles, multiple technologies and engages the services of helpful insects (Smith & Kennedy, 2009). Slowly insects are being seen as allies, protecting human health and our crops.

As a result of ongoing environmental crises caused by human activities on the planet, many insects are undergoing high rates of decline (Hallmann et al., 2017). A possibility to save endangered insect species requires increased human awareness of insects that are inhabiting the Earth, and who have a right to live and to experience friendly engagement with humans. The research motivation for *Insectography*, then, is based on this environmental worry and an interest to explore choreography as artistic engagement with insects as a way of relating to insects. Insects have a wide range of movement capacities, and these can be explored by humans through choreographic engagement. Through evolutionary adaptation, insects have acquired varied capacities (Engel, 2015): insects walk, crawl, and run, jump, vibrate and fly, and metamorphose. They exhibit advanced behaviours and interactions, combining these basic elements into intricate movement choreographies shaping a myriad of natural life histories.

We have found limited previous research on choreography and insects. One example, however, is from Chittka (2004), who explores insect dances as windows into insect perception from the perspective of experimental psychology. Chittka reports how the perceptual world of animals is often very different from that of humans, since many animals have sensory modalities that humans lack (Chittka,

2004). Even if we know a lot about how insects see, smell, taste, and hear, understanding how insects perceive the world, is beyond human grasp, since we can only perceive the world through our own embodiment (see for example Nagel's [1974] article 'What is it like to be a bat?'). Later in this chapter, Helena will still try to describe the bumblebee's, little transformer beetle's from Ecuador, and Kung Fu Manti's lived worlds, as if she was in their "shoes". Chittka's (2004) work proposes that some animals do, in fact, describe the world around them through a symbolic dance language. Chittka argues that honeybees show the best example of such language where nestmates through dance communicate with each other about profitable food sources (we will hear about this as Helena voices a bumblebee later in the chapter). An article from Bru-Dominguez's (2019) provides a different focus. Within a feminist framework, Bru-Dominguez studies the choreography *Memòries d'una puça* [Memoirs of a flea] by Valencian choreographer Sol Picó through Braidotti's post-human concept of *becoming insect* (Braidotti, 2002). Bru-Dominguez (2019, p. 2) explains how Picó as choreographer has long been interested in incorporating the realm of insects in her work, thereby drawing a parallel between how the insect is associated with processes of transformation, and Braidotti's nomadic subject. These existing studies from Chittka (2004) and Bru-Dominguez's (2019) offer a platform for us to connect with and acknowledge within our own research process.

2 Expanded Choreography

Choreography is the concept for *crafting* originating in the field of dance. Choreo*graphy* has gone through extensive change in meaning since it was first taken into a dance related glossary in 1700, when the meaning of the word was the art of writing down dances (Leon, 2020, p. 69). During the early twentieth century, choreography first came to mean the act of creating a series of human movements in space and time, whereas later its meaning expanded to include the entire staging of dance-based pieces (Klien, 2008, p. 143). Traditionally, choreography was a representational and hierarchical affair: a choreographer's ideas governed the dancers (Klien, 2008, p. 143), who were seen to be objects fulfilling the choreographer's subjectivity, ideas, and pre-planned patterns of movement. However, during the early twenty-first century, there has been a paradigm shift in choreographic understanding which is still ongoing—characterized by Hildebrandt (2013) as *The End of Choreography*.[4] Entrenched within post-human, feminist, critical, inclusive, and decolonial theories and practices, choreography has expanded. This paradigmatic shift implies democratization of choreography, and choreography as agent in society, moving away from the stage as a central space for choreography to happen (Østern, 2018, p. 25), as well as choreography being viewed as non-deterministic and open (Klien, 2008, p. 143). The human body has a tardy connection to choreography, and through western history

[4] Provocation delivered by Antje Hildebrant at Cue Positions Symposium at Chisenhale Dance Space November 23rd, 2013, https://vimeo.com/80257439.

choreography has used the human body as its main object of manipulation. However, Klien (2008, p. 39), among a range of choreographers and/or researchers (see for example: Dupuis, 2020; Forsythe, n.d.; Leon, 2020; Lepecki, 2006, 2010), argues that choreography can be used as a metaphor for dynamic constellations of any kind, self-organised or superimposed. Choreography can "become a metaphor for observed order in biological systems, for exchange of forces in the world of physics and the interaction of elements in the world of chemistry" (Klien, 2008, p. 39). Klien (2008, p. 5) proposes choreography as a (crafting) aesthetics of change which can be applied to more-than-human spheres, and which can contribute significantly to the ongoing shaping (crafting) of society. Choreography therefore can be used as a way of seeing and relating to more-than-human patterns of behaviour, organization, and movement. However, extending beyond what Klien's work offers, we emphasize the embodied and lived dimensions of choreography, as does Monni (2018). Within Klien's view, we see the risk of choreography becoming mainly conceptual. Therefore, within this project we are not so interested in dis-connecting choreography completely from the embodied practice of dance. Rather, we enter the project with a criticality and distance to existing ideas of what dance might be and who might be a choreographer, and with an understanding that other-than-human as well as human bodies can engage in dance. Choreography then, as a way of crafting, in this study, is understood as having bodily engagement with a world of constellations, dependencies, arrangements and ecologies (Klien, 2008, p. 1), a system we ourselves are already part of. In this system, we allow insects to choreograph us: to shape and craft us.

2.1 Research Design/Research Choreography

As we explore choreography in an expanded way, we can sense our whole way of organizing the project as *research choreography*; a way of crating and giving shape to the research (Simonson, 2021). This research choreography is positioned within *performative research* as a paradigm (Arlander, 2018; Bolt, 2016; Haseman, 2006; Østern et al., 2021), utilizing *performative inquiry* (Fels, 2015) as the main approach to create and analyse research material.

Within performative research we understand research as creation, non-representational, and not aspiring to represent a reality that exists independently of the researcher. The researcher is fully entangled with the research, not only illustrating critically reflective research cognition, but as an affected researcher-body who needs their body to fully understand the researched phenomena. Additionally, the research can be produced, analysed, and presented in diverse modes and materiality, and finally, the research operates on an onto-epistemological level, where the researchable unit is understood as relational phenomena, not separated subjects and objects (Østern et al., 2021).

Fels (2015) describes performative inquiry as "an invitation to attend to what calls us to attention" (p. 478). According to Fels the heart and pulse of performative

inquiry are *stop moments* that interrupt, disrupt, trouble, astonish—moments that somehow, on a bodily affected level, make us stop, pause, and pay attention (Fels, 2015, p. 479). Noticing, attending to, dialoguing around, and writing, and thereby creating something new, stop moments invite new possible actions, choice, and potentially transformative change and knowledge production. In this performative research project, we move through the insectographic practice with performative inquiry as a methodological and analytical approach, paying attention to stop moments in the meeting between insects and us.

2.2 *The Performative Research Material*—Insectography *Workshop, January 2021*

The concept of *Insectography* began to germinate in mid-2020, and by early December 2020 we shaped the activities that form the foundation of the work that this chapter is based on. We decided that we would have a one-day workshop for the four of us in January 2021, and prior to this there would be pre-workshop activities to form a foundation for the tasks explored. As we are based in the city of Trondheim, Norway, and January usually delivers freezing temperatures, we had to plan a workshop with no actual meetings with live insects. The insects sleep at this time of year. For this first workshop we had to rely on digital meetings with insects through film clips. The film clips that we engaged with were chosen by Helena from available sources on the Internet.

Three days before the January workshop Helena sent a selection of film clips of insects to Tone, Rose, and Arnhild. Providing us with video links, Helena asked us to watch the videos of the selected insects, and we were each allocated two species to look at each. We all documented our initial responses to "our" insects and prepared two insectographic tasks, one for each of the insects we were looking at, to offer at the workshop. At the same time, we also considered what materials or objects we might want to bring to the workshop to engage with. An insectographic task was defined by us as a prompt to the other three participants to engage with the insect and create movement. On our workshop day we met to work in a studio within a larger theatre complex in Trondheim. The windowless studio created a cocoon for our day of exploration. We began with conversation, and Helena shared the process, tensions, and joys she felt with the responsibility of choosing insects for us. We each gave insight to how we felt about our insects, and how they resonated with us. From our dialogue, we moved into the tasking process. Each task was introduced by the person who created it, delivering as much information and direction as they felt was needed. An example of an insectographic task is shown in Fig. 1.

Photographer Arne Hauge, who at a later stage became part of the insectographic research group, joined us mid-day, as we wanted to capture visual material from our first workshop on our insectographic journey. We used a Padlet to create, share, and

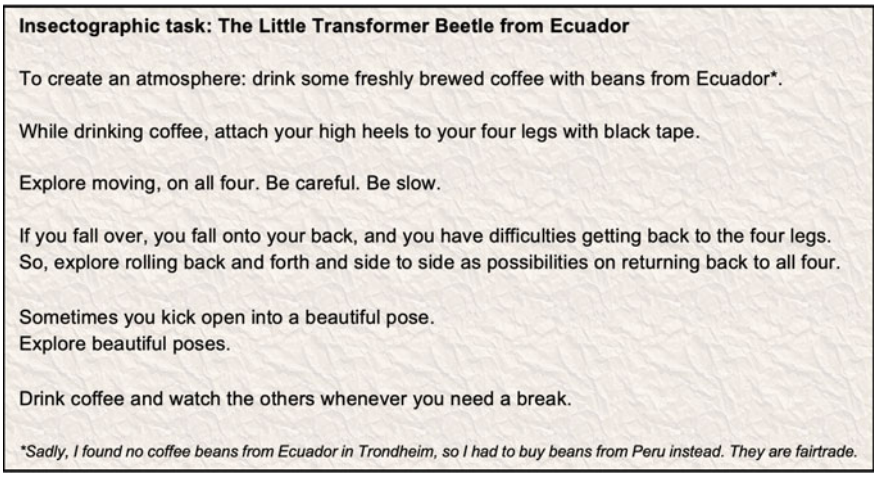

Fig. 1 Example of an insectographic task explored during the workshop

document reflections during the day. A screenshot of the Padlet we used is shown in Fig. 2.

Objects and the space were used in various ways in different tasks. Over the course of the day, we played with headphones and self-selected soundtracks, paper, the objects in our bags, high heel shoes and black electrical tape, oil, sugar and spices, chairs and other furniture at the periphery of the space, and yes, we drank hot coffee too.

3 Performative Inquiry Through Stop Moments Between Insects and Us

For Tone, Rose, and Arnhild who have a dance background, we have chosen stop moments during the workshop or workshop preparation that somehow interrupted our everyday non-attentive relationship with insects. These were stop moments that "somehow, on a bodily affected level, made us stop, pause and pay attention" (Fels, 2015, p. 479), moments that made us realize the embodied life trajectories of the insects we were engaging with, and which made us leave the moments with increased embodied insect awareness. In these stop moments we see that the insects are choreographing (crafting) our moment explorations, and that expansion of choreography is ongoing. Helena has taken on the role of giving voice to the Bumblebee, Little Transformer Beetle from Ecuador, and Kung Fu Mantis. In our crafted stop moments Rose, Tone, and Arnhild relate to these in a bodily way. In voicing them, Helena uses her insect biology knowledge, and steps into a first-person perspective of the insects. In this, she commits an anthropocentric move, humanizing the thinking and feeling

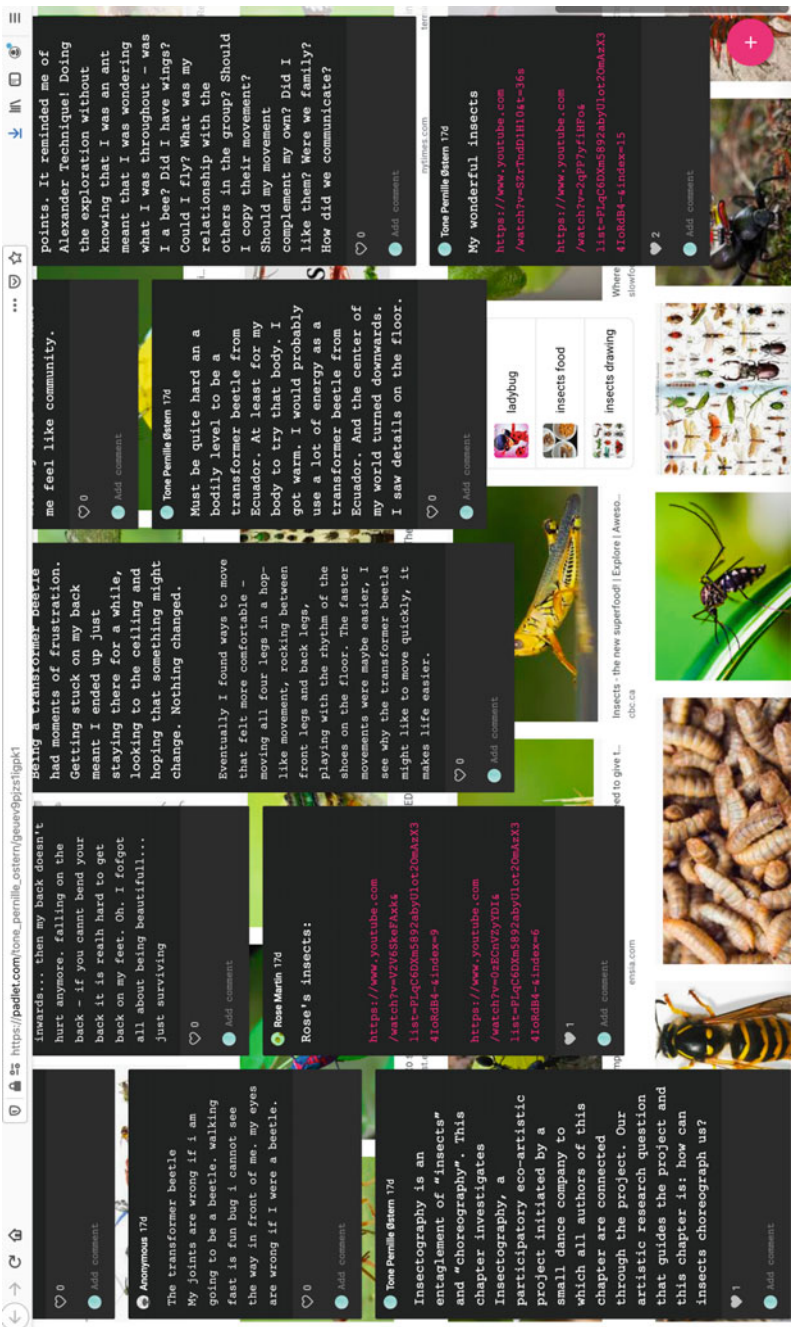

Fig. 2 Screenshot of the Insectography Padlet created during the January 2021 workshop

of the insects. We know this is not how insects think and feel, as they are embodied differently (Elwood, 2016; Klein & Barron, 2016; Tye, 2016). However, this anthropocentric move allows us to make a storied connection between the insects and us in this article, in turn possibly enhancing a sensation of insect-human-connectedness.

In the three human-insectographic stop moments that follow, we weave the insect-voice filtered through Helena, with the human-voices from Rose, Tone, and Arnhild. The insect-voice (of Helena) has no specific formatting, *whereas the human-voice is formatted with italics*. Each stop moment is voiced through a photo collage (choreography/crafting) combining photos from the workshop (called "studio photos"), shot by photographer Arne Hauge, with insect footage downloaded from unsplash.com or wordpress[5] (called "insect photo"). In this, we visually craft together an insect with a dancer-researcher.

3.1 Little Transformer Beetle from Ecuador and Rose Entangling in a Stop Moment

(See Fig. 3). So… when I need a rest I turn into this little, almost perfect, ball. I retract my six legs, head and antenna into groves and I look exactly like caterpillar poop, or debris of some type. The rough surface of my body helps the disguise - and no one can spot me. I do the same trick if I spot danger. The hungry enemy walks right by me and disregards me as food. I am quite small, and the smaller one is, the more one is at risk of being eaten by someone bigger. The drawback of this transformer body is that when I walk, I must carry all this carapace, and my legs look unusually broad to be insect legs – and my walk is a bit clumsy. It goes like this: walking… danger? Ball!… unfold… get on your feet again… And that's the tricky part… when on my back it is not just to turn around and be on your feet again. There is lots of bouncing and waving with my legs… a little push from the wings… and eventually I am on my way again! *As I lay on my back, legs and arms suspended limply in the air, rocking on my spine for what felt like the millionth time - back and forwards, side to side, around and around - it struck me: why had I never noticed the effort that insects put into their work, their activities, their lives? Why had I never pondered how much effort it might take for the transformer beetle to shift from its back to its front? It was only now, as I struggled, gave up, paused, and then tried again that I could sense what these insects might encounter. I rocked and rolled around my spine. My human back was not so happy to be on a hard wooden floor. For a moment I felt that I might have had a hint of sensorial attunement to what this little beetle might feel. The helplessness and determination that coexisted, followed by joy and power when I finally made it to my feet*.

[5] We have used photos with copyright restrictions that allow the photos to be downloaded and used freely. However, the photographers should be credited.

Fig. 3 Crafting a stop moment with beetle and Rose, with Rose exploring the Little Transformer Beetle for Ecuador insectographic task offered during the workshop (Beetle photo by Katja Schulz on Wordpress, studio photo by Arne Hauge. NB: This beetle is not a Little Transformer Beetle from Ecuador, since it was not possible to find an open copyright image of that specifically)

3.2 Bumblebee and Tone Entangling in a Stop Moment

(See Fig. 4). *Meeting with the bumblebee through the film Helena sent completely choreographed my evening the day before the workshop. The bumblebee, the colours, the vibrations, the sounds, and the backgrounds caught my attention.* I am a bumblebee worker, a female. We are all females here now. My job is to find food for the "babies" of the queen. It is a busy life from day one. I was born without ears, just like the others, but we feel each other's buzz by the vibration of things and the air, and we have our ways to communicate. You see, we learn with each other by emulation learning… not like the honeybees… and we do not dance. For us it is all in the buzz… and scents. I have found this flower field where we, the bumblebees, can be all by ourselves – no one else is there – I guess it is because those flowers play hard to get. Their pollen must be shaken out of them with a buzz. It is some work, but one gets to be just us bumblebees around these flowers. We mark empty flowers with a scent to let the others know there's no food there before they start using lots of energy buzzing. One must vibrate and shiver the flight muscles a certain way – the right frequency… then all that lovely pollen falls out of the anther. Not many other insects can do that. *What I saw was buzz pollination, and in a flash (or flesh), I realized how sticky, messy and juicy the procedures of buzz pollination are. How hard the pollination is. A choreographic impulse popped up. The choreographic "popping" is completely embodied, more like a felt hutch than a clear thought. I needed stickiness, powder, messiness. An oily challenge. I found sugar, salt, turmeric, sand, a bottle of sunflower oil, four empty boxes and four trays for the oil. I was ready to take on the oily, sticky, vibrating, messy, sexy, and very determined challenge that the hard work of a buzz pollination bumblebee invites to.* And yes – the flowers are happy too because we carry their pollen to the right place – another similar flower. We take

Fig. 4 Crafting a stop moment with bumblebee and Tone, with Tone (and the rest of the authors) exploring the bumblebee insectographic task offered at the workshop (Bumblebee photo by Taylor Cowling on Unsplash, studio photo by Arne Hauge)

some pollen to feed our babies, and we help them make their own babies. Works for us.

3.3 Kung Fu Mantis and Arnhild Entangling in a Stop Moment

(See Fig. 5). In China, martial arts exist based on my movements – they call it "Southern-" and "Northern Praying mantis". *Sitting on the floor with crossed legs and eyes closed, I felt as if everything that was running in my life stopped, and I landed in the moment. I started to notice my breath going all the way down to my stomach as I moved and was moved, and how my bottom and legs became heavily rooted to the floor. I could sit like this forever, just sensing, feeling, breathing and being present in the moment. I felt hypnotized, just as if I was the prey of the Kung Fu Mantis.* I ambush the prey I patiently wait, slightly rocking my body and my head to detect movement in my surroundings… That's how I sneak into them … moving really slowly, so slowly that I look immobile… I keep my eye on the target… this way it won't dare move… and when I'm close enough - shush!… faster than your eye can see, I snap the poor thing with my forelegs - and it becomes my lunch. I have good stereoscopic vision – and that allows this hunting way of living. My mobile neck is also helpful as I can turn my head 180 degrees to roam the surroundings and have my body still at the same time … and all of sudden… This sure has spooked and "frozen" humans, as much as my prey! *From recently being the hypnotized one, I then felt the Kung Fu Mantis power of playing with and controlling its prey, and I really felt mindful and being present in the moment.*

Fig. 5 Crafting a stop moment with Kung Fu Mantis and Arnhild, with Arnhild exploring the Kung Fu Mantis insectographic task offered at the workshop (Kung Fu Mantis photo by Morteza Bach on Unsplash, studio photo by Arne Hauge)

4 Crawling, Leaping, Flying into an Insectographic Discussion

Within our human-insectographic stop moments, which are intersected and interjected with the filtered insect-voice from Helena, the ways in which insects might choreograph us are drawn out. The adaptation, morphing, and frustrations of the transformer beetle play out in movement that is laboured, the work, work, work, of the bumblebee fosters a choreographic "popping", and the attention and mechanics of a kung fu mantis reveals mindfulness. Within these movements and moments, and explorative co-creation, we sought to explore choreography not as an art form depicting an existing or pre-planned reality, but instead as a set of performative capacities that opened for bodily insectographic movement meetings (Leon, 2020; Lepecki, 2006, 2010). With the help of materials like self-selected soundtracks, high heel shoes, oil, sugar and spices, walking, crawling, running, jumping, and vibrating, we have sought to allow insects to choreograph us, becoming insectographic. Chittka (2004) offers the view that insect dances are windows into insect perception. Since we as human beings are differently bodied than insects, even though we can learn to know about insects' sensory modalities, we cannot perceive the world the way they do (Chittka, 2004; Nagel, 1974). However, the bodily exploration that arose when we allowed ourselves to be choreographed by bumblebees, little transformer beetles from Ecuador, and Kung Fu Mantis in this study created nearness, understanding and empathy with the embodied life, amount of energy, diligence, and ways of patterning that these little creatures perform. Somehow, the insectographic processes allowed us to touch their lifeworld, crafting with our bodies even for just a tiny, choreographic moment.

As choreography has gone through paradigmatic shifts, the human engagement and narratives about the insect world has evolved and shifted through times. Awareness of the role of these pollinators for human survival, among other things, is fuelling the new narratives of insects, while knowledge of ecology, sensory modalities and life strategies is showing us that we may be not all that different: for example, our sense of smell seems to be quite similar regarding fundamental mechanisms and construction (Hildebrand & Shepherd, 1997; Klein & Barron, 2016). We are also discovering that the "silent majority" of insects that fill the earth, do us only good and share with us the challenges of staying alive right now. We are maybe ready to meet the insects on a common ground and engage with each other in new ways. With this performative inquiry research project moving through stop moments, we have sought to explore and show how choreographic (crafting) tasks might prompt humans to engage with insects.

Insectography, taking part in expanding choreography, enables us to make connection to Braidotti's (2002) change of focus from being, to becoming. In our workshop and the choreographic tasks that evolved, we explored alternative choreographic becomings and insect-human spaces for us as nomadic, hybrid researcher-artists who are already involved in a process of becoming insectographic (see also Ferreira, 2015). At the same time, Braidotti's (2002, p. 169) notion of "becoming-insect" considers insectoid life in a way that allows transgressive possibilities through new alliances and assemblages. As Wilcox (2017) explains when drawing on Braidotti's notion, becoming-insect is "not in the service of utopian projects but rather to point towards heterotopic worlds of difference and multiplicity" (p. 28). Through choreographic tasks, we see that there is a potential to foster human engagement with insects. While this project is still within the early stages of development, with further explorations in workshops, discussions, readings, and writings to come as the project proceeds, we see that the insectographic offers possibilities for an expanded way of seeing, sensing, feeling, creating and crafting *with* insects. Ultimately, we offer the insectographic process explored in this study as a way of celebrating and extending ideas and practices of choreography as a way of crafting, emphasizing crafting as a two-way-process between human and more-than-humans. The interdisciplinarity of this project entangling expanded choreography, biology, post-human theories and performative inquiry with us, bumblebees, little transformer beetles from Ecuador and Kung Fu Mantis, suggests crafting as interconnectedness among species and extends choreography as a bodily performative process of re-shaping and re-crafting one another.

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Desire Lines as Artographic Crafting: Learning-With Wildlife in Rural Canadian Landscapes

Anita Sinner and Rita L. Irwin

1 Introduction

Our positionality between the animal, and the human animal, is intended to embrace how we are always co-mingling and co-habitating with multiple species. Much like Haraway suggests, our inquiry is guided with reciprocity in an effort to cultivate mindfulness that opens our conversation to how "companion species are ordinary beings-in-encounter" in our situated locations (2016, p. 13). This positionality is important to our artographic disposition that embraces commitments to learning, creating, and becoming that defy particular research methods in favour of continuous inquiry, ever open to emergence in coming to know our relations differently. In this way, we embrace crafting in form and content. We actively make objects (form), such as our visual expressions in relation to desire lines, as well as artfully recount stories of our process (content). As a pedagogic prompt, crafting together with deer and squirrels suggests a transference of knowing between, with recognition of ingenuity and of abilities that require connectivity and respect inherent in the exchange, suggesting a form of scholarship occurs as we learn together.

In tandem with wildlife, we act as custodians of the geo-spaces we occupy in this time and place, and it is with respect and embrace that we are co-evolving in the moment of the encounter to render heterogeneous assemblages. In this way, our conversation is immersed in thirdness, where we deliberately set out to perceive things differently through living inquiry practices: observing, caring, conversing,

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and documenting our materiality, technology, and organic and geophysical systems (Irwin, 2013; Triggs & Irwin, 2019).

We are further guided by Massumi's (2014) thesis in this inquiry, and while he asks what animals can teach us about politics, our proposition focuses on what animals already teach us about pedagogy, and why such questions matter in arts research (see also Fredriksen, 2019). Like Massumi (2014), we regard humans as animals, and explore the artful role of play, empathy, relationality, connectivity and creativity in our encounters. We consider again how and why we sense a proximity to, and distance from, our animal and human animal encounters, or what Massumi refers to as a continuum of differences in the process that takes into account affect theory, aesthetics and related conceptual potentials (2014, pp. 2–3). We extend this framework to becoming-contemplative, much as Zourabichvili (2012) suggests. We consider more fully the politics of educational inquiry, in particular the qualitative character of terms like sympathy, creativity, and perhaps most importantly in this conversation, play, as part of our thought experiment (see also Massumi, 2014, p. 3). Like Massumi, we are conscious of the close proximity such terms hold in the "accusation of anthropomorphism" (2014, p. 2). We remain heedful of the anthropomorphic, and take up this inquiry "(…) with the goal of envisioning a different politics, one that is not a human politics of the animal, but an integrally animal politics, freed from the traditional paradigms (…)" (Massumi, 2014, p. 2) which guides the artfulness that is our intended thought experiment in this chapter. In response, our animations are much like the rendering of artographic excess, as an excess of energy or spirit, where to venture along desire lines with intensity is an effort to disrupt educational discourse in speculative ways.

Ramsden (2017, p. 74) invokes 'desire lines,' an urban planning term, to denote paths created by animals and humans that diverge from concrete or paved roads and serve as the shortest and/or most easily navigated route between an origin and destination. Desire lines are also known as social trails, or colloquially, as a cow path or goat track, where the width and erosion of desire lines can be indicators of how much traffic a path receives. With animal and human animal connectedness at the fore, we explore our relationality as the desire lines that we encounter shape our ecological systems in ways that embrace mutual intra-dependence with other species. These other species are transforming natural materials as a crafting process, much as we continue to strive to characterise experiences with materiality in ways that bring more response-ability to art education (see also Haraway, 2016). Given that we have both lived much of our lives in close contact with nature, such habits of mind and body are not romanticised efforts to forge an alignment, but rather a commitment to ethical and sustained practices of learning-with, and sensorial forms of mattering with multispecies (Haraway, 2016).

2 Artographic Potentialities: Mapping Desire Lines

Inspired by our current encounters with nature, and our past engagements with improvisation (Sinner, 2017) and slow scholarship (Lasczik Cutcher & Irwin, 2017), we enter our artographic inquiry to "consider the conditions for language" differently (Massumi, 2014, p. 8). In part, we are seeking movements beyond the paradox of the limitations of language, to transcend the conditions that make for anthropocentric boundaries rather than continuums of difference. In earlier, historical approaches, artography has been rendered as a/r/tography with slashes to denote artist/researcher/teacher (see Springgay et al., 2005). The different typographic styles of the words artography and a/r/tography are not only a matter of writing, but also convey different meanings (LeBlanc & Irwin, 2019), including a/r/tographic propositions with walking (see Lee et al., 2019) and being-with (Irwin, 2013), among various perspectives. One abiding premise has been that it should not be stabilized, but rather seen as a living inquiry (Irwin et al., 2018). Artography is open to change and reconceptualization as theory influences how it may be pursued. For instance, over time, several scholars have experimented with adding identities, such as the notion of the artographer being a curator of sorts (e.g. McCartney, 2016). Indeed, Gouzouasis (2013) resisted the forward slashes (it is most often cited as a/r/tography) in an effort to create what he felt was a more holistic orientation. Having explored the inclusion of the slash to articulate a third space in-between identity constructs of artist, researcher, teacher with accompanying commitments to artmaking, inquiring, and learning (see Irwin, 2013; Springgay et al., 2005), and the dash as a conjunctive between these constructs (see Sinner, 2008, 2021), in this conversation, we initiate the potential of another distinction within the artographic opus. For this study, we are sensitive to the need to focus on the fluidity of concepts between and among the animal and human animal, and as a result, like Gouzouasis, we prefer to resist the forward slashes that tend to denote identities and human activities. After all, it is in our openness to the in-between spaces of all of our relations, that an artographic disposition (Leggo & Irwin, 2013) opens to the in-between 'and' spaces Ted Aoki refers to as vibrating between and among concepts permeating our relations (see Pinar & Irwin, 2004). We become alert to that which may have not been noticed before: the sensorial, the perceptual, the conceptual. The fluid potential of these in-between or middling spaces is abundant with possibility for rethinking our relations. In so doing, we continue to embrace the fullness of living inquiry through slow scholarship and contemplative dispositions (Lasczik Cutcher & Irwin, 2017) and invite other authors to think about how they would position their work within the overall idea of artography.

This approach brings sensorial possibilities to the fore, and presents another mode of crafting with neither the slash nor the dash, but the in-between spaces, or what Massumi refers to as the *included middle*, a space where differences come actively together and does not "observe the sanctity of the separation of categories, nor respect the rigid segregation of arenas of activity" (Massumi, 2014, p. 6). The vitality of such sensorial attunement with artography offers a productive portal for engaging in the

potential of nature and to articulate a creative commons with desire lines. At the same time it is possible to embrace principles of participatory bodies in movement, and learning in relation to the land, as the cultivation of ethical choices in research. Sensing each other's presence, as both animals and human animals, and sharing in desire lines criss-crossing our everyday moments, as artographers, we are noting, walking, anticipating, listening and keeping stillness as a necessary condition for blurring the borders between us and the other.

3 Deer Trails

In becoming-contemplative, I (Anita) turned to learning-with deer. During the pandemic of 2020, I remained deep in the rainforest of the far west coast of southern Vancouver Island where I reside in the off-season of the academic year. Formed from an island arc, the area is geologically distinct: the shoreline holds fragments of the ocean crust that remain from subduction. The inland is noted for mineral concentrations like quartz and copper that are layered with unique micro-environments of rich biodiversity, often described in lay-terms as a place with 'an unusual feel' (see also Yorath & Nasmith, 1995).

With a resident, multigenerational family of black-tailed deer led by an alpha doe, I map desire lines shaped by difference in repetition (see also Deleuze, 1994). In the radius of this inquiry, deer orient the landscape by adapting animal-human animal presence in eco-zones of forest, field and sea that trace plants, predators, water, berries and trees as a form of materiality in action. Within this fold, we as artographers may enter with a sense of pedagogies of care-full observation, in a protracted quest to learn outside of the regulated curriculum (Somerville & Bodkin, 2016, pp. 75–76). With extended exposure to the daily patterns of deer, in this experiment I follow their pathways, guided by Haraway's (2016) 'tentacular thinking,' in an effort to cultivate response-ability and re-orient my understandings of the land in accordance with their movements. By mapping our bodies in relation to networks, where our trajectories, patterns and lines are lived and form as stories of matter and mattering, and as a "practice of caring and thinking" (Haraway, 2016, p. 37), I venture at times when I do not interrupt their purpose during the early mornings and early evenings while they are grazing, sleeping, and socialising. Nor do I want to draw near, particularly during mating season. If they are suddenly absent, I elect not to walk, for absence is a good indicator of bears and cougars, and like the deer I am alert to potential encounters. For the most part, we—deer and I—walk frequently with the rhythm of seasonal vegetation, and seldom so in winter.

Mapping deer trails requires approximately an hour to wander, stop, consider, meditate, assess, make note and form constellations of crafting a routine that is systematic and repeating twice daily. Across the roadway, under the big leaf maple, to the fence along the perimeter, through the forest, around the bluff, scaling the steep rock to the tall grasses, resting for a time, then embarking down the roadway to the patio, down the stairs to the freshwater pond for a long drink—where I often

linger too—across the field to the bank, down to the seashore to explore, back up to the field—all the while grazing—returning up the far set of stairs, along the side of the house, to the forest once more. With minor variations, the repetition of this circular route ensures members of the small herd (from a couple to eight or more walking together) can canvas the new growth consistently and with precision. Yet it is in their repetitions that differences emerge. Their route is evidenced in the hoof marks and clusters of droppings along the way that help redistribute berries and seeds for the coming year, as well as map the continual intra-action of many more plants and animal species partaking in their desire lines. And notably, their desire lines incorporate human desire-lines as deer take formal pathways to access gardens and expedite movements, suggesting the deer are becoming something else also (see also Deleuze & Guattari, 2005).

3.1 Embodied Documentations

My efforts are not to imitate deer, but to play with spatial thresholds of proximity that inform how and why such sensorial vibrations inform thinking-with. To do so, it requires a re-visioning of the documenting technology, and to be methodologically consistent with the logic of thought. I shift between the eye view and a single-reflex camera that inscribes images with the work of a mirror, to digital video that I think of as allowing a kind of body-in-relation to the viewed perspective, or put another way, "a tool that invents" (Massumi, 2014, p. 63). Renderings are then made with improvisational gestures when attaching a go-pro to the head, arm, leg or foot. Reviewing hours of visual data within this archive of practice attends to encounters with my senses (which unlike deer I cannot always readily detect) of touch, sound, smell, and taste, as well as seeing. From the video, I distilled a triptych to map deer trails in the ecozones of the forest, field and sea, with unexpected perspectives emerging in this series from my forearm (see Fig. 1).

Embracing uncertainty as a photographer, with a sensation of the body passing through, the blurriness and messiness of micro-moments, when enfleshing with salal,

Fig. 1 Ecozones, October 2020 (video stills by Anita Sinner)

enmeshing with variegated grass, and entangling with seagrass. Each zone independently and collectively invigorates how deer are continually bio-crafting, socio-foraging, and politically enacting sustainability for the well-being of this landscape. It is from this understanding that flexible and responsive processes become a form of geostorying (Haraway, 2016), and my wayfinding brings new constructs to the fore in changing seasons, light, climate and more, along desire lines that have no beginnings or ends, and no conclusions (see also Clarke, 2017).

This triptych serves as "a changing field of reciprocally presupposing differencings" (Massumi, 2014, p. 3) that activate mutual inclusion as we "enter into a zone of indiscernibility," (Massumi, 2014, p. 6) where deer-human relations intensify the scene by co-mingling, co-evolving, co-creating in respective movements. Massumi (2014, p. 12) suggests that such play is "a veritable laboratory of forms of live action" where learning serves adaptive ends. As I continue to unpack mine and the deer's sensorial encounters, I come to wonder: Is co-habitation a form of trust?

We are careful in our actions with species, always aware that we are moving beyond typical subject boundaries to propose another way of enacting our educational prerogative with desire lines. In this way, desire lines are akin to assemblages, continuously mingling, active and transversal, a configuring of meshwork that weaves trails with the nuance and textures of geographies of self-in-relation. For Deleuze and Guattari (1994), such becoming is always double, where we overlap with another.

How might we reconsider our everyday assumptions that shape intra-actions as mutually inclusive? And, might there be a pedagogy of possibilities emerging in response to our changing ecological modes of becoming-with?

4 Squirrel Routes

The 2020 pandemic created many changes and for me (Rita) that included an unanticipated four month stay on a family farm on the northern Canadian prairie. Far from my urban home, the region was safe from the virus and opened up unexpected opportunities for learning-with domestic and wild animals. In particular, the activities and desire-lines of a single squirrel became daily delights not only for the squirrel but also for me who became enthralled with his performative engagement in the treed landscape. Emerging from bushes after carefully surveying the field, he would dart across the grass to a particular tree and check again. Standing upright and intent on seeing and hearing his field of vision, he would decide his next move. Often darting to the next tree and surveying again, he would trace and retrace his desire lines up and down particular trees, and between them. Yet the route that mesmerized me the most was the one taken in the canopy of tree branches as he ran across them, jumping from branch to branch, with hardly any notice. Following these desire lines, dozens of times a day, became a great curiosity for me. I soon began leaving him peanuts at particular locations along his route and took delight in watching him find them. After some time, I was surprised to find a gift left for me at one of my peanut leaving locations. I instantly recognized it as a gift from the squirrel because it was exactly

where I left a peanut. It was made of natural materials matted together. What did this mean? Was it in appreciation for my gifts left for him or was it an exchange for even more? Or, was it something else? Over the next month or so, I received four such gifts about a week apart. They were always matted materials and never quite the same as the last. I was tempted to retrieve them as aesthetic objects but chose to leave them and eventually he recovered them. Yet, I felt their value as gestures of our relationship, and from a human-centric focus, as gifts.

These nest making materials are vibrantly material (Bennett, 2010) as part of an intraspecies reciprocity. From this perspective, these matted materials are at once alien and common, making them too far and too close to be clearly seen and understood. In acknowledgement and regard for the thing itself, there is also fear of the unknown materiality of the thing. As I began to dwell with the ontological storying of these matted materials, I began to recognize the ecological intensity of the living assemblage of connections around me. Were these discarded items or objects to be appreciate? Were these things to notice or things to ignore? To me, they held a thing-power because they provoked my attention and they commanded my engagement beyond them as things, to something more than things. After all, these matted materials were not only things to be noticed, they were things delivered through desire lines traversed over and over again by a squirrel. The desire lines also held thing-power. Both the matted materials and the desire lines commanded my attention and drew me in to think about the agential nature of every thing, every matter. As I began to appreciate this assemblage of matter, I recognized the rocks where I placed the peanuts, at one time chosen for their size and beauty, but now recognized as stops along desire lines. I recognized the larger ecology of the farm itself. Admittedly there were times I also followed the desire lines of cattle, even deer and moose, and those made by family members. Yet it was the squirrel who caused me to think again and again about my relationship with nature, the non-human, and the ecology of matter (Fig. 2).

Becoming-contemplative within an artographic disposition (Lee et al., 2019) I realized my photographic practice offered opportunities for me to imagine an inter-species ethics. While there is an immediacy within thing-power to notice the thing in a particular time and place, the artist and pedagogue in me wants to think again

Fig. 2 Vibrant materials, October 2020 (photographs by Rita L. Irwin)

and again on these moments. Photographs return me to those moments and provoke me once again, often with similar intensity. Through images, my commitment to making, inquiring, and learning (Triggs & Irwin, 2019) between and among animal and human animal bodies and the desire lines became evocations for co-creating and co-learning with wildlife (Massumi, 2014). As I review these images I wonder: Does the squirrel recognize our shared desire lines as shared reciprocity? How might we co-create materials shared among human animals and non-human animals? How might I change my educational practices to embrace the ethical and political dimensions (see Lindgren & Öhman, 2018) as we imagine alternative pedagogical approaches to animal and human-animal relationships in a variety of curricular settings? Perhaps more importantly, how does my new attentiveness to the natural world inspire me to be more critical of my daily actions and the potential harm they may engender? The squirrel is a wild animal that co-exists with me and others on the farm. I am enthralled with what we were able to craft together, in relationship, yet I need to respect his needs as I respect my own. Adopting a position of questioning taken-for-granted assumptions will need to continue.

5 Desire Lines: Initiating Propositions for Sensorial Artography

We locate our inquiries in the contours of our artographic conditions, in relation with animals *and* notions of differences, the production of differences, and evermore variations that activate differences in the moment of the encounters (see also Massumi, 2014). Our response-ability focuses on learning how to engage with species (Weisberg, 2014) as an enactment of presence and absence where we continuously attend to sensorial knowledge by posing experimental 'what-if' questions, for as Haraway (2019) suggests, it matters what stories tell stories.

Learning-with animal and human-animal bodies offers speculative possibilities upon a spectrum of thirdness, and we are actively engaged in the porous conditions of emerging ecologies of sensible practice. In so doing, we strive towards *en*-crafting all our relations (Massumi, 2014; Todd et al., 2016). In coming to be (en-), we are making, doing and thinking as an activation—our crafting together. Perhaps in play we nurture new habits of projecting alternate pedagogic imaginaries, where we seek ways to dislocate and disrupt what we know and the educational contexts within which we know, to create a more speculative, contingent and immersive condition where not knowing is intentional, always reformulating understandings in the moment. In this case, we embark on 'world-making' with bodies, materialities, differences, intensities, and excess, in contact zones that draw out aesthetic forms of engagement with politics, ethics, environments, technologies and more. By questioning the human and moving to an animal and human animal relation, our desire lines reveal how and why our attachment to sites contributes to the worlds we make.

Such world-making is formed by attentiveness and responsiveness, where our differences are enmeshed with multi-species. By engaging in the conditions that surround us during such spatiotemporal production, our purpose is to open the concept-creation of desire lines as propositions for caring, responding, and envisioning possibilities together (Haraway, 2016).

The emergence of sensorial artography is a catalyst for such creative ecologies, where materialising moments are co-constituted acts and actions with our multi-species kin, as Haraway (2016) advocates. Perhaps in turn our art education classroom of tomorrow moves beyond institutional walls and becomes a site of possibility spaces, an artographic inscribing with geo-stories as ways of proceeding, where materials prioritize ecological renewability as the goal of the curriculum, rather than emphasizing mastery of techniques and mediums. Perhaps a visioning with the abilities of natural systems, where desire lines are pathways to another (speculative) configuration is a worthy deliberation. This is in part our pedagogic imaginings with desire lines, yet to be mapped. As art educators, we continue to cultivate such relationality with a disposition of artisans, and we continue to practice our crafting together.

The vitality of art and education, and the contingencies of situatedness suggest that the resilience of artography resides with living inquiry–our reciprocating energies in action–in becoming-with the environment. The fluidity of our artographic inquiry remains ongoing, unfinished, and ethically so, for as art educators our curiosity with desire lines is premised on how such encounters with materiality remake rural landscapes. Continual processes of reshaping and recrafting conditions of learning-with our networks of relations can transcend traditional pedagogic boundaries to embrace more-than-humanness as a situated and transformative affect and an intimate gesture with materiality. In artographic excess, our text and texturing of creative relations serves a wider methodological assemblage, and an aesthetic embrace of animal and human-animal practices. In desire lines we share with, and synthesize different bodies of knowing, sensing and living our entanglements in the world. Artography enfolds such practices with sustainability, and in turn, evokes more expansive dispositions of crafting-with the environment.

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Crafting-*with* Other-than-Human

Ecological Awareness with and Through Human and More-Than-Human Efforts of Embracing a Former Gravel Pit

Helene Illeris

1 Landscape and the Disappearance of Land

It is the first day of December. I am leaving my house to take a walk. When crossing my doorstep, I already know where to go. These last months, I have become addicted to my visits to the gravel pit. I need to be with her, to make her move my body, to see what kind of mood she is in today, to experience her kind of body close to mine.

This afternoon she is really dark, cold and humid. No trace of friendliness. She just lies there with her dark green water, gravel paths, and small, thin young trees fighting to survive in the arid terrain, growing slowly and without conviction. When I enter her realm, I immediately feel different. Her darkness and depth open towards my body, embracing it, making me become a part of her immobile way of being, blurring the boundaries between us.

"A landscape contains no presence," writes the French philosopher Jean-Luc Nancy, "It is itself the entire presence" (Nancy, 2005, p. 58). According to Nancy, *Landscape* is an image, a representation of an absence. When Christianity drove the pagan Gods out of nature, humans belonging to Western civilizations lost their grounding in the material world and were left alone with a strange, empty space, dominated only by the always moving line of the horizon. Landscape "opens onto the dividing up and sharing out [*partage*] – of the sky and the earth, of the clouds and the oaks – that it itself is, the separation of the elements in which a creation always consists" (Nancy, 2005, p. 60). What disappears with the birth of Landscape is the presence of *Land*, which Nancy (2005, p. 56) sees as "the set of forces that play off one another, against one another and in one another", and to which, according to the Norwegian professor of urbanism and landscape Janike Kampevold Larsen (2013, p. 84), "the modern era provides no immediate relation, […]no unmediated

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reciprocity". In contrast to Landscape, Land contains a diversity of voices, vibrations and agencies. Land is alive, although on a non-human scale. But how can we, as daughters and sons of Western modernity, find ways to relate to it, having lost our access to our remote pagan Gods?

In this essay I explore my efforts to embrace a recreational area, a former gravel pit, as Land. The inquiry is part of a larger study aimed at producing knowledge about how ecological awareness can be practiced in sustainability art education[1] (Illeris, 2020). By "ecological awareness" I intend an increased sensibility towards how we humans exist as *earthlings*, as bodies that are basically made of the same substances as animals and plants, soil and gravel. Following the British philosopher Timothy Morton, I connect ecological awareness to a sense of intimacy "a sense of being close, even too close, to other lifeforms, of having them under one's skin" (Morton, 2013, p. 139). While acknowledging our common history of estrangement towards each other, I want my body to become Land, and I want Land to come alive with me.

2 Living Inquiry

In my explorations I adopt a sensory-based, auto-ethnographic approach inspired by a/r/tographic fieldwork and living inquiry (Pink, 2009, Springgay & Truman, 2018). By "living inquiry" I intend an experimental form of ethnography where movement, learning and the creation of meaning are entangled in processes of creation. Instead of the "discovery" of preexisting "facts", just waiting to be dug out by the researcher, in living inquiry, movements and actions in and with the world create new realities in ongoing processes of crafting-with reality (Illeris et al., in press; Springgay et al., 2005).

On an almost daily basis, I make small expeditions to Himmelev Forest, a recreational area established in 2003 on the abandoned site of a former gravel pit and adjacent walking trails, covering an area of approximately 140 ha in total (The Danish Nature Agency, 2017).[2] On my excursions to what we as locals still just call "the gravel pit", I use my body to approach the area in different ways. By walking, sitting, lying on the ground, listening, watching, sensing, writing, photographing and filming, I experiment with how I can craft connections to the land which challenge the ways in which I usually approach it on my walks. With my moving body I try to embrace the former gravel pit through ecological forms of awareness, including intimacy and affect (Illeris et al., in press).

[1] Following Sterling (2009) I prefer "sustainability education" to "Education for Sustainable Development" (ESD) in order to keep a critical distance to educational policy documents connected to ESD.

[2] The plan of the Danish Nature Agency, in alliance with the municipality of Roskilde and the private company HOFOR—Greater Copenhagen Utility that uses the area for the supply of drinking water to the Copenhagen metropolitan area, is for Himmelev Forest to be enlarged over time to a size of ca. 300 ha.

As part of my inquiry, I relate to the history, geology and ecology of Danish gravel pits. Without pretending to generate new knowledge in research fields far from my own, these readings help me to challenge my immediate experiences with the pit and connect to the broader societal and natural processes of Land and Landscape. As Morton (2018, p. 128) writes, ecological awareness is not only about intimacy, it is also about trying to connect to the many, apparently incompatible, time formats present in more-than-human forms of existence. In fact, when I connect to the pit through geology, I slowly begin to perceive the deep time of the becoming of the surface of the Earth. Through readings in history I connect to the accelerated time formats of modern industrial excavation processes, and by connecting through biology, I become attentive to the vulnerable time of biological lifeforms, re-emerging in the pit after its closure.

In order to present the multiple entrances of my inquiry, this essay alternates between short auto-ethnographic narratives, text-based studies, photos and a short film. In this way I hope to create an intertwining of languages able to capture and co-craft my efforts to embrace the Land. In conclusion, I offer four propositions for working with Land in sustainability art education. In this way I hope to leave the reader with an openness towards the potentialities of embracing the landscapes that all of us are entangled with in one way or another.

2.1 Landscape

It is a late afternoon in the beginning of January. I walk through the area of the former gravel pit with my camera. Like always she soaks up my human presence like a sponge. While moving forwards, I can see how the lines of the perspective draw me towards the line of the horizon, produced by my habitual glancing in front of me as I walk. As usual, I take some snapshots with my phone to see if I can catch the beautiful, soft winter light. I notice how the pictures reproduce landscapes in the conventional sense of looking: in the foreground the solid land, in the middle ground the central lake with trees and bushes, in the background the borders of the pit encountering the always cloudy winter sky. Through my eyesight and upright, bipedal walking, I see how I craft the gravel pit as an image. Instead of Land, Landscape is reproduced over and over again in the pictures of my camera (Fig. 1).

2.2 Land

As the low sun disappears behind the slopes and it gets darker, my attention slowly changes. The dark warm colours of the cold landscape intensify and become deeper and deeper. I begin to lose my ability to see what is in the distance. The horizon is lost. Now it is all about process. I look downwards and my gaze is absorbed in the movement of the ground encountering my feet. I perceive how my skin and lungs

Fig. 1 Landscape (Photo: Helene Illeris)

capture the cold and humid air as I breathe. The air becomes a part of my body and so does the smell from the putrefying black leaves on the ground. Breathing in and out, I feel how my skin begins to smell like the black, wet leaves on the ground. The sound of the humid putrefying substance is a deep dark tone of unbecoming human, at least in the strict sense. My moving body is taken over by processes belonging to Land. There is no landscape any more, the pit is just a black scar in the skin of the earth. The forces of Land transform me, crafting me into something different than a passer-by, something heavier, more earth-driven. The lens of my camera in front of my eyes moves away from what is left of the horizon and I begin to take pictures of the ground, of the stones, the mud, the water (Fig. 2).

3 Gravel Pits

My pit is one among many gravel pits in the area, lying almost side by side, some still active and expanding, most of them closed. When I first moved to Trekroner, a suburb outside the city of Roskilde in Denmark, I was not aware that this municipality is the biggest supplier of gravel in Denmark with more than 3 million m^3 extracted per year (Statistics Denmark, 2020, July 1). During the twentieth century, the demand for construction materials grew rapidly, and still more pits were opened around Roskilde, wherever the farmers were willing to sell their land. Over a short period the landscape changed from flat, fertile grain fields to an industrial area with huge machines, roads and railways. Later on, when one after the other the pits were emptied, a raw and naked landscape appeared: No vegetation, no soil, only a surface scared by dark, gaping holes was left behind, while the sand and gravel they once contained was

Fig. 2 Land (Photo: Helene Illeris)

now encapsulated in constructions made of concrete, cement and asphalt (Eisen, n.d.).

Once emptied, local inhabitants and industries were tempted to use the pits as waste dumps, and the area southeast of Roskilde became one of many wastelands produced by human exploitation and subsequently defined as empty and unproductive by local authorities (Hoag et al., 2018, p. 90). However, following new political trends of environmentalism, around 1975, the idea of reclamation was introduced, and in 1977 the first recreational area, Hedeland (i.e. Heathland, in Danish), was opened.

The transformation of the gravel pit into a recreational "forest" happened only after I had moved here in 2000. In the 1990s the pit was emptied and as the extraction of gravel slowly subsided, the former pit has transformed into what the Danish Nature Agency (n.d.) defines as "two beautiful lakes". In 2004, more than 200,000 trees were planted around the lakes and in the adjacent areas. Following recent trends in reforestation, the trees and bushes have been planted directly in the poor soil where the moraine clay has been mixed with gravel and sand. This anthropogenic bioturbation means that the trees grow slowly and that some of them will probably die (The Danish Nature Agency, n.d.). The advantage of not adding topsoil before planting is that the former gravel pits are poor in nitrates but rich in minerals (Olsen & Hansen, 2011), and thus provide a much needed contrast to the intensively cultivated and nitrate-rich areas that cover more than 60% of the ground in Denmark (The Danish Society for Nature Conservation & Animal Protect Denmark, 2018). Today the new forest hosts many threatened species of insects, birds and plants, for example the pallid harrier (*Circus macrourus*) and the protected bee orchid (*Ophrys apifera*) (The Danish Nature Agency, n.d.). From an educational view, another important advantage is that the geological, industrial and ecological history of the area remains perceptible and can be traced empirically through direct sensory exchanges.

3.1 Multi-Species Assemblage

When, a couple of days later, I return to the pit after having read about her history, my attention is focused on the physical traces left by the exploitation of the land. My eyes and body search for recent geological signs: How much is left of the topsoil? Where does the layer of gravel start? While I make my way, crisscrossing the terrain, I can almost hear the sound of the huge excavators removing the 10 m deep layer of black moraine clay deposited through thousands of years by the forests that grew following the glacial period. With my inner eye I can see how the soil is transported away on big trucks driving up and down on the old access road at the southernmost part of the pit—the only asphalt road accessing the area.

The slopes are muddy and it is difficult to walk off the trails, but when I reach the path along the lake, I am able to move faster. At the border of the lake I sit down on the humid ground and observe how moss and herbs have found their way through the gravel. I try to imagine the naked desert that was left behind when the excavators withdrew after the surface of the ground had been removed and the formlessness of matter revealed. At the same time, though, I am also aware that in this moment I am approaching a new and fragile multi-species assemblage, which could not have come into existence, were it not for the poor soil of this poor and damaged land (Fig. 3).

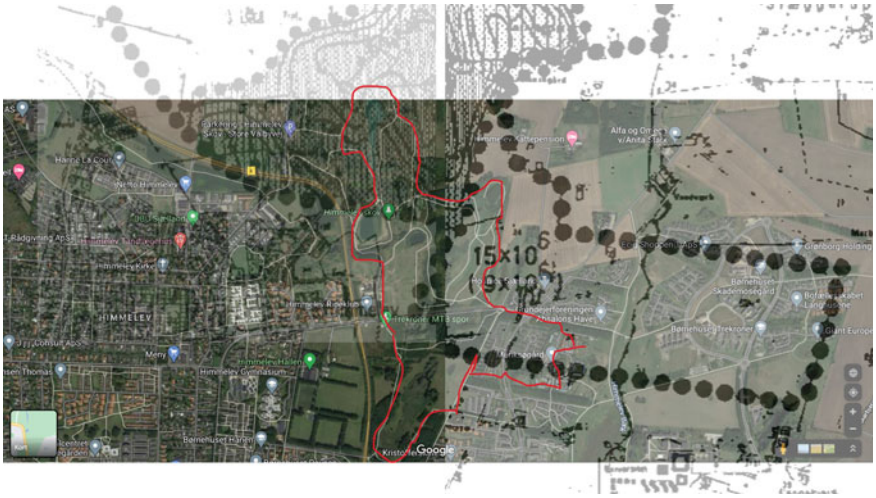

Fig. 3 Artistic sampling of images showing different layers of Himmelev Skov viewed from above: aerial photo, geological structure, and my usual walking route (in red) (Image: Helene Illeris)

4 Deep Time and the Anthropocene

Deep time is a planetary temporality scale. As far as the official geological time scale (GTS) is concerned, deep time began with the birth of the planet some 4,6 billion years ago. Although the sedimentation of the gravel goes back to the end of the Weichselian glacial period (115,000 to 11,700 years ago), the geologic history of the area around Roskilde Fjord is still close to "no time" when seen from a perspective of deep time. When the ice around Roskilde Fjord began to melt around 25,000 years before our present time, the meltwater deposited layers of gravel and sand which later were covered by a layer of moraine clay (Houmark-Nielsen, 2016). When it comes to my pit, the gravel extracted was part of the Himmelev Formation, a 17 m deep layer of gravel and sand, sedimented by rivers of meltwater in a system of intertwined rivers, delimited by stagnant ice (Jacobsen, 1984, s. 71–72).

A number of researchers (e.g. Larsen, 2013; Morton, 2013) see the connection to deep time as a possibility for humans to increase their ecological awareness beyond romantic ideas of nature as an antithesis to man. The geological term "Anthropocene" is currently used to indicate how the great acceleration of human activities since World War II is dramatically changing the conditions of planet Earth, and how we are already living on a qualitatively different planet than the generations just before us (e.g. Jagodzinski, 2018).[3] While most of what humans think we know—and even our ways of knowing things—is deeply embedded in a pre-Anthropocene, stable worldview, the Anthropocene is not only a name for human geological dominance, it is also the name of the collapse of the whole idea of humans as separate from other "natural phenomena" (Latour, 2017). The sharpened attention towards deep time is thus inevitably a sharpened attention towards our own increased vulnerability. A couple of decades ago, very few of us even considered that land could have any other value than as a resource for human needs. Now the forces of Land are talking back, and we need to train our senses anew in order to perceive what the environmental anthropologists Nils Bubandt and Anna L. Tsing (2018, p. 3) call "the feral dynamics" of how emergent ecologies "are produced in the post-industrial scarred landscapes of the Anthropocene".

4.1 Intertwining

My back is getting cold. While lying on the ground, I feel gravity. I feel more-than-human forms of existence all around me. I perceive the clothes I wear as a shield between me and the land: plastic and polyester, viscose and cotton, leather and wool. Protected by all these non-human forms of existence, my skin does not directly touch the ground. I take off my woollen gloves and my hands begin to touch, to explore.

[3] In 2016 The Anthropocene Working Group (AWG) within the International Commission on Stratigraphy recommended a formalization of the Anthropocene epoch beginning from the middle of the twentieth century (Waters et al., 2016).

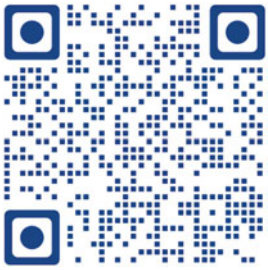

Fig. 4 Entangled movements of sand, mud, water, ice and my own moving body, film Helene Illeris

Closing my eyes, I let my hands search for a deeper contact with this layer of old gravel, moved forward by the ice front. I sense that the pebbles are different: granite, flint, black, grey, brown, round and smooth or edgy and rough. Together with the sand they constitute a hard surface that rejects my hand.

Protected by my rubber boots I let my feet take a step into the water. They are getting cold as they sink into the muddy sand. The lake bed is sticky. A thin layer of ice breaks as I walk. In addition to the monotonous sounds from the cars on the highway, three sounds mingle in my ears: the "slurp" my boots pulling out of the lake bed with each step, the water moving around my legs and the thin ice breaking in front of me. At each step black mud from below the lake bed swirls under the thin ice in front of me. I forget the sounds and my cold feet as I admire the beauty crafted by the intertwining of my steps and the thin layers of sandy mud covering the lake bed below the shield of the breaking ice (Fig. 4).

5 Aesthetic Connections

The aesthetic experience is about solidarity with what is given. It is a solidarity, a feeling of alreadiness, for no reason in particular, with no agenda in particular—like evolution, like the biosphere (Morton, 2018, p. 121).

When Morton (2016, p. 9) writes that one of the greatest myths of modernity is that the idea of "space" as a homogeneous and empty container has conquered the specific, localized experience of "place", he is entering the same realm as Nancy (2005) writing about the difference between Landscape and Land. One could also say that both authors are arguing for a different approach to aesthetics than the idealistic one forwarded by thinkers such as the philosophers Kant (2007) and Schiller (2004). While Kant's idea of beauty was connected to establishing the "right" distance between human beings and their surroundings (Morton, 2007, p. 28), the challenges of the Anthropocene calls for different conceptions of time and space. Conceptions able to help us open up towards different formats that are not limited by human senses and the human lifetime. Formats that we can hardly perceive.

Through living inquiry I have tried to give new directions to my sensory experiences and thus to aesthetic relationships. I have studied the phenomenon of gravel

pits just in order to let go of it and connect to unfinished, uncircumscribed sensations of intimacy and solidarity without empathy or identification, and to explore ecological awareness. To adopt different approaches to what I am used to understanding as "surroundings" or "environment" is not an easy task. After two centuries of modernity, after five centuries of perspectival representation, and after 150 years of violent abuse of landscape as a "resource" we need to experiment with new forms of being and working with the earth, *as earth.*

Morton (2018) puts forward the idea that art and aesthetic experiences will be crucial in the creation of such new relationships. My experiments with embracing the pit might be seen in this light—as exercising solidarity with what is given. As a search for a pedagogy of the Land.

6 Pedagogical Propositions for Practices of Ecological Awareness

In the beginning of this essay I wrote that my ambition with this text was to get closer to an understanding of how ecological awareness can be practiced in education. From this perspective my ongoing expeditions to the pit are an exploration of how to craft relationships with non-human realms. The combination of living inquiry and readings in geology, anthropology and history has been a personal learning experience that I would like to share as an example of an educational approach.

Inspired by the directors of the research network WalkingLab, Stephanie Springgay and Sarah E. Truman (2018) I will end this essay by offering four propositions directed at educators, students or others interested in sustainability education, ecological awareness and crafting new ways of embracing Land. The American philosopher Alfred North Whitehead (1978) coined the idea of propositions as a way of opening human minds towards the relational potential of the world. In the words of Springgay and Truman (2018, p. 130), Whitehead states that "propositions act as hybrids between potentiality and actuality". Also referring to Whitehead, educational researcher David Rousell and his collaborators define a proposition as "a theoretical lure or provocation that combines virtual potentials of the speculative imagination with the empirical dimensions of embodied experience in the actual world" (Roussel et al., 2018, p. 25). Put more simply, a proposition is meant to open up complex and imaginative engagements with the world with no particular outcome determined in advance. Pedagogically speaking, this means that while usually assignments are given to students to make them understand the world as stable and transparent, propositions offer an entrance to the world as an ongoing process, a *worlding*, of which they themselves are an inseparable part (Manning & Massumi, 2020, p. 8).

In practice, propositions are often formulated as small texts, which are born through an iteration of exploratory behaviours (Roussel et al., 2018). When working with living inquiry at the university, two of the statements that I use in my presentation of propositions to the students are that "a proposition is an occasion to experience

sensuous knowledge in the making" and "a proposition is a practice, meaning that you can only create propositions by practicing them yourself before you offer them to others" (Illeris, 2022, p. 187). From my efforts of trying to embrace the gravel pit as Land, four propositions have emerged, which I will now offer to the reader as possible openings towards more ecological ways of encountering a place or a site.

Proposition 1 *Find a place where you feel embraced. Preferably outdoors, possibly with traces of"nature" understood as biological life (soil, plants, insects etc.). Try to connect to the place as a partner. Ask "her" or "him" about her name, talk to her, invite her to speak in her own language.*

This proposition is an invitation to open human awareness to possible encounters with a place on an equal footing, as partners. The personification through naming is a basic way for humans to connect to non-human forms of existence such as objects, animals and places. To me the idea of "The Gravel Pit" as a name (or nickname), instead of the official "Himmelev Forest" is important, as ordinary as it might be. The same counts for my use of the personal pronoun she/her. When it comes to the pit she communicates by different forms of embrace, allowing me to tune in to her by responding in different ways. Although withdrawn from human ways of being, she offers me a fragile feeling that we are reaching out towards each other, that we are sensing each other's rhythms and intensities.

Proposition 2 *Connect to the place through all of your senses. Listen, touch, smell, taste, look, feel. Instead of interpreting the place as something exterior, a "surrounding", create your being together as a unique becoming, a crafting-with.*

A way to get closer to each other is through the senses. How do humans and places sense each other? Do they smell each other? See each other? Bend towards each other? How do they touch? By giving time to slow sensory approaches, and by overcoming the human discomfort and embarrassment that can be connected to such patient bodily explorations, humans might be able to craft a relationship to Land as a living, breathing phenomenon that we are an integrated part of.

Proposition 3 *Explore who your partner might be. Search for her history, physical composition, temporality formats. When you are there, try to imagine how she has moved with time and space.*

Ecological awareness in the Anthropocene calls for non-homogeneous conceptions of time and space that we as Modern humans can hardly perceive. Morton (2018, p. 126) writes that "time flows from things" and that "everything emits time". In order to come closer to non-human temporality formats we have to train ourselves to relate to the deep time of geology as well as to the more ephemeral temporality formats of biology. Together with our partner we need to train both our perception and our imagination: Who are we now, who have we been and how will we as life forms intertwine in an imagined future? What are our potentialities?

Proposition 4 *Experience what you can learn from just staying together in this slow, patient manner. Can you sense how ecological awareness might unfold? Maybe you and your place want to craft something together while you are together? Create pictures, sound files, poetry?*

In contemporary societies most educational practices are directed at some form of production. Often they are directed at a predictable result that can be measured or tested (Biesta, 2009). Trying to experience the world in new ways through offering propositions to each other is not a part of this kind of schooling, and in most countries ecological awareness is not a recognized learning goal. However, crafting in the physical sense of producing forms of existence, that are also perceptible to others, might be a way of increasing ecological awareness pedagogically. In my own case, writing, photographing and filming while I was visiting the pit became important ways of creating something "together", trying to capture our relationship. In educational settings I have seen how students choose just to take a few "ordinary" snapshots or to bring back some "random" things, a straw, a stone, an empty beer can. For Modern humans *Crafting-with* a place is not a refined aesthetic activity like it might be for humans of ancient or indigenous cultures. New forms of crafting-with a place are yet to be developed and rediscovered. In educational settings ecological awareness should be explored with humility and solidarity towards the seemingly forgotten existence of Land behind the infinite number of images of Landscape.

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The Many Lives of a Tree: Speculative Fabulation on Environmental Reshaping Processes and Their Discursive Symptoms

Ana Sarvanović and Milica Ivić

1 Introduction

In order to tell this story, we will focus on the oak tree that was submerged for centuries at the bottom of the river Kolubara, in Serbia, transforming over the years into the so-called black oak and becoming the raw material for Milan's giant sculptures. Milan Stanisavljevic[1] is a self-taught artist and one of the most significant sculptors of naive art in Serbia. Together with his father Dragiša, he began creating in the 1950s. His works are large in format, fascinating and complex in form with recognisable symbolic content (Kosenko Maširević, 2017). Since Milan's first exhibition in Belgrade in 1964, when he was 20 and officially entered the world of institutionalised art, he has participated in hundreds of solo and group exhibitions. From his childhood he witnessed long tree trunks of 10 to 40 m being found in the river close to his village, where local people were collecting firewood, gravel and other materials they needed in everyday life. The wood was part of a given material reality, but unlike other locals, Milan and his father began their crafting interaction and transformation of the found wood as a purposeless and inexplicable activity.

As art educators and researchers eager to understand a wood sculptor's process of crafting, we asked Milan to meet us. We met in his atelier in Belgrade on the penthouse of a skyscraper, where he lives and has worked for many years. Large bird sculptures were also part of the meeting. However, the dark wood the sculptures were crafted in, influenced the direction of our conversation. In Milan's vivid narrative he explains

[1] Milan gave his consent for the use of his name and works in this text.

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that the black oak was formed by the force of the river, which hit the river bank and knocked trees down on one side of the river. The water then pushed the trees over to the other river bank and covered them in mud as it flooded the surrounding fields. The trees were hidden in the muddy soil for thousands of years, until humans found a way to disturb their hibernation and Milan woke them up with his chisel. Milan's descriptions of his intimate relationship with the old, carbonised wood intrigued us and irreversibly enchanted our imagination about relations between the mentioned and yet unknown actors of Milan's story. We indulged in following those actors—those *wild facts* "who won't hold still" (Meiresonne & Terranova, 2016)—through an approach that Haraway (2016) calls *speculative fabulation.* A speculative fabulation can be full of creatures of imagination, critters, who may not even exist, and can be told in a way of everyday storytelling (Meiresonne & Terranova, 2016). Speculative fabulations do not submit to strict academic rules (ibid.), but have potential to engage readers and challenge their present understandings and values. Our fabulation about the black oak, however, does not build on wild imagination, but combines scientific facts about chemical and other processes in nature. The speculative character of the fabulation concerns our choice to puzzle together different types of knowledge into a coherent narrative that could not entirely be viewed by a human, both because the places where the fabulation was taking place (under water, in mud etc.) were not accessible to humans and because of the differences in humans' and the wood's lifespan (Fig. 1).

Fig. 1 Milan's atelier (Photo: Ana Sarvanović)

In direct contact with Milan's works, we toured around the sculptures, tried to hold around them with the span of our own outstretched arms. We imagined the size and scope of the trees from which they were sculptured. We noticed that the materiality and sturdiness of the black oak, as well as details in it, preconditioned some of the forms that came out as a result of Milan's crafting; the bird's wings of a sculpture were transformed tree branches, and an eye was formed from a wood knot. Apart from our imagination—*wild facts*, this story is based on a certain amount of *still facts*– photographs that show Milan's direct interaction with the wood.

In one of the photographs, we see the yard of a rural household, a young man, a sculpture, a mother, and a cow. The sculpture is a strange addition to the ordinary rural scene. In another photograph, from 1969, there is a young man with a chisel pointed upwards, next to an upright sculpture made out of a tree trunk. The sculpture is twice as tall as the man, overhanging the roof and chimney of the house in the background, exceeding the volume of the human body. Although it is an indirect deduction, it is clear that the making of the sculpture required a concrete investment of strength in different body positions. We can imagine that the sculpture is lying on the ground, that a young man is stepping on it and swinging a tool. We can imagine the time it takes and the sounds of the persistent digging of tools into the material during the birth of the sculpture. We later learned that the sculpture is called *Giving Birth to Oneself* and is 3 m high and 1 m wide. Today, this sculpture is a canonical example of *art brut* practices from this area.

Observing these photographs helped us imagine Milan's efforts, but only he, through embodied experiences, got to know the wood. He told us that the black oak has more the characteristics of coal than of wood. When we later looked into coal mining, we discovered that the mining company *RB Kolubara* extracts significant amounts of coal from the mining basin, close to where the black oaks were found, by the river the company was named after. This is one of the most significant opencast mines in the region,[2] where powerful and massive rotary excavators, with an average height of about 35 m and weighing between 1,500 and 2,000 tons, excavate and load coal, which is transported to processing plants by conveyor belts, thus, intervening in a superhuman way in the existing terrain. The connections between this mine (any mine), coal and black oak, which at first seemed inevitable and incomprehensible, indeed led us away from Milan's art and urged us to follow the wood. By doing so, we stepped into the microcosm of chemical processes that rule over the life and death of trees. That is how inconceivable temporal dialogues/negotiations/exchanges of elements, terrain, people, machines and metabolic processes of the living system became the focus of our research. The whole series of speculations that we will present in this concise form, come from the encounters that took place, during the mutual relations that we were able to sense at the beginning, and throughout the whole multiplied series of unpredictable flows that this complex story diverged through.

[2] With four power plants, RB Kolubara produces more than 50% of the electricity in Serbia. According to the *Annual report on the national residual mix for Serbia for 2020* (Akcionarsko društvo „Elektromreža Srbije" Beograd, 2021, p. 4) 70.34% production of Serbian electricity is based on the exploitation of fossil fuels.

2 The Speculative Fabulation

Let's say, in a rather naive and vague way, that a tree has many lives and they are not the same for every tree. That Milan's oaks have many lives, we discovered during the visit to his atelier, when we were allowed to look through his document archive. We found the text of the poet Dobrica Erić (Erić, n.d.) with a poetic vision of the first life of an oak, still forming part of a forest; the second life, cataclysmically submerged and buried in mud; and the third life as "resurrected" in Milan's sculpture. However, it seems that each life or reincarnation of a tree is more complex than this poetic vision, due to the entanglement of chemical elements and reactions in different environments/contexts, which in turn trigger new lives and deaths, because "[…] trees are without a clear division between life and death, between the present and future, at least not in the same way humans understand these concepts" (Piškur, 2021, p. 5). As any other living thing, a living tree,

> [a]s long as it endures, it struggles to use surrounding energies on its own behalf. It uses light, air, moisture, and the material of soil. To say that it uses them is to say that it turns them into means of its own conservation. As long as it is growing, the energy it expends in thus turning the environment to account is more than compensated for by the return it gets: it grows. (Dewey, 1916, p. 5)

The decomposition of plant material also takes place in a symbiotic relationship with its environment, where biological interactions happen and determine the future fate of wood components. The decomposition has its time and place that also determine the tree's reincarnation or afterlife. Today, our common understanding is that dead trees will decompose naturally with the help of aerobic microorganisms, bacteria, and fungi, and no fossils—neither black oak, petrified wood, nor coal—will remain. But it has not always been like that.

A few eons back, somewhat beyond our anthropocentric grasp, there was a time when life learned to transform itself, to co-evolve, to create inventions, to intra-act (Barad, 2007) with its environment and mutually transform each other—to survive. Although it does not come from the contemporary post-human theory, the discursive shaping by Lovelock (1995) known as the *Gaia hypothesis* corresponds well with this narrative. It suggests that organisms coevolve with their environment, that life maintained the stability of the natural environment, and that this stability enabled life to continue to exist. At some point life invented "the trick of photosynthesis" (Lane, 2016, p. 35), the magic of splitting water and releasing oxygen into the atmosphere as a waste, causing the so-called *Great oxygen event*. This ingenious invention rearranged the atmosphere, as we know it today, prevented the complete oxidation of the crust, and preserved the oceans, thus setting up a *liveable world* (Myers, 2017). Forming a synergistic self-regulating system with inorganic Earth's surroundings, life managed to create a fertile planet. Since then, the "communities of photosynthetic creatures" (ibid., p. 125) have been constantly transforming elements and molecules from their environment, re-shaping and re-crafting themselves and their environment, in visible and invisible ways.

To maintain balance, life had to invent decomposing. It took whole eras for plants to adjust on the microcellular level to the new circumstances. This for instance led to changes in key compounds hardly digestible for microorganisms; like *lignin*—a macromolecule that gives strength (Britannica, 2022, March 17; Liu et al., 2018) and *tannins*[3]—a biomolecule that protects from predation and gives a specific brown colour (Britannica, 2021, January 27). These compounds enabled some of the processes that led to fossilisation. Buried under layers of soil, due to sediment pressure, and appropriate temperature, the plant material (rich in lignin) will need over hundreds of millions of years to become what we call fossil fuels. It is assumed that the whole amount of coal on the Earth was formed at the 'moment' when plants started developing lignins, while in reality there were no microorganisms already specified for their dissolution/degradation/processing (Robinson, 1990). Coal could have been formed at this time and never after. However, in order to be preserved as black oak, it not only had to lie down in conditions of extremely low oxygen concentration, but it had to react differently to the aquatic environment/context, to mature in total darkness, starting a different life and a different internal transformation.

It is uncertain if the oak's 'mummification' was a result of fungi's ancestors' undeveloped ability to degrade lignin, or of the 'rapid' burial process under great pressure of the strata. Either could have triggered the coal formation.[4] However, we learned about a plant that certainly acted as a game-changer—*sphagnum moss.* This moss creates an acidic environment (Rydin et al., 2006) that further triggers chemical reactions with oak tannins, producing mineralised remnants of exceptional firmness, and a distinct black colour (Meier, n.d.; The Origin of Bog Oak, n.d.). We assume that the valley of the river Kolubara has always been rich in plants, including carbon forests, sphagnum moss and pedunculate oak forests.

Despite being buried lying down in a dark riverbed for thousands of years with the meandering of the river and the ebb and flow of streams and rivers, the gravel extraction near rivers, and the natural rhythm of flooding and drying sometimes 'eject' black oak closer to people. The black oak was most accessible to people, who were collecting firewood and digging up gravel along the river banks. In the past, the extraction of gravel was performed manually, with an ox, then a horse-drawn carriage, and today with tractors, excavators, and other available mechanisation. During such interventions in the river flow, people would find wood of exceptional strength, but which did not make a useful firewood; it was almost fire-resistant, due to the large content of minerals it contained.

Starting with the example of the Kolubara, we discovered that the extraction of black oak from riverbeds still takes place in different circumstances, in different locations on the planet, and with different purposes. In some countries, the extraction process involves extensive preparations; engaging professional divers and special machinery. We also came across a documentary video (Memedović, 2018) about the

[3] Although many plant species contain tannin in their parts (bark, leaves, fruit, roots, etc.), the etymology of the word tannin is related to oak – *tannum* means oak bark.

[4] The presence of lignin in ancient plant fossils and the main factor for coal formation (abiotic processes or biotic ones) are still matters of scientific debate (Hibbett et al., 2016).

extraction of black oak along another Serbian river, the Morava. This still takes place in an old-fashioned way without modern technology. As shown in the documentary, individual enthusiasts first cruise the river during dry periods, when the river banks are exposed, searching for the black tree trunks and then they use improvised extraction techniques of the locals living along the river courses. The local inhabitants possess specific knowledge about the river, which makes them capable of planning and improvising the spontaneous exploitation and conservation of this type of wood. They claim that the whole bottom of Morava River is paved with these ancient black oaks (ibid.).

We found similar examples in Ireland,[5] where speculations about the origins and usages of wood are reduced to a minimum (Harney & Harney, 2021; History of Bogwood, 2020; Irish Bog Oak, 2011). What we call black oak, they have named *bog oak*. Ireland is mainly a bog/wetland, which is a vital precondition for the natural conservation of wood. The interest and extensive knowledge about bog oak in Ireland result possibly from their Celtic[6] ancestors' strong appreciation and attachment to oak. Irish sculptors have developed comprehensive knowledge about the origin and chemical composition of the bog oak, as well as about extraction techniques and methods of determining appropriate drying time of the wood and various methods of processing and distribution (Llntelt, 2019). According to different Irish bog oak sculptors (Harney and Harney, 2021; History of Bogwood, 2020) the first lives of Irish bog oak ended with the environment's re-shaping caused by the last Ice age (about 10,000 years ago), when a large amount of melting ice flooded the majority of Ireland. The scientific facts spoil the mystical characteristics ascribed to bog oak by Irish and Serbian ancestors; the peculiarities of an incombustible wood, however, the old beliefs about the magical wood have moved into narratives of crafting with it.

Whether professed by Irish bog oak craftsmen in their aestheticised YouTube presentations (Eibhlín, 2021; Harney, 2015; Heffernan, 2012; O'Mahony, 2019), told by Milan, or poetically expressed through his sculptures, all of the narratives illuminate connections between ancestors, people, and animals, who lived in the forests. As Erić says about Milan's sculptures "[…] while looking and touching those black, massive shapes, (…) you can feel the breath and scent of those ancient, pre-flood forests'" (Erić, n.d.).

In its first life, oak belongs to the so-called hardwood, which means that it is strong and sturdy, but also hard to process. Buried in the mud, strengthened and darkened in water for thousands of years, the black oak is even harder to process. Its strength in the second life provides resistance to even the sharpest and most persistent tools available to man; "The outer part of the wood is soft, which hardens when dried.

[5] England, Russia, Siberia, the Ukraine and Croatia, also record discovery of this oak.

[6] During this research, known European finds of bog oak and the Celtic territories were found to overlap geographically. Unraveling their past mutual relations; it seems that in the process of land colonisation, the oaks looked for wet, sandy, gravelly, and clay conditions, near groundwater and river basins. In their conquest of territory, the Celts sought out those underwater oak forests. Their connection is visible in one of the possible meanings of the term *druid* – oak-knower.

And the heart of a tree, the heart is like steel" (Memedović, 2018, 6:40). The 'heart' is distinctly black, which could be polished to a high shine by glazing and sanding.

3 Transitions from the Second to the Third Life

While growing, a tree forms and transforms its structure and shape in an intimate relationship with its environment; "The tree senses its context from the beginning and develops in dialogue with it" (Nassar & Barbour, 2019). Thus, this *shapeshifter* expresses and embodies its context, in time, geography, climate, and the Earth's history through its physical form. Wood sculpting requires the sculptor to adapt to the material affordances and fit into the already existing shape, fibres, knots, folds, twists, veins, 'irregularities' of wood—into its embodied history (ibid.), removing what is surplus. Choosing a trunk for sculpture must follow the sculptor's primary idea, and the shape they want to achieve. Therefore, sculptors are looking for a tree, which possesses a mass, shape, size, and all other characteristics which best correspond to their idea of a future sculpture. In the case of bog oak, it seems that the process is necessarily reversed, that the tree 'finds' a sculptor. The craftsman must adapt to what the river/environment chooses for them. Consequently, the idea of the future sculpture must arise in dialogue with the tree, with its structure, curves, veins, and forks. Milan said: "While working with wood, I trust it, I respect its natural shape and my feelings." Hence, by his self-observation (the same we recognize with the Irish bog oak craftsmen), he was chosen as a medium to release the forms hidden in the trunk, to shape, extract, preserve the tree's accidental inclinations.

While we were walking around the gigantic bird sculpture and touching its parts, we could sense how it was speaking to us, like in *a multisensory interview* (Maapalo & Østern, 2018). At the same time, we could hear Milan's voice describing his own thoughts, emotions and choices. He pointed out: "…And this is an eagle, it flew in [to the wood], wanted to become an eagle, and I helped it get out of the tree, out of the shit." In a similar manner, Gulliksen (2020) described her own experiences with carving:

> [t]he wood needs a long period of intense persuasion to accept my ideas, but when the shapes are found at last, the knife follows the fibres as if they had a secret agreement as to where they were heading. The knife follows the directions of the fibres. When they meet, the fibres and the knife, they unite like rivers connect, meet gliding down through shallow valleys. (p. 57)

The basic tool for processing black oak is an adze. We saw this tool for the first time in Milan's atelier, as he showed us how to use it. He assumed that we didn't know what it was: "You hew a little and you hit a little like with a hammer." The specific curvature and position of the blade did not look familiar. It seemed

archaic. An adze is called a *tesla*[7] in Serbian. It is a hand tool used for carving and smoothing wood. Although it resembles an axe, its blade is in a transverse position to the handle, while the other side can serve as a hammer. A person who uses a tesla usually swings the tool, cutting, tearing off, breaking off, or, in a word, hewing pieces of wood. Sometimes they have to step over a lying tree trunk and shape it by moving backwards. We imagine the 'secret agreement'/*assemblage* (Deleuze & Guattari, 1987) between Milan's body, the adze's blade, and the black oak's firmness and knots, in the meeting of three strong wills in the negotiation process. The 'ordinary' order of crafting is presented in Erić's poetic description of Milan's sculptures, which "look like ghosts from pre-flood forests, volcanoes and caves" (Three Generations of Stanisavljević Art, 2019) (Fig. 2).

Reflecting back on the title of one of Milan's early sculptures: *Giving birth to oneself*, is slowly becoming more graspable. This birth is a process of reverse reshaping between the man and the wood. The dialogue between the man and the wood is going back and forth; crafting the man that is crafting the wood in a way that he is being born or reborn as a different, crafted self. The mother and father, and the hard black oak itself were already given to Milan by birth. In an interexchange with the given facts and the crafting process, Milan appears as re-crafted and re-born. At the same time, his crafting of himself facilitates opportunities for us and for the tree to "[…] bridge centuries and connect us with our ancestors (and their descendants alike), and with this whole enchanted world (…), with the world being resurrected by his tools, which grant them their third life and preserve them for eternity" (Erić, n.d.).

4 Discursive Symptoms

From these micro-relations of man, tools and fibres of materials, we return to the broader macro-perspective, temporal and discursive picture in which all the geological, economic and political agencies that make this story possible are reactivated. Our one-day trip to Milan's village aimed to find a river in which black oaks lay buried for thousands of years.

Not far from the river, we had an unexpected encounter with a 70-m-high rotary excavator at the Kolubara surface mine. This is part of a complex system of coal exploitation and electricity production covering an area of several square miles, and constantly broadening its surface. As we drove along the river course, as far as the eye could see in the distance, there were symptoms of environmental reshaping, caused by human activity—excavators, conveyors, crushers, plants, power plants. We learned that with their long-term, twenty-four-hour operations, the excavators have already 'eaten' entire villages and are moving unstoppably forward, removing

[7] The tesla tool is a bit similar to half of the shape of the Tesla symbol on electric cars. For more about the connections between the tool *tesla*, Nikola Tesla (the father of electricity, after which the car brand is named) and the importance of hand crafting in schools, see: Fredriksen (2016).

Fig. 2 The gigantic bird sculptures (Photo: Ana Sarvanović)

existing houses and still existing villages (see: A ray of light for communities in Serbia's coal heartland, 2016; The village of Junkovac near the Kolubara mine—neglected & destroyed, 2014; Vreoce: Selo koje nestaje [Vreoce: The Disappearing Village], 2018) (Fig. 3).

Fig. 3 The giant rotary excavator (Photo: Ana Sarvanović)

The mine here operates as an obvious example of large-scale environmental reshaping, because it visibly employs methods of digging, drilling, damming, extracting trees, removing layers of soil, etc. Coal mining is not just an intervention into the material reality of the local environment, it is also an interruption of the long and slow cycle of carbonisation of dead vegetation. Such activity easily evokes dystopian narratives about destruction and the end of the world.

In real time and given social circumstances, nothing about post-human/Anthropocene narratives and theories is ideologically or politically neutral. Disaster is not a neutral term. The oxygen catastrophe, which represents the first known destruction of a species, whether it happened suddenly or through the slow development of organisms that released oxygen in their metabolic processes, led to the destruction of the previous majority of the anaerobic system of living organisms on Earth, for which oxygen was toxic. To this type of evolutionary shift, we pose the idea of catastrophe, because the imaginability of such an event has consequences for an almost unimaginable evolutionary shift in which the Earth would (again) be without man. Activating catastrophic scenarios is part of the *apocalyptic thinking* or *tragic detumescence*, as defined by Haraway (2016), which is in line with the idea of the end of at least human world/history and the impossibility of creating a social imaginary horizon that would represent an alternative to neo-liberal capitalism and the direction of its current development (Fig. 4).

Fig. 4 RB Kolubara—detail (Photo: Ana Sarvanović)

Thinking of post-human discourse reminded us of Krajewska (2017), who argues that: "Calling to imagination this extreme time span emphasises the uttermost temporality of Homo sapiens on our planet, and also stresses that it took the Earth about four billion years to achieve favourable conditions for humans—the era of the Holocene, with habitable equilibrium of resources and hospitable climate" (p. 32–33). Turning to the post-human should balance between anthropocentrism that limits new imaginary horizons and the perspective of the Anthropocene that frees us from responsibility for the existing socio-political reality, production relations, and a future that has already ended.

In the broad temporal scope of the reshaping that we have included in this story, this kind of balance might come from a sobering reconsideration of the consequences of our intervention. Indeed, plants perform complex processes by photosynthesis to reshape the bonds of oxygen, hydrogen and carbon molecules.[8] The flow and flooding of rivers reshape the soil by taking away large oaks; the specific environmental conditions in which the wood finds itself reshape its living properties to partial carbonisation; moss changes the environment and transforms wood into a mineral etc. With further life, the river meanders, changes its flow, due to the population settlement or to ore exploitation, as is the case in Kolubara. This further changes

[8] The magical interplay between oxygen, carbon and hydrogen forms a completely different fabulation, which would require another research, no less thrilling than this one.

and exposes the soil layers. Aerobic conditions reshape a tree that has spent tens of thousands of years in an environment of low oxygen concentration, then Milan, Dragiša, and other similar craftsmen transform this wood into their sculptures. The world of art reshapes their crafting practice through valorisation and inclusion in a particular narrative, and in the end, from the post-human perspective. Another act we perform here is a discursive act of reshaping everything that has already been processed materially and discursively by chemical elements, plants, sludge, rivers, excavators, adzes, people and the institutional art world, and so we reversely intervene in both material and discursively existing reality.

In the end, we can return to the beginning, to the broad field of art (theory). During our research, we become aware of the dominant discursive processes that also 'craft' our understanding of the existing phenomena and impose their new discursive reshaping that is just so human, even when trying to deal with post-human and more-than-human elements. The pluralistic richness of artistic practices and their reception exist within the horizon of the bourgeois ideology of autonomous social spheres (Močnik, 2019, p. 83). The way Milan's artwork is appropriated by the art world is typically modernist, where "[…] the observer freely perceived (and possibly interpreted) the artwork within the framework determined by that particular artwork" (ibid., p. 85). Though, in contemporary art, the observer "[…] must find a framework within which the exhibited artefact will function as an artwork" (ibid.).

The way in which we view the framework for the existing artefacts in focus here, even when this framework is the metabolic rhythm of everything that existed, exists and will exist, from the perspective of the complex organism of Gaia, is *still* a typical intervention of contemporary art that survives within the horizon of autonomous social spheres. Milan's acceptance into this institutional system was mediated by elements of the art world that were not inherent to the direct, material, formative relation between Milan and wood. The perspective of new-materialism and post-humanism, made it possible to reverse this relation to its roots and enrich the understanding of mutual re-craftings that made our story possible.

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Soil Laboratory: Crafting Experiments in an Exhibition Setting

Riikka Latva-Somppi

1 Introduction

In this chapter, I will reflect on the role of craft and design in environmental discourse. In order to do this, I will discuss the collective craft and design project *Soil Laboratory* as a case study highlighting its methodological decisions. I will first introduce the exhibition *Soil Matters*,[1] which was the context for my case study. Then, I will illustrate through the case study how craft and design exhibitions can facilitate a deeper examination of societal or environmental phenomena.

These current times of ecological urgency challenge us to disrupt the dominant expectations of design to be harnessed for economic progress, industry and capitalism (Fletcher et al., 2019, pp. 9–10). As exemplified by this anthology, practitioners in the craft field are increasingly concerned with issues related to past, present and future of the (natural) environment. Design researcher Ramia Mazé (2013, p. 89) argues that representation, such as 'naming' and 'making visible', is a practice of politics. When craft and design make visible how and by whom natural resources are accessed, or address the inequality of human and non-human entities, politics of sustainability are actualized (Mazé, 2013, p. 85).

Curator and design researcher Christina Zetterlund (2013, pp. 49–50) explains that exhibitions are platforms for contextualising, reflecting upon and discussing craft

[1] The Soil Matters exhibition was on display at the Design Museum Helsinki, Finland from September 4th 2020 to January 10th 2021. https://www.designmuseum.fi/en/soil-matters/ (accessed March 18th 2022).

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and design and therefore have the power to affect how the field is understood. She notes that museum exhibitions have played an essential role in communicating craft and design history by presenting objects from collections. However, she encourages expansion of the notion of craft and design beyond visual exhibition objects "that decorate capitalism," allowing critical examination of contradictions of everyday life (Zetterlund, 2013, p. 50). Design researchers Ilpo Koskinen, Thomas Binder and Johan Redström (2008, p. 53), note that, in a sense, exhibitions can be compared to research papers as both are forms of knowledge dissemination. They argue that while both forms of communication may build on theoretical frameworks, exhibitions allow reflection by providing experiences rather than theoretical thinking. Furthermore, through exhibitions, knowledge sharing can be expanded beyond the academic community, through practices such as museum pedagogy in the form of organized lectures and workshops for the general public.

Museums are not neutral but have social and political agendas (Putnam, 2001, p. 31). Since the late twentieth century, museums have actively invited practitioners of the creative field as curators to develop conventional presentation and interpretation through fresh and critical initiatives (Putnam, 2001, p. 31). Following this tendency, the heads of the Design Museum Helsinki launched a programme in 2017 by which they seek new content through competing exhibition proposals. These recent winning proposals enhance the new Design Museum strategy, which emphasises the museum as a place for creating new knowledge and as a platform for societal change.[2]

In 2020, the exhibition proposal *Soil Matters* was selected to represent the theme 'materiality'. The proposal combined art, craft, design, and science to discuss humans' and soil's intertwined relations. The exhibition was curated by two craft practitioners, Maarit Mäkelä and me, Riikka Latva-Somppi, both of us situating our work also in research and academic education. I have a ceramics and glass art background. Similarly, Maarit Mäkelä has a long working history in the craft field as a ceramic artist. The exhibition's curation builds on the feminist understanding of situated knowledge, as explained by biologist and philosopher Donna Haraway (1991, pp. 188–189). She suggests that by acknowledging our situatedness and drawing from it—not splitting the subject and the object—we may become "answerable for what we learn" (Haraway, 1991, p. 190). Thus, the exhibition shared knowledge that springs from the craft and design practice and was communicated aesthetically through craft and design. Simultaneously, the exhibition was a platform where collaborations were born and knowledge merged, and was created and reiterated in the hope of cultivating responsibility and care towards soil.

[2] These aspects of the new museum strategy were discussed in the first meeting with the museum personnel after *Soil Matters* was selected as the winner of the Design Club Call in 2020.

2 Shared Matter

> Knowledge is key to interpreting and understanding the causal relations that contribute to the ecological status of the earth. Individual value sets emphasise emotions and the importance of cultivating a personal relationship with the environment. Soil can be seen as fertile farming land or profitable plot land, as polluted industrial soil that requires expensive recuperation measures, or as a valuable ecosystem. As well as profit-based approaches, each of us can explore our role as just one of the many members of the soil community. Thinking about our own relationship with soil helps us to assume more responsibility for our actions.

An excerpt from the thematic texts that we, the curators, wrote to accompany the exhibition works.

Technoscience scholar Maria Puig de la Bellacasa (2019, p. 395) emphasises affective soil relations and proposes establishing and sharing art and science practices that strengthen intimate human-soil matter entanglements and the "(im)possibilities of care". She argues that interdisciplinary cultural engagements can be understood as aesthetic storytelling that does more than illustrate or communicate science. "They co-create stories" and "renew soil imaginaries" in a way that is affective, practical and ethico-political (Puig de la Bellacasa, 2019, p. 395).

As an area of design, craft is rooted in making products for daily use. This links craft and design practices to the consumption of the earth's resources, employing minerals, metals, water, and energy as raw materials. Thus, craft practices are tightly interwoven with the materiality of human cultures of the past and present, including their impact on the environment. When a craft practitioner's disciplinary approach to materiality and object making is applied to the contemporary environmental discourse, it inevitably becomes entangled with its own becoming (see also Latva-Somppi et al., 2020). Haraway (2016, p. 4) encourages staying with the heavy, ongoing present environmental challenges, even though this can be disturbing and uncomfortable for any of us humans. Hence, dwelling on the troubles of the design and craft processes can provide a profound means to reflect on environmental and cultural materiality from the perspective of craft practitioners and also that of consumers.

Eco-feminist thinking builds on environmental ethics that emphasises relationality and interdependence (Cuomo, 2005, pp. 203–204). Moreover, it supports the idea that individual experience, intention, and will have ethical and political significance. Such feministic thinking echoes the American philosopher and conservationist Aldo Leopold's (1949/2020, p. 192) thought that all ethics build on the idea of the individual as an interdependent member of a community. His 'land ethic' extended the concept of a community to include the land: soils, waters, plants and animals. A land ethic does not prevent the utilisation of natural resources, but it changes humans' ethos from that of an exploiter to one of a caring member of the community (Leopold, 1949/2020, p. 192). Furthermore, Leopold (1949/2020, p. 202) argued that we can only be ethical "in relation to something we can see, feel, understand, love, or otherwise have faith in".

2.1 Site-Specific Material Inquiries

The *Soil Matters* exhibition brought together projects through which the following questions were asked: How are the craft and design industry and the consumption of everyday objects involved in the reformation and contamination of soil, and what is our relationship with soil? Furthermore, the exhibition examined ideas of soil as dynamic matter, overconsumption and solid waste, material innovation, and soils as living environments of soil communities.

The potency of craft and design can be diverted from highlighting form and visuality to, for instance, site-specific meaning-making (Zetterlund, 2013, p. 56). The nine projects selected for the *Soil Matters* exhibition were geographically situated in the Nordic countries of Finland, Denmark and Iceland; in Venice, Italy; and in Inner Mongolia, China. The site-specific inquiries proved that while the issues around soil are locally bound, they share a common global narrative. Local geologies are irreversibly affected at sites of excavation, refining, transportation, production, consumption, construction and, finally, abandonment—where the discarded products or their traces end as waste.

The curation of the exhibition sprang from experience of practitioners and researchers in the field of ceramics and glass. Ceramic and glass practitioners possess knowledge of natural materials and materialities; for instance, an aesthetic sensibility developed over time through active engagement with materials combined with scientific material knowledge, such as material chemistry (Latva-Somppi & Mäkelä, 2020). Ceramics is essentially fired earth. The local geology determines the colours and consistency of the ceramic objects that are made from the site-specific clay materials. For example, the iron-rich clay of Finland fires to reddish-brown colours. Iron also lowers the temperature that is needed to turn the earth into ceramics. Similarly, the primary raw materials used in glass-making originate from the earth; the main ingredient is silica sand, combined with soda ash and calcium carbonate initially retrieved from plant ashes. Likewise, iron affects the colour of glass by giving it a greenish tint. By adding another earth metal, manganese, the green colour can be diminished. Ceramists and glassmakers are thus involved in the soil-matter in many ways. They engage with it bodily while making and caring for it as their material medium, but also by extracting and consuming it as raw material.

Next, I will explain how knowledge gained through craft practice was mediated in the exhibition *Soil Matters*. First, I will introduce the different thematics of the exhibition by briefly describing the related projects. Then, I will reflect on the methodology of the project *Soil Laboratory* by reviewing the basic ideas and practices of laboratory and fieldwork and how they merged with the gallery space during the exhibition. After that, I will define the educational dimensions of the *Soil Laboratory* project as a whole. Finally, I argue that craft has the potential power[3] to affect human-soil relations by engaging with and making visible complex environmental matters.

[3] According to Hannah Arendt (1998/1958, pp. 199–207), power always rises from acting together for a common purpose. It is always "potential power" that establishes relations and creates new realities.

2.2 *In Dialogue with Local Soil*

Although many of the nine exhibition projects covered overlapping themes, they can be roughly divided into three categories: natural soils, anthropogenic geology, and collective efforts to care for soils. To allow a deeper reflection on the collective practices of care, I will briefly present the six works in the first two categories and then look at the three projects that form the third category in more detail.

The first category included projects that contemplated human-soil relations in an environment assumed free of human impact, or even protected from humans. One such is Maarit Mäkelä's work *Earth-Dialogue* (2015), in which she deliberates the idea of creative materiality by using undisturbed soils from New Zealand (Fig. 1) (see also Mäkelä, 2019). Her work utilises soil's materiality in artistic production in a respectful and almost spiritual way. Similarly, Erna Skúladóttir's work *Horizons (Dirt is Matter out of Place)*[4] (2020) was created from natural soils. The artist used soil from a fragile ecosystem, the Krýsuvík geysers in Iceland, which are protected by law. When she collected the material for her artwork from a nearby ditch, the soil had become ordinary dirt. Through the work, she reflected on the status of soil and its classification and regulation that is dependent on economic, environmental, and cultural values.

The second category contrasted 'untouched' nature with environments that human activity has impacted on heavily. This category introduced soil as a dynamic matter that constantly changes due to pollution and solid waste production. The project *Rare Earthenware* (2014) by Unknown Fields Division, directed by Liam Young and Kate Davies, traced three objects of technology—a cell phone, a laptop and a smart car battery—to the origins of their materials in Inner Mongolia. It juxtaposed the high-end industrial products with three handcrafted vases made from the polluted soil gathered from a tailings lake of the mining industry. The vases represent Tongping or 'sleeve' vases dating from the Ming Dynasty, which are objects of high value and international trade. The artefacts embody global supply networks that displace matter across the planet (see also Unknown Fields, 2016).

Also, the project *Traces from the Anthropocene: Working with Soil* (2019) addressed the consequences of human action in a particular geological environment. This was the seed project for the exhibition and was similarly led by Maarit Mäkelä and me. Here, a group of ceramic artists and researchers studied the Venice Lagoon's soil and sediments with scientific and artistic methods to understand how they have changed due to anthropogenic impact (see also Latva-Somppi et al., 2020). In another work, Swedish designer and artist Annelie Grimwade Olofsson addressed overconsumption and questioned material innovation in the changing geology in *WASTE-LAND* (2019–). Her ceramic sculptures result from meticulous study and material experimentation with solid, toxic by-products of waste incineration (Fig. 2). Finally,

[4] The phrase "dirt is matter out of place" was famously applied to social and cultural systems by social anthropologist Mary Douglas, but its origins may lie in discussing urban waste and sewage (Campkin, 2013).

Fig. 1 Earth-Dialogue consisted of the finished artefact and a minimalist array of soil materials from New Zealand (Photo: Design Museum Helsinki, Paavo Lehtonen)

through my work *Artificial Islands* (2019–2020) I asked whether we can distinguish between a naturally created landscape and an artificial construct generated by consumer society's needs. The work was composed from photographs and found materials from a Venetian island that was built from domestic waste, construction rubble, and the waste from the Muranese glass industry, following a centuries-old local tradition of island-making.

2.3 Making and Unmaking with Care

The projects in the third category inquired into our relationship with soil and explored ways of caring for it together. The project *Soil Care: Symphony rehearsal* (2019–2020) by Taiwanese designer Tzuyu Chen relied on collaborative craft practice. She invited exhibition visitors to think about their soil relationship by presenting recordings from interviews with soil professionals: an archaeologist, a construction engineer, and a biodynamic farmer. The interviewees were asked about their relationship with soil while they crafted objects of clay made from the soil of their working locations. Soil material samples and ceramic tests from the specific sites where the interviewees worked were displayed side by side with the recordings in a video format.

Fig. 2 *WASTELAND* used the by-products from BOFA (Bornholms Affaldsbehandling), the municipal waste management company of the island of Bornholm in Denmark (Photo: Design Museum Helsinki, Paavo Lehtonen)

Un/Making Soil Communities (2018–) by the Swedish designer duo Kristina Lindström and Åsa Ståhl examined how could we engage in the consequences of the design industry, and who should be included and how (see also Lindström & Ståhl, 2020) (Fig. 3). The designers conducted participatory design workshops in a district in the south of Sweden that is generally called "The Kingdom of Crystal". The workshops were designed to involve the local residents in speculating about how to act in the glass industry's aftermath. Using participatory design methods, they co-imagined how to care for the polluted soil, and whether it could include working with plants that can remediate soil. Furthermore, they discussed the risks and responsibilities that are present when we work with other species. The workshop participants were given some seeds of plants that are known to extract heavy metals from the soil. In this way, the designers handed over the initiative to continue to care for the environment together with plants after the workshop had ended.

During the exhibition, the *Un/making Soil Communities* project was extended to the local site of the former glass industry, the Nuutajärvi Glass Village in Urjala, Finland. The invitation, which was initially crafted for the local residents of the Kingdom of Crystal in Sweden, was now extended, in a relay manner, to the Finnish craft practitioners working in the context of the exhibition (see also Latva-Somppi et al., 2021). In addition, participatory design workshops were reconstructed and took the form of sharing the research processes publicly in the exhibition setting and online.

Fig. 3 The project display presented iconic objects of Finnish glass design as examples of using metals in the manufacture of glass. The setting also included soil polluted by the glass industry and an ongoing phytoremediation experiment (Photo: Design Museum Helsinki, Paavo Lehtonen)

The two above mentioned projects explored our relationship with soil and ways of caring for soil by inviting local residents and soil professionals to engage in the processes. Moreover, both projects are connected to the third project of this category which is also the case under study: the *Soil Laboratory*. This project explicitly aimed to present the collective and collaborative efforts aimed at caring for soil. Next, I will explain the key features of this evolving project, which was physically placed in the heart of the gallery space during the exhibition.

3 Open-Ended Experimentation

Museums have established practices that engage artists in interventions within the museum space, to bring in fresh ideas and to interact with the museum collections in a new way (Putnam, 2001, p. 31). In the *Soil Matters* exhibition, the idea was to present the dynamics of working and thinking together in the exhibition context. The *Soil Laboratory* was conceived to make the artistic research work visible to the general public and to enable taking forward projects that stem from the works on display by the team of ceramic artists and researchers: namely Maarit Mäkelä, Catharina Kajander, Tzuyu Chen and me.[5] Moreover, the *Soil Laboratory* was designed to allow the public to engage in discussions around the exhibition's topics. Visitors to the exhibition were encouraged to follow the progress of the work and approach the artist-researchers with questions. The project was purposefully named a laboratory, not, for example, a studio, to emphasise the element of research, experimentation, and open-endedness. Mäkelä and I, the exhibition's curators, designed the concept and the activities. We also participated with the rest of the research team in the projects that were carried out.

Three interlocking projects evolved during the exhibition: (1) *Soil Stories*, where the public was invited to send in soil samples to be analysed for heavy metals and to be used in artistic production, (2) *Critically Endangered Species*, where a professional ceramist handcrafted large vessels from local clay which were then painted with the soil samples sent by the public, and (3) the phytoremediation experiment of the *Un/making Soil Communities* project.

Soil Stories invited the public to send in a small amount of soil from a personally meaningful location or a site with an interesting history. The heavy metal contents of the samples were measured in public soil scanning events, their place was marked on a large map, and the samples were numbered and put on display on a shelf. Finally, the soils were processed to clay slip and ceramic test pieces to see what colours they produce when fired to ceramics (Fig. 4).

The detailed formulated instructions for collecting samples requested an intimate encounter with a site-specific soil of one's interest: participants went to the place in

[5] The project *Soil Laboratory* involved collaboration with the Finnish Environment Institute (SYKE), the Geological Survey of Finland (GTK), and the Finnish Association for Rural Culture and Education (MSL). https://soil-laboratory.aalto.fi (accessed March 18th 2022).

Fig. 4 Test pieces were made of Finnish earthenware clay, dipped in the processed soil samples from around Finland and left to dry before firing (Photo: Tzuyu Chen)

question, carefully collected soil, removed sticks, leaves and other organic material, dried, packed and sent the soil to the museum. Additionally, they could send stories, maps and the related history of the site where they gathered the soil. Many samples originated from the senders' home plots and cottage sites. Also, soils were gathered from local places with an industrial past, such as former mines.

Ceramic artist Catharina Kajander coiled large ceramic vessels from Finnish red earthenware clay during the first three months of the exhibition in the *Soil Laboratory*. The artist was present six days a week, and the audience could follow the slow building and drying of several large clay vessels. Attention was directed at other-than-human species dependent on the wellbeing of the soil. The selection of species was based on an interview with a biodiversity specialist and the 'Finnish Red Book' (Finnish Environment Institute SYKE) on the viability of Finnish species in 2019. Maarit Mäkelä joined in with the painting of *Critically Endangered Species* on the crafted vessels using the slips that were processed from the soil samples (Fig. 5).

The third project continued the *Un/making Soil Communities* project. This time, the location was the Nuutajärvi Glass Village. First, the research team gathered and analysed soil samples to determine how the glass industry had affected the soil. Then, they selected three soil samples that were contaminated with different heavy metals for a phytoremediation experiment in the gallery space. One of the soils was rich in chromium. The other two samples indicated traces from the glass industry through

Fig. 5 The team of artists and researchers work in the Soil Laboratory during the exhibition's open hours (Photo: Riikka Latva-Somppi)

their lead and arsenic content. The researchers sowed seeds and took care of the plants during the opening hours of the museum. Towards the end of the exhibition, the plants were harvested, dried and analysed. Consequently, a correlation with the heavy metal contamination of the soils was indeed found. The public was invited to follow the activities in the *Soil Laboratory,* such as the two public soil scanning events (Fig. 6). The activities were also carefully documented and published on the laboratory website.

4 The *Soil Laboratory* as a Tool

The *Soil Laboratory* methodology combined three approaches: laboratory, fieldwork and exhibition. The laboratory metaphor is frequently used for (craft and) design projects and spaces that build on open and collaborative inquiries between stakeholders sharing the same interest (Binder, 2007). Similarly, the *Soil Laboratory* facilitated a platform for reflecting on the relationship between humans and soil in a co-active manner. Rather than exhibiting finished artefacts, it became a space where ongoing material explorations were shared with the public. These explorations

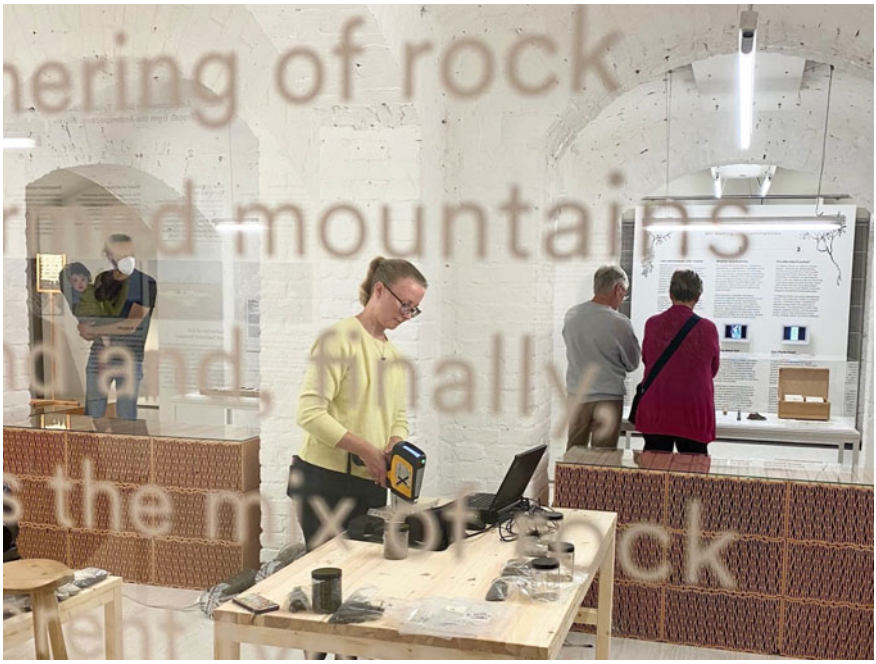

Fig. 6 Geologist Maarit Saresma from the Geological Survey of Finland measures heavy metals from soil during the *Soil Laboratory's* public soil scanning event (Photo: Design Museum Helsinki, Minni Soverila)

merged crafting with scientific methods from soil contamination and phytoremediation research that were carried out in collaboration with a geologist.[6] The project further included fieldwork, which, in design research, is typically conducted to learn how users make sense of the design product (Koskinen et al., 2008, p. 52). In this case, fieldwork meant exploring the contexts for the study. Consequently, the experiments were taken out to natural settings such as the Nuutajärvi area, involving residents and glass practitioners (Fig. 7). These experiments also became 'social objects' as exhibition visitors talked about them with the practitioners of the *Soil Laboratory*, and with each other while viewing the exhibition (Koskinen et al., 2008, p. 51). The audiences also engaged with the processes when they were asked to collect soil, send or bring it to the exhibition, and follow the *Soil Laboratory* website to retrieve the analysis. Finally, the exhibition space leant on the traditions of the art field, opening its practices to critical viewing and aesthetic evaluation, but also reflection and contemplation (Koskinen et al., 2008, p. 53).

[6] Design researchers Ilpo Koskinen, Thomas Binder and Johan Redström (2008) discuss 'Lab, Field and Gallery' as approaches adapted to design research from other established fields yet allowing a focus on design skills and processes.

Fig. 7 Author collecting soil for the phytoremediation experiment in Nuutajärvi with a local glass practitioner Sara Hulkkonen (Photo: Tzuyu Chen)

5 Learning with Soil

Museums are informal learning environments. They have pedagogical interests as well as obligations. Hence, in addition to the methodological approaches of laboratory, fieldwork and exhibition, the *Soil Laboratory* further included an educational element. As educators, we, the curators of the exhibition, shared the educational intention with the museum. Thus, the designed setting had communicative and pedagogical aims: providing an informal interactive space for learning and encouraging in-depth questioning (National Research Council [U.S.], 2009, p. 127) of soil relations.

The *Soil Laboratory* was thus designed to be a place of action that awakens curiosity, that is easy to approach and that has a sense of ongoingness. This was done by careful planning of opening hours, working tables and other research settings and displaying tools and materials such as processed soil, ceramic tests and enlarged images of endangered species. Moreover, an essential element was revealing the incompleteness of the work, and not staging processes but openly proceeding with them in real time.

Audience interaction was planned together with the Design Museum's experts of museum pedagogy. Further, the presence of the practitioners enabled questions to be answered and discussion with the exhibition visitors. Additionally, an expert lecture on clay soils of the Helsinki area was given by geologist Maarit Saresma from the Geological Survey of Finland. Furthermore, a lunch talk with the curators

Fig. 8 *Painting with Soil* workshop participants working with an array of soil processed to fine slip using sticks and brushes as their tools (Photo: Tzuyu Chen)

was streamed, and curators' tours were organised on-site for interest groups and online for the general public. Moreover, the *Soil Laboratory* hosted the making of an educational video where a ceramic artist discusses with a soil biodiversity expert.[7]

Painting with Soil workshops for families and specific groups with limited numbers of participants were designed and facilitated by one of the participating researchers, Tzuyu Chen. She first introduced the participants to the use of natural soils as a ceramic medium. Then, the participants were given prefabricated tile forms of Finnish red clay and soil materials from various locations in Finland (Fig. 8). While painting on the tiles, the participants learned the ways in which different minerals and metals in the local soils affect their colours. Further, various questions were answered, such as why Finnish clay is grey in its unfired state, but the fired bricks are reddish, and where white and yellow clay come from.

In addition to the museum's pedagogical approaches, a solid connection to university education was naturally present due to the researchers' affiliation. During the exhibition, Aalto University design students visited the exhibition on various occasions. Moreover, the Un/Making Studio collaboration resulted in the inclusion of a

[7] In the video, Urban Ecosystems professor Heikki Setälä discusses soil biodiversity with Maarit Mäkelä. The video was produced by the Forum for Environmental Information, Maj and Tor Nessling Foundation, Baltic Sea Action Group and Design Museum Helsinki. https://www.nessling.fi/soil-at-risk/2021/02/08/the-critters-in-the-soil-run-life-above-ground/ (accessed March 18th 2022).

visiting lecture on a Master's level course, named *Glass Challenge*, which was geared towards re-thinking the materiality of glass following the exhibition's themes.

6 Conclusions

I have reflected on the methodology of the *Soil Laboratory* and presented its contextual setting, the *Soil Matters* exhibition. The exhibition did not gather together just craft and design practitioners; instead, the majority of the projects were building on interdisciplinary collaborations. Involving practitioners who engage with the material and speculative meanings of soil was a conscious attempt to think collectively, to re-envision, and making these ways of working together visible carries a potential for better care, in this case, for soil (Puig de la Bellacasa, 2019, p. 395).

In the *Soil Laboratory*, we explored crafting experiences and emotions together with scientific facts of the environment in the gallery setting of the Design Museum. The methodology of the *Soil Laboratory* combined laboratory work, fieldwork, and an exhibition, and added a fourth essential element: education. The methodology originated from the idea that associating scientific thinking with engaging events and real-world outcomes may have personal significance (National Research Council [U.S.], 2009, p. 128) and result in ethical reflections.

Through public exhibitions, narratives that seek to re-imagine human–environment relations can be shared. The *Soil Laboratory* and its context, the *Soil Matters* exhibition, demonstrate that ceramic and glass practitioners possess a deep understanding of their working medium: clay, minerals and metals. A creative practitioner's ability and skill to feel, love and understand the materiality of their medium was central in communicating how soil extends from natural matter to material for creative practice. In addition, in the exhibition, design and craft practitioners were regarded as having responsibilities concerning addressing the consequences of their consumption and also the power to act accordingly.

Museums have established practices of making exhibitions and engaging the general public in discussions on important environmental and societal topics, communicating with the media, attaching stakeholders to projects, finding funding and engaging the public through museum pedagogy. They are institutions of authority with a prospect of societal influence. Using this potential increases the power of craft in its involvement in the politics of sustainability (see also Latva-Somppi, 2021). The study at hand brought craft and design projects into an institutional frame aiming at the creation of general reflection and societal impact. In this case, the institutional frame was reinforced by the affiliation with Aalto University and collaboration with environmental organisations.

Via the exhibition *Soil Matters*, I propose that craft and design exhibitions can be used to discuss wider environmental and societal phenomena through the knowledge generated from within the field, to enhance a caring attitude. Craft offers a tool to engage with the aesthetics of matter and the intimacy of making. It can also be used

to critically examine its connections to material production and the consumption of natural materials.

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Nurture-By-Nature in Affordance-Need Context

Jun Hu

1 A Fragile Beginning of Something Much Larger

In the spring of 2020 during the Covid-19 pandemic, an improvised community art project took place in Lachine Park, Montreal, Canada. The participating hundreds of people, young and old, turned debris of a broken embankment into waterfront land art. The study on how it happened and developed without an organizer initiated my reflections about the possibility for an alternative educational approach: Teaching without a teacher.

Lachine Park is a few blocks away from where I live, and it is my favorite place for outdoor activities. Whenever the weather permits, I take a walk along the waterfront trail at St. Louis Lake in the afternoon before the sun sets. I find it very entertaining to watch the seasonal changes of the landscape and the everlasting life cycle of animals and plants. During the pandemic, this park offered comfort to my neighborhood by being spacious enough for people to appreciate nature while keeping social distance.

While I was taking one of my afternoon walks, I was shocked by the sight of a deep trench along the embankment full of broken rocks. It looked like a deep scar clawed by a monster. The bank was torn apart by the heavy ice and snow carried down by the strong current of the river. The damage done by the mighty power of the cold winter became visible as the snow was melting away. Just as I was feeling sorry for the natural disaster, I felt a sudden warmth at the sight of two kids building Inuksuk, the arctic style of indigenous rock art in the shape of a man-like abstract sculpture with two arms stretching out in a welcoming gesture. I imagine the arms were stretched toward me, and was deeply affected by the rock-man's gesture; The Covid-19 pandemic had an extraordinary impact on me, with Asian background. In addition to worrying because of the virus, I'm also worried about the anti-Asian hatred that has been developing

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in North America. The media's (as well as the USA's former president's) addressing of the virus as a "Chinese virus" led to stigmatizing of Chinese immigrants, myself included. However, the Inuksuk, with its welcoming gesture standing on the bank, appeared as a relieving sign of hospitality and compassion of the local community.

Moved by the children's Inuksuk, I decided to make my own rock art, to return the favor. The Inuksuk reminded me of Tibetan Obo, rocks piled into many tiny towers along the route of pilgrimage, which serve as prayer to Buddha as well as route markers in the wilderness. Similarly to what the children did, I picked up debris rocks from the broken embankment and started to build with them in a style corresponding to my psychological state and informed by Tibetan Obo, piling rocks into a slender tower standing in perilous balance. The search for a *perilous balance* had a therapeutic power in my crafting process. The embodiment of physical balance of the rocks was meaningful for the establishment of my psychological balance. Trying painstakingly to restore the balance of rocks on their smallest tips, and to pile them up as high as I could manage, I metaphorically expressed my concern of the disturbed balance of the world. It was not only the natural balance that had been disturbed by the Covid-19 pandemic, the social balance was also disturbed by prejudice and discrimination. It was extremely difficult to place the rocks on top of each other, and make them stay there; however, when I succeeded, I immediately felt relief and joy.

I kept doing this until around half a dozen Inuksuks rose up along the bank. While I was building, a blonde lady passing by greeted me and kindly asked me if she could take pictures of me and my balancing rocks. I was flattered by her interest. She introduced herself as Maja Vodanovic, Major of Lachine city and also a former art teacher. She thanked me for my efforts, and commented on the Inuksuks. "They have a comforting beauty of calmness", she said. She made me realize that the power of the perilous balance was not only pacifying for myself, but also for people who saw the rock sculptures. Encouraged by her comments, I wondered if the perilous balance rock art could be a meaningful way of restoring psychological balance that brings peace and resists prejudice. I started to perform rock crafting regularly whenever the weather permitted it. (see Fig. 1).

2 The Public Engagement

It is amazing how occasional acts of children's play and my own explorative work could develop into an improvisational community art project of a grand scale. As the site unexpectedly drew more and more people into the activity, the landscape of 5.6 km long bank of St. Louis Lake at Lachine Park was transformed into an open-space art studio and gallery (see Fig. 2). Hundreds of anonymous community volunteers who came and went at will during the first wave of the pandemic, created a parade of numerous rock art works in diversified styles and changed the landscape dramatically. In the spring of 2020, when most of the public activities were put to a stop, and the schools closed, the land art project served as a rare "art lesson" for

Fig. 1 My rock balancing land art in abstract style made at Lachine Park in the Spring of 2020. (Photo by Jun Hu)

the children. In the time when the local community center was shut down, people found comfort in visiting this public art project. Because people came and went at different time periods and the waterfront trial is long enough, the activity did not violate the distancing restriction. And because the figure-like rock art stood side by side, people could feel connected. Having lasted throughout the spring – summer season, the activity brought people joy and solace, and drew the community together spiritually.

Fig. 2 Improvisational Inuksuk rock art by the local community at Lachine Park, Montreal, Canada (Photo by Jun Hu)

3 The Improvisational Nature of the Event

I consider myself an a/r/tographer, who draws knowledge and creativity out of the liminal space in-between the three identities of artist, researcher and teacher, (Leggo et al., 2011) by playing my role leaping between them as my way of engagement. This land art project does feel like a/r/tographic to me for having enhanced my creativity and knowledge through my participation, except for that the party of the teacher was missing. The community land art project makes me reflect on the potentiality of a/r/tography with regard to art teaching, beyond a teacher-student context.

What amazes me most in this activity is its improvisational process, for there existed no organizer, nor was there any art teacher with a lesson plan beforehand. Neither I nor anyone else had played the role of organizer or art teacher, but despite these things functioned extremely well. As my creativity was triggered by my sight of the children's Inuksuk, people saw my works standing along the bank and started to make their own. This happened naturally like a chain reaction as more and more people joined in this way. The success of this improvisational community art inspires me to reflect over art education: Is the teacher indispensable in art teaching?

In retrospect, I suppose it was the convergence of two needs that naturally empowered engagement and creativity in this improvisational community land art project. The two needs are human response contextualized in two natural disasters, the mechanism of which I would explain with the concept of *affordance*, a psychological term initiated by James Jerome Gibson in 1977. Affordance, the core concept of Gibson's ecological psychology, refers to the potentialities in the environment that invite interaction, such as that the ladder invites climbing. Gibson argues that no matter how powerful man becomes to alter the world, it does not change the fact that "we were created by the world we live in" (1977, p. 56). I here borrow the concept of affordance to study this land art project and how the environment invited human interaction to make the land art, which demonstrates a "crafting with the environment" in an affordance-need context.

At the peak of Covid-19 pandemic during the spring of 2020, there happened to be two concurrent natural disasters. One disaster was geological. It was the local embankment torn apart by heavy ice and snow, which caused the scattered debris of rocks, that invited human action to pick them up to restore the landscape. The other disaster was hygienic, which was the deadly Covid-19 pandemic. Its consequent social distancing measures isolated people, which provided the need to connect to people in alternative ways and thus prompted the walking habits outdoors. The two affordances in the environmental disasters corresponded to two human needs, respectively the need to restore landscape and that to restore social relatedness. Together, they formed the affordance-need context for the improvisational rock art project.

Affordances, as explained above, are related to how all life forms interact with the natural world. In this chapter I play with this concept, introducing my own analogous version of an affordance-need context, that I believe is applicable to art learning. I will argue that such an understanding supports individualized artistic creativity in a self organizing way, as a form of nurture-by-nature, beyond the teacher-and-student

context. I would like to share my own experience of this through an autoethnographic reflection on how the affordance-need context had its effect on my creativity as I participated in the local land art events described earlier.

My need for solace was met by the affordances found in the rocks. I realized in the aftermath that balancing rocks corresponded to my fundamental psychological needs, namely the social relations balance that had been disturbed during the pandemic period. Crafting with rocks, and the related analogy of physical and mental balance had its positive effect on me during my crafting process. As it had this calming and soothing effect on me, might it also affect others in a similar way? Further, it might be pacifying also to the audience who were watching the balancing performance and the outcome of the rock art. I think of this as an instinctive nurture-by-nature process that is innate to humans.

The long line of rock art works that stood along the bank seemed to me a continuous statement of love, support and gratitude by the entire community, who together were fighting against the pandemic. Even though I hardly met or spoke with any of the other creators, I felt connected with them at heart, for their works spoke for themselves. My works, standing among them, were my response to the hospitality and kindness of the neighborhood where I had lived for eight years. The enforcement of social distancing measures, instead of bothering the project, had helped with the spatial intervals of land artworks now placed in a natural arrangement for exhibition along the bank.

Although most of the works could not stand the strong wind and heavy waves, it did not prevent people from continuous ardent involvement with the rocks. Once the works fell, they were rebuilt or simply replaced by new ones. The land art, like nature itself, kept changing all the time. There were a lot of visitors, who came to see the "exhibition", but who did not themselves engage in the acts of making art. People were taking pictures, talking about the creations, or simply standing quietly appreciating the new landscape. It seemed to me that people were cheered up by the land art, and that they were temporarily relieved from the frustrations of the pandemic.

This nurture-by-nature approach sustains an open-ended creativity. As I went on working, I felt that my presence and activities caused a chain reaction that attracted even more people to be involved. They came up with a variety of styles, each contributing to the diversity of this community land art project in their own way. The diversity in style took shape spontaneously, regardless of any instructor, and it reminded me of how organisms' diversity evolves in the natural world, due to varying affordances and needs.

4 Diversified Styles as Individual Needs and Preferences Vary

There are diversified styles as individual needs and preferences vary. In one of the Inuksuk, the hand-drawn cheerful face and the colorful rainbow (the logo of Hope across Canada) were a powerful message of assurance to people suffering from this seemingly everlasting pandemic (see Fig. 3). Some people developed an abstract style, while others developed a representational style (see Fig. 4). Each person has brought their own desires and personality into the work, which made the diversified exhibition appear to me as a soundless symphony (see Fig. 2).

I myself came up with a new style corresponding to my need as a Chinese immigrant. In addition to being inspired by the abstract Tibetan Obo and the perilous balance act, I also started to create more representational works, which had a narrative aspect, similar to that in the *Rainbow (Hope)* Inuksuk. However, there is a distinction in my representational works, in relation to both form and content. My two styles

Fig. 3 *Rainbow (Hope),* Inuksuk by anonymous artists at Lachine Park in the Spring of 2020 (Photo by Jun Hu)

Fig. 4 Heterogeneous styles of rock art by anonymous artists at Lachine Park in the Spring of 2020 (Photo by Jun Hu)

basically required the same making process, but the artifacts were presented differently. The difference was that narrative photography played a more important role in the representational style.

For example, the three images in Fig. 5 are actually photos of exactly the same rock art, taken from different perspectives, although they look completely different. I did not create them with a design beforehand as I did with the Inuksuk, for it is totally unpredictable how those rocks will stand and be piled up. The challenge is how to handle the complexity of three images in one piece of work from different perspectives. The narrative aspect did not come out of my intention solely, but out of an interactive process, and through my affordance-need context.

The affordances in those irregular rocks interacting with my need for a moral example, resulted in discovering the figures of three historical heroes in one piece of

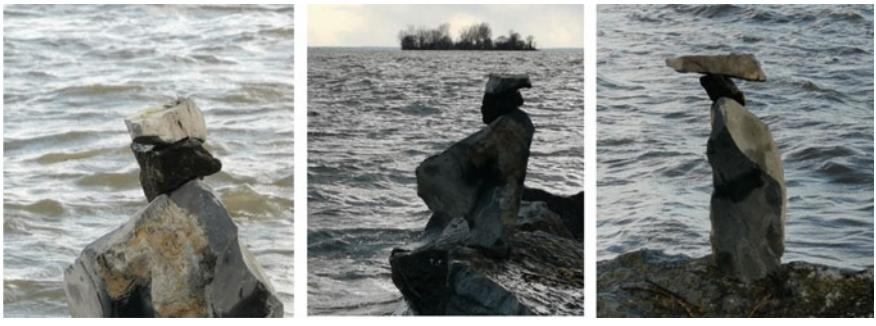

Fig. 5 Three images of the same rock balancing art at Lachine Park on April 14, 2020. From left to right: Confucius looking over the river, Jiang Ziya fishing without a hook and Qing Shihuang touring the empire (Photos by Jun Hu)

rock art. Each image of the same piece of work represents a hero in Chinese history, namely Confucius (551–479 BCE), Jiang Ziya (eleventh century BCE) and Qing Shi Huang (259–210 BCE). They dress in traditional costume, each with a dramatic gesture hinting at a renown anecdote that had some significance to me during the difficult situation I was in at the time:

> Left: Confucius looking over the river. Confucius praised the virtue of water that is at the same time humble and powerful. Water is humble for it absorbs and cleanses dirt and waste. Water is powerful for it is wise enough to overcome any obstacle to reach the sea.
> Middle: Jiang Ziya in exile, fishing without a hook. It was the wisdom of this founder of the Zhou dynasty, that the fish would come to him of their own volition when they were ready.
> Right: Qing Shi Huang, the First Emperor, touring the empire. As the founder of the first unified China, he was courageous enough to face unprecedented challenges.

I posted them in my WeChat minutes, as an encouragement for myself as well as my Chinese friend and to learn the virtues of tolerance from Confucius, wisdom from Jiang Ziya and courage from Qing Shi Huang, in face of the anti-Asian prejudice and discrimination during the pandemic. The posting harvested lots of thumb-ups.

The irregular shapes of rocks initially put off any representative and narrative intention. As the work progressed the rocks opened up a nurture-by-nature possibility in that they played an active role as inspiration in my narrative creativity. In other words, the art was created beyond my initial intention alone. It was only during my "crafting with the environment" process that my psychological need happened to converge with the affordance of the rocks, and at a certain point those ideas of imagined historical figures were triggered. In this sense, I was creating together with nature, rather than simply taking nature as the background, or the objective, or using natural materials as a means to an end.

My crafting with environment experience demonstrates a non-anthropocentric approach of art making and learning. Situated in the affordance-need context, nurture and nature became one, resulting in creativity through a spontaneous process, not needing control by any external agent, such as an art teacher.

This reminds me of a Chinese concept, the *Supreme Master* (大宗师), that appears in the Taoist philosophy essay by Chuang-tzu (庄子, 369–286 BCE), who wrote this about its features: "There is in it emotion and sincerity; but it does nothing and has no bodily form. It may be handed down, but may not be received. It may be apprehended by the mind but may not be seen. It has its root and ground (of existence) in itself. Before there were heaven and earth, from of old, there it was, securely existing"[1] (translated by James Legge, 1891). In my mind I connect this concept of the Supreme Master with what I mean with the affordance-needs concept, as to me it fits all of Zhuang-tzu's description of its features, as I will describe here below.

[1] Original text in Chinese: "有情有信, 无为无形, 可传而不可受, 可得而不可见。自本自根, 未有天地, 自古以存"。(庄子《大宗师》).

The Supreme master counts on human need and instinct, so "*there is in it emotion and sincerity*". During the pandemic, it helped people by finding escape in the rock art, forgetting about the Covid-19 pandemic for a while, and feeling relief from the frustration of isolation. In my experience, the affordance-need contextualizes human actions rather than pushing humans into action, so "*it does nothing"*.

Since it is contextualized in the relation between human and nature, it "*has no bodily form"* in the physical world. I believe that it is a mistake to understand the artificial world created by human beings, or culture, as separated from the natural world, as if they are two worlds, with the artificial world protruding from the background of the natural world. They are all of one world indeed. The physical balance is one with the psychological balance, in the performance of rock balancing. The aesthetic quality of my rock art comes out of the natural law of balancing instead of my artistic intention. The more perilous the balance, the more aesthetically pleasing. I simply need to follow the law of nature to create the rock art, which is easy and fun, rather than to follow a predetermined design, which can be frustrating and is bound to fail. In this sense of following the natural law, my crafting with the environment makes no distinction between human crafting and other organisms' ways of being in this world.

Affordance-need context takes effect in the community land art by coincidence rather than planning beforehand, so "*it may be handed down, but may not be received*" (if we take "handed down" as a chain reaction such as in the case of the community land art, and "not received" as a lesson plan not available). By coincidence though, it follows the laws of nature, so "*it may be apprehended by the mind"*.

Affordance-need context is a fluid situation, so it "*may not be seen*" in solid form. It keeps changing as the community land art keeps changing at the joint venture of human engagement and natural forces. Affordance-need context "*has its root and ground (of existence) in itself. Before there were heaven and earth, from of old, there it was, securely existing*", because it is simply the existence of our world itself, making no distinction between human culture and nature. Biodiversity is evidence of the fluidity and an everlasting affordance-need context. As creatures' interaction with the environment results in endless abundance of natural beauty, human crafting with the environment has already resulted in cultural diversity, which continues to evolve in an open-ended way.

Those reflections transform my understanding of a/r/tography by replacing identity centered perspective with a non-anthropocentric one. It is a new enlightenment for me in those reflections that art does not wait for humans to start the creative practice, and is not human's privilege, though humans may claim so arrogantly. The Supreme Master's pedagogy of teaching without a teacher is an eternal and universal pedagogy. In other words, good art teaching can do without a human teacher, as long as the affordance-need context is prepared. In the case of the community land art discussed in this chapter, there existed no human teacher with an educational intention, but that did not prevent the activity from taking an educational effect that matches any definition of good art education. Taking the definition of art education as "education through art" (Read, 1948), the improvised art project was not only something with aesthetic satisfaction that the community created and appreciated,

but enhanced the solidarity of the community in face of the pandemic disaster. A teacher who could have made that happen in such a difficult situation would have deserved the praise of "ingenious", but there was no teacher to whom we could pay tribute. If we have to, it is the Supreme Master, that is nature itself, that we should praise.

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Correction to: Expanding Environmental Awareness in Education Through the Arts

Biljana C. Fredriksen and Camilla Groth

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The original version of Chapters "Crafting in Dialogue with the Material Environment" and "Soil Laboratory: Crafting Experiments in an Exhibition Setting" were inadvertently published as non-open access, which has now been changed to open access under a CC BY 4.0 license, and the copyright holder has been updated to 'The Author(s)'. The correction to the chapters have been updated with the changes.

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