

A microscopic image of a textured surface, possibly a mineral or biological specimen, showing various colors and patterns. The colors range from dark brown and black to light blue and white. The texture is irregular and porous, with many small holes and cracks. The lighting is dramatic, highlighting the rough edges and creating deep shadows.

# ENVIRONMENT, DATA, CONTAMINATION

Ed. Samir Bhowmik and Jussi Partkka





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# Introduction: Contamination as a Method

JUSSI PARIKKA AND SAMIR BHOWMIK

Environment, Data, and Contamination ran as a course at the University of Arts, Helsinki, from 2022 to 2023. It was characterized from the start as a “research studio” that also develops artistic research methods that investigate an alternative notion of data. Featured as part of the Helsinki Biennial 2023 program and research, the studio was pitched as an investigative apparatus where the environments were the objects of attention and the methods of doing this work. This seems like confusion at first: environment, surely, is only, at best, a condition of the existence of methods. Or the way in which methods produce something visible, audible, modeled as an environment – both in the sense of a surrounding (that, for example, enables sensing and thus aesthetics to emerge) and in the more ecological meaning of the term as the world of humans and non-humans in the specific atmospheric, elemental, and living context of climate change and biodiversity crisis circa 2023. Yet this does not entirely outline the idea we were after: Environments already contain methodological ways of understanding relations, traces, assemblages, modes of sensing, and modes of living. Part of this can be seen in the “weather as a method”<sup>1</sup> as well as, for example, the method of

1 Harshavardhan Bhat, “The Weather Is Always a Method,” *International Relations in the Anthropocene: New Agendas, New Agencies and New Approaches* (2021): 407–423.

autographic visualization that starts from environmental surfaces where “data” is thoroughly embedded in its material circumstances.<sup>2</sup>

Artists and doctoral candidates of our research studio were invited to develop case studies that would be expressed both as artistic work and as texts; essays contributed to this book to extend the idea of Environment, Data, and Contamination with their particular methodological ideas. This edition is meant to serve as an exposition of artistic research methods explored during the research studio, as well as accompanying the exhibition *Environment, Data, Contamination*.<sup>3</sup> This book offers various methodologies and insights into how environmental data are incorporated into artistic practices to frame critiques and commentaries. This also meant approaching the notion of data in an alternative way than one might in the social sciences, let alone data sciences.

With interest growing in “environmental data,” we asked how this “data” is materialized in relation to sites and spaces, infrastructures and modes of sensing, as well as in the inverted sense: how sites and spaces are data and computation, and as such, are involved in the broader assemblages of contemporary technological culture. What critical data studies had been doing with a focus on the extended data assemblage<sup>4</sup> from sensing and collecting to storage and infrastructures and implementation, we wanted to ask by way of the artistic interests and methods of the studio: a collection of

2 Dietmar Offenhuber, “Data by Proxy—Material Traces as Autographic Visualizations,” *IEEE Transactions on Visualization and Computer Graphics* 26, no. 1 (2019): 98–108.

3 *As You May Sense - Environment, Data, Contamination*, 12 June 2023–2 July 2023, Kuva/Tila Gallery, Academy of Fine Arts, Helsinki.

4 Rob Kitchin and Tracey P. Lauriault, “Towards critical data studies: Charting and unpacking data assemblages and their work,” in *Thinking Big Data in Geography*, eds. Jim Thatcher, Josef Eckert, and Andrew Shears Jim (Lincoln: University of Nebraska Press, 2018).



visual arts, performance, and sound and composition among others. Here, the shift from symbolic encoding to environmental dynamics was one of the directions we followed in order to make the notion of data feel intuitive to an artistic approach.

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A starting point for our collective inquiry concerned contamination. Acknowledging the importance of chemical definitions as they indicate specific transformations in the quality of soil or water bodies, we wanted to move beyond a straightforward quantitative notion. While pollution and poisoning would persist as relevant reference points to how we discussed environmental issues, ours was not a focus on governance or policy. Instead, we wanted to see how contamination resonates with a broader stance of eco-criticism, where the scientific understanding of climate change is layered with cultural analysis as much as a political project for sustainability.<sup>5</sup>

Contamination, as a term and material assemblage, contains a layer of concerns. Our interest unfolds through multiple scales of the interaction of forces that might become visible in a particular body—soil, water, human bodies, etc.—while expressing more than this one specific body coined contaminated; they can encapsulate implicit and explicit forces such as environmental regulations (or the neglect of such), industrial and agricultural trends, and for example atmospheric patterns. One way to frame this would be to speak of a kind of “reverse engineering”—to use a technical term—but one that does not see engineering in only mechanical ways but

5 Pat Brereton, *Environmental Ethics and Film* (London and New York: Routledge, 2016). Sean Cubitt, *Anecdotal Evidence: Ecocritique from Hollywood to the Mass Image* (Oxford: Oxford University Press, 2020).

as a continuum of natural, technological, and political forces that express not only they're joining up but the force of this joining up. That something new had emerged due only to their shared appearance. A new diagram of elements even.<sup>6</sup> Hence, as an interaction of forces, this implied the question of contamination as “method,” one that expresses not only a new state of things (a change in the chemical constitution or other technical facts) but the process itself.<sup>7</sup>

We started with two trajectories of contamination; one concerns a political history of appropriation and land relations and its relation to contemporary production, the other being ontological, even ontogenetic, as it creates worlds in and through contamination.

Max Liboiron's (2021) focus on *pollution as colonialism* served as a framing where the chemical state of pollution and contamination is read against a backdrop of political relations; in their case, this concerns North American settler colonialism and its persistent legacy that shows in the dynamics resource in a two-fold manner: creating nature as a resource also includes the idea of waste disposal as a territorial resource, or the idea of externalization of waste “costs” in ways that specifically targets Indigenous lands as part of this history of accumulation of violence, direct or indirect.<sup>8</sup> While the context of their analysis was specific to North America, we want to observe see how it resonates with a broader range of areas, including Finland and the broader Nordic Sami lands, as it becomes an invitation to see the historical accumulation of toxins as part of other historical accumulations alongside the point about the accumulation of resources of protection and sheltering against toxins.

6 Gary Genosko, *The Reinvention of Social Practices: Essays on Félix Guattari* (Washington: Rowman & Littlefield, 2018).

7 Bhat, “The Weather Is Always a Method,” 407–423.

8 Max Liboiron, *Pollution is Colonialism* (Durham: Duke University Press, 2021).

While these points can be tracked with the toolkit of methods in critical geography and other disciplines that specialize in the politics of land, there is also a media studies angle at hand. In related terms, Sean Cubitt has articulated the relation of contamination with the broader media technological assemblage as it concerns infrastructure: from toxic mining waste to leaking pipelines or catastrophic oil spills. Such mediated materiality concerns more than the representations of particular issues; it involves a whole material cascade of relations of finite resources and contamination across Indigenous lands (or across the axis of class and poverty).<sup>9</sup>

Contamination closely tracks and features the shadow history of the creation of synthetic surfaces, the intentional resurfacing of the world as petrol-driven industrialization, and its seemingly accidental creation of leaks and spills as the second-order surface along the logistical corridors of materials. Think of this as the fossil fuel planetary accident of Paul Virilio's (and Wolfgang Schivelbusch's) thesis that every technology contains its own form of an accident.<sup>10</sup> Fossil fuels are not a media or technology, but they are, in most fundamental long-term ways, the condition of existence of one large-scale general accident.

The other perspective we wanted to consider runs parallel to the above. Here, contamination has a different kind of ontological, or ontogenetic, meaning. It also refers to a dynamic that creates worlds that we inhabit but in a way that becomes a certain anthropological (as well as non-human) trait beyond the history of colonialism and violence of contamination. Anna Tsing's reading of social relations—

9 Cubitt, "Anecdotal Evidence".

10 Paul Virilio, "The Primal Accident," in *The Politics of Everyday Fear*, ed. Brian Massumi (Minneapolis: University of Minnesota Press, 1993): 210–218 and Wolfgang Schivelbusch, *Geschichte der Eisenbahnreise. Zur Industrialisierung von Raum Und Zeit im 19. Jahrhundert* (München and Wien: Hanser, 1977).

inclusive of so-called nature too—is emblematic of this stance where contamination is the starting point in the processual sense of encounters.<sup>11</sup> To quote Tsing on the collaborative force of contamination:

How does a gathering become a “happening,” that is, greater than a sum of its parts? One answer is contamination. We are contaminated by our encounters; they change who we are as we make way for others. As contamination changes world-making projects, mutual worlds—and new directions—may emerge. Everyone carries a history of contamination; purity is not an option. One value of keeping precarity in mind is that it makes us remember that changing with circumstances is the stuff of survival.<sup>12</sup>

While different in its emphasis, this notion of contamination is nonetheless as consequential as it also speaks of a methodological force involved in contaminations: to start in the mix of relations, not to unfold what “unnatural” happened, what natural became contaminated, but which counters made it be so and which histories are carried into this contaminated site of a meeting. At the back of the rise of ethnonationalist forces, of which white supremacy is one but not the sole racist trajectory, we also wanted to articulate such themes of resisting purity in our studio. This kind of emphasis resonated in broader ways with how bodies are formed and what sort of a critical post-humanities perspective<sup>13</sup> would enable us to think

11 Anna L. Tsing, *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*. (Princeton: Princeton University Press, 2015).

12 *Ibid.*, 27.

13 Rosi Braidotti, “Posthuman affirmative politics,” In *Resisting Biopolitics*, eds. Stephen E. Wilmer, Wilmer and Audronė Žukauskaitė (New York and London: Routledge, 2016), 42–68.

in terms of Spinozian-styled composite bodies that carry material and symbolic histories with them but are irreducible to the discourse of trauma.

In discussions of such bodies of sense, we found an entry point to data: the connection between sensing and knowing become emphasized in relation to existing environmental techniques—remote sensing would be one—and to complementary perspectives, such as Susan Schuppli’s take on “material witnessing.”<sup>14</sup> Following Schuppli, it becomes a fruitful trajectory to follow how contamination includes such an expressive trait that speaks to artistic methods. Schuppli’s account of material witnessing speaks directly to contamination as method. She focuses on specific sites or sometimes even events of contamination, whether those are celluloid film stock (like those canisters exposed to the air above the site of the Chornobyl nuclear accident) or Arctic snow as the layered deposition of black-carbon—and many other instances. Schuppli’s focus on such sites as “informed material” speaks to how material and structural reordering becomes informational in and through direct contact that produces the information of its own transformation. Such a seeming “immediacy” underlines how “analog or physical entities [...] tend to offer up the visible proofs that can attest to their willful or accidental modification.” Here, the ontogenetic nature of “contamination” is teased out as an expressive trait that speaks to the natureculture<sup>15</sup> continuum as it does to what Parikka has coined the medianatures<sup>16</sup>

14 Susan Schuppli, *Material Witness: Media, Forensics, Evidence* (Cambridge: MIT Press, 2020).

15 Donna Haraway, *The Companion Species Manifesto: Dogs, People, and Significant Otherness*, Vol. 1 (Chicago: Prickly Paradigm Press, 2003).

16 Jussi Parikka, *A Geology of Media* (Minneapolis: University of Minnesota Press, 2015); Jussi Parikka, “Medianatures,” in *Posthuman Glossary*, eds. Rosi Braidotti and Maria Hlavajova (London: Bloomsbury Publishing, 2018).

continuum: the mode of expression and materiality inherent in the mediatized way of knowing so-called natural facts.

Our aim was not to produce more theory or theoretical positions—even if this book collects our ideas in this format of writing. Instead, we wanted to pick up on how such different ideas formed insights into reading material proxies<sup>17</sup> as traces of existing circumstances. Contamination as a method was thus to involve this idea of the complex centrality of the proxy as an epistemic-material figure: traces that stand in for a cascade of histories and events that enable us to read environments as self-inscribing traces, like “analog computers and visualization systems”<sup>18</sup> that turn different scales of surfaces into such diagrams.<sup>19</sup>

So, when Harshavardhan Bhat articulates the idea of “weather as method” (2021), it helps to understand this replacement of “natural” agency onto different scales of bodies at play.<sup>20</sup> In their case, it might be the monsoon as a complex dynamic spatial assemblage; this new materialist position pushes us to think about what embodiment might mean across scales beyond the singular human or animal bodies as such. In our case, the proposition to think of contamination as a method relates to a similar strand of scalar complexity: what bodies and histories are brought into connection through contamination; what is the model of land and landscape that emerges through such lenses; and how, in contexts of digital culture and aes

17 Offenhuber, “Data by proxy—”, 98–108.

18 Ibid., 98–108.

19 Lukáš Likavčan and Paul Heinicker, “Planetary Diagrams. Towards an Autographic Theory of Climate Emergency,” in *Photography Off the Scale*, eds. Tomáš Dvořák and Jussi Parikka (Edinburgh: Edinburgh University Press, 2021): 211–230.

20 Bhat, “The Weather Is Always a Method,” 407–423.

thetics, it helps to understand some of the links between ecology and data too.

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The chapters respond to these contexts in different ways, with some focusing on the surface of inscriptions and some articulating different cases of material agency as they express different scales of what “environment” comes to mean.

“Surface and Streak,” Bruno Caldas Vianna compares deforestation in the Amazon to the dermatological trauma of scarring and stitching on the human body. The rainforests and the indigenous inhabitants become victims of the logging highways that cut scars through ecosystems. Caldas argues that the opening and closing of such inscriptions inadvertently follow the waves of economic conditions of capitalism and the exploitation of natural resources. The Amazon and the body mirror each other, and in comparing the inscription of the highway, one may feel the brutality incurred on the body.

Just as the Amazon is inscribed by the violence of logging practices and monocultures, stones and stone-built heritage in cities are inscriptions of environmental change, as Frank Brümmel argues in “Stones as Active Agents”. Brümmel seeks to encounter and comprehend the readability of stones and to tease out a narrative of active agency that geology manifests in archiving environmental data—including pollution and climate change. For Brümmel, stones, and geology are environmental data for artistic examination, in which deliberate inscriptions into layers of deep time become speculative devices for discussion of contemporary environmental change.

If stones and rainforests are visible inscription material for anthropogenic climate change, seas and oceans are their invisible

fluid counterparts—supposedly even more immune to scarring and stitching. But of course, this concealment is relative to the position of the inscriber and vice-versa the inscribed. Bodies of water as planetary wastebins might cover the more permanent giant inscriptions of asteroid and comet strikes, but today serve as media for contamination of the plastics and waste that continuously swirl among affected marine lives and organisms, marking them with toxicity. The toxic inscriptions are in motion and flux.

Saara Hannula argues in her chapter, “Ingesting Bodies of Water,” that the fluid and non-contained nature of the sea and other water bodies that merge into it creates a milieu of interconnected ecosystems, organisms, and contamination. The sea is a fluid archive of environmental history and a deep time reservoir of contamination that contains traces of the Anthropocene. And it is within encounters with this contaminated diversity that Hannula asserts one can aspire to collaborative adaptation and transformation.

For Orla Mc Hardy, the scales of comprehending contamination are found in the range between her pristine backyard pond to the vastness of the seas, where monitoring the growth of a plant in a tiny body of water opens up encounters with larger eutrophication taking place in the Gulf of Finland. Mc Hardy’s *Ponds* is not so much about environmental damage as much as it is about the act of encountering waste, contamination, and the anecdotal forms this can take.

How does one give voice to contaminated diversity? If the sea is a springwell of adaptation from its constituent contaminants, how can the agency of microplastics, nylon ropes, and polystyrene be comprehended, let alone acted upon? Ville Raasakka’s *Waves Don’t Wash on Dormant Waters* explores the sonic agency of marine contaminants and brings them to the foreground: they become heard and pondered upon. The sensorium expands to the auditory, moving beyond the prevalent visualizations of waste and



contaminants. Non-human actants (such as our waste) speak and sing to us from their watery environs, beckoning and challenging us to act differently.

Just as Raasakka explores the non-human sonic agency of microplastics, Johanna Sulalampi's *Gatherings with the Silent* approaches the agency of lichens through what she calls sonic fiction. Sulalampi explores lichens' "artistic" abilities as versatile, adaptive, and collaborative assemblages forming themselves and their environments. Her goal is to create future geographies of sound based on sensing and imagining with lichens, to craft sonic stories that might bring us together in our quest to learn better strategies for staying with the trouble.

Fluid archives tend to require anecdotal representation and understanding, just as stones and rainforest highways, just like lichens as speculative devices to confront contamination. Visual, sonic, or tactile representations also become entry points to matter and materiality. One is reminded of the invisible fertilizer nutrients that flow into the sea, how the continental green of the cyanobacteria then exposes their over-nourishing effects, and their visibility of toxicity becoming surface evidence of the fluid archive.<sup>21</sup> The giant tail of monocultural farming becomes evident in the vastness of oceanic cyanobacterial blooms.

Lauri Lähteenmäki explores this entanglement of monocultures in an essay about industrial forestry in Finland. "Approaching the Hybrid Nature of Forests in Finland" examines Lähteenmäki's

21 "Eutrophication or the increase in the supply of organic matter to an ecosystem through nutrient enrichment, is induced by excessive availability of nitrogen and phosphorus for primary producers (algae, cyanobacteria and benthic macrovegetation)." HELCOM, "Eutrophication," State of the Baltic Sea, accessed may 3 2023, <http://stateofthebalticsea.helcom.fi/pressures-and-their-status/eutrophication/>.

experiments with photographic methods of landscape photography to frame (sample) the “environmental.” Presented as activism, Lähteenmäki wishes to destabilize the perception of the imagined nature vs. the industrialized. He argues that scientification and industry drove forests into quantifiable units and cultivation models, which serve as the basis for visual exploration in his practice. Points, grids, and patterns overlaid on terrain also become the starting points for his methodology of research. Unlike Caldas, where the highway became the inscription on the body, representing each other, here the image serves as the reverse inscription of the subjugated landscape.

Representing the “deeper” inscriptions of extractive landscapes, geological depths as planetary surfaces, or flat images is contradictory, as argued by Heini Nieminen in her chapter “Art as Geomedia.” How to approach and represent extraction deeper than the surface? Are we simply aestheticizing extractivism without concern for its multi-scalar aspects? Nieminen argues for a multi-disciplinary position, especially the role of visual arts to be incorporated with environmental humanities and media archaeology to truly understand the “extractive view.” Her artwork *Faraday’s Rocks* hide Finland’s glacial erratics and their electromagnetic radiation by coddling them in mylar blankets, shielding them from remote sensing acts as a counter-position to the extractive view from the geostationary orbits. Where depth is reduced to an inaccessible surface, the flat image becomes resistance.

Depth and discard are the vertical features of any mine, inversely proportional: a hole in the ground and a hill above the pit. The toxic overburden that is the hill is the negative space of the depth. In *Performing Discard*, Qiong Zhang presents a poetic exploration of these dichotomies and contradictions. Zhang argues that nowhere else is extractivism and environmental damage from it as abundant than in

the impoverished regions of China, such as Baiyin in the Northeast. Compared to the urban centers, the rural and industrial regions rich in resources have remained places of extraction and discard. These are Zhang's auto-ethnographic sites of performance where the layers of valuation and discard are revealed. Standing at the edge of the void of the pit, what can one throw at it to get a response?

From inscriptions to fluid archives to depth, sensing and agentifying contamination and damage can be embarked upon by visual, sonic, and performative paths. Practicing "deep adaptation," as elaborated by Leena Kela in her essay "How to Approach an Islet," argues for a more holistic method that is embodied and technical but also draws in the social, economic, and political, where slowing down and resting become counterpoints to productivity. As waste, rest becomes resistance to destruction. For Kela, islands are landscapes where embodied acts of resting and reflection can take place. One does not have to start with the continent, an island—an islet, even—is enough.

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# Surface and Streak

BRUNO CALDAS VIANNA

We know maps as two-dimensional representations, a collection of (often agreed upon) symbols that form a drawing that holds shared meaning. Should maps be understood as supports for poetic expression rather than exact tools? Can a map be subverted as such to convey a subjective effect? Let's define a drawing as the disturbance of a surface that results in a visual effect. Artists can choose a variety of surfaces—paper, canvas, or walls—to interfere with, using watercolor, oil paint, or ink sprays. A patch of skin can be streaked by a needle under the dermis, where the ink deposited will remain until the death of the bearer of the tattoo. Skin can be disrupted by other mechanical means, for example, exposing the subcutaneous tissue to cause bleeding. This will leave the permanent skin feature known as a scar. Its visual effect is often amplified by perpendicular stitches made across in order to suture the wound and support its healing.

When a road is opened through the surface of a jungle, it leaves a thin, linear mark easily recognizable in satellite images. This mark is also known in scientific literature as a scar. Scars can also be produced as a consequence of fire or logging which affect large continuous areas.<sup>1</sup> Fire burns leave a dark texture, denoting the

- 1 Mateus dos Reis, Paulo Maurício Lima de Alencastro Graça, Aurora Miho Yanai, Camila Julia Pacheco Ramos, and Philip Martin Fearnside, "Forest Fires and Deforestation in the Central Amazon: Effects of Landscape and Climate on Spatial and Temporal Dynamics," *Journal of Environmental Management* 288 (June 2021): 112310, <https://doi.org/10.1016/j.jenvman.2021.112310>.

charred surface where there used to be trees. Logging tracts leave a paler shade of green, clearly distinguishable from the canopies which were cut.

Highways are opened in the jungle to ease access to remote places, providing health support, transportation, and trade opportunities. They draw from geological and elevation surveys which support the transformation of any available land into an agricultural surface. Most often, they are built on the grounds of the colonization of these areas. In the 1970s, the Brazilian military dictatorship defined the Amazon as a frontier to be occupied. This settlement generally meant razing trees to create farms dedicated to industrial monocultures (such as soybeans) or cattle.

A gigantic road of four thousand kilometers would have to be built to facilitate this. Known as the Trans-Amazonian Highway (BR-230, official name *Rodovia Transamazônica*), it would cross the country from east to west, from the drought-plagued states in the northeastern region to the Colombian border. The task started in 1972 and was enormous: unstable soil and torrential rains made the construction daunting. Fifty years later, only a few stretches were finished, and fewer are still usable. These working stretches, however, had a very damaging impact as they were used to settle farmers that removed originary peoples and extracted the rainforest's logged wood.<sup>2</sup> In recent years, other road projects have been, unfortunately, more successful, allowing access from the southern limits of the Amazon.

When these roads are opened, they immediately attract settlers to their paths. In the semi-legal occupation methods of the

2 Javier Godar, Emilio Jorge Tizado, and Benno Pokorny, "Who Is Responsible for Deforestation in the Amazon? A Spatially Explicit Analysis along the Transamazon Highway in Brazil," *Forest Ecology and Management* 267 (March 2012): 58-73, <https://doi.org/10.1016/j.foreco.2011.11.046>.



Brazilian rainforest, the first thing needed is physical access to land. Legalization is likely to come later and might be obtained by *grilagem* (fraud)<sup>3</sup> or even official settlement programs. It is the roads that define the impulse for colonization and consequent deforestation. Their edges are occupied first, with the original vegetation removed to allow for farming or grazing. When they are entirely conquered, further exploration begins in perpendicular-oriented paths. This leads to a kind of devastation known as fishbone deforestation.<sup>4</sup> Smaller, self-funded accesses are opened and gradually enlarged, leading as far as possible from the original highway opened by the state. The edges of these smaller roads also become occupied, forming a shape that is easily recognized through satellite imagery.<sup>5</sup> Ecological literature also catalogs other deforestation patterns such as *radial* or *dendrite*.<sup>6</sup>

- 3 Bruno Lupion, "Amazônia: o caos fundiário que favorece a grilagem," OUTRASMÍDIAS, last modified April 24, 2020, <https://outraspalavras.net/outrasmidias/amazonia-o-caos-fundiario-que-favorece-a-grilagem/>.
- 4 Francisco José Filho, Barbosa Oliveira de, and Jean Paul Metzger, "Thresholds in Landscape Structure for Three Common Deforestation Patterns in the Brazilian Amazon," *Landscape Ecology* 21, 7 (2006): 1061–73, <https://doi.org/10.1007/s10980-006-6913-0>.
- 5 Service Map, "Desflorestamento em forma de 'espinha de peixe' na Amazônia," September 3, 2019, <http://www.servicemap.com.br/blog/desflorestamento-em-forma-de-espinha-de-peixe-na-amazonia/>
- 6 Eugenio Y. Arima, Robert T. Walker, Stephen Perz, and Carlos Souza, "Explaining the Fragmentation in the Brazilian Amazonian Forest," *Journal of Land Use Science* (April 2015): 1–21, <https://doi.org/10.1080/1747423X.2015.1027797>.



Images 1 through 4 (from top left to bottom right): Deforestation along the Trans-Amazonian highway, between  $4^{\circ}25'05''\text{S}$   $55^{\circ}47'52''\text{W}$  and  $3^{\circ}10'36''\text{S}$   $52^{\circ}10'55''\text{W}$  with the camera at 358 kilometers above sea level. Image courtesy of Google Earth (Landsat/Copernicus). A scar on a hand after thirteen days. Image courtesy of Wikipedia contributor Pavel Ševela. A scar running up the inside of a left forearm after a radial artery has been removed. Image courtesy of Wikipedia contributor Doctor Roach. Deforestation along the Trans-Amazonian highway, between  $4^{\circ}27'38''\text{S}$  and  $49^{\circ}54'45''\text{W}$ , with the camera at 312 kilometers above sea level. Image courtesy of Google Earth (Landsat/Copernicus).



Where others, including scientists, propose an animal-related visual metaphor for deforestation, my work insists on this being a completely human picture. These patterns closely resemble the shape which results from the dermatological trauma of scarring and stitching. Like open skin that immediately tries to heal itself, when the jungle is cut, its many inhabitants and forces try to regrow it right away. Keeping the scar open is a struggle against nature, requiring constant effort from the colonizers. This effort is only worthwhile because of the specific economic conditions that make it so that, for the individuals squatting in and living off the Amazon, a standing tree has lesser value than a grazing ox.

This set of specific economic conditions is also known as capitalism: externalities such as the vertiginous warming of the planet are not deducted from the price paid for raw meat or lumber from centenary trees. Instead, they are left to be paid, unevenly, by the planet's inhabitants in the coming decades and centuries.

By proposing a poetic map of the territory, where rivers and roads are replaced by stitches and cuts, I'm assuming a decolonizing stance to adopt a multi-scalar view of time and surface. In a few years, fishbone deforestation also ends up disappearing as the scars grow wider and larger and become a single amalgam of agricultural violence until the drawing is the surface. The human life scale is taken over by the time measured by the life of trees. And the surface scale of the tree is taken over by a surficial plane of plants:

Territorial surfaces, and plant surfaces.

Plant surfaces, and agricultural surfaces.

Surveys, landscapes, and data surfaces.<sup>7</sup>

7 Jussi Parikka and Abelardo Gil-Fournier, "An Ecoaesthetic of Vegetal Surfaces: On Seed, Image, Ground as Soft Montage." *Journal of Visual Art Practice* 20, Issue 1-2 (2021): 16-30. <https://doi.org/10.1080/14702029.2021.1917858>. c

The map is not a representation: the map is the territory.<sup>8</sup> To make maps that subvert plans and planes is to reclaim such surfaces into drawings that become life.

8 Bernhard Siegert, "The Map Is the Territory," *Radical Philosophy*, no. 5 (2011): 13–16.



# Stones as Active Agents

FRANK BRÜMMEL

In *Code and Clay, Data and Dirt: Five Thousand Years of Urban Media*, Shannon Mattern makes a compelling case that smart urban areas are not a contemporary exception, but instead, cities have long been built to provide and record intelligence—for thousands of years. One example she cites is those of the rock inscriptions from Longyin Cave in Guilin, China, and the words of Robert E. Harrist, who argues that it's important to consider the millennia-old engraved texts as “environmental case studies” that are not only “integral parts of their landscape settings” but also “mixed genealogies of inscription, landscape.”<sup>1</sup>

This work is drawn to the possibilities of stones as record carriers for historical environmental impact<sup>2</sup> and examines stone-built heritage and structures in Helsinki as proxy archives. Bringing Shannon's work together with my own, I also draw upon Dietmar Offenhuber's

1 Shannon Mattern, *Code and Clay, Data and Dirt* (Minneapolis: University of Minnesota Press, 2017), 92.

2 This work was developed between 2022 and 2023 in the framework of a year-long collaborative research studio (K-JI-11-22A: Ecological Thinking) at Uniarts Helsinki together with Aarhus University (Research Pavilion 2023 and Helsinki Biennial 2023). For more detail on the course's motivations to engage with the themes of environmental data, sensing and contamination, please see the course blog at: <https://blogit.uniarts.fi/en/blogs/ecological-thinking/#about>.



Image 1. An index of stone-built building and sculpture pedestals as proxy archives and record carriers for historical environmental impacts in Helsinki. Material information from top left to bottom right: the Helsingin päärautatieasema (Helsinki Central Train Station), designed by architect Eliel Saarinen, is comprised of Hangon graniitti (Hanko granite) and was built in 1904, with the stone works completed between 1914 and 1916; the Aleksis Kiven patsas (Aleksis Kivi statue), designed and sculpted by Wäinö Aaltonen, is on a pedestal comprised of Vehmaa rapakivigraniitti granite (Balmoral Red) and was raised in 1939; the Nordean pääkonttori (Nordea head office, previously that of Suomen Yhdyspankki), designed by architect Ole Gripenberg, was built in 1936 and comprised of Vehmaa rapakivigraniitti granite (Balmoral Red); and from the Vehmaa Uhlu louhimo quarry; the equine statue of Marshal Mannerheim, designed and sculpted by Aimo Tukianen, is on a pedestal comprised of Vehmaa granite (Balmoral Red) and was raised in 1960; and the Tempo house, designed by architect Risto Skogström, is comprised of Vehmaa granite and Taivassalo granite (Balmoral Red) and was built in 1978. Photographs courtesy of the author, Frank Brümmel.





concept of autographic visualization<sup>3</sup> to create “environmental case stud[ies],” making them an integral part of life here, allowing other ways of readability.

In this work, I ask how to develop an artistic method that would bring both stones and stone-built heritage out of the passive role of witness and into the active role of an agent. How can we encounter and understand other unknown ways of readability and acknowledge the authenticity of stones, one that exists beyond human comprehension? Is there a mode of authenticity that recognizes the more-than-human agency of the stone and its collaborators like the wind and the rain and time? Can we see stones as being alive?

Building materials in Helsinki, including granite and other plutonites, are more resistant to environmental pollution than other materials like sandstones and limestones. While patterns of damage in Helsinki’s stone structures may not be readily noticeable, other parts of the world have visibly damaged stone structures due to weathering processes under increased environmental pressures and climate change. Drawing upon the experience of my former profession as a stonemason in restoration and conservation, I explore the impact of environmental pollution and climate change on stone-built heritage in Helsinki; my work questions whether the seemingly intact stone-built environment in Helsinki may also be

3 Dietmar Offenhuber, “Data by Proxy—Material Traces as Autographic Visualizations,” *IEEE Transactions on Visualization and Computer Graphics* 26, no. 1 (2019): 98-108.

contaminated.<sup>4</sup> For this, I reached out to collaborate with experts, including researcher and conservator Elisa Heikkilä from the Finnish Heritage Agency, Christoph Beier, head of the research program of Geology and Geophysics at the Department of Geosciences and Geography of the University of Helsinki, and Katrin Wilhelm, a researcher at the School of Geography and the Environment at the University of Oxford.<sup>5</sup>

But finding the building dates and materials of buildings was very challenging until I was directed to a small booklet by the former director of the geological museum, Martti Lehtinen: *Helsingin Kaupunkikiviopas* (Helsinki City Stone Guide). Based on this booklet I made a small but exemplary set of buildings and public sculptures.<sup>6</sup> Built between 1914 and 1978 (Image 1), they can act as a reliable base for samples, as the building material used is from the same group of stones, and the precise year of construction is included.

4 Books and articles the blog-text refers to include Brian Dillon's *Ruins* (Cambridge, MA: MIT Press / Whitechapel Gallery, 2011), 25; Doris Reithmeier's lecture entitled "Saurer Regen: Entstehung, Auswirkungen, Gegenmaßnahmen" (Acid Rain: Formation, Effects, Countermeasures), accessed December 1, 2022, [http://daten.didaktikchemie.uni-bayreuth.de/umat/saurer\\_regen/archiv/saurer\\_regen.htm](http://daten.didaktikchemie.uni-bayreuth.de/umat/saurer_regen/archiv/saurer_regen.htm); Susan Schuppli's *Material Witness* (Cambridge, MA: MIT Press, 2020), 3; Katrin Wilhelm et al., "Stone-Built Heritage as a Proxy Archive for Long-Term Historical Air Quality: A Study of Weathering Crusts on Three Generations of Stone Sculptures on Broad Street, Oxford," *Science of The Total Environment* 759 (10 March 2021): 143916, <https://doi.org/10.1016/j.scitotenv.2020.143916>; Ann Laura Stoler, *Imperial Debris On Ruins and Ruination* (Durham and London: Duke University Press, 2013); and Jussi Parikka on Roger Caillois's *Writing of Stones*, *Electronic Mediations*, Volume 46, and *Geology of Media* (Minneapolis: University of Minnesota Press, 2015), 62.

5 Amongst other important information shared by Katrin, the title refers to a particular discussion in which Katrin mentioned the term 'stones as active agents.'

6 For more, please see: Martti Lehtinen and Jukka I. Lehtinen, *Helsingin Kaupunkikiviopas* (Tekijät ja Affecto Finland Oy, Karttakeskus, 2008).

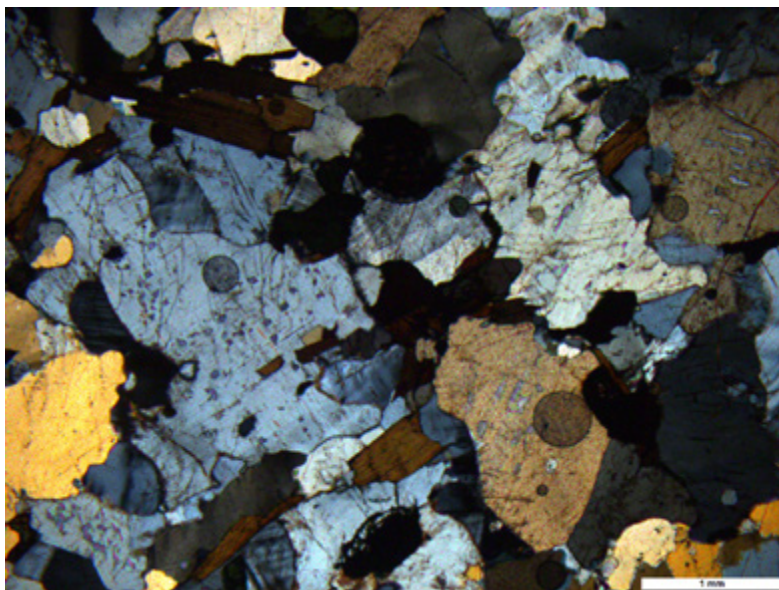


Image 2. A scanned image of thin section from the migmatite *Mäntsälän punainen* in cross polarised transmitted light. Image courtesy of the author, Frank Brümmel, and produced under the guidance of doctoral researcher Nikolaos Karamelas at the Department of Geosciences and Geography at the University of Helsinki.



Image 3. Large outdoor stone exposure trials like the Asterixe at the Fraunhofer Institute in Holzkirchen, Bavaria, Germany. Photographs courtesy of Katrin Wilhelm.

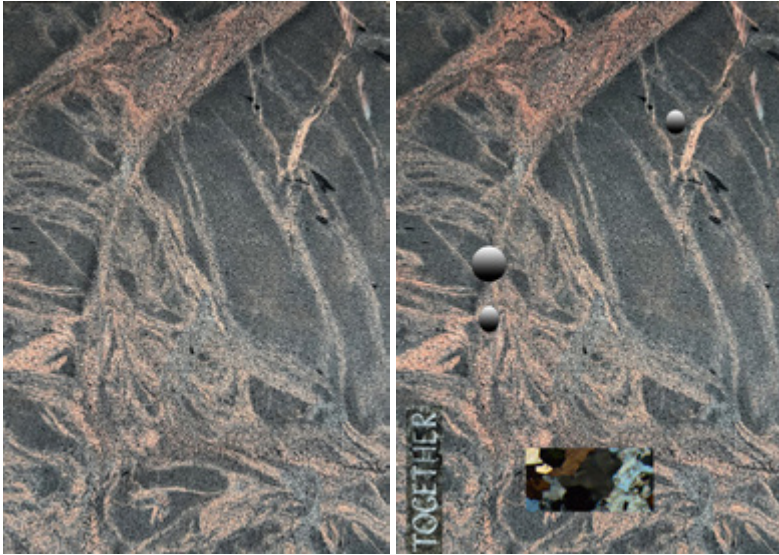


Image 4. The slab of Finnish stone, migmatite named *Mäntsälän punainen*, that is being cut and polished. On the left is the stone slab, cut and polished. On the right, a (Photoshop) rendering of additional informational layers being added, including letters, visualization and thin section. Images courtesy of the author, Frank Brümmel.

My work aims to build a device that combines my artistic practice of making stone-text-plates with material trials. In these works, I carve words and ornaments in stone, making fictional archaeological artifacts (similar to artifacts in an archaeological museum or at an archaeological site). I work with a Finnish stone, a migmatite named *Mäntsälän punainen* (Image 4). It shows vivid patterns of its genesis, especially after it is cut and polished.

In the 20th century, large and long-term outdoor stone exposure trials (in Germany and other countries, see Image 3) were set up to advance our understanding of stone decay and to test conservation interventions and techniques. Naturally, the technological but also ontological and epistemological approaches were a product of

their time. Over the last three decades however, methods and technology have fundamentally changed.<sup>7</sup> For example, a now possible procedure to gauge environmental contamination is to take samples from each site, making thin sections (Image 2). When plutonites are placed under the microscope, specific patterns indicate the presence of certain minerals. More sophisticated methods and devices (e.g., ICP-MS) can be used to discover even more, like if these mineral patterns indicate actual compositional changes in something approaching realtime.<sup>8</sup> Still, the idea of even longer-term trials—ones that would need to be conducted across multiple human generations—continue to hold imagination.

The changes between minerals in these sections, like the surface of the *Mäntsälän punainen migmatite*, are windows that opens into time, showing different layers of inscription, allowing for other ways of reading stones and our urban environments.

7 Here, I would to express my gratitude to Katrin Wilhelm for sharing this history with me.

8 Inductively coupled plasma mass spectroscopy (ICP-MS) is an analytical technique for determining trace multi-elemental and isotopic concentrations in liquid, solid, or gaseous samples. Long-term research would allow for the finding of more data and building of more reliable sets. Collecting samples requires a longer time investment than the framework of this research seminar allows. I therefore imagine the results as the basis for later research in Helsinki or other places.





# Practices for Contaminated Bodies of Water

SAARA HANNULA

During the past years, I have been looking into the ways in which bodies of water register changes in the lived environment and how knowledge is formed through bodily relations and interactions that either involve or are mediated by water. The premise is that material bodies, whether human or nonhuman, can function both as archives that store information and as media that transmit it.

I am developing a series of embodied and performative practices that propose ways of relating with the body of water known as the Baltic Sea. They are attempts to encounter the sea in its complexity and multiplicity: as a body consisting of many bodies, each of which carries traces of past entanglements, as matter that witnesses the ongoing environmental changes in the Baltic region, and as a medium that has the capacity to birth, sustain, and extinguish forms of life.

## Contaminated bodies of water

The body of water known as the Baltic Sea has undergone several transitions and transformations since its emergence after the last

ice age.<sup>1</sup> It resists the idea of self-containment by engaging incon-  
tinuous fluid exchange with other bodies of water and creating a milieu  
where various water cycles, aquatic ecosystems, and forms of life  
come together. As such, it may be seen as an event rather than a  
stable entity that strives to remain the same.

Each body of water that enters the sea carries material traces  
of the environmental histories and biocultural practices that have  
shaped the landscape and the circulation of water in the Baltic  
region in the past decades. As a result, the Baltic Sea could be seen  
as a fluid archive that tells stories related to land use, industrial  
development, and changes in livelihoods, all while recording their  
toxic fallouts. The accumulation of contaminants, whose temporality  
and lifespan are often in stark contrast to those common to marine  
organisms, introduce elements of permanence into the otherwise  
fluid surroundings.

Anthropologist Anna Lowenhaupt Tsing writes about contam-  
ination as a process of collaboration and transformation through  
encounters.<sup>2</sup> She introduces the notion of contaminated diversity to  
highlight processes of “collaborative adaptation to human-disturbed  
ecosystems,” describing forms of biocultural diversity that emerge

- 1 Due to post-glacial rebound, the closing and opening of the channels connecting the Baltic to the North Sea and the Atlantic Ocean, and the subsequent shifts in salinity, its shape, size, and consistency have changed significantly over time. At times, the water has been fresh, and at other times, it has been brackish: in its current state, it is a mixture of salty water coming from the Atlantic Ocean, freshwater brought in by the numerous rivers that flow into the basin, as well as groundwater, rainwater, and remnants of other water bodies that have entered the basin in the past. From Aarno Kotilainen, “Kuinka Itämeri on kehittynyt,” *Itämeri nyt*, accessed December 9, 2022, [https://www.itameri.fi/fi-FI/Luonto\\_ja\\_sen\\_muutos/Ainutlaatuinen\\_Itameri/Kuinka\\_Itameri\\_on\\_kehittynyt](https://www.itameri.fi/fi-FI/Luonto_ja_sen_muutos/Ainutlaatuinen_Itameri/Kuinka_Itameri_on_kehittynyt).
- 2 Anna L. Tsing, *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins* (Princeton: Princeton University Press, 2015), 27–29.

as a result of trans-species kinship and adaptation to circumstances that are affected by slow disturbance.<sup>3</sup>

While contamination may foster diversity, it may also lead to the proliferation of certain bodies at the expense of others. In the case of the Baltic Sea, it has caused extensive eutrophication, oxygen depletion, and toxic bioaccumulation, thus contributing to the ongoing disappearance of bodies, species, and entire ecosystems. Besides suffering from the overgrowth of phytoplanktons, bacteria, and algal blooms, many fish and other animal populations are exposed to toxins such as mercury, dioxin, bromine, lead, cadmium, and tin, which makes them even more vulnerable to changes in their living environment.<sup>4</sup>

As the body of the sea continues to change, it requires constant adaptation from the bodies that inhabit it. Some adjust to the changing circumstances through metabolization, mutation, and gene exchange, whereas others die off in the face of change. The sheer range of these bodily responses reveals the contradictions that emerge when thinking with contamination: on the one hand, life continues to evolve in unexpected ways, and on the other, it is inevitably and irreversibly lost.

3 Anna L. Tsing, "Contaminated Diversity in 'Slow Disturbance': Potential Collaborators for a Liveable Earth," in *Why Do We Value Diversity? Biocultural Diversity in a Global Context*, eds. Gary Martin, Diana Mincyte, and Ursula Münster (Munich: Rachel Carson Center for Environment and Society, 2012): 95–97.

4 Riku Lumairo, "Haitalliset aineet Itämerellä," *Itämeri nyt*, accessed December 9, 2022. [https://www.ostersjon.fi/fi-FI/Luonto\\_ja\\_sen\\_muutos/Itameren\\_tila/Haitalliset\\_aineet](https://www.ostersjon.fi/fi-FI/Luonto_ja_sen_muutos/Itameren_tila/Haitalliset_aineet).

## Practices in the making

*I sink underwater and begin to adjust to the liquid movements of the body that surrounds me. My body begins to lose its contours and boundaries, its imagined self-sufficiency and capacity to hold itself upright. It falls, rotates, and spirals, gradually yielding and opening into new directions while being held by the other. The body of water that is contained by the skin fluctuates with those around it, and in the fluid movement of relating, the categories of inside and outside and self and other begin to leak.*

The practice of immersing oneself in the sea and moving underwater is an embodied way of thinking and being with contamination. As I expose my skin, my eyes, and the insides of my mouth to the water, my body becomes a sensor that ‘reads’ the fluid data carried by the body of the sea. The moment the water enters the body’s pores and cavities, the information it contains is stored in the flesh in the form of toxic imprints, whose effects will likely be revealed much later.

By engaging directly with the materiality of the sea and by attuning to the precarity of the bodies that are constantly affected by it, I become a witness to my involvement in the contaminated histories that have contributed to their emergence and that will eventually lead to their extinction. Here, artist-researcher Susan Schuppli’s concept of “material witnessing” might be of use: the notion refers to the capacity of matter to register external events, to record evidence of acts of violence, and to testify to them in legal contexts.<sup>5</sup> Although Schuppli focuses primarily on nonhuman witnesses, the fleshy materiality of the human body lends itself to this purpose just as readily.

5 Susan Schuppli, *Material Witness: Media, Forensics, Evidence* (Cambridge: MIT Press, 2020).

As bodies of water relate and leak into each other, they become witnesses and active agents in gathering evidence, exchanging information, and producing experiential knowledge on the changes that are taking place. The purpose of the performative practices I am proposing is to offer ways of experiencing and processing these changes as a more-than-human community and as a body consisting of many bodies.



# Ponds or Flesh on the Bones of Abstraction

ORLA MC HARDY

“Anecdotes are ecological encounters.”<sup>1</sup>

—Sean Cubitt, aged 67

“We don’t want it to be *mistanished*. It means gone.”<sup>2</sup>

—Seamus, aged 5

May 9, 2023

Leitrim, Ireland

As a mother of two young children, much of the shape, rhythm, and logic of my days is informed by their unfolding perspectives and needs. This ongoing relational caregiving often forces me to stay in place, travel less and activate hyper-local networks to build and sustain community. And yet, there is much to be learned from intimate day in day out encounters, a type of situated knowledge. Lauren Berlant defines a situation as “a state of things in which something that will perhaps matter is unfolding amid the usual activity of life.... that forces itself on consciousness, that produces a sense

1 Sean Cubitt, *Anecdotal Evidence: Ecocritique from Hollywood to the Mass Image* (Oxford: Oxford University Press, 2020), 15.

2 Seamus is my youngest child, and every day I wonder what he’ll tell me next.

of the emergence of something in the present.”<sup>3</sup> If as Sean Cubitt writes, “anecdotes deal with situations,” in writing this, I wonder if collecting anecdotes might reveal something about what comes to matter?

Uncoupling maternity from femininity and interpreting ‘mother’ in the broadest sense opens it to consider any act of ongoing caregiving and maintenance, of staying alongside another over time whether “that is of their birth, adopted, fostered, community, surrogate or ‘other’ children.”<sup>4</sup> If we take this ‘other’ child that we are to care for as non-human, a project, an ecology, a community, a garden - how can close attention to the time of ongoing care, love, and affective lived relations reveal possibilities about thinking, living and caring for human and more-than-human-worlds at a time of climate collapse and energy precarity?<sup>5</sup>

May 10, 2022

Leitrim, Ireland

Anecdote as method.

First, skim the duckweed off the surface with a net. Next, gently tip out the contents on the ground, and one by one, extract the squirming tadpoles from the green mass and toss them back into the pond. Repeat this ritual many times during the summer, at least once per week, in order to keep the duckweed in check. If you miss a week, the entire surface will be covered in the green film. You may fear for the frogs, having already learned about the devastating effects of eutrophication on the waters around Helsinki harbor caused by

3 Lauren Berlant, *Cruel Optimism* (Durham: Duke University Press, 2011), 5.

4 Lisa Baraitser, *Maternal Encounters: The Ethics of Interruption* (London and New York: Routledge, 2009), 10.

5 Maria Puig de la Bellacasa, *Matters of Care: Speculative Ethics in More Than Human Worlds* (Minneapolis: University of Minnesota Press, 2017).



cyanobacteria.<sup>6</sup> Eutrophication happens when excess nutrients, particularly nitrogen, and phosphorus, end up in bodies of water due to agricultural and industrial waste process runoff, causing an overabundance of cyanobacteria and plants. As they decompose, they produce large amounts of carbon dioxide, lowering the pH of the seawater in a process known as ocean acidification (OA).<sup>7</sup> This is hugely detrimental to marine organisms and ecosystems.

**March 3, 2023**

**Leitrim, Ireland**

A year later, I returned to my pond, this time teeming with the Irish common frog (*Rana temporaria*)<sup>1</sup>. In Ireland, frogs are recognized as an internationally important species and are protected by the EU Habitats Directive and the Irish Wildlife Act. While understood to be detrimental to fish in ponds, it's unclear if duckweed (*Lemmaeaceae*) is detrimental to the frogs. It is associated with both clean waters as well as eutrophic conditions. Monitoring the growth of a similar plant in the small body of water in my garden helps me understand the threat posed by algal blooms to the Baltic Sea in a real way. Experiencing a small pond puts into perspective the polluted and off-limits pond on the island of Vallisaari, a key site of the 2023 Helsinki Biennial.

A small hand emerges from the water, fingers splayed. For a moment, it holds that position, then drops under again. It looks like a movie: a hand grasping at the air before it sinks under water and drowns, or a zombie's hand as it breaks through the surface of

6 Cyanobacteria are microscopic single celled organisms which use sunlight to make their own food.

7 Anu Vehmaa, "Ocean acidification increases the agony of the Baltic Sea," AirClim, last updated May 2021, <https://www.airclim.org/ocean-acidification-increases-agony-baltic-sea>.

the earth, out of a grave. It has the look of death, but it's an expression of living and making life. The frog is in the throes of spawning, its limbs shooting out of the water in a moment of frenzied mating.

**March 10, 2023**

**Helsinki, Finland**

Artist-researcher Samir Bhowmik is presenting at the symposium, 'Environment, Data, Contamination' at Uniarts. He tells us about rare earth tailing ponds filled with the leftover processes from mining. They are giant toxic monstrous tails (and tales) of capitalist extraction. Tailings often gather to form ponds which are dead zones in many ways. However, new lifeforms adapt to their conditions, and the ponds become home to bacteria producing new otherings. Bacteria transform a tailing pond into a place of a kind of life, becoming an example of *geo-symbiosis*, a term coined by Sebastián Ureta and Patricio Flores.<sup>3</sup>

**March 15, 2023**

**Leitrim, Ireland**

I've been collecting videos of my children's hands as they make sense of the world around them, often putting things in unlikely combinations and, in doing so, imagining new possibilities for these materials. This is sense-making in a very particular way which we often age out of, that puts "flesh on the bones of abstraction: the flesh where we think and do."<sup>4</sup> I gather and compile these clips on a timeline as an instance of animation, where animation is an enactment of care. It's a container that holds and pays attention to small increments of time, slight movements, and the time it takes a gesture to form and collapse. I didn't have my camera with me to record the frog's webbed foot that day, so I stopped what I was doing and just watched. I counted under my breath, "one hundred, two hundred,

three hundred,” noting how long it stayed frozen above the water (three seconds or 72 frames) and how long it took to plunge back beneath (half a second or 12 frames).

**March 17, 2023**

**Leitrim, Ireland**

The headline in the paper says that according to experts, “Global freshwater demand will outstrip supply by 40% by 2030.”<sup>8</sup> By 2030, my 5- and 7-year-old (which translates to every 5- and 7-year-old) will be 12 and 14 years old. This ricochet from death to life brings home the complications of futurity. I’m reminded of Heather Davis’s parting comments at the symposium in Helsinki when they asked: *what can we learn about time when it seems that time has almost run out? In the space of the atemporal, what might become possible?*

**March 28, 2023**

**Leitrim, Ireland**

Back at the pond today, clearing the green from the surface again. This time, I am looking out for frogspawn. Cubitt suggests that the ‘materialism of the encounter’ can be read as an expression of the anecdote as method and that “the encounter is not risk-free.... There is the terrifying possibility that the repressed environment returns for revenge. It may matter where the encounter starts, on the human or non-human side: and how we, as Other, respond when the world encounters us. There are no guarantees, but the risk cannot *not* be taken, because to refuse the encounter and the understanding that depends on it is no risk at all but a racing certainty of disaster.”<sup>9</sup>

8 Fiona Harvey, “Global fresh water demand will outstrip supply by 40% by 2030, say experts,” *The Guardian*, March 17, 2023, <https://www.theguardian.com/environment/2023/mar/17/global-fresh-water-demand-outstrip-supply-by-2030>.

9 Sean Cubbitt, *Anecdotal Evidence*, 15.

My friend, a poet, reads over my writings. She says the action of cyanobacteria's growth to the point of eutrophication reminds her of an Emily Dickenson poem:

*To fill a Gap  
Insert the Thing that caused it --  
Block it up  
With Other -- and 'twill yawn the more --  
You cannot solder an Abyss  
With Air.*<sup>10</sup>

10 Emily Dickenson, "To fill a Gap," in *The Complete Poems of Emily Dickenson*, ed. Thomas H. Johnson (Boston: Little Brown & Company, 1960), 546.





# Waves Don't Wash on Dormant Waters

VILLE ASLAK RAASAKKA

In 2017, environmental researchers collected water and sediment samples from two sites in Helsinki; Vanhankaupunginlahti Bay and West Harbour.<sup>1</sup> The researchers—Pinja Näkki, Eeva Eronen-Rasimus, Hermanni Kaartokallio, Harri Kankaanpää, Outi Setälä, Emil Vahtera, and Maiju Lehtiniemi—sought to investigate the sorption<sup>2</sup> of Polycyclic Aromatic Hydrocarbons (PAHs) as well as the bacterial communities colonizing the different plastics by incubating four different types of plastics found in the samples.<sup>3</sup> Four common types of marine plastics were used in the study: Cellulose acetate, usually found in cigarette filters; poly-l-lactic acid, typically dispersed from plastic cutlery; Polyamide, commonly shed by nylon boat ropes; and Polystyrene, typically used in packaging.

- 1 Pinja Näkki, Eeva Eronen-Rasimus, Hermanni Kaartokallio, Harri Kankaanpää, Outi Setälä, Emil Vahtera and Maiju Lehtiniemi, “Polycyclic aromatic hydrocarbon sorption and bacterial community composition of biodegradable and conventional plastics incubated in coastal sediments,” *Science of The Total Environment*, Volume 755, Part 2, 10 February, 2021
- 2 Sorption is the removal of a compound from solution by solid phase constituents.
- 3 Pinja Näkki, Eeva Eronen-Rasimus, Hermanni Kaartokallio, Harri Kankaanpää, Outi Setälä, Emil Vahtera and Maiju Lehtiniemi, “Polycyclic aromatic hydrocarbon sorption and bacterial community composition of biodegradable and conventional plastics incubated in coastal sediments,” *Science of The Total Environment*, Volume 755, Part 2, 10 February, 2021

*Waves Don't Wash on Dormant Waters* (2023) is a sound artwork that uses field recordings to respond to the microplastics of Vanhankaupunginlahti Bay and its underwater marine environments. Certain environments and phenomena attune us to listening. Sound studies scholar Brandon Labelle has described how auditory observations can sometimes “exceed arenas of visibility” and how “the unseen, the non-represented or the not-yet-apparent” can be brought to attention with sonic rather than by visual means.<sup>4</sup> Labelle describes a kind of “sonic agency” that can be ascribed to different actants with specific sonic strategies. In this sonic artwork, areas of common visual experientiality may be exceeded, as sonic sensing of materials is connected to the environmental research and data of the underwater site in Helsinki.

## Materiality and Experientiality

In recent decades, the growing omnipresence of microplastics has contributed to a kind of “material turn” in environmental and cultural discussion and thought.<sup>5</sup> For example, Dietmar Offenhuber has proposed that the “gap between data visualizations and their corresponding phenomena” might be bridged with autographic visualizations that concentrate on the materials presenting themselves “to the senses” in an “experiential” way.<sup>6</sup> Even so, according to art scholar Heather Davis, our “sensorial experience of the environment,”

4 Brandon Labelle, *Sonic Agency*, (Cambridge: MIT Press, 2020).

5 Tim Ingold, “Towards an ecology of materials,” *Annual Review of Anthropology* 41 (2012): 427–42.

6 Dietmar Offenhuber, “Data by Proxy—Material Traces as Autographic Visualizations,” *IEEE Transactions on Visualization and Computer Graphics* 26, no. 1 (2019): 98–108.



including the affects and the aesthetics involved, has already been “entirely re-ordered by the presence of plastic.”<sup>7</sup>

*Waves Don't Wash on Dormant Waters* builds upon this material and experiential bridge with two kinds of sonification. First, autographic sonification of the object sources of plastic contaminants is produced by hand with cigarette filters, plastic cutlery, nylon boat ropes, and polystyrene packages. Recorded in a studio setting, these sounds will act as sources of “sonic contamination.” Second, sound recordings from Vanhankaupunginlahti Bay will be made. The object sounds will be granulated into microscopical particles and dispersed in small doses into the underwater sounds. A kind of “microplasticity” of the object recordings is achieved—a sonic contamination of the underwater recordings.

### Translation of Research Data via Sound Processing

An incommensurability, an incompatibility between the data sets and the sound processes produced, becomes evident since they come from two very different domains. A translation is needed to move from one domain to the other. A kind of transformation that is perhaps similar to what Bruno Latour has described as necessary in observing networks involving human and non-human actants.<sup>8</sup>

The research data presented in the article requires translation. The numerical data of the environmental measurements are transported and scaled to numerical music data. The four data sets become four *musical* data sets of rhythmical, registral, timbral, and

7 Heather Davis, “Life & Death in the Anthropocene: A Short History of Plastic,” in *Art in the Anthropocene: Encounters Among Aesthetics, Politics, Environments and Epistemologies*, eds. Heather Davis and Etienne Turpin (Open Humanities Press, 2014).

8 Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network-Theory* (Oxford: Oxford University Press, 2007).

spatial musical data. The first data set selected from the article maps PAH contamination distributions at the site. These will be transformed into rhythmic distributions of the contaminant sounds (plastic objects). From the second data set selected, the (different) molecular weights of the PAHs will redistribute the dynamic weights of different register areas of sound. In the third data set, we find the bacterial colonies translated to produce “sonic bacterial growth,” making timbral growth points in the original so-called “clean” recording. The fourth data set is a coordinate analysis of the bacterial communities, which will be translated to spatialize the sound accordingly.

### Microplastics, Seawater, Sediments, and Bacterial Communities

Finding agencies in non-human actants and retracing something that might first seem like a “background element” is an essential process in Brandon Labelle’s *Sonic Agency* and the Actor-Network Theory, described by Bruno Latour.<sup>9</sup> By bringing forth the amplified non-human sound sources of seawater and plastic and the sonification of the data from the contaminants and the bacterial communities, I want to bring the silent background to a sounding foreground. I am composing affective qualities within, from, and to them.

Considering cultural theory and philosophy, an “affective turn” towards non-humans has been undertaken at an increasing scale in recent years.<sup>10</sup> Retracing non-humans below sea level is, to me, a way of giving agency to these entities. Developing autographic sound practices expands networks involving non-human plastics

9 Labelle, *Sonic Agency* and Latour, *Reassembling the Social: An Introduction to Actor-Network-Theory*.

10 Heather Houser, “Affective Turn,” in *Posthuman Glossary*, eds. Rosi Braidotti and Maria Hlavajova (London: Bloomsbury, 2018).

toward the human auditory system. The seabed, seemingly dormant and motionless, gains voices to be heard by other—including human—ears.



# Gatherings with the Silent

JOHANNA SULALAMPI

Lichens were quiet when we met. And while the years passed, we were quiet together. I did not know what diversity they were hiding. More than one species for every minute of a day just in this country. Learning about the participants that constitute their visible body made their existence feel like more than the sum of their parts. Fungi, algae, cyanobacteria, microorganisms, insects, water, air, chemicals, and more. A silent polyphonic assemblage.<sup>1</sup>



All images are courtesy of the author, Johanna Sulalampi.

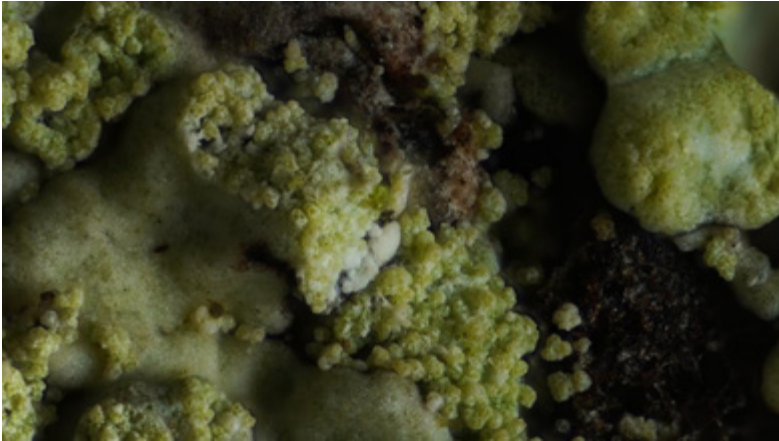
- 1 Ahti Stenroos and Myllys Lohtander, eds. *Suomen jäkäläopa* (Helsingin yliopisto: Luonnontieteellinen keskusmuseo, 2011): 13–15, 29–31. Nastassja Noell, “Chapter 5: Radical Lichenology,” in *Radical Mycology: A Treatise On Seeing and Working With Fungi*, ed. Peter McCoy (Portland: Chthaeus Press, 2016): 111–114. Anna L. Tsing, *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins* (Princeton: Princeton University Press, 2015): 23–24.

Despite not sharing a common language, they encouraged me to meet them repeatedly. We gathered at rocks and stumps every afternoon, sharing moments in their terrestrial coral reefs and kelp forests. I was interested to learn their history since it was repetitive in such a different way and lacked a tone of self-sufficiency. I came to know that it was *Rhizocarpon geographicum* and *Xanthoria elegans* who traveled in space for 15 days. During that time, their metabolism ceased, but upon their return to Earth, they recovered. I also heard that the fungi–algae relationship had developed several times over the course of evolution under different conditions, indicating this is a successful collaboration.<sup>2</sup> Listening to the history of lichens opened the possibility of challenging the false speciality of being a human. It took my thoughts towards the possibility of what being a lichen proposes.<sup>3</sup>

And I did my best to understand them. Unfortunately, at these gatherings with lichens, it was mostly me staring at them, squinting my eyes (because I had lost my eyeglasses again) in whatever weird posture I had to assume to see them in their habitat. I was trying not to stomp on them or harm them in any way. I found out that the lichen we see is all there is. There are no mycelia or roots or other underground structures. The fungi’s skin is trying its best to protect the algae that feed them with sugar. Some of the lichens are fragile, and growing all the way back can take them a long time. The fastest-growing lichens grow no more than a centimeter per year. During these gatherings, I destroyed years’ worth of lichen community growth by accident. Despite the slowness of their essence,

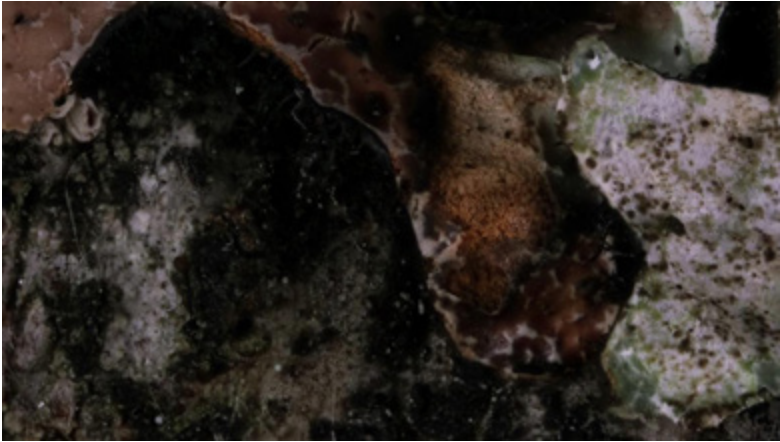
2 Stenroos and Lohtander, *Suomen jäkäläopa*, 13–15, 29–31, 48–50. Noell, “Chapter 5: Radical Lichenology,” 111–114, 129–131.

3 Salomé Voegelin, *The Political Possibility of Sound: Fragments of Listening* (New York: Bloomsbury Academic, 2019): 108, 113–114.



lichens grow all over the world, even in Antarctica. They can thrive on almost any surface: metal, desert soil, and rocks.<sup>4</sup> Compared to humans, lichens do not break the ecosystems they inhabit.

4 Stenroos and Lohtander, *Suomen jäkäläopa*, 13. Noell, “Chapter 5: Radical Lichenology,” 111–114, 129.



### Contamination stage

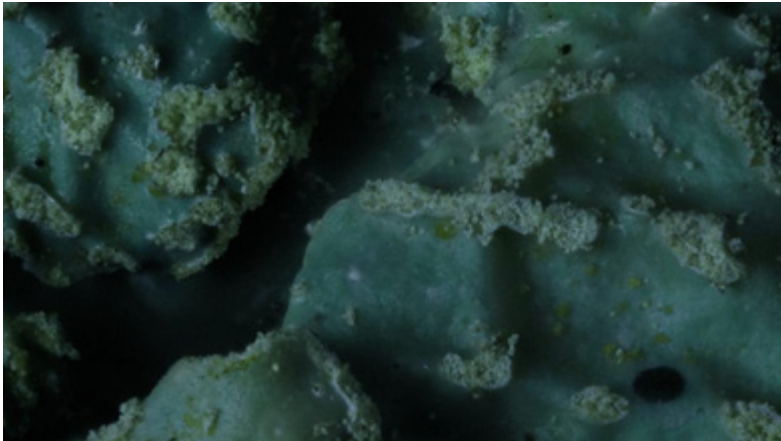
Here I was with my awkward, watery human body, surrounded by the colorful, silent diversity of lichens, mosses, and microorganisms. All of which this small suburban area had carried through the capitalist transformation, accidentally surviving between the human landscapes. The area is called a forest. But it is a forest in the sense of *a third nature*, as professor of anthropology Anna Tsing proposes. Third nature refers to all of the species that have survived capitalism (so far).<sup>5</sup> Although most of the forests in Finland have gone through many traumas, throughout their remains, lichens create beautiful castle-like structures and compositions on tree stumps and rocks, with great trapeze acts on the branches.

Lichens are active members of the area they inhabit and greatly affect the coexistence of others. They are sponges for absorbing nutrients, carbon, and nitrogen, releasing it slowly to the terrain.

5 Anna L. Tsing, *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*, viii.



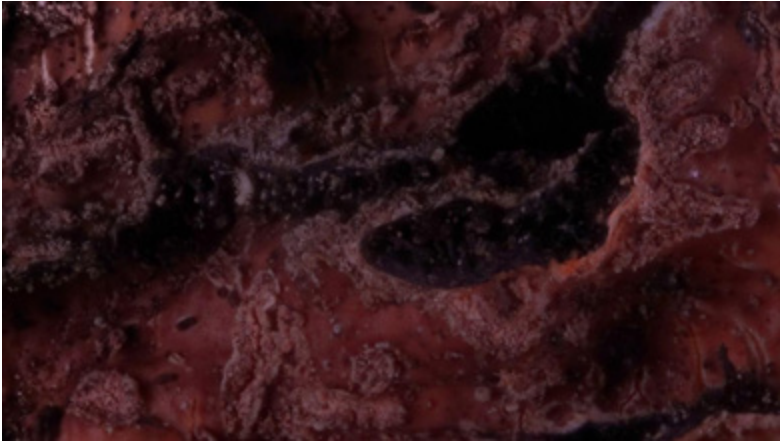
They are nature's chemical indicators.<sup>6</sup> Unlike plants, lichens do not have a vascular system. Rather they absorb water and nutrients from air, rain, spray, and humidity of the microclimate created by mosses. And they absorb everything in the water, including heavy metals. In dry seasons lichens go into a dormant state that lasts more than 100 years. Their recovery can happen in minutes after rehydration.<sup>7</sup> Over the course of our many gatherings, I realized I had become part of the lichen's lives through disturbances I caused in the water, air, and soil of the small suburban forest. We contaminated each other; our histories and physical bodies commingled. They changed me, and I, them.<sup>8</sup>



6 Noell, "Chapter 5: Radical Lichenology," 118–121.

7 Ibid., 114–115. Stenroos and Lohtander, *Suomen jäkäläopa*, 13–15, 29–31.

8 Anna L. Tsing, *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*, 27.



### Voice of the inaudible

How could I, as a sound artist, approach these creatures that had significant artistic ability on their own? Working in collaboration through our differences is the essence of survival for all species.<sup>9</sup> *Sonic fiction* is a way to engage with non-human beings and things.

9 Ibid., 28.

Fiction holds the possibilities of sound in the incomplete, unfamiliar, unrecognizable, and unheard.<sup>10</sup> It also holds the so-called inaudible: lichens.

The lichen world has a special tempo, colors (intensities of which are humidity dependent), forms, textures, and orientations that can be interpreted through sound, guided by the affects and emotions of the spatial compositions, abilities to adapt, invisible interactions, and gestures these sensible beings present. Sonification from scientific data, drawn out, is not the goal. Sound artist and researcher Salomé Voegelin writes how geography in sound has no maps. Instead, it builds on encounters, lack of encounters, and events between people and things developing in the realm of the invisible with rhythms and textures.<sup>11</sup> What if we focus on sensing and imagining together with lichens, creating future geographies in sound? What does *together* mean in this context?

By wandering in the lands of lichens, I was able to hear their bright, clear voices resonating through the environments they inhabit. Theirs are voices of coexistence and collaboration. I can imagine a time and landscapes when human actions have faded, where the lichens have evolved to the point that their structures make audible sounds. Their majestic pipes and horns howled in dissonance through forests and deserts. Water streams rush and roar through their pits and holes; raindrops resonate in their bowls. The earth vibrates with the marvelous polyphonic composition of these symbiotic beings.

10 Voegelin, *The Political Possibility of Sound*, 21, 35–38.

11 *Ibid.*, 75.



# Approaching the Hybrid Nature of Forests in Finland with Photographic Methods

LAURI LÄHTEENMÄKI

In Finland, nature—particularly forests—has played a central role in national art. Landscape painters such as Werner Holmberg (1830–1860), Pekka Halonen (1865–1933), and Eero Järnefelt (1863–1937) pioneered imagery that still, even one hundred years later, lives vibrantly. Not only in the arts but in minds too:<sup>1</sup> the country’s *forestedness* is regularly embraced.<sup>2</sup> In the eyes of an environmentalist, the ground truth, however, looks different. After post-World War II industrialization, forests have been pervasively transformed by industrial forestry practices connected to nation-building.<sup>3</sup> When

1 Hannu Linkola, “Niin todenmukainen kuin mahdollista’: Maisemavalokuva suomalaisessa maantieteessä 1920-luvulta 1960-luvulle” (PhD diss., University of Helsinki, 2013), 72–73.

2 86% of total land area. From Kari Korhonen, Arto Ahola, Juha Heikkinen, Helena Henttonen, Juha-Pekka Hotanen, Antti Ihalainen, Markus Melin, Juho Pitkänen, Minna Rätty, and Maria Sirviö. “Forests of Finland 2014–2018 and their development 1921–2018,” *Silva Fennica* 55, no. 5 (2021): 7, <https://doi.org/10.14214/sf.10662>.

3 Antti Parpola, “Uinuvat metsävaramme käytön piiriin’: Valtionmetsien käytön suuri murros 1939–1970” (PhD diss., University of Helsinki, 2014): 12–13.

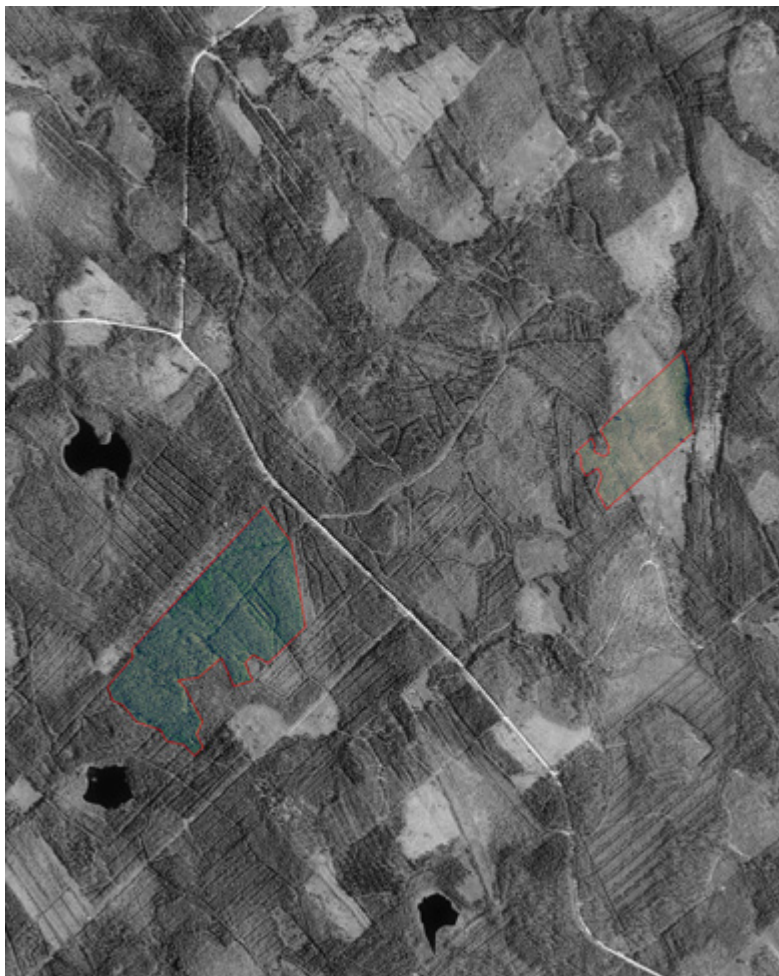


Image 1. Two forest stands in different growth stages.

examined by ecological factors, such as biodiversity and the age of trees, Finland *de facto* suffers from deforestation.<sup>4</sup>

An artist with formal training in environmental (social) science,<sup>5</sup> I examine the subjects of my landscape photography through the frame of the environment. Since the 1960s, environmental science proceedings have accumulated into an understanding of nature as a field of crisis where increasing ecological issues situate. This has pushed the boundaries of the conventional understanding of nature as the opposite of culture—the binary that some consider fundamental in making sense of the world.<sup>6</sup> The concept of the Anthropocene represents the core of the environmental frame: we live in an era defined by human-made ecological and geological disruptions in the whole Earth System<sup>7</sup>, which now question the existence of humanity and other beings. Today, the extended bodies of humans in technologies, material inputs and outputs, and contaminants reach every ecosystem on Earth.<sup>8</sup>

4 According to Korhonen, *Forests of Finland*, only 37 % of the total forest area consists of mature and old forests (>80 years old trees). Old forests are significantly important for biodiversity (Hyvärinen et al. 2019, 42).

5 Master of Science (MSc.) in Environmental Change and Policy at the University of Helsinki, 2020.

6 Jacques Pollini, “Bruno Latour and the Ontological Dissolution of Nature in the Social Sciences: A Critical Review,” *Environmental Values* 22, no. 1 (2013): 26.

7 Clive Hamilton, “The Anthropocene,” in *Encyclopedia of Ecology (Second Edition)*, edited by Brian Fath (Amsterdam: Elsevier, 2019), 239–246.

8 Climate change affects all ecosystems that are sensitive to mean-temperature changes and anomalies in climatic conditions. Recently, the PFAS (per- and polyfluoroalkyl substances) levels globally in rainwater were found to exceed safe levels for human freshwater consumption (for more, please see Ian T. Cousins, Jana H. Johansson, Matthew E. Salter, Bo Sha, and Martin Scheringer, “Outside the Safe Operating Space of a New Planetary Boundary for Per- and Polyfluoroalkyl Substances (PFAS),” *Environmental Science and Technology* 56, no. 16 (2022): 11172–11179. <https://doi.org/10.1021/acs.est.2c02765>. These are some—but not the only—examples of ecological transformation.

## Photographing the monuments of environmental change

When I point my camera toward the immense environmental impacts of forestry in a landscape with my photography series *Vihreän kullan kuume* (*Green Gold Fever*)<sup>9</sup>, 2017–2022, I find myself in a similar position to Bernd and Hilla Becher, photographers of the monuments of industrial modernity (*Anonyme Skulpturen*, 1970). Like their power plants, mining equipment, and agricultural infrastructures, monocultures, clear-cut areas, and forest road networks make up the material basis of an overconsuming, high-energy society increasingly interested in cardboard boxes and biofuels. The landscape—drained, fertilized, planted, thinned, and cleared—refuses to fall into the category of “nature” we are accustomed to understanding. Today’s forests constitute human structures and restricted autonomies allowed to other organisms. The subject of my photography is a hybrid object that mirrors the image of our society.<sup>10</sup>

When I exhibit photographs, the *activist* qualities of my work are often highlighted. Relocating an environmental issue that manifests in society’s peripheries into a gallery may be a performative gesture, but the imagery is not.<sup>11</sup> Therefore, this reception I have got could be symptomatic of a conflict between imagined nature and the new

9 See the photobook by the author, Lauri Lähteenmäki, *Vihreän kullan kuume: raportti Suomen metsien tilasta*, (Vilnius: Self-published, 2022). Parts of the series have been included in my Master’s Thesis (MFA, Academy of Fine Arts, Uniarts Helsinki, 2022).

10 See Jacques Pollini, “Bruno Latour and the Ontological Dissolution of Nature in the Social Sciences: A Critical Review,” *Environmental Values* 22, no. 1 (2013): 26.

11 According to Sarah James, the Bechers did not consider their work political. From “Subject, Object, Mimesis: The Aesthetic World of the Bechers’ Photography,” in *Photography After Conceptual Art*, edited by Diarmuid Costello and Margaret Iversen, *Art History* 32, no 5, (Sussex: Wiley-Blackwell, 2010), 60–61.





Image 2. A quadrat sample, used to measure plant species in a selected environment, e.g., in a forest stand.



Image 3. Bird population census can be implemented by walking a predefined figure marked on map and listing all observed bird species.

environmental reality. But the romantic idea(l)s of a flourishing wild have no place in today's world. Where my activism is suspected to happen is outside the image: frames always leave out something to

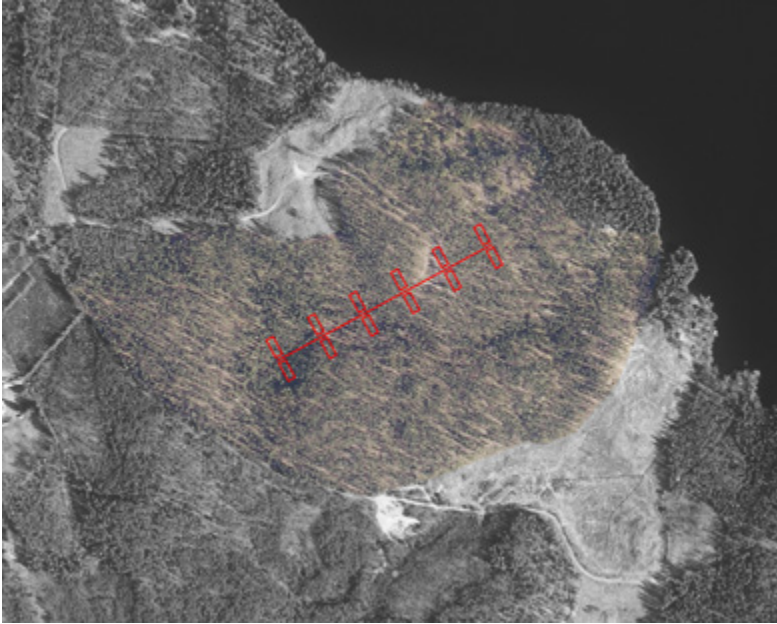


Image 4.

signify what is in. Thus, *there must be pristine forest somewhere, but you decided to show these photographs.*

### Applying the methods of science to artistic research

To overcome the previous assumptions, I apply methods of ecology, geography, and environmental aesthetics in my new project.<sup>12</sup> They share the goal of Robert Adams, a New Topographics photographer, to project “a normal view of the landscape.”<sup>13</sup> I focus on forest stands, a unit of demarcation used in forestry, which divide the landscape into distinctly featured sections that are separately

12 Funded by the Olga and Vilho Linnamo Foundation.

13 Carol di Grappa, *Landscape: Theory* (New York: Lustrum Press, 1982), 12.

managed. Forest stands, also called stands of trees, make up the forest landscape in Finland.<sup>14</sup>

Field ecology uses sampling to generalize a view of a specific environment.<sup>15</sup> The targeted research variable could be, for example, species composition. In my case, it is the aesthetics of ecologically transformed forest stands. Lines, grids, and randomized patterns are drawn on maps, guiding sample collection.<sup>16</sup> I appropriate this method by photographing in predefined locations figured over aerial images.<sup>17</sup> The epistemic interest in sampling in ecology and my new landscape photography methods is to withdraw from subjective observation and accentuated detail. The eye is limited to a particular location at a time, so most landscape observations lean on perspectives and framing that set boundaries for the environment.<sup>18</sup> Collecting and compiling samples extends the scale.

But does it make any sense to include objectivity, generalization, and quantization—the ideals and principles of science—to artistic research? Artistically fruitful experimentation could lead to a vicious circle—much like what happened to forestry. In the nineteenth

14 See Image 1.

15 In Image 2, multiple quadrat samples are used to measure plant species in a selected environment, e.g., in a forest stand.

16 Albert et al., “Sampling in Ecology and Evolution – Bridging the Gap Between Theory and Practice,” *Ecography* 33 (2010): 1028-1029. See Image 3 where a bird population census can be implemented by walking a predefined figure marked on map and listing all observed bird species.

17 Please see images 4.

18 Saara Jäntti et al., “Rajatut maisemat” in *Maisemassa: sukupuoli suomalaisuuden kuvastoissa*, eds. Tuija Saesma and Saara Jäntti, *Nykykulttuurin tutkimuskeskuksen julkaisuja* 115, (Jyväskylä: University of Jyväskylä, 2014), 9.

and twentieth centuries, forestry followed *scientification*,<sup>19</sup> which made possible its transformation from an activity of subsistence practiced by local peasants into a nationwide industrial process. Forests were standardized into controllable units with specific cultivation models and harvest times, with methods borrowed and applied from ecology and economics.<sup>20</sup> What followed was the total ecological transformation of forest lands in Finland, which is now responsible for endangered species (one-third of all<sup>21</sup>) and biotopes (76% of forest types<sup>22</sup>), turning the land into a source of climate-warming greenhouse gas emissions.<sup>23</sup>

- 19 “A process whereby the use of and claim to systematic and certified knowledge produced in the spirit of ‘truth-seeking’ science becomes the chief legitimating source for activity” according to Peter Weingart, “From ‘Finalization’ to ‘Mode 2’: Old Wine in New Bottles?,” *Social Science Information* 36, no. 4 (1997): 610.
- 20 Tapani Tasanen, *Läksi puut ylenemähän: metsien hoidon historia Suomessa keskiajalta metsäteollisuuden läpimurtoon 1870-luvulla*. (Vammala: Metsäntutkimuslaitos, Metsäntutkimuslaitoksen tiedonantoja 920, 2004), 359–366.
- 21 Hyvärinen et al., *Suomen lajien uhanalaisuus – Punainen kirja 2019*. (Helsinki: Ympäristöministeriö & Suomen ympäristökeskus, 2019), 42.
- 22 Kouki et al., “Metsät,” in *Suomen luontotyypien uhanalaisuus 2018: luontotyypin punainen kirja: osa I – tulokset ja arvioinnin perusteet*, edited by Tytti Kontula and Anne Raunio, *Suomen ympäristö 2018*, no. 5. (Helsinki: Suomen ympäristökeskus ja ympäristöministeriö, 2018), 188.
- 23 “Greenhouse gas emissions in 2021 remained on level with the previous year, the land use sector a net source of emissions for the first time,” Statistics Finland, accessed March 30, 2023, <https://tilastokeskus.fi/en/publication/cktlcpwag38sg0c556liqop0y>.



# Art as Geomedia

HEINI NIEMINEN

Geology's expanded spatial and temporal scales exist beyond human comprehension, causing significant challenges to representational systems. In scientifically framed imagery, visualizations of the Anthropocene have shifted substantially from photography, a view understood by human perception, to remote sensing technology.<sup>1</sup> Although visual imagery has been a fundamental tool in conceptualizing the Anthropocene, scientific popularizers often lack awareness of the impact of this imagery and fail to educate the audience enough to read it.<sup>2</sup> Jussi Parikka crystallizes the importance of media; "it is through and in media that we grasp earth as an object for cognitive,

- 1 Remote sensing or earth observation dominates the field of mineral prospecting, exploration and extraction. The properties of an ore-bearing terrain are measured by using electromagnetic waves without physical contact. Remote sensing devices can draw a comprehensive geological map and reveal the different valuable material resources on ground. For more, see Nichole Rashotte, "Introduction to Remote Sensing in Mineral Exploration," Gold Exploration, Investment News Network, November 6, 2019, <https://investingnews.com/daily/resource-investing/precious-metals-investing/gold-investing/introduction-to-remote-sensing-and-mineral-exploration/>.
- 2 In his book *Against the Anthropocene – Visual Culture and Environment Today* (Berlin: Sternberg Press, 2017), 12–13, 17, T.J. Demos explains that typically scientific popularizers don't take into account the implications of their representations even though this imagery both illustrates geological concepts and shape them in particular ways that are profoundly political (though the latter is rarely presented or acknowledged as such).

practical, and affective relations.”<sup>3</sup> As a concept, *geomedia* refers to geographical sources, such as maps, images, videos, statistics, map services, or other geography-related information.<sup>4</sup> Since all of these materials are used widely as elements or media of visual arts, what, my work asks, are the possibilities and responsibilities of an artist as an intermediary of geomedia?



Image 1. A film still of *Faraday's Rocks*, 2023. An aerial film by Sorbus Productions, 2023.

*Faraday's Rocks*, 2023 (Image 1), is my attempt to understand the complexity of extractivism. I try to hide the glacial erratics on my mother's field in southeast Finland and the electromagnetic

3 Jussi Parikka, *A Geology of Media* (London: University of Minnesota Press, 2015), 12.

4 "Paikkatiedon avoin oppimisympäristö" (The open learning environment of spatial information), Paikkaoppi. <https://www.paikkaoppi.fi/fi/paikkatieto/geomedia/>



radiation they are signaling from the “extractive view.”<sup>5</sup> Tracing ore boulders carried by an ancient continental glacier is a special ore prospecting method commonly used today.<sup>6</sup> Drawing from the idea of a Faraday cage and electromagnetic shielding, I try to protect these specific boulders. I am trying to stop a possible mining site from being found. I cover them with Mylar blankets.<sup>7</sup> In the process, I realize that the exposing lens of extractivism has turned on me. I protect my environment in Global North with Mylar blankets whose materials originate far from Finland, extracted from a mine of which I know nothing.

The process of developing *Faraday's Rocks* made me acknowledge the problem of representing geological depths and geographic

- 5 The ‘extractive view’ is a concept used by Gökçe Önal who is referring to Macarena Gómez-Barris: “The extractive view, similar to the colonial gaze, ... facilitates the reorganization of territories, populations, and plant and animal life into extractible data and natural resources for material and immaterial accumulation. Conventionally, the aerial view has been an everpresent measure of territorial knowledge and the rhetoric of seeing-is-controlling.” From Gökçe Önal, “Media Ecologies of the ‘Extractive View’” *Image Operations of Material Exchange*, *Footprint: Conflict Mediations*, Vol. 14, No. 2 (Autumn/Winter 2020): 31–48.
- 6 This method is used in Nordic countries and particularly in Finland. Confirmation about the use of this method of exploration provided via email from FinnMin (Finnish Mining Association), dated June 6, 2022.
- 7 Electrical shielding is a process by which an electromagnetic field is blocked with a barrier that is used to isolate an electrical signal from its surroundings while a Faraday cage is used as a protective shield against the electromagnetic radiation. It is claimed that space blankets, made of aluminized Mylar can block or radically reduce electromagnetic radiation. For more, see: “Aluminum Uses in Electrical Shielding,” Clinton Aluminum, last updated February 27, 2018, <https://www.clintonaluminum.com/aluminum-uses-in-electrical-shielding/>.

changes as planetary surfaces and flat images.<sup>8</sup> How, this work asks, to approach and represent extraction deeper than the surface? According to Samir Bhowmik, the true scope and scale of representations of topologies, deep time, and multi-scalar aspects of extraction are difficult to grasp when representations are immaterial and dimensionless. To understand these complex realities, we must consider the elements of deep time and develop representational methods corresponding to these multi-scalar structures.<sup>9</sup> If we fail to consider this multi-angle perspective, we are likely to succumb to merely aestheticizing extractivism.<sup>10</sup>

Such challenges of representation compel us to ask what we can do with the interpretations of images of geology, geography,

8 “Surfaces,” Parikka stresses, “should be approached as nothing like superficial.” For more, see Jussi Parikka, “From Planetary Depth to Surface Measure, or How to Read the Future from an Image,” in *Deep Mediations: Thinking Space in Cinema and Digital Cultures*, eds. Karen Redrobe and Jeff Scheible (Minneapolis: University of Minnesota Press, 2021), 286–287.

9 Bhowmik addresses the topic from the perspective of lithium fields and the Gigafactory. Taking the *Lithium Dreams* project of the *Unknown Fields Division* as an example, Bhowmik observes that while the visual imagery of the lithium fields is striking, by only surveying the extraction sites, the work leaves any fieldwork or film of an extraction zone incomplete. We should, Bhowmik proposes, “re-examine the relationship between representation and the actual extent of extraction, manufacturing, and waste in order to understand the environmental implications.” From Samir Bhowmik, “Lithium Landscapes: From Abstract Imaginaries to Deep Time and Multi-scalar Topologies,” in *Media Fields Journal* no. 16 (2021): 1–12. <http://mediafieldsjournal.org/lithium-landscapes/>.

10 For more about the visual culture of the Anthropocene, please see T.J. Demos *Against the Anthropocene*, as well as *Beyond the World’s End* (Durham: Duke University Press, 2020).

and aerial images.<sup>11</sup> Could visual art return some of the depth lost in compressed images of Earth? Map values instead of resources? Create a non-scientific, non-goal-driven analysis. Perhaps this is what Parikka is asking for when he writes to extend the media archaeological discussions of deep times of media to a more environmental-arts-and-humanities approach. To move geology further away from scientific discipline closer to a cultural marker. Art could create anomalous “predictive images—...in this set that aims to measure the earth as it might become”.<sup>12</sup> If art can make creative interventions, propose alternative futures, and reveal various physical and abstract layers of geological depth without being restricted to scientific or financial demands, then artists hold the possibility to challenge extractive views, acting as viable mediators of geomedia.

11 Aerial photography is the oldest tool of remote sensing. Despite the increasing availability of more advanced imaging technology, aerial photographs remain one of the most reliable and widely used sources of remotely sensed data. In broad terms, aerial image is any photograph taken from the air, but some distinguish aerial images as images taken from drones, balloons or airplanes and satellite images taken by satellites: “Satellite imagery covers a wider area that makes it ideal for larger-scale scientific operations. In contrast, aerial photography is taken at a lower altitude and provides more detail.” From <https://www.nearmap.com/au/en/aerial-view-blog/aerial-maps-versus-satellite-maps>. For more on aerial images, see Jussi Parikka, “*From Planetary Depth to Surface Measure, or How to Read the Future from an Image*.” In *Deep Mediations: Thinking Space in Cinema and Digital Cultures*, eds. Karen Redrobe and Jeff Scheible (Minneapolis: University of Minnesota Press, 2021) 287. Parikka gives examples of artistic research related to these images, for example, artist Abelardo Gil-Fournier’s workshop from pages 295 to 301.

12 Jussi Parikka, “*From Planetary Depth to Surface Measure, or How to Read the Future from an Image*,” 290, 300.



# Performing Discard

QIONG ZHANG

## 矿坑

早上我打开新闻  
镜头里是邻居们在河边撑网  
暴雨无边无际  
反反复复  
早上来了好几拨人  
化了浓妆  
领头的人不说话  
所有人都不说话了  
这时我执意要成为屋子里轻浮的人  
我穿上荧光色的外衣  
并把手臂举起来  
并在脑海中反复回放蓝色卡车接受枪击  
一场金属构成的纯白的雨  
闻起来像是海中代购的金币  
天黑前邻居抓起一只龙虾  
白色蟑螂进进出出  
龙虾伸出漫长的触须  
暴雨临近  
暴雨使动物们疯狂  
再没有一个时刻使它们如此接近  
因为暴雨我回到矿坑的中心  
暴雨使南方变暗

傍晚邻居拧开水龙头  
 众人吞咽黑色的云和牙齿一样硬的面包  
 蜘蛛织一堵严密的墙  
 红色的垃圾桶  
 是最后的晚餐  
 过量的雨使我失眠

### The Pit

In the morning, I turned on the news  
 The scene—neighbors unfurling a net at the river's edge  
 Downpour endless  
 Again and again  
 Many groups arrived in the morning  
 Wearing gaudy makeup  
 The leader does not speak  
 Nobody speaks anymore  
 At this moment I resolve to be the most frivolous person in the room  
 I put on fluorescent attire  
 And raise my arms  
 While my mind replays the blue truck under gunfire  
 A spell of pure white metallic rain  
 Smelling like gold coins traded in the middle of the sea  
 Before darkness falls, the neighbors catch a lobster  
 White cockroaches pass in and out  
 The lobster reaches out with its long antennae  
 The downpour closes in  
 The downpour stirs animals into a furor  
 No other moment brings them this close  
 Because of the downpour I head back to the center of the pit  
 The downpour darkens the south

At dusk, the neighbor turns on the faucet  
 Everyone swallows black clouds – bread as hard as teeth  
 A spider weaves a tight-knit wall  
 The red trash can  
 Is the last supper  
 Excessive rain makes me sleepless

(*The Pit* is a poem written by the author in 2016. The original, in Chinese, is on the preceding page. It was translated into English by Patrick Devereux in 2019.)

When a mine has been depleted, and the construction crews leave, the mining operation ends, and the mine returns to the world. The earth has been excavated, the excavated mineral or the treasures—whatever they may have been—have been taken, and the waste that came with them has been discarded. If one looks into the depleted mine pit, it looks like a void.

Statistics show that “mining is the largest portion of industrial-scale waste.”<sup>1</sup> Where has the massive amount of waste generated been disposed of? Why did it have to be discarded? If all the material extracted was once part of the earth, why are some considered highly valuable treasures and others must be discarded? Can’t they just stay in place, waiting for the subsequent excavation like recyclable trash in most European cities? In their introduction to discard studies, Liboiron argues that “wasting is a technique of power,” as “systems must rid themselves of people, places, and things that actually or potentially threaten the continuity of those systems to persist.”<sup>2</sup>

1 Max Liboiron and Josh Lepawsky, *Discard Studies: Wasting, Systems, and Power* (Cambridge: MIT Press, 2022), 10.

2 *Ibid.*, 3.



Image 1. The site of Baiyin open pit mine No. 1. Photograph courtesy of 冷月印记 (2020).

Since the establishment of the People's Republic of China in 1949, northwest China has been described in government-constructed historical discourse as a poor and culturally backward region rich in mineral resources. One such example is Baiyin, located in the suburbs of Lanzhou in Gansu Province. *Baiyin* translates to *white silver* in English, though it is known as “Copper City” due to the vast copper mines discovered in the area. Since the 1950s, the Chinese government has established a state-owned mining company. As one of the key construction projects of the First Five-Year Plan of New China, over 20,000 tons of explosives were sent from all over the country to Baiyin. The early extraction flattened seven hills that stretched hundreds of miles and produced mushroom-shaped smoke clouds resembling nuclear explosions. The mine was closed in 1988, leaving two huge pits at the mining sites. In 2008, Baiyin was listed



in China's first batch of resource-depleted cities. Under the narrative of contributing to the economic development of the socialist state—after more than 30 years of extraction and producing more than 60 million metric tons of copper ore<sup>3</sup>—this area was abandoned by extractors who had come from developed regions. In 1952, China's GDP was 67.9 billion yuan; by 2008, it exceeded 30 trillion yuan. China's economic output in 2008 was 77 times higher than in 1952.<sup>4</sup> Still, Baiyin remained one of the country's poorest and most environmentally devastated regions.

A pit remains where the mine was found.

Poverty persists while resources are taken away.

What has been discarded?

*What is discard?*

In my work, I attempt to approach discard, observe the process of discarding, and perform the act of discarding at the Orijärvi deposit, a depleted copper mine in Southwest Finland. Standing next to a pile of weathered yellow copper ore rocks, I pull a fishing net, draw it close to my body, and then throw it into the air, pushing the twisted monster out of sight. Where it is discarded does not matter as long as the discarded item is no longer visible to me—although it always returns after a while, no matter how hard I push

3 工业遗产网 (Industrial Heritage Network), “铜城”的工业遗产——白银露天矿旧址” (The industrial heritage of the ‘Copper City,’ the former site of the Baiyin Open Pit Mine), last updated May 17, 2014, <http://www.dayexue.com/Article/yjgg/201405/528.html>.

4 The Central People's Government of the People's Republic of China, “新中国成立60周年经济社会发展成就回顾系列之一” (Part of a series reviewing the achievements of economic and social development in the 60th anniversary of the founding of New China), last updated September 7, 2009, [http://www.gov.cn/gzdt/2009-09/07/content\\_1410926.htm](http://www.gov.cn/gzdt/2009-09/07/content_1410926.htm).

it away. In doing so, my surroundings regain order, cleanliness, and aesthetics for a moment.

To throw a discus, one must spin with it. The more discs are thrown, the more the person puts themselves in a constant spin. If I imagine the excavation-discard process as a slow-motion discus-throwing movement, a discarded mine pit would be like a discus thrown into the void. From the discus's perspective, the dizzy, disoriented humans are being thrown as they spin together with the discus, generating the centrifugal force in the throwing on the other end. But mine pits are fixed, hollow, and blend into the environment. If the throwing continues or restarts, the mine pit becomes a trap. One could say that the trap needs hollowness as bait to conceal the hidden actions behind it. Within the void of the trap, something has been erased. When one looks at a mine pit, it appears to be static, empty, and void. Could I return to the concealed excavation if I throw it into the void again? Through the performance of discard, I attempt to reveal the overlapping layers of excavation and hidden human traces.

Stretching and contorting the space-time axis, if my next excavation were an ancient tomb, based on knowledge gleaned from Chinese urban legends, I should have carried with me, in addition to various types of metal shovels, a seemingly useless fishing net. When I finally found the site where the ancient treasure was buried, I started to excavate it, about to touch it; this is when the ghosts and corpses of the tomb might jump out at me (because they were disturbed). At that point, I would throw the previously useless fishing net at them, tangling them, canceling out their power by throwing my previously useless tool.

Now, as I stand in the void, facing a constantly morphing monster, what can I throw?





Image 2–6. A sequence of film stills of the author’s performance at the Orijärvi Copper Mine in Kisko, Salo, Finland (2023). All images are courtesy of the author, Qiong Zhang.





# How to Approach an Islet

LEENA KELA

“The machine is tired and exhausted,” philosopher Bayo Akomolafe said when speaking about times of catastrophe and crisis.<sup>1</sup> The time of crisis is accelerating. Bodies are becoming tired and exhausted. We are facing one storm after another, fighting climate change and trying to defeat it. We are falling into despair and losing energy.

## How to practice coping with destruction

The Baltic Sea, one of the most polluted seas in the world, has many properties to examine the concept of destruction. Some parts of its basin are considered dead due to a lack of oxygen and a surplus of nutrients caused by centuries of farming on the shores of the shallow sea.<sup>2</sup> Destruction inhabits the sea, and the Institute for Coping with Destruction seeks ways to embrace it instead of fighting against it. Formed in 2020 as a collective, together with artists Heini Aho and Eero Yli-Vakkuri, the institute works at the Archipelago Sea near the island of Örö. It exists as a physical site called *Tuhon tila*

- 1 Akomolafe, Bayo, “Dr. Bayo Akomolafe on Slowing Down in Urgent Times,” interview by Ayana Young, *For the Wild* 155, January 22, 2020, audio, 1:29:15, <https://forthewild.world/listen/bayo-akomolafe-on-slowing-down-in-urgent-times-155>.
- 2 Sami Jokinen, Joonas Virtasalo, Tom Jilbert, Jérôme Kaiser, Olaf Dellwig, Helge W. Arz, Jari Hänninen, Laura Arppe, Miia Collander, and Timo Saarinen, “A 1500-year multiproxy record of coastal hypoxia from the northern Baltic Sea indicates unprecedented deoxygenation over the 20th century,” *Biogeosciences* 15 (05 Jul 2018): 3975–4001, <https://doi.org/10.5194/bg-15-3975-2018>.



(Area of Destruction), which consists of 42 hectares of land formed by almost 300 islands, islets and underwater rocks the collective co-owns with many others. In the institute, we have been practicing deep adaptation<sup>3</sup> by challenging and overcoming the physical limits of our bodies, learning new marine skills and practicing, for example, trembling, growling and seawater tasting. By living within destruction and finding ways to cope, we can meet the ecological crisis as a call to adapt and change ourselves. The next step is to learn to rest.

An islet is a small island, often unnamed and sometimes even invisible to the eye, as some underwater rocks can also be called islets. Islets are barren islands with little to no vegetation—at most,

3 For more on deep adaptation, please see Jem Bendell, “Deep Adaptation: A Map for Navigating Climate Tragedy,” *University of Cumbria*, July 27, 2020, <https://www.lifeworth.com/deepadaptation.pdf>.



there may be some moss, grasses or other small plants. There are tens of thousands of these tips of rocks, peeking out from the Baltic Sea at the Finnish archipelago.

During August 2022, we engaged with our remote islets by swimming to them. The vastness of the sea landscape distorts the shapes of islands and islets, and it is challenging to estimate distances at sea. Swimming in the open sea is both a physical and mental exercise. You need to prepare well to be able to swim long distances. The sea temperature was 20 degrees Celsius, which was relatively good for swimming. Still, when swimming long distances in open water without a wetsuit, there is a risk of a muscle cramp. Also, swimming amongst the large flocks of common jellyfish made us sometimes yarn for the wetsuits.

The shores of the island of Örö, where we departed from, and the islets we arrived at were sharp and slippery, covered with algae. Landing on an islet by swimming is like asking permission to approach another. First, you need to look for a spot which looks the least rough. A place where the waves are not hitting the rock too hard because they might push your body onto the rocks too forcefully and cause damage. You need to look for a gently sloping spot where you can slide your body onto the rock like a seal or crawl on all fours like a frog. When landing, you need to be aware, present, and curious.

How does gathering become a “happening” that is greater than a sum of its parts? One answer is contamination. We are contaminated by our encounters; they change who we are as we make way for others. As contamination changes world-making projects, mutual worlds –and new directions– may emerge.<sup>4</sup>

4 Anna L. Tsing, *The Mushroom at the End of the World. On the Possibility of Life in Capitalist Ruins* (Princeton: Princeton University Press, 2015), 27.







Getting to know the islet is the next step. If walking barefoot, the soles of your feet provide a lot of information on the shape, surface, temperature, and possible flora of the islet. The principal visible inhabitants of the islets are birds such as seagulls, terns, and great cormorants, which have left their excrement in formations of white marks on the rocks. The sizes of the islets vary from very small to quite large, so exploring an islet is always an adventure. Due to the nature of the islets, which are so many, remote and without any utilization purposes, people rarely visit them. Still, they are full of human traces carried there by the sea: toothbrushes, food packages, ropes, nets, canisters, and many others. Human traces are everywhere because the sea water is also a vast dump that moves disposed of objects and microplastics within its flows.



## We are learning to rest in the eye of a storm

What is then resting? Resting is to resist a capitalist sense of productivity and the notion of endless progress.<sup>5</sup> Resting is to reconnect. When resting instead of fighting, one is adapting, coming to terms with the climate catastrophe as a condition we live in—amongst other crises—instead of trying to escape. Resting is staying with the trouble. To be present and learn to adapt. Resting is not to become passive, to turn your back on something you are not willing to participate in, but resting is an active form of resistance.

Is there space for resting within destruction? Slowing down as a method for coping with destruction changes the experience of time. Slowing down doesn't only refer to the function of speed but

5 Jonathan Crary, *24/7: Late Capitalism and the Ends of Sleep* (London and New York: Verso, 2013), 9–11.



to awareness.<sup>6</sup> Slowing down is learning to be present where you are and what you are doing. It means not accepting to be a machine but being present and, through that, acknowledging others who are there with you, acknowledging entanglements with the past, present and futures we share with other humans and other-than-humans.

The destruction of the Baltic Sea is often not visible to the human eye examining the sea from above the surface. The troubles the Baltic Sea face may not even be visible when diving into the water since we might not have the capacity to recognize them. How can we work with environmental destruction when it can't be detected in a visible form or experienced with bare human senses but needs to be imaged based on scientific facts and knowledge? How can we build relationships with the complexities of environmental destruction and

6 Akomolafe, interview.

its multiple entanglements with the lives of other species, futures, economy, justice and our own existence? How can we slow down, think through the complexity, and face the destruction when the emotional burden is so heavy that it might break us down?

We return to the islets. Islets are for resting within the destruction. They are solid grounds in the middle of the constantly moving seas. They are places to recover from burnouts caused by accelerating destruction. They are places for dreaming when reality offers nightmares. Islets are small islands for embracing hope.

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## Performing Discard

Qiong Zhang

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## How to Approach an Islet

Leena Kela

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# Biographies

**Jussi Parikka** is Professor in Digital Aesthetics and Culture at Aarhus University in Denmark, where he leads the Digital Aesthetics Research Centre (DARC). He is also visiting professor at Winchester School of Art (University of Southampton) and at FAMU at the Academy of Performing Arts in Prague, where he leads the project Operational Images and Visual Culture (2019-2023, funded by the Czech Science Foundation). In 2021 he was elected as a member of Academia Europaea. His published books include *Insect Media* (2010), *Digital Contagions* (2007/2016) and *A Geology of Media* (2015), and *A Slow, Contemporary Violence* (2016). Recently, he co-edited *Photography Off the Scale* (2021) and is the co-author of *The Lab Book: Situated Practices in Media Studies* (2022). His new book, *Operational Images*, is out in May 2023. Parikka's books have been translated into 11 languages, including Japanese, Korean, Chinese, Czech, Italian, French, Spanish, and Portuguese. <http://jussiparikka.net>.

**Samir Bhowmik** is a Helsinki-based multi-disciplinary artist, architect, and scholar. He is an Academy of Finland Research Fellow at the University of the Arts Helsinki, where he teaches and explores extractivism and ecology through film, installation, and performance. His current research project *Terra-Performing* (2022-27), examines extractivism and environmental change through intelligent performance research. Samir received a Doctor of Arts (2016) from Aalto University, Finland, and a Master of Architecture (2003) from the University of Maryland, United States. His collaborative artistic works and writings have appeared in *Leonardo* (MIT Press), Helsinki Biennial 2021, and the Venice Architecture Biennale 2021. <https://samirbhowmik.cc>

**Bruno Caldas Vianna** is based in Barcelona. His artistic practice traverses poetical affordances of technology by creating visual narratives in innovative and traditional supports, short and feature films, live cinema, augmented reality, mobile apps, and installations. Between 2011 and 2016, he ran Nuvem, a rural space dedicated to art and technology in Brazil. From 2012 to 2018, he taught at Oi Kabum, a school for art in technology in Rio de Janeiro. He is a founder of the autonomous technology collective Coolab and contributes to the AI non-profit Laion and the Amazon news website InfoAmazonia. Bruno has a degree in film and a master's degree from NYU's Interactive Telecommunications Program, and he is pursuing a doctorate from the University of the Arts in Helsinki, Finland, investigating visual arts and artificial intelligence. Currently, Bruno also teaches at Elisava University in Barcelona.

**Frank Brümmel** is an artist and educator with a background as a stonemason. A native of Germany, he lives and works in Turku and Helsinki, Finland. Currently, he serves as a tenured Lecturer in Sculpture at the Academy of Fine Arts, University of the Arts Helsinki, where he is also a doctoral candidate. He makes fictional archaeological stone artifacts, and carves texts and ornaments in stone, applying an imagined indefinite future archaeological point of view on society. His artistic research is centered on the question of a possible educational element in sculpture, looking at artists as teachers, as well as the impacts of certain differences in regard to applied non-didactics. His works have been shown nationally and internationally in artist-run venues, galleries, and museums. [www.frankbrummel.com](http://www.frankbrummel.com)

**Saara Hannula** is a Helsinki-based artist, researcher, and lecturer with a background in architecture, environmental art, and the



performing arts. Her artistic practice consists of context-specific artistic research processes that focus on questions of ecology, materiality, and belonging, and that are shared in the form of site-responsive installations, events, performances, and publications. Saara has been a doctoral candidate at the Theatre Academy of the University of the Arts Helsinki since 2017 and is currently working as a lecturer in ecological sustainability at the University of the Arts Helsinki.

**Orla Mc Hardy** is an artist and educator. Her work has been exhibited and screened internationally. Working through expanded animation, video, text, documentary, collage, sculptural installation, and within a tradition of feminism(s), her current work examines where value is placed (and not placed) on the hidden time of care, love and labor.

**Ville Aslak Raasakka** (1977– ) is a Helsinki-based Finnish composer specializing in ecology. His recent *12 compositions* (2016–2023) investigate coal, oil, and wood in specific ecological cases in Finland and abroad. His practice involves making field recordings, orchestral and chamber music, electronic music, and installations. His works are performed by the Klangforum Wien (Vienna), der/gelbe/klang (Munich), Mise-en Ensemble (New York) and Dal Niente (Chicago). His orchestral work gained a recommendation at the Unesco International Rostrum of Composers in 2019. Raasakka is researching ecology and music at the Sibelius Academy, where he also teaches composition and works in the ecological steering group. His music is published by Universal Edition (Wien, London, New York) and Donemus Publishing (The Hague).

**Johanna Sulalampi** is an audiovisual artist based in Southern Finland. Her main artistic skills are in electroacoustic music based

on field recordings and experimental usage of traditional instruments. In the recent years she has merged sound with moving image, performance, ceramics and new technologies. She has also directed her work towards creating space for non-human actors and expanding the use of technologies in sound art. Her artistic work with sound is inspired by the voice of the inaudible and imaginative creatures, collages that are revealed from sound masks, changes in the sound through bodies and spaces, multichannel sound systems, synesthesia and psychoacoustic experiences. Her latest works from 2022 include a commissioned media composition for the Danish ensemble K!ART and an ambisonic electronic composition that was performed at the ORF Musikprotokoll festival, IEM Cube, and the Finnish National Opera's Opera Beyond conference.

**Lauri Lähteenmäki** (1992–) is a Helsinki-based artist and environmental expert. His photography-based artistic practice draws from Environmental Science and Policy, in which he has a Master's degree (University of Helsinki, 2020). A graduate of the Academy of Fine Arts (MFA, Uniarts Helsinki, 2022), he works as a coordinator of the Ecological Sustainability Program of the Creative Sector in Finland at Uniarts Helsinki and in the university's ecological steering group. His current artistic project develops interdisciplinary landscape photography methods for environmental research of forests in Finland. His recent photobook, *Vihreän kullan kuume: Raportti Suomen metsien tilasta (Green Gold Fever: Report about the state of forests in Finland)*, compared political discourses of forest utilization to the ground reality of extensive industrial forestry. His previous solo exhibition *Suomaa (Bogland)* (Exhibition Laboratory Project Room, Helsinki, 2022), addressed the history of peatland eradication as a national project. <https://cargocollective.com/lahteenmaki>

**Heini Nieminen** is currently a doctoral candidate at the Academy of Fine Arts, University of the Arts Helsinki who lives and works in Kotka, Finland. Her background is in sculpture and environmental art. Nieminen's artistic research focuses on the artification of knowledge, how knowledge translates into art and how it is conveyed as art from an ecological perspective. She often addresses these themes as outdoor temporary installations. Her motives come from the need to bring attention to humankind's exploitation of nature, to global consumer culture, and to the disengagement of humans from their natural environment. Nieminen also works actively as part of an artist duo Elin&Keino with Sandra Nyberg, in the field of environmental art. Nieminen's and Elin&Keino's works have been exhibited nationally and internationally in outdoor exhibitions and events such as Land Art Mongolia, Andorra Land'Art21, Sculpture by the Sea Bondi, Eldorado, Lille3000, OpenART, and Headland Sculpture on the Gulf. <https://www.heininieminen.com/>

**Qiong Zhang** is a poet and a performance artist based in Helsinki, Finland. She has been a doctoral candidate at the Theatre Academy of University of the Arts Helsinki since 2021. Her practice plays with daily narratives and bodily behaviors in various social-cultural contexts to reveal hidden political problems. Her current research investigates corporeality and invisibility in relation to the human illusory perception of technological surveillance in everyday life. She also works as one half of the artist duo Hijack打劫 with Jing Xie since 2016. She has been awarded Performing Arts in the Digital Age Fellowship from Goethe-Institut (Germany, 2019), Weiming Poetry Prize (China, 2010), and commission artist of CT20 (UK, 2021), Hop Projects (UK, 2020), EMBASSY Gallery (UK, 2019). Zhang holds an MA in Performance Research from the University of Bristol (2014) and a BA in Chinese Literature from Peking University (2010).

**Leena Kela** is a performance artist, a doctoral candidate at the Academy of Fine Arts of the University of the Arts Helsinki, a founder and an artistic director of the New Performance Turku Biennale, and a director of the Saari Residence maintained by Kone Foundation. In her artistic works and research, she explores the dialogue between corporeality and materiality in performance art. She makes performances that play with and twist our relationship with everyday objects, perceptions, and phenomena. Her recent video and performance projects deal with questions of the post-human era, destruction, deep time, and resting. She works in active collaboration with artists Heini Aho and Eero Yli-Vakkuri in their project *Institute for Coping With Destruction*. Over the past twenty years, Leena has presented her performances internationally in performance art festivals, events, and exhibitions in every continent except Antarctica. [www.leenakela.com](http://www.leenakela.com)



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A scanned image of thin section from the migmatite *Mäntsälän punainen* in cross polarised transmitted light. Image courtesy of the author, Frank Brümmel, and produced under the guidance of doctoral researcher Nikolaos Karampelas at the Department of Geosciences and Geography at the University of Helsinki.

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How do we sense our surroundings? How does artistic research foster novel environmental sensibilities? This book gathers essays on artistic methods and ecological thinking developed as part of the Environment, Data, and Contamination research studio at the Academy of Fine Arts Helsinki. Led by Samir Bhowmik (University of the Arts, Helsinki) and Jussi Parikka (Aarhus University, Denmark), the studio explored alternative ways of engaging with “data” as materialized in specific landscapes and elemental media.

Contributors: Frank Brümmel, Saara Hannula, Leena Kela, Lauri Lähteenmäki, Orla Mc Hardy, Heini Nieminen, Ville Aslak Raasakka, Johanna Sulalampi, Bruno Caldas Vianna, and Qiong Zhang.

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