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TRACING MATTERS OF SCALE BY WALKING WITH MINERALS

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ABSTRACT

Most practices of design are dependent on materials, and an anthropocentric way of thinking matter as mere resource ready to exploit, dominates. This text attempts to counteract that mode of thinking *about* matter, by walking and thinking-*with* stones, minerals and fossils in a disused limestone quarry in southern Sweden. The text is folding together thoughts from philosophy of science and vital materialism with insights from the lithic, spatio-temporal scales of sedimented fossil archives of the quarry and situated experiential explorations taking place there. What emerged from the learnings of the minerals, and what this text contributes with, is a proposal for a performative multi-scalar type of thinking that challenges linear, humancentric timescales, binaries and dualisms and instead opens up for more entangled understandings of, and care for, human-matter relations.

> I believe that encounters with lively matter can chasten my fantasies of human mastery, highlight the common materiality of all that is, expose a wider distribution of agency, and reshape the self and its interests.
>
> – Jane Bennett, 2010

> The present is both a reckoning of what we are ceasing to be but also the seed of what we are becoming.
>
> – Rosi Braidotti, 2020b

INTRODUCTION

Recently, scientists were able to study a dying star that exploded and understood for the first time, the vast amounts of calcium that is released into the universe in that process. Therefore, even the smallest pebble is, on deeper reflection, a link to a dynamic cosmos of inhuman forces and materialities that extend to the most remote parts of the galaxy, connecting it to all living bodies of animals, plants and water.

Walking-with minerals is an ongoing and in-progress exploration, and part of my PhD-project within design, titled Cultivating Caring Coexistence – Designing Anthropodecentric Futures, where I am continuously exploring the following question: How do the ways in which we think matter, predetermine, limit, or enable the way we then construct our relations to place, to environments, to objects as well as communities of human and more-than-human earth-others? Guidance comes from a theoretical framework of critical and feminist posthumanism and new materialism and concepts like *vibrant matter* (Bennett, 2010) that are dealing with issues of human and more-than-human relationalities. In order to explore theory in a more situated way, I started walking in-situ, both alone, together with a colleague, guided groups and together with others. In-situ means situated in the original site, and my interest in the origins of materials led me to a local site of extraction, a disused limestone quarry. The purpose of the text is to bring together theoretical concepts with my own insights from walking in the

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quarry. The first section of this text introduces the local scale of the lithic site of the quarry and connects it to the scale of global extraction, its geosocial pasts and presents of the so-called 'Anthropocene' to give a background to why I suggest to think matter and material otherwise. The text touches upon how I see design as an *ecology of practice* drawing from, but not limited to Isabelle Stenger's relational concept (2005), and how my walking has emerged as a *tool for thinking-with* mineral-others. Connecting the concepts *vibrant matter* by Jane Bennett (2010) and *time as becoming* by Elizbeth Grosz (2011), with the situated walks tracing scales of time and space in the fossil strata, led me to my main insight: a multi-scalar type of thinking that I find necessary in order to even grasp matter as vibrant. The following section presents one of the experiential methods more in detail; *tracing-common-ground*, which further explores human-lithic connectedness, followed by a summary on what was learnt from the mineral archive of this site and why the proposed multi-scalar way of thinking can be useful in thinking matter otherwise and why this is valuable.

THE SITE – A VIBRANT VOID OF DISPLACED MATTER

Limhamn is an area outside of Malmö in southern Sweden, and the name means lime-harbor, indicating the site's 'natural resource' that has always been at the center, the limestone. Extraction of lime has most likely taken place since prehistoric times but the start of more large-scale quarrying can be traced back to the year 1866 (Länsstyrelsen, 2016). When the mine closed in 1994, the extraction had resulted in a large void, approximately 1300 meters long, 800 meters wide and 65 meters deep. A void of displaced matter, was my immediate reflection on my first visit. However, it is not a void in terms of empty space, on the contrary, the closed off quarry is bustling with life of different plants, insects and larger animals, some extremely rare or on the brink of extinction. The old quarry, this gigantic (w)hole, is an assemblage consisting of more than 1500 nonhuman inhabitants, in addition to the sedimentary mineral rock, fossils as well as the industrial remnants of human quarrying and processing of the lime. An assemblage, following Deleuze and Guattari's philosophical concept (2013), is here thought of as a spatio-temporal composition of human and/or more-than-humans, always lively and unpredictable, never fixed. Although the quarry was classified as a nature reserve in 2011 due to its rich flora and fauna, it does not mean it is a static, harmonious whole, rather it is an assemblage fitting Bennett's description: an "ad hoc grouping of diverse elements, of vibrant materials of all sorts" that come and go and can be both "intimately interconnected and highly conflictual" (2010, p.23). One example of a contradictory element of the quarry that struck me on my walks, is the water pumps. The current formation of the assemblage is dependent on that 70 liters of water is redirected, every second. Human activities have an obvious part in this entanglement; however, this text is taking its departure from on another important power hierarchy present, namely the violent force of human dominance that have displaced the minerals in the first place, through extraction by hand and later with the aid of machines and dynamite. This violent ascendancy is a power position that is probably not viewed negatively by most, considering the mineral as resource and the effects it has had, as ingredient in produced objects, buildings and infrastructures, developing societies. New building developments surround the quarry, giving the post-industrial site a new kind of value as exclusive view. Progression notwithstanding, I attempt a less human-centered perspective when thinking-with the mineral, nevertheless accounting for the frictions that it might entail.

"We walked through the limestone layers – my skeleton's main component (organizers' comment). A moment in the remnants of a heavy industry where vegetation and wildlife take over. Newly built exclusive apartments cling on the edge of the quarry, balancing, overlooking what exactly?" (Co-walker, 2020)

THE SITUATION – DESIGN AND EXTRACTIVISM

Limestone is a sedimentary rock composed primarily of calcium carbonate (CaCO3) in the form of the mineral calcite. Most products we use on a daily basis include minerals, for example, a glossy paper contains calcium carbonate along with kaolin clay, sodium sulphate, soda ash and titanium dioxide. Concrete, the main end-product for lime and one the markers of the [so-called] Anthropocene (Waters & Zalasiewicz, 2018), contains in addition gypsum, iron oxide and clay. Most plastic products, plastic being another marker, also contains processed limestone. All practices of design are dependent on, made from and marketed by the choice of materials. Yet, despite a growing general awareness of the sustainability discourse, the connections between design and unsustainable extractivism are backgrounded due to issues that are all linked to matters of spatial and temporal scale. For example, the geographically far distances between sites of extraction, production and consumption: the origin of materials, how it is extracted and by whom. Reports show how large-scale mining has negative impact on human rights for local inhabitants around mines in for example mining countries like Zambia (Swedwatch, 2019). Two thirds of consumption-based emissions from Swedish consumers, occur in elsewhere and are therefore counted as emissions in the low-wage countries that produce the designed objects (Naturskyddsföreningen). The temporal scales of life-cycles: despite recent resolutions proposing longer lifetimes of products (European Parliament, 2017), most objects are still designed with a planned obsolescence keeping the consumer in a

continual loop of consumption. But then there is, what I would call a scale of transcendence: I suggest it concerns the level of connectedness between human and nature, which both mean an intellectual understanding of connectedness and how it affects consumerist and other behaviors of buying, exhausting and caring for matter-material-objects-services consumed, determining our so-called ecological footprint (Global Footprint Network). My understanding is that responsibility and care, for example in terms of recycling, is often put on the individual in a neoliberal manner, although the chances of impacting or making change are negligible due to the fact that the recycling systems along with the systems of extracting the matter in the first phase, are cogs in the same globalized economical order where everything is valued on the basis of its ability to be capitalized upon. This understanding is grounded in a "modern divide of nonhuman and human" (Åsberg et.al., 2018, p.2), a belief in human transcendence that creates hierarchies and dualisms. In other words, the view that human dominates nature, which, as I have argued, is key in the global extractivist activities driven by capitalism.

Aerial view of Limhamn Limestone quarry by Google Maps (accessed: May 2, 2021)

THE SITUATION –THE 'ANTHROPOCENE'

The notion of the 'Anthropocene' is becoming established and used in many contexts to describe our planetary age as a new geological epoch, defined by unparalleled human influence upon Earth. Evidence for this originates from human activities that leave large-scale impacts on the Earth's surface such as mining. As an emerging platform for discussing climate change I agree with Nigel Clark and Kathryn Yusoff that the term 'Anthropocene' has a strategic relevance as alarm clock (2017) and in the context of the quarry, the term is useful since it introduces other ways of thinking temporal scale beyond humancentric history. Following this reasoning, yet acknowledging that there are alternative terms suggesting other important perspectives (Haraway, 2016, Malm et. al., 2014), the term Anthropocene is continuously used in this text, however, it is important to problematize it further.

Popularized and coined by atmospheric chemist Paul J. Crutzen and biologist Eugene F. Stoermer, the term Anthropocene is derived from the Greek words *anthropo,* 'man,' and *cene* 'new'. Although their proposed date for the onset of the epoch is the latter part of the 18th century, coinciding with the innovation of the steam engine (Crutzen et. al., 2000), clearly connecting it to European economic and political actions, the term is homogenizing (hu)man impact and responsibility, despite the uneven effects across the south-north divide (see Chakrabarty, 2009, cited in Parikka, 2018, p.53), prompting the question of what man, or anthropo*,* the term is referring to. Yusoff has in the book *A billion black Anthropocenes or none*, built arguments drawing from the important works of scholars like Aimé Césaire, Éduard Glissant, Sylvia Wynter, Diane Brand and more, to highlight the term's inherent racial blindness:

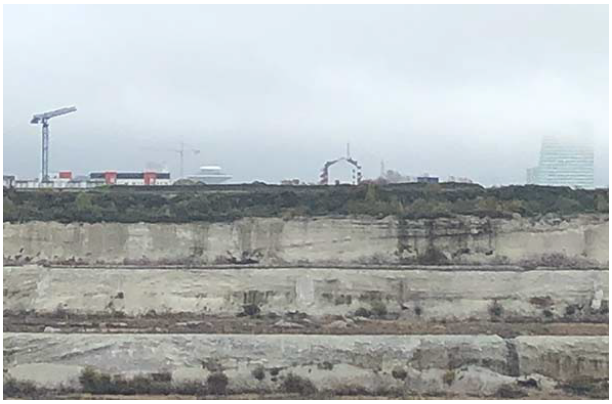
> If the Anthropocene claims a sudden concern with the exposures of environmental harm to white liberal communities, it does so in the wake of histories in which these harms have been knowingly exported to black and brown communities under the rubric of civilization, progress, modernization, and capitalism. (2018, xiii).

Yusoff is problematizing the whole discipline of geology, or what she calls w*hite geology* (2018, p.21), which she recognizes "as a racial formation from the onset and, in its praxis, as an extractive and theoretical discipline" (2018, xiv).

The reason for bringing these aspects up, is the importance of understanding the inequities that a lot of the materials that designers use are built upon, since, the links between designing and extractivism often are obscured. I build this understanding further on Tony Fry's statement that design is inherently contradictory, meaning that on the one hand, design is the creation of something new, on the other hand, creation equals destruction (2009). Furthermore, as Arturo Escobar concludes, "much of what goes on under the guise of design at present involves intensive resource use and vast material destruction; design is central to the structures of unsustainability that hold in place the contemporary, so-called modern world" (2017, p.1). The term extractivism emerged from Latin American scholarship, to describe the commodification of the earth. It is defined as follows by Ecuadorian economist Alberto Acosta:

> Extractivism is a mode of accumulation that started to be established on a massive scale five hundred years ago. The world economy – the capitalist system – began to be structured with the conquest and colonisation of the Americas, Africa and Asia (2013, p.62).

Many sites of extraction are violations of human and more-than-human communities, causing social and environmental destruction, still, as Heather Davies concludes, "there is a refusal to simply condemn these acts, and instead the [design] work figures desire as central. The seduction of colour, of shine, of bling, of telecommunications technologies all operate as fundamental to these images of devastation" (2019 p.4). Furthermore, my experience of the Swedish design community, it is easy to see yourselves as politically neutral and hence stay safely unaware of the ideological work performed by constructing and producing things in the world, often repeating normative values or even reinforce the colonizing of ideas to impose upon others. These problems, Joanna Boehnert suggests, emerge from lack of understanding of the historical circumstances and power relations that have created the unsustainable societies of today and how the capitalistic system, with its neoliberal governance, is impacting lives and the planet in negative ways (2018). And as we are "just now noticing the extinction [we have] chosen to overlook in the making of […] modernity and freedom" (Yusoff, 2018, xii), I can conclude that there is a most urgent need that the connections between design and geo-politics become clear.



Plateaus on the east side of the quarry. Photo: P. Lilja

"This is place is so beautiful with its large-scale white walls" (Co-walker, 2020).

Seen through the strata of the limestone quarry, the epoch of the Anthropocene constitutes barely two millimeters of the first step when walking into the site. The human power however, is evident everywhere in the form of the void itself, the plateaus and the textured walls marked by dynamite. The challenge here, is hence not only to recognize the beautiful fossil sedimentations, but to try to slide across scales of temporality and spatiality, connecting it not only to the politics of global extractivism but also to how the matter itself is understood. The mineral walks attempt to explore the mineral matter as vibrant more-than-human entities, by tracing these landscapes formed by power hierarchies and human exceptionalism.

WALKING-WITH MINERALS…

… can be to trace the relations of minerals and humans in this specific, lithic location. What if we think beyond the industrial history of this place: What happens if we, as human beings, do not put ourselves in the foreground all the time? What if we focus deeper on the background, on the limestone, the fossil and the mineral? Can we try to see even the inert rocks, stones and minerals as lively and vibrant? Look around you and choose a stone from the ground. Pick it up, hold it and keep it with you. This is your mineral companion throughout this walk. The stone is a kind of everyday thing. It's just a piece of rock. The stones and minerals have always been here, they surround you and you are even standing on a gigantic rock, floating in space. Feel the weight of the stone in your hand, grounding you in this specific location. Today, we walk in the enduring company of the rocks, so let's allow for other kinds of rock stories, not just those that talk about human productivity, culture and politics, which presuppose that the mineral only exists for us.

A COLLECTIVE MINERAL WALK

Together with designer Anette Væring, I designed a specific mineral walk that took place on a sunny and calm day in September 2020, hosted and marketed by the municipality of Malmö. It was a two hour-long public event with twenty participants that all had signed up for tickets on a well-established website for local cultural events. The cost of the tickets was a symbolic 10 SEK (€1) to cover administrative costs of the event coordinator, making the walk fairly accessible to find out about and afford. However, the mineral walk in the quarry is not accessible for wheelchairs due to that parts of the rather steep dust roads are not paved. Around two thirds of the participants where artists, designers or researches from other disciplines interested in the posthuman framework, the fact that it was guided by designers or the possibility of accessing an otherwise closed-off quarry. The latter was also a driver for one third of the participants interested in the quarry for a variety of other reasons. Three persons had grown up close to the quarry and had childhood memories of the soundscape of the industry during the 1980's. The italic text sections above and below, are recitations from a text that was read out loud in the beginning of the event as well as in the middle, during an exercise called *tracing common ground*. Some of the feedback from our co-walkers in this public event are quoted in italics throughout this text, and has informally been collected either orally during the last part of the walk, and via email or social media platforms after the walk.

A TOOL FOR THINKING

The public mineral walk, is designed as, what Isabelle Stengers would call, a *tool for thinking*, "that address

and actualize [the] power of the situation, that make it a matter of particular concern, in other words, make us think and not recognise" (2005, p.3). This is grounded in my understanding of my design work as an ecology of practice of sorts, correlative to how Stengers is approaching her own field of physics: "as it diverges, that is, feeling its borders, experimenting with the questions which practitioners may accept as relevant, [and where] the relationship of relevance between the situation and the tool [is key]" (Stengers, 2005, p. 184-5). My ecology of practices is situated in flux between constructed borders of art, design, curatorial practice and research, and my gathered explorations of walking with minerals, are consequently not just attempting to recognise the quarry as a quarry but rather explore it as a tool for thinking to actualize the quarry and the situation. To emphazise the active part of the thinking-tool, the part that actualizes or enact action through thinking, I find the notion of *thinking-with* helpful. I suggest that it means a way of thinking otherwise from thinking *about,* and inspired by Haraway, it is about the ability to think-with other beings, human or not, rendering each other capable of unexpected feats and enlarging their capacities. Because, "[t]he urgencies of the Anthropocene […], demand that kind of thinking beyond inherited categories and capacities in homely and concrete ways" (2016, p.7). And to change the anthropocentric story, think we must; we must think as Haraway exclaims by concluding that "[t]o think-with is to stay with the naturalcultural multispecies trouble on earth" (2016, p.40). In the context of rocks, stones and minerals in the quarry, thinking-with it is an attempt to counteract a mode of thinking about matter as dead and mere resource and instead understand the human-lithic as shared world.

"As we walk back up and out of the limestone quarry on winding gravel roads, I reflect on my childhood memories, the sound of the big stone crusher that I heard every day when biking to school. The long trains transporting the minerals to [the company] Cementa's large cisterns wher it was waiting to be mixed into cement. The cement, the raw cement." (Co-walker, 2020)

What is at stake, according to Stengers, is "giving to the situation the power to make us think" (2005, p. 185), but what is at stake in the quarry, where the sound of the dynamite has long gone been silenced? During the planning phase of the public walk some nagging thoughts lingered: What difference will this walk make? Is this not just a very exclusive walk in an otherwise gated area, for a small group of priviledged participants in a very safe environment considering the absence of toxic elements leaking and evaporating into bodies so common in other mines and quarries elsewhere in the world where these problems have been exported? Now, I would answere yes to the above questions without hesitation, still convinced that this quarry has the potential to actualize all of those relevant frictions in a helpful way. In order to attempt this, the mineral as a discursive tool to think-with might not be enough on its own because just 'thinking' does not necessarily generate a full experience, and as Marilyn Strathern taught so many through Donna Haraway's mentioning: "It matters what ideas we use to think other ideas" (as cited in Haraway, 2016, p.34). To explore question of human-lithic relationalities and if it matter how we think matter further, I am bringing Stengers' idea of relationality between tools and situations together with thoughts on relationality from the field of political science, namely vital materialism, thinking-with Bennett's concept of vibrant matter.

THINKING-WITH VIBRANT MATTER

The notion of vibrant matter is an important part of a theoretical framework put to work here in an attempt to counteract the dominant anthropocentric dualisms, which are a prerequisite for extractivism, not only in Limhamn or elsewhere in Sweden but globally. The problem, Bennett argues, is that "materiality is both too alien and too close for us to see clearly" (2004, p.349). With the concepts of thing-power (2004) and vibrant matter (2010), Bennett wants to make us more sensitive to more-than-humans, realize their powers in and on our bodies and surroundings, and, by connecting it to ecological thinking, evoke an enhanced ethical sense for ecological sustainability. Bennett theorizes a vital materiality in the tradition of philosophers spanning history from Democritus, Epicurus, Spinoza and Diderot to Deleuze and Guattari who would call this vitality *immanent* (1988) in that it exists within matter and runs through and across bodies, both human and more-than-human. Extremely simplified, this vital view is detaching "materiality from the figures of passive, mechanistic, or, divinely infused substance" (Bennett, 2010, xiii).

This text attempts to think-with the mineral by reading it through the concept of for example vibrant matter, however, to most of our co-walkers in the publicly announced event, these concepts were not well or at all known. To disseminate the theoretical context, the site and the the physical walk are key in order to situate thinking and learning from the lithic timescales exposed in the quarry. So, the walk was designed as a humble and easy-to-follow first step of speculating rocks, stones and minerals as vibrant and finding common human-lithic ground, through the two sessions of reading aloud (excerpts in italic), with the aim to engage in an active form of thinking-with and *walking-with*.

TRACING SCALES OF TIME AND SPACE

You are walking through deep time in a kind of museum of layers and thick deposits of sedimented matter that are exposed in this place. This is a strange museum where biology becomes geology. The limestone is a thick mineral cemetery that has been animal and then became stone, during unimaginable 65 million years.

An archive of life, death and the fossils in between. Notice the sedimented walls and regard the layers as a kind of measuring tape. Here, it has taken 50 years for every millimeter of limestone to form. Ask yourself, how many years have you been alive? The Anthropocene, the human epoch, makes up only 2 millimeters of your first step on this journey. Keep walking, and focus on the fact that each step you take, corresponds to about 50,000 years. Now, let us walk 65 million years back in time.

Limestone sediments, Limhamn. Photo: P. Lilja

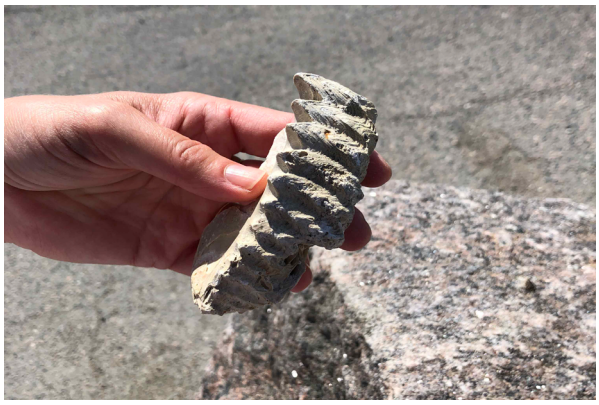
"Stone", as Jeffrey J. Cohen wrote, "is an aeonic companionship" (2015, p.17), a support I would add, in challenging the life-death divide, because it requires a new understanding of temporal scales beyond the human. It is difficult to grasp the timescales of strata spanning 65 million years, but "a rock […] opens an adventure in deep time and inhuman forces of slow sedimentation" (Cohen, 2015, p.4). Can walking down to the bottom of the pit, carefully contemplating that each step equals 50 000 years, make this fathomless scale of temporality more understandable? The fact that the quarry measures 65 meters from top to bottom and the sediments span 65 million years is an interesting numeric coincident. Furthermore, the walking distance from the starting point at ground level to the bottom measures 650 meters. This made the simple calculations comparing space and time fruitful as we were walking 65 million years back in time. One could of course argue that this exercise is reducing time to spatiality by conceptualizing the strata into a vertically linear measuring tool for counting, a tool at home in the reductionist and modernist world-view. Still, by combining it with physical movement, the aim was to create an embodied experience of this multi-temporal site and perhaps introducing thinking beyond human-time scale. In addition, this potentially opens up for thinking time otherwise, in which spatial scale is also importantly entwined. Grosz argues that "spatial practitioners [like artists, architects and designers] need to develop other notions of time in order to act upon the future", and suggests a notion of "time as becoming", connected to lived experiences and bodies (Grosz, 2001, cited in Schalk, Kristiansson & Mazé 2020, p.180).

"Sometimes I closed my eyes during the silent walk down into the limestone quarry, to more clearly feel the vibration under my feet far below the ground and imagine a tropical sea, 62-65 million years ago, (some million years after the extinction of the dinosaurs) ...then, opening my eyes and to see that I am surrounded by 65 meters of layers upon layers of limestone sediments, huge walls made from fossils rising from the ground, fossils from this tropical sea!" (Co-walker, 2020).

By measuring time through rock strata in order to understand evolution and change, time "becomes detached from the specific anthropocentric onto-epistemologies [opening up] to consider the multiplicity of temporalities and alternative metaphysics" (Parikka, 2018, p.52-53).

"I thought a lot about how this journey down into the ground / earth, into deep time, relates to large scales… specifically how it enters into dialogue with / problematize large modernist projects." (Co-walker, 2020)

When it comes to the lithic participants of the mineral walks, the stone companions are seldom seen as a form of life, rather, they mainly get to represent the cold, dead or inert, and as such, resources to be exploited. Perhaps it would be easier to think and walk-with a living tree, plant or animal as vibrant? Well, the challenge in thinking minerals as vibrant in this particular quarry is rewarding I would argue. Because the sediments introduce a scale between biological life and geological mineral, challenging the binaries of life and death, past and future as well as disciplinary boundaries. The limestone here was formed in a warm sea between 65–62 million years ago and it consists mainly of deposits from microscopic coccoliths (algae), bryozoans (mosses) and corals (Länsstyrelsen, 2016). So, instead of a temporality supporting static and binary categorizations of lively (for example biology, algae, tree) or dead (for example geology, fossil, wood), what the mineral walks attempts to make apprehensible, is a transformational power aligned with what Grosz calls *nature as becoming*, a philosophy of becoming which argues that nature transforms beyond the limits of passivity of resource. Grosz "understands life and matter in terms of their temporal and durational entwinements. Matter and life become, and become undone. They transform and are transformed" (2011, p.5). Fossils, according to Kathryn Yusoff, "unlock this life–death, time–untimely, corporeal–incorporeal equation" (2013, p.779).


Fossil of oyster found in Limhamn's limestone quarry. Photo: P. Lilja

A MULTI-SCALAR DESIGN APPROACH

If the mineral is (to be) rendered lively or vibrant, we must understand it over durations of time beyond the limited timescale based on a human lifetime. This would in turn call for a rethinking of the human-centered linear concept of past-present-future. When thinking-with the limestone quarry, the layers of minerals start to protrude the anthropocentric frame, forming what could possibly be called an archive of more-than-human knowledge. In line with what Stephanie Springgay and Sarah E. Truman argue, rocks are *queer archives* (2018), immanently lively because they melt, erode, collapse and so on. Vibrant in their production of differences over vast timescales, to the extent that it becomes invisible from a human perspective. So, how can we relate to this as designers? Perhaps, if we expand this thinking to include matter processed into materials and designed objects? Objects, Bennett explains, like

> "stones, tables, technologies, words, and edibles that confronts us as fixed are mobile, internally heterogenous materials whose rate of speed and pace of change are slow compared to the duration and velocity of the human bodies participating in and perceiving them. [They appear] as such because their becoming proceeds at a speed or a level below the threshold of human discernment" (2010, p.3-4).

What I have learnt from thinking and walking-with the rocks, stones and mineral during my explorations, is to think beyond the human-centric time-scale and to engage with time as becoming. It is an intellectual act, a type of multi-scalar thinking and a mindset that, I argue, is needed in order to grasp the complexities connected to these urgent times. The ability to think through and across deep temporal scales is an important skill for the designer who wish to be able to actualize strategies for living and dying well in these troubled times (Haraway, 2016, p.1, Tsing et. al., 2017), aiming at different futures. To conclude, I propose that a vital materialism has got the potential to cultivate a multi-scalar way of thinking matter and material through time as becoming, and I am curious to further explore how this approach would possibly predetermine, limit, or enable the ways we then construct our relations to place, to environments, to objects as well as communities of human and more-than-human earth-others. The ethical foundation for this argument will be further unpacked in the final section.

WALKING AS METHOD

This lithic location consists of an assemblage of human and more-than-human agencies in a continuous open-ended becoming, be it the porous walls of mineral fossils caving in, the pump, rerouting the groundwater that would otherwise flood the quarry with unknown effects on the surrounding land, or the rare types of frogs and plants finding refuge here, or the graffiti painter trespassing. By walking-with, we are tracing these encounters creating an understanding of this place and our own connection to it.

WALKING-WITH

> Walking slows you down, time passes differently and mind and body are merged in the effort to cover ground and take in the surroundings. That is, every step embodies time as well as space, each step meshing things past and those to come in an ongoing process, each step participating in the making of worlds and in the process, knitting together responsibility for past, present and future. (Lesley Instone, 2015, p.135)

Walking, has a long and interesting history as both political and philosophical endeavors that for example Rebecca Solnit famously have collected in her book *Wanderlust, a history of walking*, where she is asserting that "walking is a mode of making the world as well as being in it" (2014, p.29). Solnit also touches upon walking as a form of knowledge making:

> "Walking shares with making and working that crucial element of engagement of the body and the mind with the world, of knowing the world through the body and the body through the world" (2014, p.29).

By moving down into and through the sedimented quarry space, I have learnt things from encountering not only minerals, but also water, atmosphere, steel, plants, soil, concrete and animals. I feel affected by this assemblage of more-than-human encounters, in subtle ways hard to put into words, but to conclude, it is building an understanding of place and my relationality to it. Perhaps it is similar to what J.J. Cohen explains: walking "with stone is intensely to inhabit that preposition *with*, to move from solitary individuations to ecosystems, environments, shared agencies, and

companionate properties" (2015, p.11, emphasis in original). If, by agreeing with the propositions presented by Truman and Springgay, it is possible to understand the mineral strata of the quarry as a queer archive of knowledge, I suggest that we can allow the mineral to teach us about deep geological time and vibrant matter while the movement of the walking helps to embody that knowledge. "Walking with stone", Springgay and Truman concludes, "demands that we think not about what the rocks mean to us, nor the memories they hold, but what vital and affective qualities are co-composed" (2017, p. 853).

PERFORMANCE AND IMAGINATION

Unlike my walks in solitude, the public mineral walk is a carefully designed and curated *dramatization* (Braidotti, 2020a) starting with a listening session establishing the site as an assemblage through different narratives, focusing on opening up for more-than-human perspectives through the mineral companions of the walk. Tactility was engaged by touching stones and carrying a selected one throughout the walk. The main part of the walk, was conducted in silence with the aim to focus the participant's attention to the more-than-human encounters. The performativity (Butler, 1999) of the mineral walks, in other words everything that was brought about through the experiential and situated approach, happened through the intra-actions (Barad, 2007) between the designers/guides, the narrative figuration of the vibrant minerals and the participants. Crucial for creating this kind of agential space for renegotiating matter (as mere resource) is to facilitate imagination. The narrative, here in terms of the text that was read, is key in creating imaginaries, and has the potential of *reconfiguring the world in its becoming* (Barad, 2007, p.207). The challenge of designing the public walk as a tool for thinking, is how to offer the co-walkers a stimulating narrative and environment so that they can connect the dots themselves, which puts focus on the function of imagination. The ability to imagine is necessary to be able to relate the vast timescales to the materiality of minerals within our bodies and our surroundings. My conclusion is that whether the walk can be actualized as a tool for thinking and potentially for reconfiguring our relations to matter, is dependent on how well the design and dramatization facilitate for, and spark, the imagination of the walker. I see a potential in the performative walk to become a pedagogical activity where different groups come to learn through the quarry as archive, listening to the researched narrative, walking-with minerals, understanding the timescales and touching the mud – getting in contact with the micro- and macro-materialities of previously extracted and exploited matter. I believe this can raise awareness for the human-mineral relationships and entanglement.

TRACING COMMON GROUND, BECOMING-WITH MINERALS

We are walking talking minerals, able to walk upright over the earth because of the mineral that long ago, infiltrated the organic world of fleshy matter-energy, became our partner and gave us mobility in the form of our skeletons. Without this solid mineral base, we would fall apart, and the same applies to societies, companies, relationships, identities, knowledge. Like the forests and trees that sit like a skin over the earth's stones - without the solid strength of the minerals inside, without the stone, that skin would crumble. Now, start tracing the minerals inside of you, on your skin.

> […]500 million years ago […] some of the conglomerations of fleshy matter-energy that made up life under-went a sudden mineralization, and a new material for constructing living creatures emerged: bone. (De Landa, 1997, p. 26)

Tracing common ground, is an activity of the public walk that took place after the initial 45-minutes long, silent part. Brushes along with paint that me and my colleague prepared from the calcite was placed in a large circle in the middle of the quarry where we, quietly embraced by the distant sedimented walls, sat down together with our co-walkers. The aim of this exercise, is to embody an understanding of the common ground between the bodies of the human and the mineral, by tracing the skeleton in our hands with mineral paint.

Tracing the lithic in the human. Public mineral walk, Limhamn Sept. 20, 2020. Photo: B. Buch-Larsen.

Based on the notion of matter as vibrant, this exercise does not deny that human and more-than-human bodies are different, rather, it aims for an understanding of commonality and connectedness though a shared mineral basis. Many thinkers who have contemplated human-mineral relations, have been inspirational for the design and narrative of this exercise. For example, Cohen writes in his book *Stone, an ecology of the inhuman*, that "human and lithic compose a petric duo" (2015, p.27). Haraway tells us that "[i]f we appreciate the foolishness of human exceptionalism then we know that becoming is always becoming *with* – in a contact zone where the outcome, where who is in the world, is

at stake" (2008, p.244, emphasize in original). I find the notion of becoming-with helpful to describe the aim of the exercise tracing common ground, because it departs from everything's connectedness, challenging delusions of separation, reminding us of our own 'mineralness', that we are formed by minerals and connected to earth's ecological community. In other words, the human and the lithic share a mineral base.

"When we sit on the ground and are given a task to trace the skeleton of our hands with mineral paint, a magical stillness arises, a meditative feeling of getting in touch directly with the limestone, the skin and the skeleton of my hands interacts with the minerals from the Paleocene epoch" (Co-walker, 2020).

Manuel De Landa, author of *A thousand years of nonlinear history*, who reminded us that the human endoskeleton was one of many products of ancient mineralization, also informs us that:

> About eighth thousand years ago, human populations began mineralizing again when they developed an urban exoskeleton: bricks of sun-dried clay became the building materials for their homes, which in turn surrounded and where surrounded by stone monuments and defensive walls (1997, p.27).

This connectedness or entanglement that the activity attempts to bring to the fore, is not about 'becoming one with the world' in 'harmony', rather the whole walk is simply an activity aiming to make us think about our relationalities with the material world, from the microscopic scale of the fossil companions to the macroscopic scale of globally distributed calcium carbonate, embodied here through experiential walking and tracing.

It is also a reminder of the geological pasts that we belong to, and that are moreover part of our present-future continuum (Braidotti, 2020b). The sedimented rock walls exposed in the limestone quarry are also an archive of *human* knowledge, where the Anthropocene, or 'the age of man', is recorded in the strata. Besides, the fossil unearths the process of sedimentation that also occurs within human bodies, reconceptualizing us as a multispecies beings, becoming-with one another (Haraway, 2003, 2008). It reminds me of our geologic origins and futures, and hence, it *queers* (Yusoff, 2013) or *diffracts* (Barad, 2007) the very concept of the human, its origin and identity as a singular force. Considering the mineral common ground of dying stars, limestone fossils and human bodies was an important part of the narrative of the public walk, with the aim to call for an understanding of humans, more-than-humans, matter and time as entangled and connected.

UNEARTHING AN ETHICS FOR DESIGN

To sum up, let me start by stating that it matters how we think matter. Because, as this text argues, the dominant dualistic thinking of human exceptionalism is backgrounding nature with consequences leading to the urgent and troubled times of climate change, mass extinctions and the complex consequences that includes. Nature however, according to Val Plumwood (1993), is not just a background, or something that is separated from us. Rather, "we are fully in nature and nature is fully in us" (Åsberg & Braidotti, 2018, p.1). The void of displaced matter in the quarry is shaped by an anthropocentric understanding of matter and it has provided materials like cement and chalk, enabling human designs in the shape of buildings and cities as well as a variety of commodities from plastic objects to toothpaste, which makes the site of the quarry ideal for designers to contemplate the origins of materials.

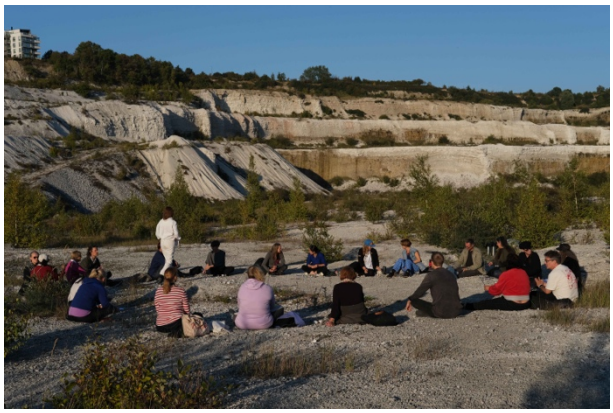
Walking-with the minerals of the disused quarry in Limhamn, emerged as a tool for thinking matter and materials otherwise than mere resource. A tool that could unlock the potential in other similar postindustrial sites and material archives. The designed dramatization of a public walk put focus on the function of imagination as key in relating to the enormous timescales of rocks, stones and minerals. The performativity of the experiential activities, (like attentive movement, walking in silence, listening, touching, carrying and caring for stone companions, and tracing-common-ground), emerged as a translation between the abstract timescales, knowledge and the embodied experience of the here and now, aiming for different futures.

The performativity of the mineral walks activated and actualized a theoretical framework with concepts like vibrant matter and time as becoming, which suggests the importance of a multi-scalar thinking, cultivating an ability to think beyond the human-centric time-scale. Potentially, a performative multi-scalar thinking might facilitate the ability to grasp vast time scales that render matter-materials- and objects vibrant, which in turn opens up for designers to respond with long-term accountability. This could potentially unearth an ethical framework and I argue along with the most cited thinkers in this text, that more potent, more complex and more ethical understandings of materiality is needed (Bennett, 2004; 2010, Braidotti 2013; 2019, Grosz, 2011, Truman, 2019 and Åsberg et.al., 2018).

The design of the public mineral walk is for example following the advice of Bennett who is arguing that what is needed is a "cultivated, patient, sensory attentiveness to nonhuman forces operating outside and inside the human body" (2010, xiv). Ethical commitment is needed because it might bring forth a new form of material awareness, potentially impacting

what and how materials are extracted, processed, designed with and used for, potentially evoking more ethically aware production and consumption patterns.

Hence, the main point of this paper is that it matters in what spatial and temporal scale we think matter. Not only a gesture to move beyond the human by recognizing agency in matter; the framework that is emerging here points to that the way matter is understood and related to, can also charge design and research with particular ethical, aesthetic, and political tasks.



Public mineral walk, Limhamn Sept. 20, 2020. Photo: B. Buch-Larsen.

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