



Fungi and Others

Towards the Symbiocene

Academy of Fine Arts and Design in Katowice

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Introduction: **Fungi and Others.** **Towards the Symbiocene**

Fungi and Others: Towards the Symbiocene has grown from the long-standing and increasingly closer collaboration of two major academic institutions based in Katowice: the Academy of Fine Arts and Design and the University of Silesia. Expanding and branching off for many years now, the dense and ever thickening network of relationships, meetings and shared cognitive practices has fostered a symbiotic community of artists and researchers in the semblance of the mycelium, which spreads on and on and connects seemingly remote species. Recently, the scholars involved have focused on rivers, particularly on the Rawa,¹ with their commitment resulting in the inception of the regional Festival of the Rawa River. They have also investigated former mining areas and the region's coal-mining heritage,² inspected locality, spoil heaps and *dzikaria*³ and explored plants, along with the ways we talk of them (see *Phytoglossias*, 2025).

- 1 Recently, local rivers have been having their voice and agency restored to them. The Rawa, Katowice's river-no-river, is one such symbolic river of the Anthropocene. It was the axis of an interdisciplinary course at the Academy of Fine Arts and Design in Katowice and an exhibition titled *Temat: Rzeka. Rawa w ujęciu interdyscyplinarnym (On the Subject of Rivers: The Rawa from an Interdisciplinary Perspective)*, which was organised by the Academy, the Museum of Silesia and the GZM Metropolis and held at the former Museum of Silesia in Katowice, using field recordings, cartographic resources, performance and film, with students and lecturers of Creative Writing at the University of Silesia composing poems on and for the Rawa; see Olszański (2022). See also *PrzepRawa* (Olszański, 2022a), a unique collection of poetry, prose and photography available in book form and online; on the Rawa, see also Kowalczyk et al. (2022). For designs developed by the Akademia Interpretacji Dziedzictwa Antropocenu (Academy of Anthropocenic Heritage Interpretation), see Puzio et al. (n.d.).
- 2 The theme was comprehensively addressed by *Podziemia. Subterra incognita (Underground: Subterra incognita)*, an exhibition staged as part of the Coal Zone module of the 6th Silesian Science Festival Katowice in 2023. The show resulted from collaborative research on the spectre of the Carbocene and post-mining underground hollows launched by the Academy of Fine Arts and Design in Katowice and the University of Silesia in Katowice under the Laboratory of the Environmental Knowledge of the Region.
- 3 *Dzikarium* is a coinage proposed by poet and writer Michał Książek in his *Atlas dziur i szczelin (An atlas of holes and cracks)* (2023, pp. 150–151) to describe wasteland areas where nature thrives without human intervention. It might be rendered as *wildarium* in English.

Clearly, the Silesian universities feel the same urge to search for new paradigms of thinking of the more-than-human world. In such an environment, our book could organically sprout and find a welcoming home.

The volume is another node in this network of collaborations and at the same time expresses fascination with things inter- and cross-species, with coexistence, reciprocity, entwinement, exchange, pulsation, mycorrhiza, cooperation and the various effects that may ensue if the humanities and art embrace symbiosis. This pursuit is informed by the seminal work of two researchers: Lynn Margulis (1998), who introduced the image of the Earth as a symbiotic planet to modern science, and Glenn Albrecht (2019), who has developed the concept of the Symbiocene as an age in which humans realise that they are not the centre of the world, which is in fact founded on symbiosis, that is, cooperation-based relationships between species. Albrecht's concept is the shared underpinning of many ideas and actions depicted in this book. While these insights and projects build on the notion of the Symbiocene, they also venture beyond it as our explorations are aligned with engaged environmental scholarship and art, which, as Ewa Bińczyk (2018) observes, are dedicated to finding remedies to the malaise of the Anthropocene and its crisis of the imagination. What we wanted was not simply to construct positive, hope-sustaining narratives that optimistically envisioned naive 'solutions' to the crisis but to kindle what Rebecca Solnit (2004) called 'hope in the dark,' that is, the capacity to persist, coexist and find each other in difficult times, as well as the recognition that the problematic heritage of modernity needed to be seriously tackled, leading to practices of disentangling ourselves from the logic of human privilege (Rogowska-Stangret, 2024, p. 10).

The volume opens with Marta Wrzosek's 'Paving the Trail, Wandering Astray: 'Thinking with Mushrooms?' at the Intersection of Biology and the Humanities,' which sketches the models of human/nature relationships reimagined through the lens of fungi, mycorrhizal networks, ritual practices and contemplation of nature by contemporary humanities scholars, such as Anna Lowenhaupt Tsing, Long Litt Woon and Byung-Chul Han. As a biologist, Wrzosek highlights the interdisciplinarity of the notion of the Symbiocene, while also pointing out the similarities of and differences between humanistic metaphors and ecological realities. Piotr Skubała and Mark Williams rely on symbolic tales to portray the consequences of the Anthropocene in their 'A Fish, a Frog, a Fly and a Flower: The Impacts of Humans on Life in the Anthropocene.' The eponymous fish, frog, fly and flower deliver their first-person narratives, each of them picturing a different dimension of the ecological crisis. Glenn Albrecht, whose concept of the Symbiocene is featured in the title of our volume, outlines the major ideas that went into the making of his *Earth Emotions* (2019) in 'Transformation to the Symbiocene.' Albrecht marshals a range of notions, such as solastalgia, tierratrauma and climate grief, in order to capture the interconnection between the condition of the Earth and the mental and emotional states of individuals who inhabit it. In 'Between Things', Andrzej Marzec examines the work of Patrycja Orzechowska, who gathers and brings things together to coexist in the space of interobjectivity beyond human meanings and interests. Marzec argues that Orzechowska's art is a relevant contribution to the current philosophical and artistic debate on the ontological status of objects independent of human knowledge. This reflective interest in the status of non-human subjects is



shared by Konrad Fleszar, who takes the structure of the lichen as his starting point in 'Cohabitation Instead of Colonisation: Two Paths of Urban Design for Nonhuman Actors' and goes on to propose a post-anthropocentric design framework, in which the city is understood not as a hierarchy of forms subordinated to the human being but as a network of interdependent relationships. Having defined the redrawing of power relations and the extension of the community of life as two fundamental principles of post-anthropocentric design, Fleszar reflects on the possibilities to enhance the urban habitat capacity.

Inquiry into symbiotic cooperation models as a form of speculation on the future is the pivot of Marta Lisok's 'Strategies of Collaboration: A Work of Art as an Aggregate of Interspecies Activities. The Example of Adjacency.' Having curated *Adjacency* (Pol.: *Przyleganie*), an tribute exhibition of Richard Long's land art at Katowice's Rondo Art in 2024, Lisok analyses the show as a laboratory of metaphors based on the artworks that formed one entity during the event.

The following part of the book comprises a series of case studies by Michał Smandek, Mikołaj Szpaczyński, Justyna Mędrala, Anna Pohl and Hanna Sitarz-Pietrzak, artists affiliated to the Academy of Fine Arts and Design in Katowice. Stemming from art-based research and practice-based research, their contributions spark reflection on possible forms of human cohabitation with other components of the biosphere. Lisok's article on *Adjacency* is a fitting introduction to the texts by Smandek and Szpaczyński, who took part in the show. Inspired by the communication systems used by bees in the hive, Smandek launched *The Spirit of the Hive* sculpture project, which experiments with interspecies communication. His paper '*The Spirit of the Hive: Internal Organisational Structures of Bee Life* as

Inspiration for Artistic Reflection on Society's Re-embrace-ment of the Idea of Community' registers his observations of bees, examinations of the principles that structure the internal operations of the beehive and explorations of the possibility to rediscover the value of communal work. Szpaczyński, likewise involved in a long-term artistic project, has so far excavated twenty-four metres of a karst cave, with this number also serving as the title of his contribution. Working with the Earth and earth, he considers himself not so much an artist-maker as an 'assistant of nature,' which indicates abolishing the hierarchical distinctions between the human and the rest of the fauna and the flora.

Immersion in natural matter is also a form of co-being for Justyna Mędrala, who regards it as a symbiotic gesture toward the world in which the line between the animate and the inanimate is beginning to blur. In 'The Senses and Resistant Matter: The Artistic Process as Research in the Age of the Symbiocene,' Mędrala relates her own creative process as a form of research in which knowledge arises in direct contact with matter, from black coal to beeswax, soap, lava and haematite, to asphalt. Anna Pohl and Hanna Sitarz-Pietrzak, artists associated with the Design Faculty, look into alternative modes of academic institution management in their 'Prototyping New Collaboration Forms at the Academy of Fine Arts and Design in Katowice.' They employ the mycelium metaphor and reference the ecosystem organisation model in transposing selected mechanisms and relations onto an arts school.

The last part of the book revolves around education. Its opening 'En-rooted School: A Manifesto of Symbiotic Education' by Magdalena Ochwat and Anna Kopaczewska is an experiment in the pedagogical imagination and a proposal of an alternative to

the traditional way of thinking of education in the time of the Anthropocene crisis. They develop the metaphor of 'en-rooted' school, itself based on the metaphors of the natural forest, the mycelium and compost. Drawing on the frameworks propounded by Tsing, Albrecht, Timothy Morton, Donna Haraway and other thinkers, Ochwat and Kopaczewska weave a vision of symbiotic, multispecies education that is horizontal, decentralised and based on interdependence, gift and reciprocity. They conclude by offering the eponymous manifesto of symbiotic education, which is designed as an open-ended, mycelium-like list of desired developments and is expected to grow and spread as readers add their own points to it.

Małgorzata Wójcik-Dudek and Marek Oziewicz focus on children's literature, which they believe to be a fertile field of germinating ideas possessed of a considerable transformative potential. Wójcik-Dudek adopts the new humanities and 'pedagogy of earth' perspectives to reconsider elements of Hans Christian Andersen's fairy-tale world in 'How Are Things? A Report on Earth in Literature for a Young Readership.' Her non-anthropocentric approach to things, inspired by the theories of Haraway, Morton, Ewa Domańska and Bruno Latour, makes it possible to perceive the agency of matter and interdependence of humans and nonhumans. Combining literary analysis and eco-pedagogical thought, Wójcik-Dudek proposes reading fairy tales as a tool for fostering pro-ecological attitudes. In a similar manner, Oziewicz reads children's literature in terms of the possible eco-centric transformation. In his 'Hug Every Tree You See – And Be Hugged in Return: Thinking with Trees from Upton Sinclair's *The Gnomobile* to Brian Selznick's *Big Tree*,' Oziewicz examines representations of trees in contemporary children's literature to conclude that the writings characteristically grant subjectivity and attribute agency to trees.

The Research Project and the Joint Conference

In 2023, collaboration between the Academy and the University was given the formal framework of a research project accepted by the Ministry of Science and Higher Education under the Excellence in Research II programme (project No KONF/SP/0047/2023/01 GEologos II). A three-day transdisciplinary conference titled *Grzyby i inni (Mushrooms and Others)* held at the Academy in May 2025 was the project's first visible sporophore, to use the language of mycology (ASP Katowice, 2025). Discussing the issues of the environmental humanities, ecological pedagogy and engaged art in the era of the climate crisis, the participants talked of practices promoting the relational imagination.

The conference convened researchers from an array of disciplines in the humanities, social sciences, natural sciences and art studies. The symbiotic scholarly entwinements were braided by Glenn Albrecht, Sara Bańkowska, Ewa Bińczyk, Anna Bera, Aleksandra Derra, Joanna Godawa, Beata Gola, Magdalena Gościński, Anna Kałuża, Anna Kopaczewska, Wiktoria Koziół, Agnieszka Kozłowska, Ryszard Kulik, Magdalena Lazar, Marta Lisok, Ilona Majewska, Anna Majka, Zofia Małysa-Jancy, Justyna Mędrala, Renata Michalak, Alina Mitek-Dziemba, Magdalena Ochwat, Kinga Olesiejuk, Marek Oziewicz, Adam Pisarek, Anna Pohl, Dominika Ritszel, Hanna Sitarz-Pietrzak, Kaja Skubała, Piotr Skubała, Michał Smandek, Joanna Soćko, Mikołaj Szpaczyński, Agata Szymanek, Maria Waclawek, Sławomir Wawrzukowicz, Mark Williams, Małgorzata Wójcik-Dudek, Marta Wrzosek, and Wojciech Zarzycki. During the conference, an international panel on climate and environmental education inclusive of perspectives from the more-than-human world was held, with speakers from Czechia, Georgia, Germany, Romania, Slovenia and Sweden.

All the conference talks were recorded and stored on the conference website (<https://grzyby-i-inni.asp.katowice.pl/>) designed by Sitarz-Pietrzak. This volume is a material trace of only a fraction of the multi-voiced discussions, pre-conference walks, workshops with academic communities and field activities. As such, this book is the second visible sporophore of our collaborative project. Everyday practices of our academic mycelium remain hidden beneath the surface of the text, mainly encompassing teaching and research to which we have been dedicated over the last two years.

Symbiotic Practices: Art, Writing, the Field

In our pursuits accompanying the conference and this book, we combined artistic and humanistic approaches to explore together the Symbiocene not as an abstract concept but as a tool for artistic, scholarly and educational practices. We may call these engagements ‘accompanying pursuits,’ but they were in fact organically intertwined with the conference and the project as a whole.

Thus, at the Screen Printing Studio headed by Dorota Nowak-Rodzińska and Tomasz Bierkowski, students of the Academy produced visual interpretations of symbiotic relationships, drawing inspiration from the complexity of natural life. At the same time, students of Creative Writing attended Ochwat and Skubała’s course *Jak być ze świata? Humanistyka terenowa* (*How to be of the world: The field humanities*), in which they studied linguistic and narrative possibilities of rendering symbiosis and wrote short texts, such as dialogues and micro-tales, inspired by relations of ravens and wolves, fungi and algae in lichens, bees and dead wood, trees and mycorrhizas and corals and zooxanthellae.⁴

4 As one of its outcomes, the collaboration yielded a paper on ‘The Symbiocene in Artistic and Humanistic Practices’ by Nowak-Rodzińska and Ochwat (2025).

We have devoted special attention to the concept of the holobiont, that is, an organism defined as a community of multiple beings. Olga Tokarczuk insists that the latest discoveries in science prompt us to view humans and other organisms alike as meta-symbiotic systems of mutual dependences. ‘We are now not so much a biont as a holobiont,’ she writes in *Czuły narrator* (*The tender narrator*), emphasizing that interconnectedness, multiplicity and non-linearity transform modes of world perception (Tokarczuk, 2020, pp. 15–17).

We developed this perspective by reading texts by Albrecht, Haraway, Margulis and Robin Wall Kimmerer, as well as poetry by Julia Fiedorczuk and Forrest Gander, as part of classes for the Academy students taught by Ochwat and Wójcik-Dudek, who are Polish studies scholars. This was augmented by a research outing to the Murcki nature reserve, field activities along the Rawa River and meetings with natural scientists (e.g., Książek and Skubała). We studied both examples of symbiotic relationships and the places where they were ruptured. A very special position in our pursuits was taken by lichens (Wójcik-Dudek, Ochwat, & Skubała, 2024), delicate and at the same time extraordinarily tenacious organisms that embody deep cooperation between species.

Towards a Symbiotic Collective

The artistic and research project with this book as one of its sporophores is the first venture in Polish scholarship to explore the Symbiocene so comprehensively and consistently. Its relationality stems from the fact that it emerged in and through a methodological dialogue at the intersection of disciplines between two academic institutions. This naturally led to establishing a symbiotic collective – an interdisciplinary research-artistic

assemblage that combines the humanities, natural sciences and art⁵ with a view to developing together practices of reciprocity, attentiveness and cross-species collaboration. Therefore we believe that this volume is something more than just a collection of texts. We like to think of it as an invitation to think and act in a symbiotic manner for the future that belongs not just to humans but to the multispecies community of life.

Our warm thank you goes to Patrycja Poniatowska and Justyna Hanna Budzik, our symbiotic partners in this publication. We thank Patrycja Poniatowska for her translatory attentiveness, which made sure that the texts, regardless of their cross-species complexity and polyvocality, should have clarity, rhythm and tenderness for meanings. Her work was a precious practice of reading-together and writing-together, in which translation involved not only dealing with words but also taking part in symbiotic thinking. We are grateful to Justyna Hanna Budzik for her insightful and inspiring review offered in the spirit of dialogue and mutual listening, which helped us accurately and vividly convey the central ideas of this book.

On behalf of our more-than-human collective,

Marta Lisok

Magdalena Ochwat

Małgorzata Wójcik-Dudek

Zofia Małysa-Jarczy

5 The collective consists of Anna Kopaczewska, Dorota Nowak-Rodzińska, Hanna Sitarz-Pietrzak (all of the Academy of Fine Arts and Design in Katowice), Magdalena Ochwat, Piotr Skubała and Małgorzata Wójcik-Dudek (all of the University of Silesia in Katowice).

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Saffron milk cap (*Lactarius deliciosus*).
Photo by Karolina Niznik

Marta Wrzosek [University of Warsaw]

Paving the Trail, Wandering Astray: *Thinking with Mushrooms?* at the Intersection of Biology and the Humanities

The second decade of the 21st century brought with it a realisation that reflects a widespread sentiment across many societies, from Asia to North America; namely, we are profoundly tired as individuals and societies (Han, 2015; 2022). Anna Lowenhaupt Tsing (2015; 2024) observes that uncertainty about the future has become a defining experience for those who enter adulthood in the 21st century. For her part, Long Litt Woon (2019) offers a form of guidance, suggesting that immersion in nature and attentiveness to the rhythms of the wild can provide an escape from the despair that often follows experiences of loss and emptiness. In a world increasingly dominated by acceleration and progress, such despair is no longer alleviated by ritual (Han, 2024).

These authors offer readers a perspective that runs counter to the dominant Western ideals as they advise relinquishing linear pursuits and tempering excessive ambition. Instead, they invite us to immerse ourselves in a world of shifting interactions – to find grounding in nature, embrace unpredictability and re-discover the joy of chance encounters and the quiet power of ritual repetition. Anthropologists Tsing and Long turn to mushrooms and mushrooming as metaphors for an alternative way of life – one largely unfamiliar in Western Europe and North America – marked not by a predetermined path but by openness to the unknown. In *The Mushroom at the End of the World*, Tsing introduces the concept of assemblages as formations that

emerge from breakdown and disruption, bringing together disparate elements of nature, much like the mycelium binds together particles of soil. Though these thinkers write within the context of Western academia, their intellectual roots are entwined with Asian cultural traditions: Han, born in South Korea, is known as a German philosopher and culture theorist; Tsing is an American anthropologist of Chinese descent who has also conducted extensive work in Europe; and Long, a Norwegian anthropologist, was born in Malaysia. For a European-trained mycologist, engaging with their work may at first seem challenging, marked as it is by a fluidity of thought and method that defies the rigid frameworks of conventional scientific discourse. Yet it is precisely this openness that offers fertile ground for reimagining how we relate to life, nature and one another. By contrast, Han's language is precise and unambiguous, making it more accessible to scholars trained in the sciences, but he does not refer directly to mushroom picking as a way of restoring balance to people in crisis; rather, he encourages people to stop, especially in the context of getting closer to nature. Some language issues, combined with a certain conceptual restraint, also mirror the European reception of Confucianism. To Westerners, Confucianism often appears as a complex amalgam of religious ideas, social and economic theory and moral-ethical guidance, which are difficult to fuse into a unified philosophical system. Yet for many people of Asian descent, these seemingly disparate elements form a coherent, dynamic and lived worldview. In the works of Han, Long and Tsing, the influence of Confucianism is particularly evident in their emphasis on community and ritual, cultural forces that are portrayed as capable of restoring balance in times of the crisis of self-exploitation (Han, 2015). This sensibility resonates

with the concept of the Symbiocene, which was proposed by Glenn Albrecht (2019) as a vision for a future grounded in interdependence and ecological harmony. The Symbiocene is a neologism and a conceptual framework that denotes a future epoch founded on mutually beneficial relationships between human societies and the more-than-human world. Emerging as both a critique of and a response to the Anthropocene as the geologic epoch defined by an anthropogenic disruption of Earth systems, the Symbiocene calls for a radical reorientation of ecological ethics and for systemic change across disciplines, economies and modes of inhabiting the world, based on regenerative design (including biomimicry and permaculture). This paradigm is not only ecological in the scientific sense but also emotional, cultural and philosophical.

It is possible that what Han refers to as the 'burnout society,' which is weakened by its rush for success and the pressure to achieve measurable and increasingly sophisticated results, has only two options: either it drowns in the whirlwind of issues and challenges, or it stops to listen to the voice of the prominent personages cited above, halts in the race to a dream goal that is constantly moving away, pauses and looks around. In fact, similar voices sometimes come from European culture as well. These are perfectly exemplified by Polish graphic designer and writer Marcin Wicha's (2025) melancholic story of Kamionek, the least picturesque part of the Vistula's right bank in Warsaw:

Certainly, Grochology and Kamionkography¹ have some practical applications, but they can't demonstrate them very well. When asked, they will answer vaguely that everything can be useful, everything is interesting, and they are all

1 Kamionek and Grochów are neighbourhoods in Warsaw (Poland).

connected and form a great mycelium. The latter remark will be a nod to modern notions about the social bonds of plants – the deep understanding of creatures that communicate in ways that are impenetrable to us.

(Wicha, 2025, p. 9; translation mine)

Undoubtedly, European readers are, as it were, already prepared for the topic, through Wicha's 'notions about the social bonds of plants,' a phrase that indirectly references recent book releases, particularly Merlin Sheldrake's *Entangled Life* (2020; Pol. ed., 2023). One idea often mentioned in the media is the wood wide web, a concept understood broadly and incorrectly as an equivalent of the nervous system of a forest. The conception was introduced by Suzanne Simard, a Canadian forest ecologist and professor at the University of British Columbia (Simard et al., 1997), yet the term itself was not coined by Simard, but was popularised by science writers and journalists, most notably by Nic Fleming in an article for BBC *Earth* and a short film available on-line (Fleming, 2015), which helped bring Simard's research to public attention. Simard, as the lead author of the paper, pioneered research demonstrating that trees and plants are connected underground by networks of mycelium, forming mycorrhiza in contact areas, and studied the topology of such networks with her team (Beiler et al., 2010). The authors showed that fungal networks can help plants exchange water, nutrients and signals. Simard (2017) and her team also tested the hypothesis that mother trees could nurture seedlings by transferring carbon and other resources. Importantly, Justine Karst and her colleagues considered some of Simard's claims to be exaggerated and her results to have been misinterpreted (Karst et al., 2023). Despite the rather heated discussions on the

significance of mycelial networks in the ecosystem, the concept of a network connecting its elements has become a breeding ground for the humanities, drawing attention to the importance of symbiosis and its implications.

In this essay, I will focus on selected issues raised by humanities scholars and examine them from a biological perspective. My aim is to establish a naturalist foundation – a grounded point of reference from which one can safely explore cultural interpretations while avoiding the pitfalls of exaggeration and misapplied metaphors. As a starting point, I will briefly comment on several statements from Tsing's book *The Mushroom at the End of the World*.

- 1. 'Assemblages are open-ended gatherings. They allow us to ask about communal effects without assuming them. (...) Assemblages don't just gather lifeways; they make them. Thinking through assemblage urges us to ask: How do gatherings sometimes become 'happenings,' that is, greater than the sum of their parts?'** (Tsing, 2015, pp. 22–23)

Ad 1. 'Assemblage' refers to thinking of the world as a dynamic collection of interdependent elements – humans, other living organisms, things and processes – that do not form a harmonious whole, but are able to coexist despite diversity, discontinuity and the lack of central control. Tsing invokes the notion of assemblage, which is a more extensive and less concrete equivalent of biocenosis and biotope to a biologist, and emphasises that the cross-linking of an assemblage is unguided and unintentional. It just happens. An assemblage in Tsing's work is like a patchwork quilt of old and new patches, mending and replenishing, encompassing inanimate nature, human-made

items and animate nature, including human groups. Tsing identifies several characteristics of assemblages, which are temporality, heterogeneity, relationality and the lack of centre. It is no coincidence that mushrooms are the model of assemblage. All the features of assemblages can also be attributed to fungi. The mycelium can link different plants under the ground, is often genetically heterogenic, and mycorrhiza (the connection between plant roots and fungi) changes in time, even within one season. What is not familiar about this concept to some biologists is, in the first place, the full inclusion of humans and their creations in assemblages. In nature studies, biocenoses are often analysed from the human point of view, but without human participation. Tsing studies an assemblage by being part of it. The closest scientific analogies can be found in works in the field of urban ecology that examine the impact of anthropogenic pressure on nature and, albeit to a lesser extent, the impact of nature on humans (Forman, 2014). Another constraint lies in the fact that functions, activities, groups and things are combined in an assemblage. Scientists rather divide entities into categories and look for functions between them. There are various approaches to studying such connections. In modern ecology, researchers use network analysis to examine relationships within communities and ecosystems. This approach was pioneered by Charles Elton's research on food webs (1927), developed by Robert Paine (1966; 1969) with the idea of keystone species and further expanded in recent decades by teams led by Joel Cohen (1990; 2004), Neo Martinez (2006), Jennifer Dunne (2002) and Jordi Bascompte (2009). Bascompte (2003) advanced the study of mutualistic networks, such as plant-pollinator systems. Field observations and experiments are transformed into a matrix and enriched by literature-based

data mining and global databases (e.g. GloBI). The data are analysed using graph theory tools, where species are represented as nodes and interactions as edges (directed or undirected, binary or weighted). Such analysis leads to the calculation of several metrics (connectance, modularity, nestedness and centrality). This network-based approach helps reveal the structure, stability and key species in ecological systems. It is important to emphasise that the assemblage described by Tsing can involve key species beyond matsutake, pine trees or humans.

2. 'Neither tales of progress nor of ruin tell us how to think about collaborative survival. It is time to pay attention to mushroom picking. Not that this will save us – but it might open our imaginations.' (Tsing 2015, p. 19)

Ad 2. Tsing confronts the myth of progress – the expectation of 'even better outcomes' – with the decision to focus on the here and now. What Tsing proposes, and what many humanists repeat like an echo, is 'thinking with mushrooms.' To a biologist, this usually means shutting down the willingness to engage in dialogue because mushrooms do not think as they have no intelligence, while they optimise, just like other organisms do. In their quest for clarity, exact and natural scientists often close off the possibility of dialogue with humanities scholars. However, we should not abandon attempts to find analogous terms and draw on the achievements of other disciplines. Biologists can accept the term 'thinking with mushrooms' as 'acting as fungi.' Tsing (2015) calls for a radical transformation of the way we make sense of the world and for embracing an understanding that takes into account nonhuman entities, relationality and interdependence, which is especially important in view of

the increasing uncertainty of the Anthropocene. Marc-André Selosse speaks in a similar vein in his book *Jamais seul* (2017). Selosse argues that our identity, health and culture of societies are produced by and in non-autonomous, interspecies cooperation. Instead of isolation, symbiosis is the foundation, and our view of biology and evolutionary history should be revised. As the idea that we – human bodies – are ecosystems, rather than individuals, infiltrates the world of culture and politics, we can and should redirect our activities toward solutions that favour inclusive systems of living organisms, rather than only human beings. Palmer et al. (2008), who studied mutualistic relationships in the savanna, concluded that we should protect processes and relationships instead of species and individuals. Tsing uses a different narrative to call for the same thing.

3. *'(...) disturbance-based ecologies in which many species sometimes live together without either harmony or conquest'* (Tsing, 2015, p. 5; italics original).

Ad 3. In her book *The Mushroom at the End of the World*, Tsing introduces us to the camp of *Tricholoma matsutake* collectors. The fungus, a prized East Asian delicacy, is harvested in the forests of Oregon and then passes through a chain of intermediaries to find its way to exquisite parties in Japan, a country where it has become far rarer but remains in high demand. Tsing weaves an analogy between what happens in the camp of mushroom pickers and elements of fungus biology. She acknowledges the adverse phenomena generated by the coexistence of ethnically different groups of pickers but considers them part of the game and compares them to fungus-plant interaction.

Interestingly, she argues that over the course of four years of her fieldwork with gatherers, there was no competitive exclusion of traders, which corresponds to the findings of Maynard and colleagues' (2017) ecological work on diversity sustaining diversity. The authors demonstrated that in a diverse biocenosis with many relationships, there is no competitive exclusion, which is the rule in poor biocenoses.

4. As Tsing (2015) suggests, matsutake mushrooms are a new gift that emerges from blasted landscapes that humans have disrupted but that still generate value through multispecies collaboration. These mushrooms thrive in forests degraded by industrial logging and human disturbance, turning ruins into places of unexpected economic and ecological significance.

Ad 4. Tsing describes the world of pine mushrooms living in mycorrhizae with pine trees that grow on degraded land. She shows how degraded habitats can become useful again if mushroom pickers and distributors appear. Her perspective is new although the traditions on which she draws are very old. Tsing is an anthropologist who inventories the resurgent assemblage just as a biologist inventories pioneer organisms in a spoil heap. Regrettably, her book contains some inconsistencies. Having consulted silviculture specialists, Tsing indicates which uses are most sustainable, yet in doing this she regards parasites as something inferior to edible fungi. This results in a construct that aspires to encompass the entire assemblage but is in fact averse to some of its elements that humans do not consider desirable in the environment. Biologists may have reservations regarding this because they know that a tree-decomposing

parasite is as much an element of the biocenosis as an organism entering the mycorrhiza and that, in an evolutionary perspective, it is as necessary as a mutualist. Moreover, some mycorrhizal fungi that are non-edible for humans might be better mycorrhizal partners for pines than matsutake.

Tsing rebuffs the critique that she is trying to find positives in the ruined natural world. Rather, she tries to point out that long-standing changes in forest management have given insight into how ruins can be restored to quality. Ruins will not turn into a paradise, but they will be functional and increasingly species-rich, and if we can grasp their potential for change, so much the better for us.

Although Tsing does not refer to Han in *Mushroom*, his insights in *The Burnout Society* (2015) and *The Spirit of Hope* (2024) dovetail with her analysis. Han aptly describes the condition of neoliberal societies. He depicts selfish and continually self-improving individuals who, freed from external obligations and left to their own devices, impose on themselves the harshest discipline, leading to breakdown and hopelessness akin to that of death camp prisoners (Frankl, 2025). Han adds that humanity can only be fully accomplished through contemplative life. *Via contemplativa* leads through learning to look, think and write/speak. 'To learn to see' means, according to Friedrich Nietzsche in *Götzen-Dämmerung*, 'to accustom the eye to stillness, to patience, and to allow things to come up to it' (Nietzsche, 1911, p. 57, qtd. in Han, 2022, p. 43). Mushrooming might be the first lesson in such looking. As Long herself muses, recollecting the process that culminated in the writing of her book:

*All your senses are pulled into identifying this single mushroom
(...) I had become almost numb after Eiolf died, as if I were*

walking around in a fog and people were speaking to me from a great distance. But finding and correctly identifying my first edible mushroom ... It was like being given an intravenous shot of multivitamins. As I wrote in the book, 'All at once a slender, golden beam of light pierced my soul.' (Fernandez, 2020)

Seeking pathways for dialogue between the humanities scholars and the natural scientists who deal with public health in the context of ecosystem sustainability is an urgent matter today. It is no coincidence that the Dr. Forest project was implemented under the European Biodiversa programme (Dr. Forest, n.d.). As part of this initiative, a European research group examined the practice of mushroom foraging as a factor influencing human health even if primarily in the context of food acquisition, rather than as a shift in lifestyle and life paradigms. Perhaps future interdisciplinary research should pursue this direction and explore this ecological dimension.

Given that the mental health crisis affects large populations in neoliberal societies, as described by Han (2015; 2024), engaging with nature through mushroom foraging may be an effective form of therapy. It can restore the sense of rootedness in the natural world, and the quiet of a slow hike combined with the hopeful anticipation of discovering fungi offers a childlike experience, like learning to walk, that helps alleviate generational anxieties. Such experiences remind us that the transition from the Anthropocene to the Symbiocene ultimately depends on our mindset. However, replacing anthropocentrism with matsutake-centrism is not yet revolutionary because while it does adopt a nonhuman perspective, it still fails to reach out beyond a single species.

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Figure 1. A young boy stands beside me. Photo of the Goliath Grouper (*Epinephelus lanceolatus*). Courtesy of the Florida Keys History Center/Monroe County Public Library



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A Fish, a Frog, a Fly and a Flower: The Impacts of Humans on Life in the Anthropocene

We have entered an epoch in which humans have become a geological force. The Anthropocene, a term popularised by Paul Crutzen and Eugene Stoermer, describes a state in which human activity has had such a profound impact on the planet that it will leave indelible marks in the geological record, from deposits of plastic and concrete to changes in atmospheric composition and biogeochemical cycles (Crutzen & Stoermer, 2000). However, this shift is relevant not only to the geological sciences; it also poses a challenge to biology, sociology and economics, as well as to ethics and philosophy.

In the face of this crisis, the concept of planetary boundaries, a framework developed by Johan Rockström, Will Steffen, and colleagues, identifying nine processes that regulate the stability of the Earth system (Rockström et al., 2009), becomes particularly significant. These boundaries made the Earth a hospitable home for human civilisation throughout the 11,700 years of the Holocene. However, according to recent studies, seven of the nine boundaries have already been crossed, including climate change, loss of biosphere integrity, disruption of nitrogen and phosphorus cycles, depletion of freshwater resources, ocean acidification, land-use changes and chemical pollution (Findlay et al., 2025; Richardson et al., 2023). In practice, this means that we are living outside the safe ecological zone,

and our continued actions may lead to abrupt and irreversible changes in the Earth system.

In this context, the need for a new narrative that goes beyond the traditional understanding of ‘environmental protection’ is becoming increasingly clear. Classical environmentalism was based on defending nature as something external to humans. Contemporary challenges, however, demand a ‘new environmentalism,’ an approach that views humans as part of the ecosystem and emphasises care, shared responsibility and ecological justice. Edward O. Wilson used the term ‘new environmentalism’ to describe a revolution in thinking about biological conservation. Its aim is to develop new ways of benefiting from nature without destroying it. What we lack is prudence and wisdom in our use of nature (Wilson, 1999). In his ‘Half-Earth’ vision, Wilson argued that protecting half of the planet’s surface in order to sustain the biosphere is not a luxury, but a condition for the survival of our own species (Wilson, 2017). Similarly, Kate Raworth emphasises in *Doughnut Economics* that we need to redefine the economy so that it operates within the planetary boundaries while ensuring social justice (Raworth, 2017).

Thus, the goal is not merely for ‘nature to survive,’ but also for the community of life – from fish and frogs to flies and flowers – to continue to exist in balance. The four organisms symbolically referenced in the title of our article represent different aspects of the web of life: aquatic ecosystems, wetlands, insects as pollinators and population controllers and plants as the foundation of photosynthetic biomass production. The loss of any of these elements triggers a cascade of consequences for others, reminding us of Barry Commoner’s observation that: ‘Everything is connected to everything else’ (Commoner, 1971, p. 16).

In our article, we attempt to move away from the cold and sometimes detached language of science in order to tell the story of the climate and environmental crisis in a more evocative and engaging way. We adopt the perspectives of a fish, a frog, a fly and a flower, beings that become the narrators of their own fates in the Anthropocene. In doing so, we follow the path suggested by Naomi Oreskes and Erik M. Conway in their book *The Collapse of Western Civilization: A View from the Future* (Oreskes & Conway, 2017). These authors, as scholars, chose the form of fiction because they recognised the insufficiency of the traditional language of science in the face of the scale of the crisis and its failure to reach a wide audience. The fictional perspective of a historian from the future enabled them to portray the ‘Penumbral Age’ and the ‘Great Collapse’ in a vivid and moving way, while remaining firmly grounded in robust data. By taking a similar approach, we seek to give scientific facts a deeper emotional dimension in order to better connect with readers. We believe that breaking through the rigidity of scientific discourse and opening up to literary forms of narration can serve as an effective strategy of communication in addressing the challenges posed by the Anthropocene.

Goliath: A Story of Fish in the Anthropocene Oceans

I am Goliath, a majestic shallow seawater fish called a grouper that can grow up to 2.5 metres in length, weigh over 300 kilograms and live for several decades. I ply my trade in the warm waters of the Atlantic seaboard, and my ancestors have left their fossils in South America (Aguilera & De Aguilera, 2004), which show that I have lived here for many million years and certainly long before your human ancestors emerged in Africa. Indeed, I might look quite primeval to you, with my

large mouth and many rows of teeth. You may know me from fishermen's tales of a giant fish caught off the coast of Florida and of my fearlessness to human scuba divers. But I am no threat to you. I am a slow-moving animal, my bite is weak, and I mostly feed on crabs, fish and shrimps. Sometimes I eat the invasive lion fish that humans have introduced into the Caribbean, and so help to restore order to the local ecology (Polansky et al., 2025). Besides, my digging activity on reefs might encourage places for other animals to live (Koenig et al., 2019).

Unfortunately, I have been fished to near extinction in many parts of the Atlantic, prized for my great size and my flesh. I sometimes appear in trophy photographs, hung by my neck, dwarfing the humans next to me (Figure 1). Trophy fishing has had a major impact on me and many other fish. In west Florida, overfishing diminished the average size of trophy fish from over 90 cm in the 1950s to just over 40 cm by the early 21st century (McClenachan, 2007, p. 639). I have become very rare in the waters of the Caribbean and coastal Brazil, and I have almost disappeared along the African coast from Senegal to the Congo (Koenig et al., 2019).

But fishing is not the only human threat to my existence. When I am young, I live in mangroves for the first few years of my life. The protruding roots of these trees provide areas where I can hide and find food. But these coastal forests are also threatened by humans. In Florida, large areas of the mangroves have been lost, and in the Indian River Lagoon on the eastern side of that Peninsula the mangroves have been diked off from the sea to reduce mosquito breeding (Koenig et al., 2019). With the rise of coastal pollution and algal blooms, which are also harmful to fish, this has greatly reduced the range of places I can live (Koenig et al., 2019). I also sometimes find levels of mercury in

my body that are dangerous to me, my offspring and the people who might eat me.

My kith and kin make up over 160 species of groupers that live in the seas from Australia to the Caribbean. We are an ancient group of fish whose origins go back to the Eocene (more than 34 million years ago; Ma et al., 2016), and we are a snapshot of the wider impacts of humans on the ocean biosphere and fish. The habitats of groupers globally are threatened by overfishing, pollution and loss of mangroves. Fishing for grouper has increased several-fold since the 1950s, with hundreds of thousands of tonnes of our flesh taken each year, and many of us now endangered (Koenig et al., 2019). Sometimes even juveniles are targeted because they are small enough to fit on a plate in a restaurant (Sadovy de Mitchesen et al., 2020).

Humans have devised so many different ways to catch seafood that tens of millions of tonnes are extracted from the oceans every year, by net, pole and line, dredge and trawl, and from the deep ocean to the shallows. Hunted fish catches had grown rapidly since the mid-20th century, then peaked in the 1990s and have remained stable since. Despite that, many fish, such as groupers, are over-hunted, with one-third of all fish stocks deemed unsustainable (Ritchie & Roser, 2021). The fish that are slow to grow and reach maturity are particularly susceptible, as exemplified by the sharks, whose noble history spans more than 400 million years but which are hunted for their meat, fins, skin, liver, oil and even teeth (Dulvy et al., 2017). Sharks also include freshwater species that are susceptible to extinction. More recently, increased demand for seafood has been met by farmed sources (Ritchie, 2019). Farmed fish are often contained in pens or cages, with their pathogens and parasites spreading in the proximity. When such fish escape into local ecologies,

they may damage fish populations by disseminating parasites and pathogens or by competing with the native fish for limited resources (Atalah & Sanchez-Jerez, 2020).

I began this story from my perspective as a Goliath Grouper. I am a predator, and I need to eat. And I understand that humans must eat too. The livelihoods of millions of humans depend on fishing, and hundreds of millions more depend on fish protein in their diets (Ritchie & Moser, 2021), especially those in economically disadvantaged regions of the Earth (Dulvy et al., 2017). But I would ask you to contemplate your impacts on the oceans. There were reasons to believe you were once doing that for my own species, the Goliath Grouper, which was hunted to near extinction in the coastal waters of North America. Legislation protected me in the 1990s, and helped my numbers begin to recover, but cold-water events and red tides (resulting from coastal pollution) curtailed this recovery. More recently, some fishing of Goliath Groupers has been allowed in Florida's waters, rolling back on earlier legislation (Coleman et al., 2023). Elsewhere there has been more progress, with about 7% of the global oceans declared Marine Protected Areas. But you must do much more because more than 50% of the world's marine eco-regions still have less than 1% of their area protected (Laffoley et al., 2019). If I am to swim by you and impress you with my might for many generations to come, now is the time to intervene and protect me and the huge biodiversity of our oceans as a whole.

The Silence of the Frogs in the Anthropocene

My name is Silas and, like most frogs, I made a gentle croaking sound to greet other frogs when I was alive. Now, I am a very special kind of frog, pickled in alcohol and preserved in a museum jar, and I will not live again (Figure 2). While that is sad

for me as an individual, no brother or sister of mine walks this Earth because I am an extinct species. I was only described by science in 1973 and given the name of *Rheobatrachus silus*, its second part referring to my blunt snout (Liem, 1973). I was probably extinct in the wild less than a decade later. I was a remarkable frog who could hold my breath under water for hours and swim both forwards and backwards. Yet my most remarkable feature was the way I bore children, with the clue given by my common name – the southern gastric brooding frog. That's right, the females of my species swallowed the fertilised eggs, and these hatched into tadpoles in their mum's gut, before re-emerging back into the world through her mouth as tiny froglets (Tyler & Carter, 1981; Fanning & Tyler, 1982).

My native geographical range was probably always quite small. I am not like a cockroach or a rat, capable of living in so many different settings. My home was southeast Queensland in Australia, and I always liked to be very close to water, perhaps hiding under rocks or in damp leaf litter. Why did I go extinct? My habitat changed, the forests where I lived were cut down, and it is possible that a lethal fungal disease called chytridiomycosis was introduced. This disease has proven to be lethal to amphibians worldwide, causing lesions and excessive shedding of our permeable skin and disrupting breathing, osmoregulation, hydration and body temperature (Van Rooij et al., 2015). Only a few places where amphibians live are still free of this terrible disease, but that does include the very diverse frog populations of the large tropical island of New Guinea in the southwest Pacific (Bower et al., 2019).

Scientists have tried to de-extinct me, and this attempt was widely reported in the media across the world in 2013. But for such efforts to succeed, the habitats I once occupied would need

Figure 2. There I am, pickled upside down in a museum jar. Specimen D54462, the Southern Gastric Brooding Frog, spirit specimen. Copyright Museums Victoria



to be restored, and that problem of chytridiomycosis solved. I wonder if it might be more important for humans to focus on the living. A recent global report that examined over 8,000 species of amphibians showed that over 40% of these were threatened, making us one of the animal groups at the highest risk of extinction, with perhaps more than 200 species lost in the past 150 years (Luedtke et al., 2023). As forests are cut down and agriculture spreads, our habitats are diminished. Combined with the effects of disease and climate change, this means that our numbers are decreasing.

Sometimes the speed at which we disappear is very disturbing. The Jambato Harlequin frog (*Atelopus ignescens*) used to be very numerous in the Ecuadorian Andes, with as many as 50 individuals per one square metre found there as recently as the early 1980s. Thereafter, the arrival of chytridiomycosis decimated their populations. By 1989, not a single Jambato Harlequin frog could be found (James et al., 2022), and the species was presumed to be extinct. Fortunately, a few populations of these frogs did survive to be rediscovered nearly three decades later, along with several other species also thought to be extinct.

Other frogs have not been so lucky. The white-nosed shrub frog (*Philautus leucorhinus*) of Sri Lanka seems to be truly extinct. It is only known from a single 'pickled' female specimen in the collections of the Zoological Museum in Berlin, which was described in 1856. The white-nosed shrub frog may have lived in the Kandy area of Sri Lanka and probably succumbed to habitat loss, but otherwise little is known of its extinction. This beautiful frog is illustrated in a paper by Kelum Manamendra-Arachchi and Rohan Pethiyagoda (2005). Their poignant images show her left and right hands

as she seems to be reaching out to you and asking: 'What are you doing to this wonderful world of ours?'

So here I am, drifting upside down in my museum jar (Figure 2), an ignominious end for such a special kind of frog. I want to finish with a metaphorical story of the boiling frog, which you just might know. This story is often cited as a metaphor for the human response to climate change. The story goes that a frog thrown into a pan of boiling water will jump straight out and survive, but one placed in tepid water and slowly warmed to boiling point will quietly sit there and die. The story is silly of course; a frog thrown into boiling water will die, while frogs are very sensitive to their temperature and will move away from a place that is too warm. But it is a useful metaphor for humans in this Anthropocene epoch of major global change, where you risk damaging most of the biosphere before you even notice that this has happened.

An Apocalypse of Wings: The Story of a Fly about the Fate of Insects in the Anthropocene

My name is Anthia.¹ For most people, I am nothing more than an annoying companion at their meals, someone to be swatted away with a newspaper or a dishcloth. Yet it is I, an ordinary housefly, who would like to tell a story that is not simply about me and my family but about the entire world of insects, and thus also about your human world. The point is that if we disappear, you will not survive for long either.

Your decisions – clearing forests, sprawling cities, pollution and climate warming – have caused the diversity of life to decline at an alarming pace. Scientists more and more frequently speak of the 'sixth mass extinction' (Ceballos et al., 2015) and of 'biological annihilation' (Ceballos et al., 2017). Until recently, you

1 The name is derived from 'Anthropocene,' to emphasise its role as a witness to the age of humans.

thought this was a problem of large vertebrates, such as rhinos, elephants or tigers. Yet the true drama is unfolding right under your feet and outside your windows – in the world of insects. The data are relentless. In Germany, the biomass of flying insects in protected areas has dropped by more than 75% in 27 years, and by as much as 82% in summer (Hallmann et al., 2017). In the tropical forests of Puerto Rico, where temperatures have risen by 2°C over 35 years, the abundance of ground-dwelling insects has fallen by 98%, and of those inhabiting tree canopies by 78% (Lister & Garcia, 2018). Global analyses show that about 40% of insect species may disappear within the next few decades unless radical change takes place (Sánchez-Bayo & Wyckhuys, 2019). The biomass of insects worldwide is declining at the annual rate of 2.5%. This means that within ten years its volume will drop by one-quarter, in fifty years only half will remain, and within a century there will be no insects at all (Weston, 2025). These are not exaggerated numbers, but rather cautious estimates. In the UK alone, butterfly populations have declined by 77% since the 1970s, and all insects by 46% (Goulson, 2019). Data for thousands of species in Europe have shown declines of one-third within just a decade (Seibold et al., 2019). This is the silent Armageddon in my insect world, of which humans know far too little (Figure 3).

The reasons are many and well known. Intensive agriculture has transformed diverse landscapes into monotonous and hostile monocultures. Trees and shrubs once surrounding fields have vanished, along with shelters and food sources. The widely used pesticides not only kill so-called pests but also massively destroy populations of all insects, including pollinators and species essential for nutrient cycles (Dudley et al., 2017).

Climate change is proving yet another deadly blow. Sensitive tropical insects, living within narrow thermal tolerances, are disappearing at the fastest rate. Mountain species or those adapted to cooler climates, such as bumblebees and dragonflies, are already shrinking in range and being displaced (Sánchez-Bayo & Wyckhuys, 2019). This is aggravated by other pressures, including habitat loss through urbanisation, air, light and noise pollution and invasive species.

This is not only about the fate of me, a small fly, or about bees, which you love so much, possibly vanishing. Insects make up two-thirds of the biodiversity of all known life on the Earth. They are food for amphibians, reptiles, birds and mammals. They pollinate countless species of plants, including your grains, fruits and vegetables. They decompose dead matter, sustaining ecosystems' food cycles. Without us, life on the Earth will become hollow, and civilisation unsustainable.

I do not want to end my story on the note of complete defeat. I can see that where humans stop mindlessly spraying poisons and begin to care for the diversity around them, life returns. In water, in the air and in meadows, it is clear that you can leave us room to breathe and reproduce if you so choose. Increasingly, I encounter people who no longer see me as a bothersome intruder, but as part of a greater whole. I know that if more of you paused and reflected, we could fly side by side for many years to come.

But time is running out. If the human world does not turn away from the logic of endless growth and start respecting planetary boundaries, my words, though they may sound like the buzzing of a fly, will be shown to have been a prophecy of the end of



Figure 3. Anthia, the housefly: A silent witness to a vanishing insect world. Image: Pixabay.com (Creative Commons CCO License)

your world. I always hover close to your tables and yet remain invisible. Now I ask you to hear me. This is not a fairy tale, but a warning. For when the buzzing of wings falls silent, there will be no one left to tell you this story.

The Story of Thalia, a Flower of the Anthropocene

My name is Thalia.² Though that is what they call me, I am but one of countless flowers; each of us represents the existence of the entire plant kingdom. Look through my eyes; once we were the foundation of life on this planet, and now we are walking toward an uncertain future. Without us there would be no human breath as plant photosynthesis is the source of oxygen, the basis of organic matter in ecosystems. We make up 450 Gt C of biomass, about 80% of all the living biomass on the Earth. Other organisms, with bacteria accounting for 70, fungi for 12 and animals for barely 2 Gt C, are a small fraction of what we carry in our greenery (Bar-On et al., 2018). We, plants, are the true pillar of life, and our bodies are earth, air and water. And yet, this status is not eternal. Plants still form the largest proportion of the living biomass, but our role is weakening. In 2020, humanity produced more artificial materials (concrete, asphalt, plastic, etc.) than the total mass of all organisms on the Earth (Elhacham et al., 2020). Our biomass is increasingly vulnerable to destructive human activity, including deforestation, monocultures and urbanisation; and now the rapid warming of the climate accelerates these changes even further (Maxwell et al., 2016).

2 The genus *Thalia* L. includes aquatic plants from the Marantaceae family. It comprises six species that occur naturally in the Americas (from the state of Illinois in the USA to northern Argentina) and in the tropical regions of Africa. Thalia, a flower with delicate petals, is presented here not only as a symbolic figure but also as a metaphor for all plants that co-create the biosphere.

Flowers – what a caprice of nature! We are proof that beauty and functionality can go hand in hand as we enrich landscapes, provoke emotion and inspire art. As plants, we are sedentary: we cannot move like animals. Our seeds, pollen and rhizomes travel slowly, so abrupt climatic changes (rising temperatures, altered rainfall patterns, etc.) feel like the ground slipping beneath our feet. You can already see phenological shifts, such as ever earlier blooming, pollen emissions 21% higher than before and pollen seasons up to 20 days longer (Anderegg et al., 2021). Changes in our life rhythms trigger cascades of disruption, including desynchronisation with pollinators, mismatches in ecological networks and potentially dramatic consequences for entire ecosystems (Ibáñez et al., 2010).

The industry, medicine, aesthetics – none of these would exist without plants. The products of our biomass (wood, paper, essential oils, rubber, dyes, fibres, medicines and countless others) form the indispensable foundation of human life and economy. Though seemingly fragile, plants like me have for centuries stored in our tissues chemical compounds that may be medicines for humankind. The rosy periwinkle, my cousin from Madagascar, has given alkaloids that save lives in the fight against cancer (Eisner, 1990). Thousands of other species still remain unknown. If humanity does not stop the loss of tropical forests and the disappearance of habitats, many of us will vanish, and with us the knowledge and power you have never managed to discover will be gone too.

Humanity uses but a fraction of our potential; only about 31,000 of more than 391,000 species of vascular plants known to science have documented uses (Antonelli et al., 2020). In agriculture, just a handful of crops – wheat, maize, rice – provide half of the world's food (Wilson, 1999).

*'I blossomed at the forest's edge, when the shade was still cool
and the air humid. The insects sang. My roots felt the pulse
of the earth. And now... silence. The hot air has dried the leaves,
and the insects are gone. Concrete surrounds me. Is this my
new habitat?'*

I am Thalia, unknown and anonymous, yet millions of my sisters and brothers share the same fate. We are sheltered by the shadow of forests, which absorb CO₂ and allow the biosphere to breathe. Without us, what makes ecosystems self-sustaining will disappear. Yet deforestation continues, trees perish, and the forest cover declines. Fifteen billion trees are lost year by year, along with 190,000 square kilometres of forests, the Earth's green lungs (Crowther et al., 2015). Once, before human civilisation, 60 million square kilometres of the planet were covered in natural forests. Today less than 40 million remain, and a part of these are only human-grown managed forests (FAO, 2024). I feel the pain of this loss, for with every tree cut, the heartbeat of the world weakens, and with it fades the hope that we, plants, carry as a gift to humankind (Figure 4).

I want you to listen. And I want you to understand: the fates of humans and plants are not separate. Carl Sagan once noted: 'They've all been working together – plants, animals, microbes – for a very long time (...) Those organisms that did not cooperate, that did not work with one another, died' (Sagan, 1997, p. 80). We, plants, are the foundation of this cooperation. If you plant forests (and, better yet, end the logging of the old ones), if you leave room for wild nature where you live, care for meadows and urban green spaces, defend biodiversity and rethink food production, you will give us – and the entire planet – a chance.



Figure 4. Thalia, the flower of the Anthropocene:
A silent witness to our changing planet. Image:
Pixabay.com (Creative Commons CCO License)

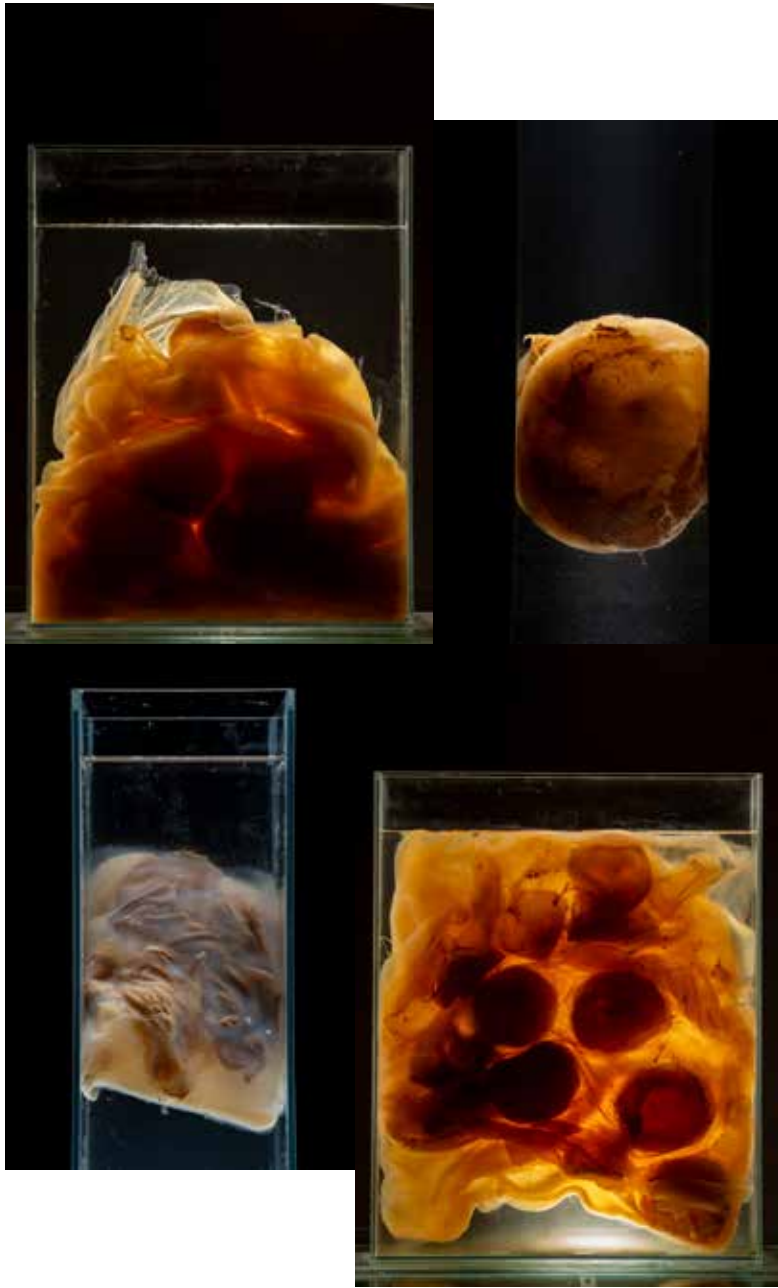
Epilogue

A frog was hopping along a quiet road by the sea. It paused for a moment to behold a fly that was buzzing above a flower. 'How are you today?' said the frog. 'I am fine,' said the fly, 'but I hope you won't try to eat me. For today I will bring new life to so many flowers that next summer this meadow will be a rainbow of colour.' The frog hopped further along the road until it slipped into a nearby rock pool. There it met a tiny fish that would grow to be a giant one day. 'How are you today?' said the frog. 'I am fine said,' the fish, 'but please don't try to eat me, for one day I will be old and noble and a mother to many.' The frog hopped out of the rock pool and continued along the road until it came to a wide, open garden. There it met a woman sitting quietly on her veranda, rocking gently back and forth in her chair. 'How are you today?' said the frog. But the woman, did not answer. The frog asked the woman again, 'how are you?' But she did not respond. The frog then noticed that the woman's eyes and ears were covered in an invisible veil, one fabricated of bank notes, mobile phones, and all the other devices that humanity had produced and that prevented her from seeing or hearing the frog, or any animal for that matter. The frog then gently perched on her forehead and kissed both her ears and eyes. At once, the veil withered away and she beheld him, such a beautiful and magnificent frog. She also saw how the frog had interacted with the flower, the fly, and the fish and how all of them were interwoven into a magnificent garment of life. The frog hopped quietly on along the road, certain that all could be well in the world.

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Glenn A. Albrecht Transformation to the Symbiocene

Introduction

The book *Earth Emotions* is about the ‘psychoterratic,’ that is, the relationship between the state of our psyche and the state of Terra, or the Earth. In the 21st century, we are living in a time when the relationship between humans and the rest of what we call ‘nature’ is in deep trouble. There has been a concerted effort to describe the ‘trouble’ within the bounds of the biophysical sciences and to dwell on the potentially catastrophic consequences if humans (not all humans) do not mitigate or adapt to these changes.

However, while there has been a focus on documenting how we are exceeding the safe limits of various planetary boundaries, such as the concentration of carbon dioxide in the atmosphere, the nitrogen cycle, etc., there has not been a corresponding focus on the consequences of exceeding the boundaries of the psychological limits of all species, sentient or otherwise. I think it fair to say that we have entered a biophysical crisis that has an equivalent psychological and emotional crisis. In 2014, I wrote about this issue of ‘safe spaces’ in the journal *Ecopsychology*:

Within a period of earth history now known as the Anthropocene, the dominant role humans play at a planetary scale has enabled us to exceed many of the biophysical limits that would have us conduct our economies within what has been described as a ‘safe operating space.’ The ‘unsafe’ biophysical space that we are creating for ourselves will have its correlates in a self-generated unsafe psychoterratic (psyche-earth) space. Identifying and documenting the negative impacts of

the Anthropocene on the psyche will be one of the important roles for ecopsychology. In order to avoid further transgression into unsafe spaces and to retreat from those already entered, we need to move out of the Anthropocene as soon as possible.
(Albrecht, 2014)

Earth Emotions was written to explore this unfortunate space that has opened up in the period informally known as the Anthropocene, or period of human dominance. Since the start of the fossil-fuelled, steam-powered industrial revolution in the 18th century we have observed a gradual, but increasing divide between human beings living within mass industrial cities and their urban satellites, and the rest of humanity and nature. Another critical aspect of the industrial revolution was the colonisation of the world outside of Europe and the importation of materials needed for industrial production. The role of racism, manifest as slavery in gathering these materials (e.g. cotton) and then exporting them to industrial centres in Europe, cannot be overestimated.

In my own lifetime (b. 1953), I have witnessed what is now understood as ‘the great acceleration’ of the Anthropocene, to the point of asking a simple but profound question: ‘Accelerating towards what?’

I leave it to biophysical and climate scientists to describe their observations of the trends and destination of the great acceleration. I wish to note that, despite their warnings so far about just how bad things could get, the captains of the SS Anthropocene have not changed the direction of their big ship. Every year, our global CO₂ emissions go up! In early April 2024, in my part of the world, the Great Barrier Reef is suffering a massive bleaching event and Antarctica is experiencing record

warming and melting. The word everyone is using nowadays is ‘unprecedented.’

It seems that more empirical information about imminent collapse has not had an impact on the human response as yet. Given the lag effect or future consequences of many of our past and present actions, this failure to motivate change is likely to be disastrous. As suggested above, perhaps acknowledging that we are exceeding our ‘safe’ psychic and emotional boundaries will prove to be a greater motivational factor for change than straight facts? A starting point for such an analysis comes from the word ‘emotion.’

‘Emotion’ has its origins in the Latin *movēre*, to move, and *ēmovēre*, to agitate or disturb. Emotions are defined as ‘that which moves us’ or affects us. At all scales, from micro to macro, there are forces of creation and destruction that are primary determinants of our emotions with respect to the Earth. I have given the extremes of these e-motions new names: *terrapphthora* (earth destroyer) - derived from Terra, the Latin for ‘earth,’ and the Greek φθορά (*phthorá*), or ‘destruction’ - and *terranascia* (earth creator), derived from Terra and the Latin *nātūra*, ‘to be born.’ I argue that the conflict between terrapphthoran and terranascient emotions, as exemplified in personality, corporate and state mentalities, is now global in scale. Terrapphthorans are the humans who are destroying the Earth within the Anthropocene. Terranascient humans will be those who will create its opposite. There is a spectrum of mentalities at play here, but perhaps we are moving towards a binary?

A Sumbiography: A Summation of My Green Past

In Chapter 1 of *Earth Emotions*, I present a short history of my own upbringing and how I developed as a terranascient, nature

- loving boy in Western Australia. I was lucky to have my grandparents and my mother as mentors. I called this limited biography a *sumbiography*, as it helps the reader understand why I wished to write about our emotional relationship to the Earth in particular places. The term is derived from the Greek *sumbi-osis* (companionship), *sumbion* (to live together), *sumbios* (living together) and, of course, the Greek *bio* (life) and *graphy* (from the Greek *graphein*, to write). The meaning and importance of the sum total of living together with 'nature,' key people and other beings is what a sumbiography attempts to describe and acknowledge. It is my hope that you can all assemble your own sumbiographies in order to see what kind of person you are with respect to nature, where on the spectrum between strong terraphthora and strong terranascia you reside, and what were the main influences in your life that produced such a person.

Solastalgia

My sumbiography put me on a path that led me to develop the idea of the psychoterratic (Albrecht, 2011a). As a nature lover (birds in particular), I resonated strongly with life-affirming places and was repelled by those where the desolation of life was evident.

This tendency of mine to avoid places that the Anthropocene was destroying and polluting was put into crisis when I had to confront open cut (pit) coal mining in the state of New South Wales, not far from my home. Here, over 500 square kilometres of aggressively mined land was producing black coal for the domestic and international power stations and steel mills of the world. The Hunter Valley was described by early European settlers as 'the Tuscany of the South,' so beautiful was this landscape. And, of course, the traditional people of this area, the Wonnarua, had

been there for tens of thousands of years before 'invasion day' on 26th January 1778.

I had gone to this part of the Hunter Valley to engage in one of my favourite pursuits, birdwatching, but instead I had stumbled into the battlefield of the terraphthorans, or earth destroyers, in the form of multinational coal miners and their 'open-cuts,' large power stations and all the infrastructure needed for the 'coal chain.' Their massive impact can be seen from space. So profound was my own reaction to the damage being done to the place and its people, that I decided to study this location, where the physical landscape and the emotional landscape were in open confrontation. I was outraged at how this once beautiful valley was being ruined by a second wave of colonisation, this time, by those who profit from coal mining.

My first psychoterratic concept, solastalgia (Albrecht, 2005), arose out of this personal experience. I define solastalgia as the pain or distress caused by the ongoing loss of solace and the sense of desolation connected to the present state of one's home and territory. It is the existential and lived experience of negative environmental change, manifest as an attack on one's sense of place. It is the homesickness you have when you remain at home, but your home leaves you! It is the opposite of Hoferian (1688) nostalgia.

Solastalgia is derived from the words solace, desolation, nostalgia and algia, or pain/sorrow. 'Solace' is derived from the Latin verb *solari* (noun: *solacium* or *solatium*), with meanings connected to the alleviation or relief of distress, or to the provision of comfort or consolation in the face of distressing events. 'Desolation' has its origins in the Latin *solus* (verb *desolare*), with meanings connected to devastation, deprivation of comfort, abandonment and loneliness (being solitary or alone). That this

new concept was an ‘algia’ was abundantly clear to me right from the start, and it is important to remember that from its Greek origins, ‘algia’ has connotations of pain, sorrow and grief. Solastalgia is not a biomedically defined psychological state; it is an existential response to an unwelcome structural change to the home. As such, it cannot be addressed by ‘therapy,’ as only personal or community-led change to the structural causes of this particular form of Earth distress will once again deliver solace to the sufferer.

The Anthropocene and Negative Earth Emotions

Having developed the notion of solastalgia, I realised that the domain of the psychoterratic must be very broad. Given the amount of distress being caused by Anthropocene ‘forcings’ such as climate chaos, it did not take me long to compile a list of emotions.

The negative psychoterratic emotions are ‘work in progress’ as we humans go on creating forms of emotional distress in the face of an increasingly desolated Earth. I have recently included ‘mersis’ as a way of warning, in language, just how bad the future could be. Mersis has been crafted to describe a personal feeling of imminent death for which one is totally or partly responsible. I want it to include a sense of shame about personal culpability for the events that led to this moment in time (Albrecht, 2025).

Symbiosis

In order to confront our imminent collapse, we need the very opposite of the despotism of the Anthropocene. An actively created symbiotic relationship with the rest of life on this wonderful planet is one that emerges from positive psychoterratic mental and emotional states. Before I go into the details of the Symbiocene (Albrecht, 2014), it is necessary to briefly engage with

the term ‘symbiosis’ as it is crucial to the authenticity of the Symbiocene as a meme, or a cultural replicator.

Negative Earth Emotions	Creator and Year
Biophobia	Kellert & Wilson, 1995
Ecoagnosy	Albrecht, 2017
Ecoamnesia	Kahn, 1999
Ecoanxiety	Leff, 1990
Ecocide	Galston, 1970s
Eco-necrophilia	Fromm, 1965
Ecoparalysis	Rees, 2007
Ecophobia	G. F. Will, 1988
Global Dread	Albrecht, 2003
Meteoranxiety	Albrecht, 2014
Nature Deficit Disorder	Louv, 2005
Nostalgia	Hoffer, 1688
Solastalgia	Albrecht, 2003
Terrafurie	Albrecht, 2017
Mersis	Albrecht, 2025
Tierracide	Albrecht, 2017
Tierratrauma	Albrecht, 2013
Topoaversion	Albrecht, 2013
Toponesia	Heneghan, 2013
Ecological Grief	Kevorkian, 2004–2013

The term ‘symbiosis’ is derived from the Ancient Greek, *σὺμβίωσις*, meaning to live together in a special form of companionship (from *σὺμβιώω* [*sumbiōō*], ‘to live together’ + *-σις/-sis*).

Symbiosis, as a concept, has had an interesting career. In ancient Greece, it was applied to two distinct, but related contexts.

In biological observations, the term was explicitly used by writers such as Plutarch (46 CE–after 119 CE), Herodotus (died ca. 420 BC) and Aristotle (384–322 BC) to describe mutually beneficial relationships between different kinds of organisms. Two such examples are the fan shell (Pinna) of the Mediterranean, which has a special feeding relationship with a species of crab called the Pinna guard, and the Egyptian plover, which reportedly removes rotting food, leeches, and other parasites from the mouth of the Nile crocodile for its own food.

In the societal context, the term was used to describe special relationships between people, most commonly involving co-habitation, social intercourse, fellowship, partnership, companionship, communion and commerce. However, there are also intimate relationships, such as sexual intercourse (‘commerce’) and marriage (wedded life), where ‘symbiosis’ may have applied in ancient Greece.

There then appears a long gap in the global literature connected to the Greek origins of the word. ‘Symbiosis’ re-appeared as transliteration in English, Spanish and German writings in the early 17th century, mainly in reference to commerce and common interests.

The first recorded social use in English was by Edward Misselden in 1622. In a study of the principles of free trade, Misselden compared the rights of private patent holders to the public good, or what he described as ‘the publique symbiosis.’ (Misselden, 1622, p. 60). In 1680, James Salgado wrote the intriguingly titled (‘Συμβίωσις), Symbiãosis, or, The intimate converse of Pope and Devil attended by a cardinal and buffoon to which is annexed the pourtrait of each, with a brief explication thereof, where

the Greek idea of an intimate coming together of unlike parties found continuity.

Scientific Symbiosis

In the 1870s, as German scientists were trying to understand and describe newly discovered relationships between the identifiably different components of organisms such as lichens, the idea of symbiosis in scientific talks and papers was used to give expression to novel ‘ways of living together’ for mutual benefit. Credit is given to the botanist Albert Bernhard Frank, who used the term *Symbiotismus* (symbiotism) in 1877 to describe the mutualistic relation between fungi and cyanobacteria or algae seen in lichens. A lichen is a combination of two separate species, producing a union of the two that has properties not possessed by either party. The scientific term ‘symbiosis’ was first used in public by the mycologist Anton de Bary in 1878. In a lecture given that year, de Bary stated:

When I was trying to find a subject for this conference, I was studying two plants that live in a special relationship. This gave me the idea to talk about observations regarding dissimilarly named organisms that live together, in symbiosis, as we can call these associations. The present preoccupation with the subject, but also the consideration that similar relationships have become well known in the course of the past 10 years, are factors in deeming them to be of general interest. Thus, this talk will be a consideration of such symbioses, namely, the living together of differently named organisms. (de Bary, 2016)

Since that time, symbiosis as a bioscience has proliferated, so much so that modern research in plant biology and the human microbiome has placed this branch of biology at the centre of what might be called ‘the symbiotic revolution.’ At the core of this

revolution is an advance in knowledge about how different organisms cooperate in nature, how some ‘organs’ within species (e.g. mitochondria and chloroplasts) are products of symbiosis and that evolution itself is shaped by both Darwinian and what I call Margulisian evolution. Our latest findings in this process of discovery include the surprising fact that ancient retrovirus genetic material makes up 8–10% of the human genome and has been crucial for our survival, including the way the human embryo develops. There is no ‘junk’ in life.

The Symbiocene

I created the concept of the Symbiocene in 2011 (Albrecht, 2011b) and developed it further in a public conference presentation under the theme of ‘Out of the Anthropocene and into the Symbiocene’ at the Landlines Colloquium at Edith Cowan University, Western Australia, in June 2013. From 2014 onward, I wrote essays, such as ‘Ecopsychology for the Symbiocene’ for the peer reviewed journal *Ecopsychology* (Albrecht, 2014) and ‘Exiting the Anthropocene and Entering the Symbiocene,’ first on my Blog in 2015 and then in the journal *Minding Nature*, connected to the Centre for Humans and Nature, in 2016 (Albrecht, 2016b). The ‘Exiting’ essay was reprinted by the Centre for Humans and Nature in 2021.

I devoted half of *Earth Emotions* (2019a) to developing the Symbiocene as a mega-meme for the future of humanity. The book was translated into French and Spanish (2020) and now into Dutch (2024). Since the 2019 publication, I have given many national and international talks and lectures devoted to the theme of the Symbiocene.

In summary, I put the case that the Symbiocene is the opposite of the Anthropocene. It is a period in human and Earth history when humans reintegrate with the rest of life. Core to this reintegration is the utilisation of our extant, relictual and novel positive psychoterratic emotions to motivate us to action. The Symbiocene must be an act of creation by emotionally and ethically motivated humans, in conjunction with other lifeforms. Emotion and motivation go together. I have *radical anticipation* for the Symbiocene, and I see it as crucial for young people to engage in the project of life and to see and feel a healthy future for themselves and their communities.

The Symbiocene will be the result of a total life philosophy that I call ‘Sumbioism.’ Sumbioism is the collective transdisciplinary art and science of ‘living together’ (*sumbios*) within the matrix of all life. A ‘sumbioist’ is a person who reflects on, writes about and lives by the discipline of sumbiology and the philosophy of sumbioism (Albrecht, 2017). I will be developing these themes in my forthcoming book on the philosophy and reasoning behind the Symbiocene.

Positive Earth Emotions

We once had positive Earth emotions for free; there were so many opportunities to experience them. Perhaps we took them for granted because they satisfied the principle of plenitude. Now, because of the desolation of the Anthropocene, we need to actively create the circumstances where these emotions can be freely had and enjoyed once again. If the Anthropocene is the source of our ascending negative Earth emotions, the Symbiocene will be a catalyst for the rediscovery of past positive Earth emotions and a stimulus for explicitly naming new emotional

connections to the Earth. Below is my table of psychoterratic typology of positive Earth emotions.

Positive Earth Emotions	Creator and Year
Biophilia	Fromm, 1964
Ecoliteracy	Orr, 1991
Sumbiophilia	Albrecht, 2018
Eutierria	Albrecht, 2010
Soliphilia	Albrecht, 2009
Ecophilia	Sobel, 1995
Meteorophilia	Albrecht, 2023
Eutierria	Albrecht, 2010
Endemophilia	Albrecht, 2010
Topophilia	Tuan, 1974
Terraliben	Albrecht, 2018
Gweif	Albrecht, 2025

Gaia and the Ghedeist: Secular Spirituality

Chapter 5 of *Earth Emotions* deals with the ethical and spiritual aspects of the entry into the Symbiocene. In many respects the form of secular spirituality that emerges from a biophilic understanding of life, is a reversal of many of our past sources in ‘the search for meaning.’

The discovery of the microcosmos, as Lynn Margulis (1997) called it, suggests to me that rather than seeking meaning in the big things in life... the big tree, the big church, the ‘big man’... we should be focussed on the smallest units of life. It is the microbial, after all, from which all complex life has come. Life is not only interconnected in ecological physical space: every being

living today has a shared life heritage that goes back billions of years.

That we now use science to understand these micro-symbiotic spatial and temporal connections does not invalidate older symbolic spiritual understandings held by humans in the past. The study of symbiosis unites past animistic spirituality with the best in modern science. Bring-on neo-animism!

In order to give expression to this understanding, I have used *ghehd*, an old root word in Indo-European languages which means ‘to unite,’ as a way to generate this secular spirituality. *Ghehd* is the root of many words in Old English and Old Germanic, such as ‘together,’ to ‘gather’ and, importantly for me, the word ‘good.’ The connections between *sumbios* (living together) and *ghehd* (united together) were too ‘ghoohd’ to miss. I then thought that a modern version of the word ‘*ghehd*’ could be incorporated into a spiritual context in the form of the ‘*ghedeist*,’ with a shortening of the German ‘*geist*’ with its meanings of spirit and mind, and affinities with a vital or life force in other languages. I thus created the neologism ‘*ghedeist*’ to account for a secular feeling for the unity of life and the intuition that all things are interconnected. My definition of the *ghedeist* is:

The spirit or force which holds things together, a feeling of interconnectedness in life between the self and other beings (human and non-human) and their gathering together to live within shared Earth places and spaces. It is a feeling of intense affinity and sense of mutual empathy for other beings. It is a non-religious term for acknowledging the life-spirit kinship which all living beings share and a way of distinguishing the good (which associates and interconnects) from the bad (which disassociates and dis-integrates). (Albrecht, 2016a)

Generation Symbiocene: Creating the New World

In Chapter 6, I present the case that a multigenerational ‘tribe’ of humans has the task of creating the Symbiocene. As I researched and wrote *Earth Emotions* in 2018, I had no feeling that such a generation was already rising from the maelstrom of the Anthropocene. However, I was wrong as both Greta Thunberg (School Strike 4 Climate) and Extinction Rebellion (XR) came to prominence worldwide in late 2018–2019, after my book was committed for publication. I feel that the world-leading example of Greta and XR members’ open opposition of the Anthropocene have vindicated my optimism that good humans would rise up in defence of life. Our Earth emotions have been stirred into action, and Generation Symbiocene (Gen S) is now an emergent force (Albrecht, 2019b).

The psychoterratic typology has been used by Extinction Rebellion (Sydney) to train new volunteers to manage their emotional engagement with a society that sees them as radicals and dissidents. They are definitely dissidents, but they are not radicals. Radical views are held by people who are anti-life. Conservative views and values are held by people who are biophilic. As I suggested in *Earth Emotions*, ‘As they build their own unique identity, Gen S has the task of building the Symbiocene. Given the dire state of the Anthropocene, their work will have to be fast and furious’ (Albrecht, 2019a, p. 190).

It is also worth noting that I hold a very positive view of the role of technology in the building of the Symbiocene. Every toxic and polluting artefact or energy source must be replaced by a science-based symbiotically benign or life-affirming ‘sumbiofact.’ Architecture (to rule over design) needs to be replaced by *sumbiotecture* (to design in collaboration with others, including non-humans).

Fortunately, some people are already in the Symbiocene and are working at top pace to create the very materials and sumbiofacts needed to live well in the 21st century. We already have bricks, leather, coffins and packaging material sourced and produced from fungi. Utensils are now being made from wood cellulose, and household furniture is being made from algae.

The current forms of alternative energy are the transition technologies to the bioenergy and bioluminescence needed to run our economies. To create a sumbonomy (Albrecht, 2024), a form of economy informed by the science of symbiosis, will require humans to move from a dumb, extractive, anthropocentric way of thinking to an intelligent sumbiocentric way of thinking.

Conclusion

In *Earth Emotions* I present a new narrative for the future. There is radical anticipation that the ‘Great Separation’ from life and nature under the Anthropocene will come to an end. There are only two possible endings now: one is the complete collapse and catastrophe of the Anthropocene, and the other is the rise and creation of the Symbiocene. I am proposing that as the Anthropocene collapses, the Symbiocene is built, with bad growth (dysbiosis) being replaced by good growth (symbiosis).

The foundation for the Symbiocene is both emotional and scientific. Good science and good emotions work together to produce something symbiotically beautiful. The Symbiocene gives point and purpose to life. It gives to the holobiont known as *Homo sapiens* the opportunity to finally live up to its scientific name.

I have warned that the ‘Great Reconnection’ with life can be extremely difficult as the ‘war’ of emotions is played out in the next decade or so. However, pointing out the past follies of terraphorans can also be a lot of fun since there is endless material

for comedians in the spectacular failure and downfall of the stupid terraphorans. We have been far too serious in taking their pathological view of unreality as truth, and it has come at the cost of our own happiness. The Symbiocene not only offers a healthy material basis for life; it also gifts us the opportunity to experience ‘the joy of life’ in all of its wonderful complexity and diversity.

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Andrzej Marzec [Adam Mickiewicz University in Poznan] **Between Things**

Patrycja Orzechowska's art is inextricable from her longstanding practice of and passion for hoarding, a pursuit that is radically different from orderly collecting in that the latter is mostly guided by the market value of the specimens. As a contrast, Orzechowska's strategy rather represents an affective, intuitive and spontaneous search for objects; it is open to accidental encounters with items without objective value, things abandoned or even discarded by human society. There is basically no saying whether Orzechowska finds things, has objects slipped to her which then let her chance upon them, or whether they accost and attract her because they regard her her their advocate. This confusion is related to the delegation of agency and stems from the artist's conscious rejection of the modernist subject/object dichotomy, in which activity has only been recognised on the human side of reality. In this paper, I examine her works primarily by means of the theoretical tools proposed by object-oriented ontology, which makes it possible to reveal the rarely explored sphere of relations between objects themselves, unmediated by humans or humanistic meanings and concepts. Still, my main interest is in the vitalist and existential perspective of artistic objects, by which I mean their strange survival models and strategies of withdrawal, camouflage or secret life.

An Object-Oriented Artist

In her works, Orzechowska primarily turns toward objects, which she gathers in at least two senses. Firstly, this gathering is

a gesture of care for things and is dedicated to their existential survival, salvaging them and helping them out of trouble, offering a new life to them or giving them another chance. Secondly, Orzechowska also helps objects meet each other and facilitates an array of unexpected connections between them, in this way bringing them together and at the same time showing that action is always collective. In the latter sense, she might be called a mediator or even a medium if we acknowledge that she can attentively listen to the mysterious, profound and impenetrable life of things. Hers is non-anthropocentric art, so we will not find in it a multiplicity of human meanings or humanistic references on which to fall back when trying to decipher it. When faced with her pieces, we may even have the 'common human' feeling of being excluded by them at times, like intruders at the exhibition who have barged in on another world independent of our affairs and our meanings. This artist is not interested in intersubjectivity, that is, relationships between subjects founded on the human language, understanding and communication; rather, she focuses on interobjectivity (Morton, 2013, p. 67), the realm of aesthetic interactions, the performativity of things and negotiations between objects themselves.

Orzechowska seems to be captivated by the fathomless world of relationships between objects, which has so far been ignored or gone unnoticed by the humanities. She watches various interobjective encounters and sometimes provokes or even facilitates them; on other occasions, she is openly surprised at what has happened between object and relates that to us (*12 małpek. Technika na butelkę traconą* [Twelve Miniatures: A Lost Bottle Technique¹], 2019–2023). She invites us into a world where objects are born and die, where they live their individual, solitary lives or, to the contrary, unite in groups and undergo a range

of almost alchemical transformations. For example, she puts on display a shirt in which bees have built their nest (ready-made, 2016), which tells one of the many interobjective stories about creative relationships that unfold beyond the human reality. This piece gives the impression of being the foundational myth of Orzechowska's art, and it embodies one of her signature modes of practice. Like bees, she finds objects that have been left by humans to fend for themselves and liberates them from human utilitarian contexts, letting things live independently of humanistic meanings and establish entirely new connections in their nonhuman interobjective realm.

Orzechowska derives some of her inspiration from object-oriented ontology (Harman, 2017). This is explicitly communicated in her *OOO* (2020), a piece that consists of interconnected stoneware rings with a slough drawn through and hanging down from them. In this way, the artist not only foregrounds a philosophical trope that can usefully illuminate her art but also emphasises that her major focus is on a variety of links and relations between objects. Each of the rings forms a snake devouring its own tail, a figure known as an ouroboros, which symbolises the axial preoccupations of Orzechowska's art. They notably include the life cycle of object as an existential story of their birth, death and revival. Alchemy, another salient motif (*A jak alchemia* [A for Alchemy], 2023), involves transformations of things, both their external transfigurations (such as their various uses and relationships with others) and their internal transmutations, bringing about the disintegration or unexpected metamorphoses of objects.

The ouroboros is also among Timothy Morton's favourite metaphors, leading us to his dark ecology (Morton, 2016) with its belief that we invariably build our lifegiving, tangled community with nonhuman strangers, knowing next to nothing or mostly

1 The title involves a play on words as in Polish *małpka* means both a small monkey/ape and a miniature bottle of alcohol. (translator's note)



just nothing of their existence. The slough hanging down from the stoneware rings implies this epistemic darkness and the inscrutability of objects, which, like a snake, slip out of our hands and refuse to be fully grasped by the human cognitive apparatus. When looking at the outer shell of a moulted animal, we realise that the animal has grown, changed and is now elsewhere than the one described by human concepts as these always appear *post festum*. Attention to the discrepancy between appearance/representation (a phenomenon) and the thing-in-itself (a noumenon) is not only central to object-oriented ontology but also fascinating to Orzechowska herself. The inertly dangling ouroboros slough tells us of the ambiguity, double-faceness (Harman, 2009) and irony of objects, which defy the definitions, notions and interpretations humans impose on them. Moulting is a process in which concepts incongruent with reality peel off; it is shaking off and becoming independent of others' gaze. It is as if Orzechowska's works wanted to tell us: 'What you can see now is not me; it is only an appearance/a skin, which I'm going to shed in a moment to become something completely different.'

In the Time of Drought...

Orzechowska's show was titled *Dry Season* in an obvious reference to the alarming effects of the ecological disaster and anthropogenic climate change. Nonetheless, let us try and interpret the phenomenon of the dry season and desertification in a non-anthropocentric manner. If we look at the calamitous consequences of global warming and ways of coping with it from the perspective of objects, we will be able to grasp essential elements of Orzechowska's art, which can be seen in most of her works. Not only humans poorly tolerate heatwaves and retreat into cooler settings to patiently make it through the hottest time of the day by doing nothing (as epitomised by the Mediterranean custom of siesta); in fact, most living organism avoid scorching temperatures. In a dry season, animals enter into aestivation, in which their body temperature is lowered, the pace of metabolism is reduced, and their heartbeat slows down, all of which help them spare the energy they need to survive. This summer lethargy (an equivalent of winter-time hibernation), which remodels the physiology of the organism and involves processes similar to dormancy, is a crucial survival strategy in adverse conditions. Desert animals characteristically exhibit reduced diurnal activity, often change their appearance, crouch, hide under rocks and remain motionless. As an adaptation to living in high temperatures, some insects developed thicker chitinous exoskeletons, which prevent them from excessive loss of water. Leaves are covered in a wax film or shrunk to thorns, in this way minimising the evaporation surface and effectively defending themselves against the appetites of carnivores. Some organisms that live in extreme conditions are able to survive through anabiosis, a state in which vital processes are basically suspended (seeming death) and which may last much longer than the usually brief and temporary state of aestivation.

The various manners of eschewing activity (siesta, aestivation, hibernation, anabiosis, etc.) indicate that a considerable majority of beings manifest their existence in ways very different from action, especially in adverse conditions. Bruno Latour's concept of the actor has prompted us to fetishise activity, which is today almost the existential criterion (to exist = to act) not only in the hyperactive world of capitalism but also in the realm of philosophy, which was traditionally associated with contemplation. Graham Harman, the founder of object-oriented ontology, insists that all the existing beings are not really connected by activity (as Latour would have it); rather, what they share is the introverted capacity to withdraw from sociable relations and defend their integrity, in short – to be themselves (Harman, 2011, p. 160).

Secret Life and Survival Strategies

Orzechowska's artistic objects behave like organisms in a dry season: they hide and withdraw to protect themselves, pursuing the supreme goal of survival in adverse conditions. The latter are not really about the objects being constantly exposed to the curious gaze of the audience, constantly finding themselves in the artificial spotlight and having their peace and quiet disturbed by camera flashes and curated tours. What put their real existence at risk are in fact the two reductive strategies identified by Harman, who calls them the undermining and overmining of objects (Harman, 2011, pp. 12–23). Undermining involves reducing an object to the material from which it was made, and indeed this kind of information (raw, hard facts) is provided, besides the title, in short gallery descriptions. The overmining of artistic objects entails dissolving them in the network of relations, looking at them through the lens of the

curator's text, contemplating them in the context of other works or approaching them only via one's own experiences and interpretations. Regrettably, we tend to employ both strategies at the same time in the belief that they will bring us closer not only to things themselves but also to establishing what the mysterious objects we are eyeing really are. We could not err more gravely as this is the surest path to losing the real object from sight, together with its unique, individual and problematic existence, which poses not only an interpretive challenge to us.

So far we have entertained no doubts about the utter safety of gallery spaces. The classic 'white cube' seems a perfect setting, a place of dreams for objects, but this idea may only be the human way of looking at it. As soon as artistic objects are brought out of dark storage rooms, taken out of their cardboard boxes and unwrapped from bubble wrap, they are left to twist in the wind of human gazes and accounts. They fall prey to sweltering workshops and professional comments exchanged over their heads; they wither during heated talks that seek to prove that they know better what these objects in fact are; and experience shows that they can be burnt to ashes in the fire of artistic critique. That is why objects will shelter from the rising temperatures of human discussions on them and defend themselves against being taken hostage by human gaze (that is, against becoming phenomena) and devolving into a mere example, an epitome of a movement or a tendency, an image that only exists in people's minds.

Orzechowska's works seek to survive in adverse conditions, waiting until the gallery is closed and the lights are turned off to go about their own, private, nonhuman business.² The dual nature

2 I spent a night in the residential room of Laznia 2 Centre for Contemporary Art in Gdansk, just above Orzechowska's show, all the time thinking that I would best like to go downstairs and have at least a peep at the secret life of her objects.

of objects is highlighted in *sunrise-sunset* (2024), which consists of two ceramic suns. One of them is red hot and illuminates the reality of phenomena (the public appearance of things) while the other sun is pale and implies the darkness-enveloped world of noumena (the intimate sphere of things). Unbearable heat is not really the most problematic aspect from the viewpoint of objects; rather, the greatest challenge is posed by the dazzling light of Enlightenment reason, which never sleeps and desires the impossible – to have a complete knowledge of things and to inspect them meticulously from all sides so that they become transparent and harbour no secrets anymore. This is why Orzechowska's artistic objects withdraw, become inaccessible and adopt various defence strategies against human knowledge. Taking on camouflage is perfectly exemplified by Dewar flasks, which are steeped in their own world (*title in progress*, 2018–2024)³ – entirely self-centred inner parts of flasks absorbed by surviving. Covered in a mirror coating that resists being penetrated by sight, they withstand all our efforts at fathoming their interiors and reflect our curious gaze, along with whatever we have to say about them. The Dewar flasks overwhelm with their sheer quantity, bringing to mind a colony of live beings (succulents that accumulate water inside), which together form a mysterious existential, persistence-based alliance. When looking at their glistening, rounded shapes, one may have an impression of sighting an entirely different world, a civilisation from another planet, where the time passes differently. What if this is indeed the case, and the deep time of objects has nothing to do with our human time, which passes far too quickly in their view? Let us imagine that a visit to the realm of Dewar flasks is like landing on Miller's planet in Christopher Nolan's

3 Most of Orzechowska's works are called *title in progress*. This is a device she deliberately uses to indicate that her objects are unfinished and indeterminate and that, being constantly in progress, they organically transform and elude the human categories, having an existence independent of them.

Interstellar (2014), where every hour costs the astronauts seven years of human life on Earth.⁴ I guess that nobody – not even Orzechowska herself – will decide to sacrifice seven human years to continually observe infinitesimal changes that might happen in the world of Dewar flasks over an hour; we prefer assuming that nothing at all goes on there. The realms of humans and objects are interconnected, yet each of us lives on an entirely different time-scale, changing and ageing at their own pace. Some of Orzechowska's artistic objects adopt a more active defence strategy than camouflage. Instead of withdrawing or going into sleep (Harman, 2011, p. 153), they develop thorns and use them, like desert plants do, to defend themselves against intruders. Her hostile-looking pieces, such as a spiked necklace (*title in progress*, 2020), thorny *Acupuncture* (2023) and cactus-like *The Bone Collector* (2016–2018), try to scare us away. All armed up, these objects above all care about their independence and give us a clear and concrete signal: Stay away from me with your arsenal of interpretations! Importantly, Orzechowska often fills her artistic universe with objects with a past that can come across as being burned out. This is not really about the fact that she works with clay, but about the fact that objects are fatigued with their own protracted existence. A lot of objects used by Orzechowska, in particular the pieces made of iron, had spent long years in withdrawal, buried deep in the ground, until she dug them out (Harman, 2011, pp. 45–50).⁵ Taking care of them, she prolongs their life and, which is mostly the case for work-worn tools, she sends them into well-deserved retirement, offering them not only rest and relaxation but also a specific art therapy.

4 The episode in which Miller's planet is being explored features a ticking sound that recurs precisely every 1.25 seconds, marking one full human day that has just passed.

5 In his account of the secret life of objects, Harman phrases it as 'withdraw[ing] into a shadowy subterranean realm' (Harman, 2011, p. 48).

View of the exhibition *Dry Season*, installation of **Patrycja Orzechowska**,
Kaznia Center Of Contemporary Art in Gdansk. Photo by Daniel Rumiancew,
courtesy: Kaznia Center Of Contemporary Art



Camouflage: The Perverse Life of Things

Despite their existential past experiences and their introverted tendency to withdraw, Orzechowska's objects are surprisingly vigorous. She suggests their vibrancy in an array of ways, with her pieces primarily referencing the magic of voodoo practices and alchemy as a tradition that legitimates the idea of things living and acting. I am far less convinced by Orzechowska's attempts to show the vitalist reality of objects through direct references to the organic world, which stays alive in spite of adverse conditions. Her artistic objects often try to pass for living organisms and imitate, or sometimes intercept, vegetal or animal ways of being, with which we are perfectly familiar. For example, *Ikebana* (2018) mobilises all its being to convince us that it is a plant in a vase while *Shutups* (2020–2023), which resembles crane flowers (*Strelitzia reginae*), does the same but in a less ostentatious way. Other works have cow's ears (title in progress, 2020–2023) or animal horns (a series of seven horned objects in title in progress, 2020–2023). Being essentially speculative (we do not know these species), the latter evince Orzechowska's dedication not to copying the present modes of existence but to evoking life as we know it. In referring to vegetable and animal styles of being, the artist shows that objects not only exist but also live the way other organisms do. Her art is essentially about finding the way to tell of this strange vitalist reality, which often contradicts common sense.

In fact, Orzechowska goes a step further in showing us that her artistic objects not only mimetically intercept other beings' vital strategies but also generate their own ways of being. This approach is showcased in an installation (title in progress, 2020–2023) composed of chains cascading down the wall and old cuckoo clock weights, which are furnished with ceramic appendages to look like insects or flowers of an unknown plant.

The structure we see looks highly organic and confounds our cognitive apparatus because we are not really able to determine what life exactly we are facing. The draped chains bring to mind creepers or shoots of flowering plants, but their flowers might equally well be odd insects. To make matters more complex, there is also the clock mechanism, which we know to run, strike and indicate various time zones (of humans, plants, animals and objects). Usually, we can imagine only animal and vegetal life, but what if there are many more ways of existing and styles of living? Orzechowska effectively unsettles the oppositions of organic/inorganic and dead/alive, which we are accustomed to using in describing our multicomponent experience of reality (Bennett, 2010). As opposed to this habit, Orzechowska's objects are located exactly in between or entirely beyond these categories.

The operations of dualistic (dead/alive) categories are likewise suspended in the piece composed of cylinder wire brushes (ready-made, 2016), which also straddle the line between the vegetal and the animal ways of being. At first glance, they look like marine organisms (sea urchins or anemones), withdrawn beings that live their sedentary lives on the ocean bottom, somewhere deep down and far away. But, conspicuously, the brushes are very dry, like most of Orzechowska's works, so we should certainly have associations with the desert rather than the sea. We are all perfectly familiar with large wiry balls of plants rolled around by the wind as a typical landscape feature of America's vast and boundless expanses. They are tumbleweeds, and their unexpected movement often evokes the sense of the uncanny in people who look at them (a motif opulently used in American cinema). We are not used to seeing seemingly dead object start bouncing all of a sudden and fill up with unusual life that is terrifying and independent of us. Resurrection plants

(e.g. the rose of Jericho) are an interesting group of tumbleweeds as they are able to survive even extreme droughts. Balled-up and self-enclosed plants appear to be entirely lifeless, and only when the conditions improve (through rain), they open up and in this way prove they have never been dead.

Orzechowska's works are a highly meaningful contribution to today's debate in philosophy and art on the status of the noumenon, an object that really exists independently of human knowledge. The artist unveils the frequently underappreciated, withdrawn and suspended existence of objects that are in standby mode and difficult to perceive. This commitment seems particularly important in the age of coerced productivity and capitalist or activist burnout. Orzechowska's objects are not only preoccupied with survival (their own existential success) but primarily dedicated to engaging in relations with other things. They all coexist in an interobjective space which is autonomous because it does not depend on human meanings or interests. Through her artistic practice, Orzechowska seeks to highlight that what is alive and what is to be considered dead has so far been determined by humans (Povinelli, 2016). As she reveals that the organic/inorganic opposition is ineffective and the anthropocentric category of life insufficient, she seeks to expand it and proposes her own, vitalistic perspective on the secret life of objects.

This text was written on the occasion of Patrycja Orzechowska's show *Dry Season* at the Laznia 2 Centre for Contemporary Art in Gdansk, which took place from 13th September to 10th November 2024.

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**Cohabitation Instead of Colonisation:
Two Paths of Urban Design
for Nonhuman Actors**

The city is a multilayered organism and a plexus of actions of physicians, architects, cleaners, artists, sellers and many other social groups. While each of them uses different infrastructures and competences, they all sustain the fragile balance of the whole. From the macro-perspective of a bird's-eye view, the city seems a homogeneous entity, yet on the micro-scale it can be seen for what it is – a dense network of interdependencies that keep life going. This idea is usefully illuminated by the metaphor of a lichen, a being which is described by science today not as a simple relationship of two partners but as a multi-organismal conglomerate of fungi, algae, cyanobacteria and a rich microbiome that has neither any central node nor any hierarchised leadership (Hawksworth & Grube, 2020, pp. 1281–1283). Each element contributes its different competences, with some of them being responsible for photosynthesis, others performing defence functions, and yet others regulating the exchange of water and nutrients. The durability of the system results from this co-dependence and distribution of tasks, rather than from one actor's domination over others.

If we shift from considering 'a city for people' to considering 'a city as a network,' we are faced with the question of descriptive tools. When botanists analyse wetlands, they chart interspecies connections, such as who pollinates whom, who establishes links to whom, and who depends on whom. Known as ecological network analysis, such investigations capture the accurate

architecture of mutuality, which sustains life. Another relevant development in the recent decade has involved the modelling of multilayered ecological networks concomitantly combining different (trophic, mutualistic and spatial) types of interactions and change over time (Bascompte & Jordano, 2007). In other words, when we rescale research and change the methodological toolkit, the city itself comes to resemble a lichen as a dynamic multispecies network of interdependences. These issues are no abstraction to me. I grew up in the Bieszczady Mountains,¹ where landscape and biodiversity were part of the local identity; green spaces were the pride and joy of the place, as well as natural surroundings in need of no justifications or reasons. When I moved to Cracow, I encountered a different paradigm, specifically the logic of urban planning, biologically active surface parcelling and aestheticisation of green areas as a background. However, there has been a reversal in this respect recently, with metropolises, such as Cracow and other big cities, embracing green transformation while smaller towns, such as Ustrzyki,² have begun to copy the concretisation models widespread in the early 21st century. This contrast shows that attitudes to nature are culturally and historically contingent, rather than universal (Moore, 2017), and their mutability pivots on perspective, including body orientation, sensory disposition and the cultural context. Perception is not a neutral mirror of the reality; rather, it is an embodied experience calibrated by the cost of action and the observer's capacity for agency. The reception of landscape is affected not only by visual stimuli, but also by sounds, that is, by the acoustic environment that

1 A mountain range in south-eastern Poland. (translator's note)

2 Ustrzyki Dolne is the country seat of Bieszczady County. (translator's note)

forms the matrix of directions and signals of life. Research on soundscape ecology has shown that what and how we hear not so much illustrates the landscape as constitutes its experiential form (Proffitt, 2006; Pijanowski et al., 2011).

I became acutely aware of this during my repeated crossings of the Pilica Lagoon on a SUP board. Originally, it was not meant as an experiment, yet when I covered the same route in different conditions, I realised how radically the image of the world altered as I changed my body position, sensory filters and time of the day. On the first occasion, I was kneeling on the board with headphones on; I shut off ambient sounds, and the low horizon of vision made the water surface behave like a mirror, with the life underneath remaining invisible. I could only see slight motions among sweet flag leaves. During the second crossing, when I stood upright and without headphones, sound was restored and the underwater world revealed, as I could see fish, circles on the water and trails of churned silt. I could also see and hear animals in shrubs, but my attention was drawn by the soundless – the beings under water. In all likelihood, their previous inaccessibility and 'absence to the senses' invested them with a special epistemic weight. Yet it was a night-time crossing that made the deepest impression on me; my sight was failing me amid dense steam rising from the water, and the vague contour of sweet flags was my only anchor. It was the first time that the plants I could not see had dominated my experience.

These crossings sparked my intuitive idea about 'plant blindness.' James H. Wandersee and Elisabeth E. Schussler (1999) described plant blindness as a tendency to treat plants as a mute background, instead of as beings in their own right. More recently, researchers have come up with the notion of plant awareness

disparity, which emphasises the educational and cultural nature of the issue. Plants only gain visibility when they are objectified, for example, by being governed by aesthetics (thujas trimmed Edward Scissorhands-style), economy (a rapeseed field) or ornamentation (flower beds). Then we say: 'Behold the plant, behold the main actor of the view.' Without this device, plants continue to be invisible even though they actually form space and sustain life. Sensory affirmation other than visual – in particular auditory – is capable of breaking this invisibility, but it is only a conscious change of perspective that reveals the presence of plants as first-person participants in landscape (Wandersee & Schussler, 1999; Parsley, 2020, pp. 598–601; Parsley, Daigle, & Sabel, 2022).

This selectiveness is coupled with economic logic. If plants are a background for us, capitalism shapes this background, making it homogeneous, easy to maintain and predictable. Polish cities have developed a 'lawn-and-thuja' aesthetics, which uniformises their landscape. There is more at stake here than taste alone since this approach also exemplifies value judgment, where we recognise some species as 'superior' and others as 'inferior.' This is a story older than modernity. Archaeobotanical research in southern Poland has found that desirable and undesirable species were distinguished as early as in Neolithic communities, which practised weeding and selection in agrocenoses (Badura, Lityńska-Zajac, & Makohonienko, 2022; Kapcia, Korczyńska-Cappenberg, Lityńska-Zajac, Wacnik, Głód, Moskal-Del Hoyo, 2024, 2024). Thus we continue a centuries-old tradition of hierarchising plants. In this sense, nature tends to be treated as a resource and a vehicle of investment values. Indeed, Anna L. Tsing argues that:

While I refuse to reduce either economy or ecology to the other, there is one connection between economy and environment that seems important to introduce up front: the history of the human concentration of wealth through making both humans and nonhumans into resources for investment. (Tsing, 2015, p.42).

This insight corresponds to the critique of the modern 'disenchantment' of nature and the turn to 'matters of care' (Latour, 2024), as well as to calls for new constellations of interspecies kinship (Haraway, 2015) and the historical view of the climate as co-constituting the history of humankind (Chakrabarty, 2009).

Given the developments above, architecture can be thought of as a tool of colonisation. Every building is a declaration of takeover of biologically active surface. 'Green roofs' and 'green walls' are sometimes aesthetic attempts to revive what has been lost while the same logic of sanitation (power-cleaning of facades, removal of ruderal plants, etc.) spawns permanent conflict with organisms that try to penetrate into the city in their own ways. If we do not want to reproduce this violence, we must invent different design practices. In my work, I develop two complementary paths.

One of them involves a reinterpretation of the existing elements of human life-space, such as furniture and everyday utensils, so as to extend their function by including the conditions of cohabitation with photosynthesising organisms. Instead of producing 'new objects for nature' (which inevitably generates repeat colonisation), I seek to introduce life into what is already there, without reducing space or committing another appropriation. The other path concerns public space and manipulates perception; specifically, I design objects that



The prototype of the installation.
Photo by Konrad Fleszar

ostensibly respond to aesthetic or practical human needs (art and design, respectively) but are in fact intended for non-human users, becoming habitats and micro-infrastructures of biodiversity. Both approaches share the striving for an anti-colonising model of coexistence.

My Modular Wooden Installation System integrated with a unicellular algae cultivation is part of the former path. Inspired by the wall unit, the design transforms this archetype of modular interior architecture into a system that retains its original storage function and is at the same time the habitat of *Chlorella vulgaris*. While the design relies on industrial solutions (photobioreactors), it inverts their logic since rather than seeking to maximize biomass production, it aims to generate conditions for co-presence and uses photosynthesis to permanently reduce the carbon footprint of the object. The system consists of a retention module (circulation of fluids and gases), a storage module (responding to human needs) and a photobioreactor module (where algae are exposed to light and photosynthesise). Each of these elements symbolically corresponds to a different – metabolic, human and nonhuman – functional dimension. The object was made of oak timber in collaboration with the Department of Botany, University of the National Education Commission in Cracow, in 2023. Tested and developed since then, the piece is a design manifesto that inquires how far users are prepared to accept the presence of photosynthesising organism in their private space and in what way/s this shift may revise our understanding of the interior as a cohabited environment.

For its part, A Non-Tree embodies the latter path. The project takes its starting point from the tree as a habitat, a structure within which mosses, lichens, insects, fungi and microorganisms

coexist across its life cycle. A Non-Tree transposes this instructive experience onto settings where tree plantings are impossible, but microhabitats are needed for biodiversity. The final form of the object was developed on the basis of 3D scans of the bark of various species – in collaboration with researchers from the University of Warsaw's Botanic Garden. These scans were used to derive structures that are easily colonised by non-human organisms. A Non-Tree is currently in the test stage; it is a speculative design intended to pretend to be a work of art (playing with the audience's perception), while in fact serving as a habitat. The ambiguity of the object finely poised between an artefact and an ecological micro-infrastructure opens up space for implementation in settings where conditions for life must be created without making claims to another swathe of land.

Both case studies presuppose that art and design will not solve the dilemma of 'pure post-anthropocentrism' or, in other words, they will not take the human out of the equation. However, they can work as lenses for shifting the focus from the human as the centre onto the network of interdependences; they can also sensitise humans to what is as a rule invisible, for example, helping to see the city as a lichen. As evinced by the literature on the environmental and public health sciences, it is biodiversity, rather than the presence of green spaces alone, that brings restorative benefits and enhances wellbeing (Dallimer et al., 2012; Wood et al., 2018). Soundscape ecology has shown that when one perception module is changed (as in hearing being activated at the expense of sight), the entire way of being in space is reorganised. This means that even a micro-scale design shift (a piece of furniture, a module, an installation) can generate educational, perceptual and, consequently institutional macro-effects.

If most pro-environmental initiatives are in fact geared to stabilising humans' conditions of life, they prove intrinsically anthropocentric. Nevertheless, 'post-anthropocentrism' need not entail the elimination of humans; it may also involve a broadening of the community of life and a restructuring of power relations so that we design in ways that connect and facilitate habitation, rather than colonising or driving away. In this sense, designs such as *The Modular System* and *A Non-Tree* not so much 'save' nature as reposition the human in the network of interdependences. At stake in them is not decorative green space but the capacity to produce the world together and to accept that some of the 'users' of the city do not talk in our terms. This inspires five general conclusions. Firstly, it is the perspective, whether bodily, sensory or cultural, that determines what can become visible as an object of design. Secondly, the language of ecological networks is a useful tool for recognising and supporting interspecies connections in urban design. Thirdly, a critique of the colonising practices of architecture should be coupled with replacement practices, such as reinterpretations of the existing elements (furniture as a micro-architecture of coexistence) and production of micro-infrastructures for biodiversity in public space (objects 'pretending' to be for humans, but designed for nonhumans). Fourthly, such actions have implications for implementation since they show, on the micro-scale of an interior, a courtyard, or a corner, how the urban habitat capacity can be enlarged without replicating the logic of appropriation. Fifthly, post-anthropocentric design does not abolish the human, but it knocks the human off the pedestal so that the city can be a lichen and not a plantation.

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Strategies of Collaboration: A Work of Art as an Aggregate of Interspecies Activities. The Example of *Adjacency*

In the late 1960s, Richard Long walked lines in fields and in this way unsealed the traditional notion of sculpture. As he walked, every step he took expanded this notion to encompass kilometre by kilometre, complete with the wanderer's body, the species that interacted with him, land topographies and weather conditions. As he eyed the landscape during his slowly paced walks, the traces of scorching sunshine, sweat, dust and pollen accrued on his skin, ever so involuntarily.

One of Long's pieces – *Stone Circle* from 1977 – was displayed at the *Adjacency* (Pol.: *Przyleganie*) show, which was held in Katowice's Rondo Art Gallery in 2024.¹ The installation was made of river boulders evenly distributed in a circle on the floor. In this piece and, indeed, in most of Long's other works, central to his practice is his movement in the field. Long's poetry conveys heightened attention to the changing conditions of the environment, which suggests that his paths trodden in grass or dust, his stones carried in and arranged into circles and his works from river-bottom mud represent walking meditation. This aspect of Long's art provided a lens through which to examine works by the other artists invited to *Adjacency*, whose practice of mapping spaces in interspecies entwinement actualises the concept of sculpture in the expanded field, to

¹ The text is based on the autoethnographic method, in which the personal experiences of the researcher, here of the curator of the *Adjacency* exhibition (2024), are used to study developments embedded in a broader cultural context. The text concludes the curatorial process, from conceptual work (research on symbiotic narratives) and cooperation with the invited creative practitioners (visits at their studios, selection of artworks) to the arrangement of the exhibition (designing relationship between pieces on display) and development of the visitor pathway and accompanying events intended to disseminate the ideas and concerns addressed in the show among the broad public.

use the coinage Rosalind Krauss proposed in her overview of the tendencies germinating in art since the 1960s. The term captured sculpture as closely interwoven with its surroundings and entangled with topographies of specific landscapes and their different conditions. A new medium of sculpture was found in spaces as experienced by the body, opening up in time and defying the modernist ideal of visual unity (Krauss, 1986, pp. 279–280). Making up the eponymous exercise in adjacency, the pieces exhibited in the Rondo encouraged speculation on the future based on potential alliances and interconnections. In the context of walking as both Long's artistic practice and the axis of the show, the exhibits could be deciphered as reflections on the body confronted with its own materiality in relations with other organisms. I explore these pieces as an ensemble; this approach results from the art research method I adopt, specifically from the exhibition format which I understand as a temporary laboratory of metaphors that pivots on the physical dimension of a set of works. Displayed together in one venue at the same time, these works form a unique field of mutual tensions that are ungraspable as long as each is explored individually in isolation from the others.

Adjacency was based on the idea of contiguity and intimate relations, the potential inherent in conglomerates and condensations that, in this configuration, provided underpinnings for thinking on reality in terms of flows, exchanges and symbioses, corresponding to Timothy Morton's (2016) framework as explicated by Andrzej Marzec (Marzec, 2023, p. 12). Rather than touting the control- and distance-based super-agency of *Homo sapiens*, the artworks on display wove a vision of harmonious resonance, in which a shared interspecies rhythm could be discovered. Its healing power was rooted in a set of motions inspired by the dynamic of entwinement, where the pursuit of rigid distinctions

was replaced by the supreme principle of interpenetration. This ensemble of works stood as archives of forgotten choreographies based on attunement to other species and liaising with them by means of a specialised set of appendages, whiskers, tentacles, suckers and hooks.

Mikołaj Spaczyński was one of the artists who took part in the *Adjacency* project. By his own description, his practice results from the combination of geological developments, natural processes and his own activities. For quite a while now, he has dedicated himself to exploring the matter of the earth and trying to make sense of it. In his works, the ground appears as an effect of crumbling hierarchies and a relic of varied life-forms, enclosed and amalgamated in its layers. The ground harbours a record of the changing coastlines of oceans of old, the now non-existent riverbeds and the history of volcano eruptions, droughts and glaciations. The stratigraphy of terrain in Spaczyński's pieces registers bygone processes and stores encoded texts that bear vestiges of individual and generational biographies. He treats rock formations as texts that unveil layers upon layers of sentences inscribed by condensed organic matter, decomposed, pulverised and reintegrated into new forms by geological processes.

Adjacency featured Spaczyński's video titled *24 metres*, which he developed between 2020 and 2023. The piece refers to his eschewal of verticality in his practice, within which he explores corridors of a cave he discovered in the Polish Jurassic Highland a few years ago.

Unlike traditional monument sculpture, burrowing into the ground, which is Spaczyński's go-to method, involves negative (concave) forms. As part of his underground sculpting, Spaczyński painstakingly removed the clayey alluvion from the tunnels of the cave. He worked with earthen matter, itself

a product of extended geological processes, which had remade the skeletons, shells and remnants of prehuman organisms, processes chronicled in the very cave he explored – a karst formation of Triassic-sea mushelkalk.

24 metres exemplifies art informed by the idea of distributed authorship. The images of the cave interior, as well as the exploring artist's movement trajectories, mingle together the geological processes of cave formation, the factors involved in them and Spaczyński's effort in hollowing out the cave corridors. Rather than being only the effect of the manual work of the artist who brings his original ideas of shape and form to fruition in the material of his choice, underground sculpting (intaglio) unfolds in the toilsome process of removing layers of dirt from the buried corridors of a rock formation. This project can be described as the reclamation of the initial shape of the cave, an attempt to turn back the clock to the moment when its tunnels and chambers were passable. Spaczyński, so to speak, dons the mantle of a conservator who restores the initial shape of *underground architecture*.

Agnieszka Brzeżańska is another artist whose work is located at the intersection of interspecies lines. She is well-versed in reading water. She has spent a lot of time, among others during annual Flow events on the Vistula, watching the ways water behaves and looking for the clues and signs it carries. As a result, her art extensively relies on aquatic metaphors that show the body not as a cohesive form but as a fluid substance that adjusts to and interacts with its surroundings. Brzeżańska's ceramic objects bear traces of vaporisation and trickling. Also, their breast-like shapes evoke the infinite fertility of the pre-historic Great Goddess, Nourishing Mother and Mother Earth. Besides her ceramic pieces, Brzeżańska also exhibited a gigantic canvas as archives of sorts of the river-borne biological material that

had sedimented on the fabric when immersed in the Vistula for several days. Spread in the gallery space, the flabby textile gave the impression of being a painting taken off the stretcher bars and cooperating with gravitation.

One of the objects designed by Brzeżańska oozed herb-scented vapour. The piece gestured at the psychoactive power of plants, which can break our habitual modes of knowing and promote exploration of other epistemic dimensions beyond measurable biological scales, and in this way presented itself as akin to the rituals of censing, purification and opening the muffled channels of perception. Activated in this way, the grammar of conscious inhaling and exhaling reminded the audience of their dependence on the body and its physicality. The steam increased the humidity of the room, marring the usual sterility of gallery rooms. It settled on the visitors' skin and filled their lungs. Hanging in the air, it spawned a mesh of associations with the heightened humidity of liminal spaces. Fog- and fume-enveloped wetlands, such as bogs, marshes and morasses, are spaces where water and soil intermix, eluding the traditional cartography that requires some spatially defined ground on which one can firmly tread when drawing boundaries and planting flags. The experience of insecurity that besets one as one navigates one's way across wetland is an exercise in the imagination; a bog is replete with soft and slimy forms, with no stable contours available to the senses. To try and describe the terrain on the basis of information from one's eyes, trained as they mostly are in the detection of clear-cut shapes, is a futile venture here. Categorising and accurate defining are doomed to failure.

Swamps suck in and must be explored through and by the body, whose weight is a gauge for the depth of the water and the density of the ground. It was the mutability of marshland that made

it a perfect candidate for a realm inhabited by diabolic creatures, who felt perfectly at home in the muddy landscape. The brown hues of bog water and its sulphuric smell sparked associations with moral collapse and compromised principles. At the same time, the potential heralded by the metaphors of quaggy ground also connoted regeneration bound up with sprouting, germinating and thriving (Mitek-Dziemba, 2025). The relevance of swampland as a vehicle for matter circulating in the closed-loop system over millions of years was addressed in silt- and mud-based performances by Teresa Murak, Richard Long and Joseph Beuys. Beuys waded across bogs, which he considered sanctuaries of primordial decomposition processes. As they worked with mud, the artists affirmed decomposition as a destructive force of transformation beyond hierarchies, a power that engendered horizontal community based on interspecies encounter and exchange.

Raising the humidity levels in the gallery room, the clouds of steam in Brzeżańska's piece reversed the characteristic modernist efforts to dry not only marshes but also procedures of description and concept-development by tying them to categorisations and distinctions. In philosophy, corresponding proposals have been put forward, for example, by Astrida Neimanis in her concept of bodies of water. Neimanis has called for descending from the rarefied air that makes us think of the planet in terms of the Blue Marble images – the globe as contemplated from the outer space, distant, blue, orderly, malleable and manageable. With their counterweight of grounding, or rather aquatisation, Neimanis' concepts tackle the issue of scale connected with the obsolescence of our erstwhile modes of thinking of time and space, an inadequacy that makes it exigent to find new parameters of understanding and describing the situation of *Homo sapiens* in the environment as it is now. Urged by



View of the exhibition *Adjacency*, 2024, installation of Iza Tarasiewicz, *The Means, the Milieu I*, 2014, Rondo Sztuki Gallery in Katowice. Photo by Krzysztof Szewczyk



View of the exhibition *Adjacency*, 2024, installation of Petra Janda, *Regina, Petra, Spheres of love, Cycle, 2020-2023*, Rondo Sztuki Gallery in Katowice. Photo by Krzysztof Szewczyk

Neimanis, thinking with water involves emphasis on dependence, submersion and drifting in the planetary hydrocommunity that criss-crosses bodies, themselves composed mostly of water, which carries the 3.9 billion years' worth of history binding the human and the more-than-human, the past and the future. Neimanis' hydrocommunity is a circuit renewed by vapourisation, precipitation, inhalation and exhalation. In this context, the realisation of being a body of water is a gesture of embedment in relationships to withdraw from which is a sheer impossibility. Neimanis depicts separateness as a dry myth cherished by Western culture and foregrounds the porosity of the body, time and again repeating that we continually absorb something, sweat, urinate and weep, in this way participating in the exchange of fluids between interiors of our bodies and the external environment (Neimanis, 2017, p. 2). Her vision of the future as necessary aquatisation is founded on the acceptance of humans' environmental entanglement and indebtedness to other bodies. Because the post-Enlightenment quantification of resources led us to abandon the global water project, we must now fashion a new aquatic imaginary in order to remake our relations with the environment, recognising the dense interconnectivity, proximities and interdependences while this project is beyond our current imagination informed by the sense of our superiority to nature (Tsing, 2016).

The horizontal flow of properties between contiguous substances and the practice of resource accumulation were highlighted by Iza Tarasewicz in her *The Means the Milieu from 2024*. Tarasewicz typically develops her installations as storages for collecting, inventorying and organising matter. The structures of thin rods, ropes and organic matter form archives of the circulation and acceleration of energy. They are constructions for splicing materials and their properties.

When building her pieces in gallery spaces, Tarasewicz seems to reenact the original ritual of creation. The installations she designs resemble matrices for reconstructing reality in case of disaster or the professional equipment for reproducing life that is fading away or has been annihilated. These features were recognisable in *The Means the Milieu* shown at the Adjacency exhibition, a piece in which reishi mushrooms, known for restoring vital forces, combined with an array of other natural substances, such as ash and India rubber, to produce a vision of a generative machine which, though momentarily at a halt, was just about to restart again. The rusty rods of the piece's frame and pulverised, withered or desiccated organic elements of its body suggested that the downtime had already lasted quite a while. Yet the fragile mechanism of the compressed structure suspended from the ceiling seemed to be waiting to kick back into operation if only a poke or a gust of air brought its parts into contact, initiating the exchange of properties and, thereby, the vital motion and action.

Radiotrophic Fungarium or *How to Make a Dress for Marie Curie*, a biotechnological installation developed by Saša Spačal in collaboration with Kaitlin Bryson in 2022, was another work shown at Adjacency that perfectly fits in with my argument. When Spačal works on her pieces, she often cooperates with microbiologists, and this joint effort charts intersecting interspecies trajectories. She incorporates living organisms into her installations, which spotlights the inherent relationality of her art, which is essentially founded on a web of interdependences, relinquishing the monolithic notion of authorship with its right to control the entire creative process. In *Rdiotrophic Fungarium*, Spačal employed species of fungi that absorb radioactive radiation and spun fantasies of using them as shields, coats and blankets for protecting bodies against the DNA-destroying effects of nuclear transformations.

The concept of distributed authorship is also usefully applicable to *Leaky Bags* produced by Isolde Venrooy in 2023 and 2024. Venrooy is interested in the notion of porosity, and her objects – bags – were deliberately perforated to strew seeds around. The trails she left behind marked the routes she walked in the field, letting the seeds fall out of the bags into fertile soil. The bags were made of fermented canvas, which the artist had buried in the ground for several months so that it retained microbiological remnants of decomposition.

What all the pieces I discussed above shared was their investment in conceptualising the activity of more-than-human beings which affected the shape of the works as they changed over time. Whether the microorganisms that damaged the structure of the fabric of Isolde Venrooy's holed bags, the sprouting seeds that were falling from them, the expanding layers of fungi spontaneously growing on the installations of Saša Spačal and Iza Tarasewicz, Agnieszka Brzeżańska's humidity-increasing olfactory project or the cave revealing its original shape as Mikołaj Szpaczyński was emptying its tunnels, each of these works was intrinsically processual. Over time, they were inevitably transforming, putrefying, evaporating, and withering away. Each of them accepted the unpredictability of this process and let the artists take the role of initiators, discoverers or researchers, attentive to and watchful for the potential developmental scenarios of their pieces, which came into being, in part, beyond their authorial impact and, in part, eluded their control.

Art history has been familiar with the idea of an open work that builds up in time at least since Dadaism with its classic *Merzbau* by Kurt Schwitters. A structure straddling the line between sculpture and architecture, *Merzbau* was initiated at the artist's flat in Hannover in 1927 and continued as a spatial diary for years to follow. The dynamic of its growth was determined

by the found objects integrated into it over these years, such as sheet metal, pieces of string, wooden planks, tickets, notes, photos, waste and leftovers. As opposed to this aggregation, one strategy frequently adopted in today's art involves transformation resulting from decomposition or other processes that deplete the texture of the work through exposure to external impacts. This approach is vividly exemplified by Anya Gallaccio's decomposing flowers in *Preserve Beauty* (1991–2017) and Dieter Roth's *P.O.T.H.A.A.VFB (Portrait of the Artist as a Vogel-futterbüste, 1968)*, a bust pecked away by birds in search of birdseed. Growing from long-lasting processes in contemporary art, these pieces emphatically embody the gradual abolition of the structurally fixed artwork as an object.

The origins of a formally open work that slides off its pedestal or shakes off confining frames by taking on a non-material or temporally mutating form go back to transformations that took place in the 1960s (Lippart, 1973). As a consequence of these changes, the notion of an artwork unravelled to permit works of art without a materially stable form (scent-based pieces), not involving artists' manual skills (conceptual strategies) or arising at the intersection of disciplines (art-based research, in which art is considered a legitimate method of qualitative inquiry, and works reveal their potential by dramatising data or by constructing practice exchange networks through which art can be shared). In his musings on the future of art, Jerzy Ludwiński wrote in 'Sztuka w epoce postartystycznej' ('Art in the post-artistic age') from 1972 that perhaps we did not deal with art anymore as it had morphed into something else which we had no name for yet (Ludwiński, 2009, p. 66). This was Ludwiński's way for outlining the evolution of art from the rejection of the traditional media to explorations of readymades, participants' movement as component of artworks and

transposition of everyday situations onto the domain of art, to the total phase, where artworks were radically stripped of materiality and transferred to the realm of ideas.

While these processes do not lie at the core of the artistic practice of the participants in *Adjacency*, they vividly epitomise the tendencies in art history that made their works possible as outcomes of the evolution the notion of art experienced in post-conceptual art. The commitment of artists such as Tarasewicz, Szpaczyński, Venrooy and Spačal to collaboration stems from their need for new ways of describing reality necessitated by environmental challenges. As technologically mediated experiences are spreading and making us feel ever more distant from other species, these artists use works of art as tools for fostering reflection on the materiality of the body, which they present as a holobiont, that is, an assemblage of activities of multiple organisms that determine its operations. Embodied in their installations, which change over time in virtue of the organic substances and living organisms they include, the archives of traces left behind by various species envisage solutions informed by cooperation and communality. The underground sculpture that discloses its shape without revealing much about the depth of its tunnels and depends on Szpaczyński's determination and effort in discovering it, the configuration of colours on the canvas immersed in the Vistula by Brzeżańska, Spačal's screen swelling from the fungi overgrowing its surface, sprinkled and warmed up throughout the show to sustain growth and the intensely smelling lingham in Tarasewicz's installation are all structures that work in time, adapt to the conditions of their surroundings and reflect long-term processes.

Aligned with one of the paradigms of contemporary art, the strategies practised by the artists at the *Adjacency* exhibition

sensitised the audience to metaphors based on entwinement and transformation. As such, they promoted attitudes of care and engagement, buttressed the sense of agency and conjured up a comforting vision of there being other possible modes of perception. This approach can be construed as a defence mechanism. Namely, such practices give the impression of seeking to divert attention away from environmental concerns. They supply a remedy for the nagging thoughts on the inevitable fusion of multiple organisms into one composite mass of minerals under geological processes, in which the Anthropocene as an era of the human domination over other species is but a tiny fraction of the history of the Earth.

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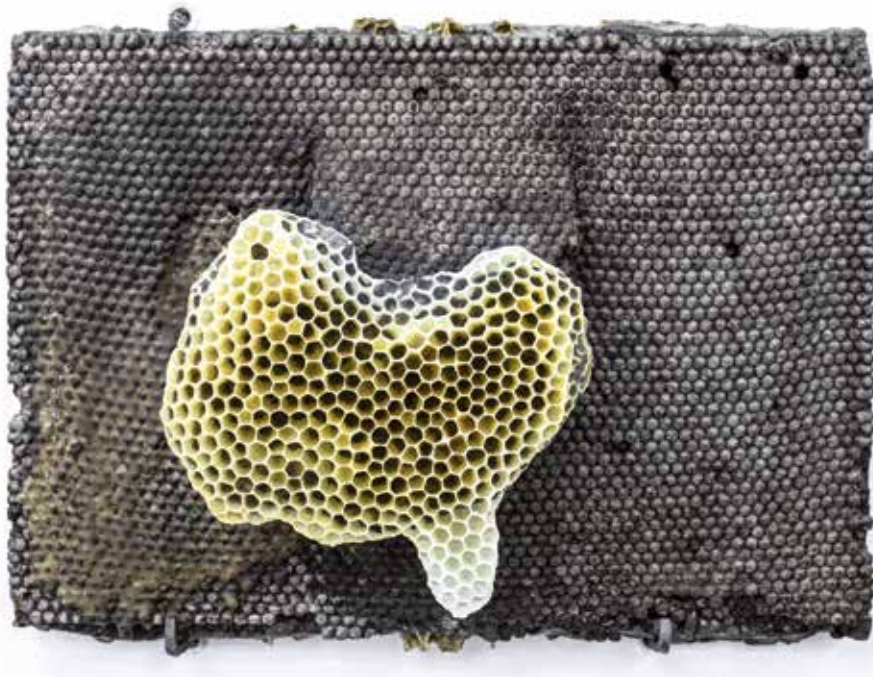


Figure 1. Michał Smandek, *The Spirit of the Hive*, 2021, relief.
Photo by Michał Smandek, courtesy of the artist

Michał Smandek [Academy of Fine Arts and Design in Katowice]

The Spirit of the Hive: **Internal Organisational Structures of Bee Life as Inspiration for Artistic Reflection on Society's Re-embrace of the Idea of Communality**

For a few years now, I have been working on a project called *The Spirit of the Hive* which involves cooperation with honey bees (*Apis mellifera*). I am interested in the internal structures that organise the life of bees and in the various ways they communicate. My fascination with these issues originated naturally, so to speak, from my engagement with my family's apiary. The major outcomes of my project include a series of reliefs from concrete and beeswax, produced collaboratively with bees. Specifically, I made concrete casts of honeycombs as bass reliefs on which bees later reconstructed the wax structure of cells at the spots I had marked. The process as such was my attempt at collaborating and communicating with bees.

Holding a concrete relief in beekeeping gloves, I needed to embed it in a beehive without harming the bees. I planted short pieces of sticks around so that there would be gaps and blockades, enabling the bees to move freely both all over the cast and past it. I also made sure that there was enough room for them to build wax cells on the concrete relief. Such collaboration could only be successful in spring and summer, when the bees responsible for wax production and nest building worked on expanding it; this meant that I had April through July at my disposal in terms of both using honey plants to the greatest advantage and benefitting from good weather conditions (Figure 1).

The beekeeper literature explains that bees behave in a pragmatic way. They will begin or continue to build a honeycomb where they find a piece of wax; hence the practice of making hive frames complete with wax foundations, that is wax honeycomb models. I remember a sentence from Maurice Maeterlinck's *The Life of the Bee (La Vie des Abeilles, 1901)*, saying:

But if the apiarist have taken the precaution of surrounding the upper lath of some of these frames with a narrow fillet of wax, they [bees] will be quick to perceive the advantage this tempting offer presents, and will carefully extract the fillet, using their own wax as solder, and will prolong the comb in accordance with the indicated plan. (Maeterlinck, 1912, p. 88)

'The spirit of the hive' in the title of my paper refers to a phrase coined by Maeterlinck, who closely watched and described the behaviour of insects in his philosophical and naturalist essays at the turn of the 19th century. I found it compelling to compare our today's knowledge with the knowledge from one hundred years before; I was also intrigued with Maeterlinck's poetic language replete with similes likening the swarm to a human society. He depicted bees as a model of a perfectly organised community, with every individual having a defined function and working for the benefit of the entire bee colony. In Maeterlinck, 'the spirit of the hive' is a superior power that governs the swarm, guiding its decisions and behaviour so as to ensure the survival of the species. Maeterlinck insists that:

All things go to prove that it is not the queen, but the spirit of the hive, that decides on the swarm. With this queen of ours it happens as with many a chief among men, who though he

appear to give orders, is himself obliged to obey commands far more mysterious, far more inexplicable, than those he issues to his subordinates. (Maeterlinck, 1912, p. 32)

Indeed, Maeterlinck's observations and intuition that the colony as a whole, rather than the queen bee alone, decided on the swarm were correct. When relying on the bee metaphor to describe human behaviour, he always indicated that it tended to be part of a larger order which might sometimes be incomprehensible to us. We know today that

[t]he bee colony superorganism is more than the simple sum of all its parts. It possesses properties that one does not find in single bees although many of the properties of single bees are determined and influenced by those of the entire colony, within the framework of its sociophysiology. (Tautz, 2009, p. 248)

There is no overriding, supreme form of control in the swarm. Constantly active in simultaneous operations, bees have developed a communal intelligence that determines their collective behaviour and combines individual bees' actions into a cohesive whole. As such, bees form a dynamic structure in which the behaviour of the entire swarm results from innumerable individual decisions. The flexibility of this complex system makes it capable of quickly adapting to the changing conditions of the surroundings. This adjustment capacity stems from individual bees' apt responses to the environment, their reciprocal impacts, extraordinary self-organisation, multi-level communication, mode of reproduction (parthenogenesis) and ability to maintain the internal balance through cooperation-based self-regulation (homeostasis) (Tautz, 2009, pp. 250–251).

In summer, when the bee colony is at its strongest, as indicated by the multitude of bees and the expanded nest containing ample larvae, the swarming season starts. It heralds the natural division of the colony for the sake of the survival of the species. The bees begin to build queen cells on honeycombs from which a new queen will emerge after some time to take over the role from the previous one. Swarming, which means the event in which the old queen leaves the nest with about 70% of the worker bees, takes place a few days before the new queen emerges. A cloud of bees hovers over the hive. Stocked with honey provisions for about ten days, the swarm will form a cluster to protect the old mother at a temporary location in the vicinity while the scout bees will go looking for a suitable site where the building of honeycombs of the new nest will commence. Meanwhile, as the new mother emerges, the worker bees destroy the remaining queen cells with the larvae within them. The new queen is preparing for her nuptial flight (Tautz, 2009, pp. 40–43).

In a strong and numerous colony of bees, the nest is quickly expanded. Over a mere two days, I was able to see a wax cell structure rising on the spots I had marked with a thin layer of wax. I would lift the hive cover and look from above at how the work was going. Sometimes, I found that the bees had connected the concrete cast to another frame or the sides of the box with wax. Closer inspections of the progress of work involved pulling the bass relief from the hive again and softly brushing its surface with a duster to sweep the bees aside and see what had been constructed. If the concrete-wax relief needed improvement, I put it into the hive again (Figure 2).

Honeycomb cells owe their hexagonal shape to the thermal properties of beeswax. As bees warm the wax up, it becomes more and more liquid. Yet these changes are not even across the structure and occur gradually. At 25 and then 40 degrees Celsius, the pliability of wax changes. Bees are able to raise their body

temperature to 43 degrees, which makes the plastic forming of wax possible. The size of cells is measured by the bees' own bodies as they surround themselves with wax walls that resemble a cylinder with a hemispherical bottom. The cylindrical top morphs into a hexagonal shape by itself, so to speak, when bees raise the temperature of wax to about 40 degrees, and the thin walls of the cells begin to melt, while internal mechanical tensions within the substance flatten the places where the cells touch. Since each cell has six symmetrically distributed cells adjacent to it, the hexagonal shape is produced (Tautz, 2009, pp. 157–172).

A steel plate protrudes from one of my bass reliefs, where I put dead, desiccated bees. This is so-called *podmore*, which is a beekeeping term for winter bee debris. Pulverised bee debris can be used as an extract or a decoct in apitherapy (Kędzia & Hołderna-Kędzia, 2017). The term refers to the generation of bees compressed into a dense coil to keep the right temperature inside the hive in winter. When winter is over, dead bees are transported outside by other bees or fall down onto the bottom board of the hive. I picked such bees one by one and dried them. Arranged into a conical structure, the dead bees are a symbolic rendering of the broader phenomenon of bee extinction. What is known as the 'pollinator decline,' a development linked to the colony collapse disorder, was noted at the end of the 20th century and is closely linked to human activity, including the industrial expansion, the degradation of green spaces, environmental pollution, huge areas of crop monocultures and the massive use of pesticides and other chemicals that make insects prone to pathogens (Pollinator decline, 2025; Colony collapse disorder, 2025). In this context, it is crucial that honey bees are among the most effective pollinators. As much as 80% of the world's flowering plants are pollinated by insects, and 85% of them are pollinated by honey bees (with the proportion



increasing to 90% for fruit trees). Forty thousand species of flowering plants cannot do without bees at all (Tautz, 2009, p. 57). It is estimated that up to one third of all the food consumed by humans is produced thanks to the bee pollination of plants (Pollinator decline, 2025).

When arranging the project in various galleries, I installed a similar object as an expositor directly protruding from the wall (Figure 3).

Another bass relief has a steel rod jutting out of it, with a wax textile – A Bee Flag – attached to its end. It is a thin film of wax transferred when liquid onto a netting. As the wax fluid did not close all the mesh points, an openwork pattern came into being, resembling an encoded record of data. I called it *A Transcript of the Language of Bees*. A pinhole notation could also be seen in a standalone sculpture titled *A Bee Banner*. In this piece, two wax textiles were hung over a manually wrought steel arm planted in a pipe which was itself fixed to a concrete spherical lens-shaped base. This construction made it possible to have the sculpture rocking by moving it with one’s hand. When holding a flag or a banner in one’s hand, one usually manifests something, celebrates and/or communicates a message.

As I bent over an open hive, I wondered what humans would know of the world and themselves if they learned the language of other species. The structure of the wax textile I produced stirred reflection on the relevance of communication, speech and language as a tool that enables us to construct the entire social reality not only on the human but also on the interspecies level. I understand ‘the spirit of the hive’ as a metaphor for a cooperating community, and this notion was an important pillar of *The Bee Library* project I developed.

The Bee Library event had two acts, which I titled, respectively, *The Bee Library* and *Words of Bees*. The project was collaboratively



Figure 3. Michał Smandek, *The Spirit of the Hive*, 2021, relief / installation. Photo by Cezary Wierzbicki, courtesy of the artist



Figure 4. Michał Smandek, Olga Smandek, *Words of Bees, Noko Giri II, Ichinomiya, Japan, 2024*, installation. Photo by Michał Smandek, courtesy of the artist

developed with local communities, and it involved the collective action of constructing a multi-element spatial installation from beeswax textiles. At the core of the project are encounter, collaboration and communication in which information transfer as such matters less than the establishment of relations and bonding. I believe that the latter can provide a starting point for the development of new models of envisioning the future, the insecurity of which we sense and already experience in confrontation with climate change.

Carried out together with Olga Smandek, the first part of the project included an artistic residency and an exhibition titled *Words of Bees*, which took place at the Noko Giri II gallery in Ichinomiya, a city in Aichi Prefecture (Japan). The gallery itself is situated in a former textile factory that boasts a century-long tradition and has been owned by several generations of the Hiramatsu family. The Aichi Prefecture has historically been a hub of the textile industry for more than three hundred years now. This local context was highly significant to us because the residency was focused on making beeswax textiles by means of our original technology during creative workshops for the local community. The project received funding from the Polish Culture around the World programme of the Adam Mickiewicz Institute and from the Academy of Fine Arts and Design in Katowice. The event was also promoted by the Polish Institute in Tokyo. The Noko Giri II gallery was filled with loosely hanging textiles. Assembling about seventy pieces, the arrangement of the installation was aligned with the architecture of the factory's interior. The audience were invited to move among the textiles, touch them and set them in a rocking motion, which enhanced the dispersal of the beeswax smell (Figure 4).

The other part of the project was staged at the Rodríguez Foundation gallery in Poznan (Poland), where about two hundred

and fifty textiles were made. Basically, the two shows were underpinned by the concurrently developed concept as *The Bee Library* in Poznan was an outcome of putting the project in for a competition. The idea was appreciated by the jury of the 2024 Hestia Artistic Journey National Grant Programme and was among the ten exhibitions selected for implementation under the patronage of and with funding from the Foundation. The promotional materials, which were based on the conceptual description I had provided in the competition entry, said: *The Bee Library* show seeks to draw attention to the effect of the primacy of individualism in Western societies. At a time of pedestalsing an individual's skills and predispositions, Michał Smandek invites the audience of his show to engage with a multi-element spatial installation that aims to shift emphasis from 'I' to 'we.' As an artist, Smandek has long explored the human/nature interdependence, and for the last few years he has focused on the study of the behaviour of honey bee colonies, which are pivotal to our ecosystem.

When visiting the show, the audience will have an opportunity to make a real impact on the final shape of the exhibition by adding their own pieces to it. As an effect, the authorship of the installation is distributed among multiple individuals, the way the labour of bees is in a beehive, and the ultimate effect will only be revealed when the event comes to an end. The project is carried out at Poznan's Rodríguez Foundation Gallery, which invites you to join a journey that starts from the beehive, bees and their communication principles and ends with reflection on society's re-embrace of the concept of communality, which may be the most seminal and indispensable change in the civilisation of the 21st century. (Biblioteka pszczół, 2024)

Each textile was made by two people, and the way it looked depended on their communication. The pairs consisted of people

who knew each other and also of complete strangers. Their status changed the moment they began to work on their piece. Erstwhile strangers were no longer strangers when working together, and people who had met before were further bonded by a work of art they were jointly producing. I believe that this was a moment of agency, as I am also a believer in the meaningfulness of collaboration and the common effort of developing *The Bee Library* in Poznan, Ichinomiya and other locations where the following beeswax textiles will be made. All workshop sessions were preceded by a demonstration, which can be called a visual and verbal tutorial (in Japan, we offered a paper manual in Japanese with photos of the stages of the process). One person immersed a netting in liquid beeswax and handed it over to the other person, who held it by the edge, shifted it and pulled it up. A netting was two metres long, a rough equivalent of the height of a person with their arms raised. Shorter individuals could avail themselves of a step stool. The layer of wax registered every movement the body made when pulling the textile out, complete with its dynamic and pace. With a bigger group of participants, each pair is a model for the following one, and the group learns by and from observation. Cooperative action in supportive atmosphere is known to have a highly beneficial influence on the mood of individuals and the group as a whole. I could never see a person hide their joy at the climactic moment of hoisting the ready textile up from the beeswax. This also marked the moment when the facial expressions and tension of the individuals involved transformed from focus and attention into satisfaction and relaxation, a change recorded in photographs. The positive energy generated by the project is precious both to the participants and to me.

Beeswax textiles bear configurations of apertures that make one think of code patterns. They appear as a textile is dipped in hot

liquid wax and then lifted out of it in a proper manner. Whenever this process is performed, a unique specimen comes into being. To my mind, the patterns produced in this way and resembling a cryptic script symbolically convey knowledge that is hidden from us. The description of the exhibition contains a sentence about the structure and various forms of recording information. We are familiar with visually similar configurations in Braille, the Morse code, perforated memory cards of early computers and Jacquard looms. Indeed, Jacquard machines use a visually similar system of holes. Before 1800, complex weaving patterns had been executed manually until Joseph-Marie Jacquard used what came to be known as the Jacquard loom, mechanising and revolutionising the textile industry. By using a series of punch cards to control the pattern, the loom operator worked faster and with more accuracy. The design was transferred from squared paper onto a model card in which holes were punched; then, the cards were sawn together into a uniform strap and fed into the loom (Jacquard loom, n.d.). The beeswax textiles in *The Bee Library* are similar to these chains. Each textile was signed by its maker (during the workshops in Japan, the participants signed original cards used when the Hiramatsu factory was in operation; the cards were attached at the bottom of the hanging textiles). When the exhibition was over, the textiles, signed and rolled up, could be collected by their owners.

At the Rodríguez Foundation in Poznan, the makers' names and surnames were displayed on the gallery window, through which one could see the interior with the textiles hanging in it and the workshop session in progress. The window pane was ever more densely overwritten with names as the exhibition itself grew ever denser with the pieces. There were more and more textiles, which came to form a labyrinthine structure,

with the audience having to push them aside when ploughing their way through them. Touching and moving the textiles was an intended effect of the total sensual experience of the installation. The pieces moved and rocked, filling the interior with an intense smell of beeswax.

Beeswax is made by bees and used to build the nest. Worker bees are most effective at wax production between their twelfth and eighteenth day of life. Wax is produced by eight glands in the abdominal part of the gaster. As a bee secretes (sweats out) wax, it congeals on its body into a thin scale, which the bee later chews with its mandibles, mixing it with the discharge from its mouth. In this way, wax of appropriate consistency is produced and later used to build combs of the nest. We use this wax in our project. A bee takes about four minutes to process one wax scale, with 100 g of wax sufficing to produce about 125,000 scales, from which about 8,000 comb cells can be formed. As some bees stack wax scales, others stretch them to form cells. The production of wax, as well as keeping bee brood warm, requires a lot of energy, which bees obtain from honey (Tautz, 2009, pp. 157–172).

To make honey, bees use vegetal nectar, which is a watery and sweet solution of various carbohydrates. The nectar they collect undergoes a series of chemical processes driven by various enzymes and turns into honey as bees raise the temperature in the hive and evaporate excess water. Honey is stored in comb cells, which are sealed with wax by bees. Honey is a hygroscopic substance, so the air-tight wax scab prevents it from absorbing water again (Lampeitl, 2011, pp. 148–150).

Traversing the textile-filled gallery space, we approach the wall with used beekeeping gloves, covered in propolis and wax, sticking out of it. The gloves are arranged into the sign of the Polish sign language that stands for RAZEM (TOGETHER), a fitting conclusion from and to the event.

Community building is essential in any social system (Segiet, 2021, pp. 25–26). Both the cultivation of individual autonomy and belonging to a community are essential. Likewise, the survival and development of a bee colony hinges on competition and collaboration. Our pro-social attitude was a trait that made the evolution of our species possible, and communality is pivotal to our survival. In the context of climate change, we would be well-advised to explore what survival strategies have been used by other species over hundreds of millennia. Where they individualistic or rather collective and communal strategies promoting social relations and care for the common good? Which of them more effectively facilitated coping with difficulties in adapting to the changing environmental conditions (Czykwin 2022, p. 10)?

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Mikołaj Szpaczyński, *24 metry (24 Meters)*, 2019–2024, video. Courtesy of the artist

Mikołaj Szpaczyński [Academy of Fine Arts and Design in Katowice] **Twenty-four Metres**

An Unknown Land

It was in 2007, at the beginning of winter holidays, I guess, that I was browsing through a speleological Internet forum and learnt that there was something like a cave in my hometown of Jaworzno, almost next door, to boot, at the foot of the Sodowa Mountain. Precisely speaking, in a former quarry that cuts across the western slope of the mountain. I did not go there often. It was just a huge, human-made crater in the ground, with its limestone walls crumbling, jagged, as they had been, by explosives. The object described on the forum could be at most four metres long. This was just enough to spark my interest. To go to the closest cases, you would always travel to the Jura¹; such places were not known in my area.

The quarry in the Sodowa Mountain had been in operation for almost one hundred years and was quite big. The last truck-load of rocks had left it in the 1990s. Since then, the place had already become thoroughly overgrown. Ploughing my way through the thicket of trees and shrubs, I eventually spotted an opening in the rocky bluff, a few metres above the bottom of the pit. To reach it, you had to climb up the clayey, rusty-brown escarpment. It looked like a clay waterfall, spilling off from inside the hole. The hole itself was shorter than described; it was only a two-metre-long recess in the rock, with residual clay accumulated at its end.

I shortly returned there with a garden trowel I had pilfered from my mum and began to dig that clay out. Basically, I was not sure whether the place was a natural or human-carved object. Yet as

1 The Jura refers to the Krakow-Częstochowa Upland, which is also called the Polish Jurassic Highland or simply the Polish Jura. (translator's note).

I continued to uncover the passage, I first saw the hemispherical ceiling, appearing gradually, and then streamlined walls. I realised then that the hole must have been formed by water, like the Jura caves. At the same time, it was a completely new sight to me, probably because I was in the Silesian Upland, an area formed of Triassic limestones, which are older than those in the Jura by one hundred million years or so. There are no interesting underground empty spaces to see across the area, only some ugly, crumbling remnants in old pits (Pawełczyk & Rogala, 2010). Still, what was emerging in front of me looked interesting and made me more and more assured that it was a real, well-preserved cave. The only thing I could not understand was how the hell come that all of its interior was densely crammed with clay.

Digging was a lot of fun, and I kept it up for a few months to follow. The hole was slowly growing bigger and bigger. Initially, you could only lie in it, then you could crawl in on all fours and finally squat. I was beginning to realise that no one had been there before, that I was discovering an unknown land. Just one kilometre away from home.

In late summer 2007, the object was T-shaped and five metres long. The branch to the right ended plugged up at one metre, To the left, I had cleared two metres and could see that there was definitely still a way to dig. Yet the roof of the face² looked rather unstable. I was afraid it would tumble down right on my head if I kept digging. It was no fun, no joke anymore. I backed out.

Return

I returned to the half-dug-out hole twelve years later, in July 2019.

At that time, things were falling apart for me, and when rambling around one day, I just felt an urge to go back there.

2 The face is the surface at the front of a mine heading where work is actively advancing.

I inspected the surface of the walls; weathering had cleared them of clay remnants over that dozen years. The rocks once hanging down from the roof, which had effectively driven me away from the place, were already down on the ground. I found my trowel, too, rusted all over. I grabbed it and drove it into the mass of residual clay at the end of the corridor with all my might. I pulled the handle down and cleft off a big lump, which bounced back straight into my face, falling into pieces. I swiped my eyes clear and got digging hard.

One week of digging later, I had cleared another metre of the passage and was not going to stop at that. The occupation proved to be the very thing I needed at that moment. I disappeared underground, digging myself a getaway from disappointments. I did not take long to sweat away my depression though taxing physical work amid rocks and clay, both older than human thought. I had enough geological knowledge to infer that the hollow was part of the palaeokarst, that is, a remnant of a cave from very old geological times that had been buried by clay sediments perhaps more than one million years ago (Szulc, 1998).

Sculpting I

The rust-eaten blade of my old trowel quickly broke off the handle.

Next time, I brought various working tools with me, but I abandoned them all as soon as I tried a sculpting chisel. It was easier to drive into the hard, compact clay than the towel. If I could not cut much at a time, the uncovering became a meditation on every piece of the cave for me. Tiny bit by tiny bit, I was creating its space anew. On reaching the walls, I manipulated the chisel more carefully so as not to scratch them. There often was a thin layer of limestone dust between clay and the rock, which made the clay chip off the walls relatively easily. On such occasions,

I could see for the first time fragments of water-smoothed rock surfaces with karst pitting and karren. Sculptures are marked by traces of hewing left by the sculptors. My hewing leaves the nature-made relief. I am an assistant of nature who reveals the sculpture it created.

A cave is a natural hollow in the rock that can be penetrated by humans. Speleology identifies three types of such hollows, based on their size. Alcoves are the smallest of them. They are recesses in rocks big enough for a human being to fit in, at least when ducking. Rock shelters are bigger than alcoves. They are caves that are fully lit by daylight, regardless of their horizontal extent. In the past, only the caves that were not longer than ten metres were defined as shelters. Caves proper are those long enough to be dark inside. Thus, my hole was a rock shelter at that moment in terms of both the new and the old criteria. It was seven metres long, and the light from outside reached its end.

It would be cool to cross this threshold and cut a cave at a stone's throw from home. That clay hid a hollow in the rock of yet-unknown shape and size. I did not know how long my path would be, whether it was going to stop at a dead end right away or to continue on and on over dozens of metres.

The Material

An mollusc shell impression was preserved in the roof of my cave just behind its mouth. If I went back some two or four hundred million years back, I would be swimming in an ocean or got solidified in calcareous mud.

About two hundred and forty-seven million years ago, toward the end of the Early Triassic, as land on the Earth was still one supercontinent that we call Pangea today, the ocean levels started

to rise. Where Poland and German are today, a huge, though shallow, sea was created and remained there for some dozen million years. Its marine fauna comprised relatively few species, with molluscs, crinoids and brachiopods massively prevailing. Remnants of shells were sedimented at the bottom of the sea, crushed into bigger or smaller pieces, mostly into fine lime dust. Over millions of years, the deposit thickness reached about one hundred and seventy metres. Under the pressure of new layers of sediment, the deposits were compacted and cemented. In this way, limestone rocks came into being, and now I am within one. These rocks are a petrified mass of compressed remnants of marine lifeforms. The cave I am uncovering today began to form in this now-dry and stiff mass at an indefinite moment in the past after the sea had disappeared. The profile of the cave's corridor walls clearly exhibits separate rock strata built one upon another like a layer-cake. These strata differ in thickness and texture. Each of them is a record of its period in the history of the sea, with its different dominant animal species and climate conditions. There are thin and folded layers, which register the times when storms raged, and there are thicker and uniform layers, which were formed when the sea was quiet for longer stretches of time (see Państwowy Instytut Geologiczny, n.d.).

Primordial marine creatures were the makers of limestone.

Absorbing salts and phosphates from the environment, they produced it as material for their skeletons and exoskeletons. Since limestones are the only kind of solid rock of organic origin, I find them the most interesting of all. They came into being as life developed on the Earth.

Continued I

My chisel hit against resistance. A stone? A big one. No, it's not a stone; it may be the wall. A dead end. It had taken weeks until

Metre eight

I managed to dig into the truth. It was not the definitive original end of the cave, but a breakdown, that is, a sizeable rock block that dropped off the roof and plugged what probably was a further passage. Technically speaking, a boulder.

Metre nine Half a tonne of the dug-up spoil later, in winter-time, I knew that the boulder did not bung the entire cross-section of the hallway. There was a narrow gap of about forty centimetres, which made it possible to bypass the boulder by digging to the right. So I went on gouging clay between the boulder and the right wall. The wall was neatly washed³, which fed my hope that there might still be a lot in front of me.

Metre ten Behind the boulder, the narrow passage seemed to be leading to a somewhat bigger space, and it took me the whole winter to excavate this bit. In spring, it became clear that the space was a small chamber where I could sit up and turn around easily. When clearing its hooks and crannies, I found peculiar ceiling anastomoses⁴ and a rock pillar. The chamber was the first place beyond the reach of daylight coming in through the mouth opening. Having switched off my flashlight, I could no longer see my hands when waving them in front of my eyes. It is indeed only rarely that we obtain an opportunity to experience the total lack of light. There is usually at least a tiny light source around. It may be the glow of the city, moonlight or starlight. I stood there for a longer while and contemplated the darkness I had dug out. In this way, my hole stopped being a rock shelter and became a real cave – the only one in the area of the Jaworzno Hills (Pol.: *Pagóry Jaworznickie*).

³ In the speleological jargon, this means rocks that have been smoothed by water.

⁴ Grooving in the roof, carved by the stream flowing between the roof and the sediment after the siltation of the cave.

The place was so cramped that to dig further I had to adopt complicated postures, often ending up with my neck muscles severely strained. It took me a month to unblock merely one metre of the passage. Making my way through required effort. I had to lie down on my side, squeeze in between the walls, then wrench myself from the rocky embrace by jolting sharply and push through to a small widening. Then, I had the working face just in front of me. As long as it was of clay, and not rock, there was still something more to dig for me. Yet I soon hit a hard place.

Unfortunately, it was a wall. A dead end. I long refused to give up. I tried and dug under that wall several times in the hope of finding any gap in the rock, even a fissure, but to no avail.

Time and again, I was only ever more certain that I had reached an end. The blade of my chisel broke off the handle in these frustrated attempts. This was the symbolic last straw.

It was summer 2020, exactly one year since I had resumed digging. I found it difficult to accept that my journey was over. I had walked the cave more or less nine hundred and thirty times over, each time getting a few centimetres deeper in. My curiosity of what was ahead was the fuel that drove me, and uncovering was the goal to which my energy had been channelled throughout that year. And eventually it crashed against the wall.

In autumn, I came to the cave again, with a new chisel. I decided to attack that end once again. I crawled to the face and started digging downwards, deeper and deeper. Unexpectedly, a few centimetres below, the hole began to give in. I dug through to the bottom of the rock, which I had interpreted as a dead end before. There was only clay beneath. It was not the final destination of the water that had once carved the cave, and I was happy even if there should be only one metre more to uncover.

Metre eleven

A Dream

Something was wrong with my face. My fingers felt a big hole in my forehead, and I panicked. I rushed to the bathroom to examine the wound in the mirror. Inside the hole, I saw the interior of the small chamber with a pillar. I calmed down. Everything was all right; everything was where it should be.

The Spoil

The talus of ruddy clay over which you climb to the cave mouth is constantly growing. It slowly spills over the area like a moving dune. Over one year of excavation, I poured almost five tonnes of the spoil out of the hollow. I had come back home all smudged in clay so often that people had stopped frowning on me. Clay densely fills cracks in the pavement in front of my house. As I sweep my room, dry clayey dust is the main component of the dust specks I gather. When I push through between the cave walls, the old, dried-out remnants of clay stuck to my overalls change into airborne dust, some of which probably sits in my lungs. After a day's work, I blow clay out of my nose, and when taking a bath, I have brownish water running down my body.

A while ago, I lost hearing in one ear because clay had completely clogged it. The laryngologist was astonished at what he saw, and I was not really able to explain it to him, because all I could hear was still the buzzing from pressure washing.

The clay in which I have been messing around for more than one year is most probably *terra fusca*. This soil is only produced in the subtropical climate as exposed surfaces of limestone rocks weather. There are no proper conditions in Poland now for such soil to form; it is a relic of very old times when the area of Poland was situated closer to the tropic. This is why *terra fusca* is not to be found atop the ground, with all of it having been washed off

to the subterranean hollows, sometimes entirely silting them up, like in my cave.

Continued II

Having crossed the 'dead end,' I saw that the corridor was somewhat different. Up to that point, the entire passage through the cave was a slowly descending tunnel cutting through ever older layers of limestone, which had been formed in differing conditions of the Triassic sea. Around metre twelve, I reached considerably thinner strata that had been produced when the seabed frequently emerged from the water. As a result, the walls looked like a carelessly erected rampart. I realised that in thin-bedded limestones, water produced hollows not only by the chemical dissolution of rocks but also by tearing lumps off them and thus mechanically damaging them. This reduced the aesthetic quality of this part of the cave. At the same time, its filling was more interesting because instead of a purely clayey composition this section also had a thick layer of clean, fair sand just beneath the ceiling.

Winter came. The corridor continued straight forward, with its style unaltered. Had it been as pretty as the small pillar chamber, I would have spent more time revealing more of its form. But it was still unprepossessing, so I wanted to dig through it with as little effort as possible. I cleared it to the height of thirty centimetres under the ceiling, which was exactly as much as I needed to crawl further on in a lying position.

Then, 2021 came. Making my way ahead was more and more toilsome. With every cleared metre, I had one metre longer to transport the spoil outside. The device I'd used so far (a woven eco-pea sack) did not work anymore, mainly because I had to drag it a bit uphill. It already took me almost fifteen minutes

Metre twelve

Metre thirteen

Metre fourteen

to hoick out one batch outside, and it was exhausting. In imitation of an invention I had seen in a Jura cave, I bought a canister and made a tramcar of it by cutting off one of its sides and tying a piece of rope to the holder. With the canister having rounded edges, it was perfectly suited to pull over the clayey ground. This helped me reduce the time of removing a batch of spoil from fifteen minutes to a few.

Metre fifteen Toward the end of winter, the passage with sand was thrice as long as my lying body and reached a wall which, to my utter joy, was thick-bedded and prettily modelled by water. I could dig further at a right angle to the left. Soon a puddle of water drops trickling off the ceiling began to appear periodically just before this turn. Some speleologists would even say that this puddle was a small cave lake. The shape of the passage forced me to take a bit of a bath when on my way to the face. Time and again, I poured the entire lake into my tramcar and spilt it out outside. I did not want to go out with my clothes wet until spring.

Sculpting II

Works of inanimate nature appear spontaneously and unconsciously. We often consider them in terms of artworks. Contact with them can inspire opulent aesthetic and sensory experiences and affect our moods. One can also interact with them.

My interaction with a work of nature has never been as complete as with this cave. Every square centimetre of its space is an outcome of the work of my muscles. I gouge out the same shape that water had once carved out. In this way I find myself relating to these elements. Having unfolded unwitnessed, pre-history, so to speak, seeps into my memory and my body. I develop an awareness of the cave's creative process. I am getting to know it as accurately as an artist knows their work. By default, no

detail can escape my attention. Bit by bit, I register every bulge and every hollow in the walls and the roof I uncover, and they merge into one whole.

Passing the entire dug-out way involves a sequence of movements to perform. Its turns, shapes and, mostly, small sizes determine a choreography that has become etched in my memory. This is particularly useful when I go backward from the face to the cave mouth, dragging the cannister filled with clay. I know when I need to turn, when I need to bend and when I can walk upright. The thousands of the passages I have made have polished smooth some pieces of the walls I have to rub against. This is, as it were, another geological stage that has made its imprint on the cave's walls.

The Fauna

One of the distinctive features of the cave environment, its specific microclimate considerably differs from the atmospheric conditions outside. This difference is determined by the lack of sunlight, high air humidity and a modest annual temperature amplitude. When I first met 'my' cave, it was a short, dry rock shelter, entirely sun-lit and exposed to external weather changes. As a result of my activity, its size increased, extending downward into the ground and, as this process was taking place, the subterranean microclimate arose.

Today, if some temperature fluctuations can be felt close to the cave mouth, the temperature seems to be entirely stabilised from the small pillar chamber on, as confirmed by my measurements. Whatever time of the day or season of the year, it stands at 8 degrees Celsius. It is the typical temperature of the cave microclimate at our geographical latitude.

These specific conditions began to attract a variety of creatures characteristic of subterranean ecosystems (Baryła, 2000). The nocturnal tissue moth (*Triphosa dubitata*) is the dominant species in my cave's fauna. I have never seen such a big aggregation of the tissue moth anywhere. Tissues sit on the walls along the cave's extent though they do have their favourite sections. They appear in early summer to disappear only in spring. Sometimes, they occupy the walls I have to rub against when getting through the cave. I gently poke them with my finger, and then they fly away to a safer spot. Once, I saw a small tissue get entangled in a spider's web, and two small spiders rush briskly towards it. At the last moment, I caught the moth by the wing and pulled it out of the web. Perhaps I shouldn't have meddled with this, but somehow I was not able to leave it there. In the flashlight, the eyes of tissue moths glow purple.

In late summer, the herald (*Scoliopteryx libatrix*), another nocturnal moth species, appears in the cave, though not as numerously as the tissue. I find ten herald individuals at most in a year. With their characteristic flame-like pattern on the wings, heralds are very pretty. They are less lively than tissues and usually choose a place on the roof, where they vegetate, waiting for spring. I wonder sometimes whether they are still alive. At the end of winter 2021, three of them were indeed dead. They were invaded by a fungus called *Beauveria bassiana*, which grew into their bodies as a white foam-like fountain. I first left them where they were as micro-memorials to nature playing out in the cave, but a few months later, the fungus began to attack the other insects. In the end, I collected and carried out all the infected bodies to stop this from spreading.

In summer 2021, I met a transparent-orange winged insect with its antennae as long as the rest of its body for the first time at my place. I had seen some of those in other caves a few times

before. I found out that it was *Stenophylax permistus*, a caddis fly species. It is an interesting creature whose larvae live in clean streams and headwaters. They build portable tubular houses of duckweed, small sticks and pieces of crustacean shells; some species even make hunting nets. *Stenophylax* is the only caddis fly species to be found in caves. At my cave, it has been a regular since 2021; small groups of them usually sit in shallow solution pits in deeper parts of the cave.

The cave has also been visited by multiple arachnids, with most of them coming other rather randomly and staying only briefly. Merely one species has settled here for good. Having spent a long time looking it up in databases, I learned that it was *Nesticus cellulanus*, a species of cave cobweb spiders, rather rarely found and not numerous, albeit rather widely distributed. Caves and adits are its natural habitats.

Soon afterwards, a male and a female of *Metellina merianae* appeared as well. It was another arachnid species unknown to me before and preferring underground locations. Today, tens of their offspring populate the cave.

I rejoice at every new subterranean animal that appears around. The newly uncovered becomes more and more cave-like in this way. At the end of March 2020, it went through a initiation of sorts as it was visited by the first and so far the only bat I have seen there. In all probability, it was a greater mouse-eared bat (*Myotis myotis*). It found shelter in the cave for a few days when winter made its comeback shortly after the first official day of spring.

Continued III

Digging to clear the passage behind the turn, I suddenly made a motion I shouldn't have made, but I just couldn't resist it. I bounced off the bottom with all my might and hit the cave ceiling

Metre sixteen

with my back. I dropped on the bottom and bounced back up. My body got inertly caught in this sequence; it flew up and down, hitting the roof with a boom until it began to crack and come down on me. The whole cave collapsed, and at that point I woke up. I went to the cave the same day. Everything was where it should be.

Working on this stretch, I had the roof on my mind quite a lot.

Behind the turn, the corridor was a bit wider, and the broader the hollow, the greater strain on the roof. When the cave was filled with sediments, the entire roof rested on them. I did not know whether this had happened several hundred thousand years ago or more than a million years ago, but at that moment gravitation had been put to sleep and remained so until I came along. With me clearing the cave, the roof was again left to fend for itself, and I was left to its mercy. I uncover the roof bit by bit, trying to grasp its structure. I rely on my sight, touch and also hearing – tapping with my chisel, I test its stability and establish whether it will withstand its own weight. I pass under the freshly revealed patches carefully, staring carefully up. It takes me a few months to develop trust.

Metre seventeen It turned out that the passage behind the turn stretched for two more metres, arriving at a dead end then. My path was closed by solid rock walls from all sides. My mind was like water looking for a discharge. My mind only wanted to flow through. I spent entire August excavating clay from the bottom of this two-metre-stretch in search of a passage so that another small chamber was created there.

Eventually, I found two karst pits at the bottom of the walls to the right and left of the chamber, which suggested that water had tried to flow in these directions and that it might have carved something out there. I dug beneath the two pits and, indeed,

some side passages began to appear. It occurred to me that if water bifurcated to two sides at that point, the passages would be twice as small and perhaps too narrow for me. In September, it turned out that the passage to the left was tiny, and I could barely slip my hand into it, with most water running to the right, wearing away a corridor wide enough for my body to pour further through.

The beginning of the new corridor looked bad indeed. Its roof was a mixture of stones and clay and seemed to be held together with spit and glue. It looked as if it had been propped up by the alluvial deposits just before, if not while, crashing down. When I dug out the silt, all this fell off when I was not there. Luckily, an upper, more solid layer of the ceiling was revealed in the process. I used my chisel to help the rest of the weak layer fall off. A bit further, the passage suddenly changed, morphing into a nice little tunnel meandering amid solid rock. It surrounded me with its hemispherical vault from above and its smoothed plinth from the sides.

Several tens of tramcar-fuls of dug-out clay later, in January 2022, I was able to slide under this hemispherical vault down to a widening, which seemed to be the front of a promising-looking chamber.

The form of the chamber was becoming ever clearer with every day of work. It was nicely washed and had a solid structure, with a rising, somewhat dome-shaped vault. When clearing it of clay remnants, I discovered karst relief forms I'd not seen in this cave before; specifically, a well-developed ceiling channel⁵ and a pothole.⁶ If I were to choose my favourite place in the cave, it might be this part. I spent whole spring, deepening the chamber with a view to creating a large space for contemplation.

5 An oblong gully in the roof washed off by a turbulent water flow.

6 An oval dip carved out in the roof where fast-flowing water swirled.

Metre eighteen

Metre nineteen

Metre twenty

Metre twenty-one The length of the cave prompted me to make a new tramcar from a canister of twice as big holding capacity. Pulling it through the entire cave was slower, but anyway quicker than transporting the same amount of the spoil in two batches by means of the old tramcar. Soon enough, the new one was even more efficient when my muscles had become used to dragging this load.

Metre twenty-two One day when I was midway through the cave, a lightning struck somewhere in the vicinity. The powerful soundwave of the thunder rumbling was absorbed inside and amplified by the cave. The sonorous ultrasounds reached me and pierced my body.

Metre twenty-three The corridor was narrowing down, which I took to indicate the end of the chamber. The passage kept me in its tight embrace. Squashed, I scooped the spoil with my hands because my tramcar was too big to get there.

Metre twenty-four In September, I dug through the rock squeeze and found a wall that closed the way ahead. I could still dig to the sides. Half a metre further to the left, the walls locked together. To the right, the fissure continued, but its width shrank to twenty centimetres.

A Nonhuman Perspective

Over the four years I have spent discovering the cave, I have constantly been confronted with a nonhuman perspective. That unknown and yet-unseen by the human eyes has regularly kept me up at night. At moments, I was so curious about it, that I went out to dig at night. But I was never able to catch up with it. Whenever I revealed another bit, it stopped being a nonhuman perspective as soon as I laid my eyes on it. The nonhuman perspective was always where I had not arrived yet, all the time ahead of me. Nevertheless, I firmly believe that I have never been closer to it.

Sculpting III

Every cave is created by nature as a negative sculpture in the rock and represents a unique way to go. The current shape of the way that leads through my cave has been determined not only by natural geomorphological relief-making but also the decisions I made when excavating its interior. I created a varied route, a bit sporting, with stretches that require some effort. The initial ten metres, from the cave mouth to the pillar chamber, are a relatively spacious and representative section. Any tolerably fit person can visit this part without any major exertion. The further five-metre-long section is only uncovered to little extent. Getting through it takes courage and overcoming potential claustrophobia. At the end of it, you must additionally crawl through a puddle. Water gathers in a small depression in the ground, which I made for another purpose but can no longer remember what it was. Of course, I could form the surface differently at any moment and keep water from gathering there, but I decided to leave this obstacle the way it is. You must dip in water to pass further, which resembles purification rituals known in many religions. In this case, it is probably about belief in unity with nature. Having passed the puddle, you enter a slightly bigger place: a transverse chamber, where you can take a more comfortable posture before the following and greatest challenge along the route. You must lie down on your belly, or your back if you prefer, and slide down the ramp just a few centimetres under the hemispherical vault. The daredevils who find the nerve to pass through this portal will be rewarded with finding themselves in a quite deeply excavated chamber in which they can stand upright and contemplate the space in the cave's most remote and lowest-placed recess.

After at least hundreds of thousands of years since being entirely buried, the freshly excavated and initially austere void began to come to life. As a result of circulation, the dug-out clay was replaced by humid air. The space was colonised by the underground fauna, with new species arriving every year. There are nocturnal moths with beautifully patterned wings vegetating on the walls. Hanging down the roof, spider webs hold thousands of water drops, making you think of crystal chandeliers. In the transverse chamber, some early signs of golden bacteria can be seen. They feed on organic remains, and if they go on developing, they will form a gold-glistening topping on the cave walls. Cave water began to drip through the uncovered roof, becoming the foundation of relief-making processes. In the freezing weather, ice stalagmites are formed in the vicinity of the cave mouth.⁷ Deeper in, where frost never comes, the trickling water pierces dripholes⁸ in the alluvion. Where water is seeping through the roof, calcium carbonate is bound to precipitate soon and young stalactites might grow there in a while. Their length will be the measure of a new geological epoch in the history of the cave.

The cave has become part of me, and I have become part of the cave. It's my closest place on the earth. There is a narrow fissure with the diameter of twenty centimetres at the face. As long as it is not jammed, I still have a chance for a continuation. I am sure I will carry on with my journey as long as possible.

7 A stalagmite-like kind of ice speleothem.

8 Pipe-like holes drilled in the cave sediment by water drops trickling down onto the same spot for a long time.

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The Senses and Resistant Matter: The Artistic Process as Research in the Age of the Symbiocene

*Even touch so subtle as to be overlooked doesn't
go unnoticed by the subterranean mind.*

(Ackerman, 1995, p. 123)

Aristotle regarded the sense of touch as being animalistic, least human and culpable in making people desirous (Sendyka, 2011, p. 20), stirring up an emotion which, if used improperly, was shallow, bestial and potentially destructive. The destructive affect is mirrored in the activities in which the human species has engaged since the Industrial Revolution. We are beginning to feel the consequences of these pursuits, and they are just about (in terms of the temporal scale of the universe) to contribute to our annihilation. Global temperatures have been steadily increasing by fractions of degrees, observably destabilising ecosystems and causing their internal relations to collapse. The world is facing a new situation. The increase in global temperature is on the verge of exceeding the threshold of 1.5°C as compared to the pre-industrial age, which makes humanity exposed to grave risks. More and more tipping points in the climate crisis are being reached, and this threatens to trigger catastrophic effects for billions of people. Warm-water coral reefs have already crossed the limits of their thermal resistance and are dying off on a massive scale. Glaciers, likewise, are close to the point of their melting becoming irrevocable, which will raise ocean levels by several meters and impact the lives of a huge part of the world's total population of living beings (Lenton et al., 2025).

According to Plato, touch was not even a sense for the lack of link to a specific organ, and tactile sensations, such as pain, coldness and softness, were only 'disturbances affecting the body' (Sendyka, 2011, p. 21). Meanwhile, touch could gain a gradually increasing advantage over the remaining senses (taste, smell, sight, hearing and the internal senses of proprioception [Chen et al., 2021], interoception [Jokiel & Romanowski, 2014] and balance) as technological transformations associated with coal mining accelerated. Based on humans' bodily experiences and unbounded imaginations, the belief that fossil fuels were inexhaustible persisted for many decades and could support the development of touch. What once was hauled up onto the ground by the power of the human muscles and the work of dredgers, to be monetised as a fuel for global economies, has been almost completely severed from the human body in our times. Today, we primarily deal with data and numerical indices, use the materials sourced in remote places and have our physical contact with the dug-out substances weakened by technological mediation.

In this article, I want to address the ways in which the world is perceived through touch by a person who works with visual arts and to explore 'disturbances affecting the body' (Sendyka, 2011, p. 21) as helpful in becoming empathically closer to the Earth with its physical and cultural resources, at the same time making sure that my own sense of touch does not become shallow or destructive. In this way, I can renew discourse with the reality I inhabit. I treat my own creative process as research and art-making. I look at, smell and touch every substance of interest to me. I change its structure by melting, crushing and stretching. What all my practices invariably share is that my thought process is supported and sometimes initiated by touch.

Observations of the way the hands work reveal that one gesture can express care for the tiniest bit of material or, on the contrary, indifference to and even contempt for it. Some materials will be perpetuated in a work of art while others will end up in the waste circulation. Whatever happens, dilemmas involved in the selection of materials will remain because any creative practice, whatever its intentions, is explicitly entangled in the processes of waste generation and management. If we are to develop a deeper and embodied ecological awareness we must return to the sense of touch.

Artistic research is a unique epistemic method in which creative practice generates knowledge. Artistic research aims to produce knowledge, develop skills and improve understanding of the world and humans' relationships with their environment. To carry out artistic research, one must first engage in artistic practice; this is a *sine qua non* since artistic practice provides a starting point for this kind of inquiry, serves as its tool and accompanies it throughout the process (Varto, 2018).

The process itself is supposed not so much to promote creative work as to foster reflection on its outcomes. More than that, this reflection is expected to sustain the continuity of the process. Importantly, insecurity and necessary continual decision-making are intrinsic to this process. My article unfolds in a series of sections in which the chronologies and timelines of my various research ventures are mixed as a result of my alternating involvement with various materials in these projects.

In a sense, this non-linear chronology corresponds to the age of the substances with which I work. My description begins from my research involving a fossil which is probably 300 to 360 million years old. Then, I relate my work with a two-billion-year-old mineral. Subsequently, I talk of a research object which,

as such, is a few years old, but its history on the Earth spans one hundred million years (and continues year by year), and of a rock that came into being in the Holocene (the latest geological epoch) and is about 3,000 years old. Afterwards, I pass to a fossil from 13.6 million years ago and a material stemming from humans' industrial activity and dating back to the 13th century. I conclude my argument with a report on my inquiry into a fossil that originated between 350 million and a dozen million years ago.

The description of my artistic research includes technical details of artwork development, conservation, damage and repair, as well as relevant geological, biological and chemical data. The visuals provided help one see module and scale as properties shared by all the pieces. I am committed to minimising the amount of substances that interfere with the structure of the materials with which I work in my creative process; given this, when making large-format artworks, I rely on the module and its multiplication since this solution best reduces such interferences. If a large format is used for impermanent materials, the audience have an opportunity to immerse themselves in the halted process over the brief lifetime of its outcome (an exhibition or another form of presentation).

Black coal

Black coal is the first of the fossils that are objects of my research and creative interactions.

Black coal is an organic sedimentary rock, which originated from plant remains in ancient geological periods. Depending on the type of their source plant material, fossil coals are divided into humic coals, also known as humolits (the most common type, formed from terrestrial plant matter in peatbogs), sapropelic

coals, also called sapropelites (formed from remains of marine plants, first of all algae), and liptobiolith coals or liptobioliths (formed from plant resins and waxes). Another classification of fossil coals is based on the proportion of carbon they contain and distinguishes: shungite, anthracite, black coal, lignite and peat (Polish Geological Institute, n.d.). Black coal, in which the carbon content ranges from 78% to 92%, is a mixture of several petrographic varieties that differ in hardness and lustre. As most of us, I first encountered black coal in the form of black, hand-dirtying lumps. I started to crush them into small pieces (using a chisel and a hammer) and then noticed that it was not homogeneous, with some pieces easily severed off while others crumbling when kneaded with fingers. I could also see that the intensity and the shine of the black colour differed from kind to kind. Indeed, there is a distinction into glossy vitrain, half-lustrous clarain, dull durain and fibrous fusain.

I started to work with coal because I wanted to use it to picture a piece of the sky as black and shimmering with starlight – a portion of the outer space, which is itself made of carbon. Having experimented with a range of materials to render this phenomenon in smaller works, I concluded that coal merged information on the world that we consider ours – the globe – and the world as abstract for most of us and beginning where the string of starlinks would not be able to go. When we look at the dark space above our heads, what we first see is a one-dimensional image, which takes time until we start to perceive it as three-dimensional. Crucially, what we can see is intimately bound up with what we know; for example, we understand that the glittering points are billions of smaller or greater suns and nebulae. Many of them are in fact but memories that have travelled millions of light-years to be eventually captured by

our telescopes. Let us engage with black coal in order to fathom the depths of the Earth's history. Black coal took 300 million years to form from organic matter remains that compressed and fossilised under the impact of high temperature and pressure. The life cycle of prehistoric plants ended with the transformation of stalks, tree trunks, leaves, seeds and roots into layers of black rocks. To me, coal is a symbol of the circulation of matter and evidence for the existence of time. Yet it is also of an object of perverse awe – behold dead plants which, burned to fuel the world's economies today, have poisoned the planet that was once their habitat. Black coal attracted me with its austerity, which sent me on a wilful quest for its nobleness, beauty and plasticity. Formal solutions that I developed when working with coal often contradicted its original form and, revealingly, pushed its essence to the foreground. At the beginning, when working with coal, I arranged it into a mosaic, without any gaps or empty places, presenting a 'section' of the sky (Mędrala, 2013). This intense squeezing together of pieces of coal, tightly, one by one, can be analysed through the lens of *horror vacui*, a fear of the void. This notion describes a tendency to fill the available space densely with details. Shared by various fields of art and architecture, this can reflect psychological mechanisms of avoiding emptiness.

The following work, titled *Przed świtem* (*Before Dawn*) (Mędrala, 2014) also addressed this dread and compulsive attempts to bury it in and under a mass of data. Consisting of more than 700 plant-shaped objects, the piece was again founded on crushing rocky lumps, but this time I configured the shards into the carbonic flora. I relied on metaphorical artefacts incorporated into the piece – the sources of water, light and energy and the history of coal recounted in the human language – to tell

the story of the self-sufficiency and self-regulation of the biosphere and to tackle a range of issues inherent in the relations between humans and earth and between the Earth and the Universe. With its strong pre-Romantic colouring, the piece also evoked the idea of humans' union with unbridled nature and, at the same time, a sheer impossibility to control it. The title itself referenced the fact that the piece was colourless, and a low-light source was used to make the audience's eyesight sharpen in the dark and their retinæ adapt to the dim lighting. The changing intensity of the light and, consequently, enhancement of the three-dimensional and expressive properties of the objects conveyed an awakening of the passive, the expectant and the dormant to life. The work was a diorama of a sensual and fecund garden as seen at night and conjured of darkness, a symbol of desire and seduction.

The last process of working with coal ended with the sculpting of *Czarna rzeka* (*The Black River*) in 2025 (Mędrala, 2025). A monolithic fossil resting on a Fibonacci spiral acquires characteristic traits of rivers, such as vitality, dynamism, flow, elusiveness and temporariness. The base of the sculpture is perched on the floor and the material meanders up to the waist-height, with the audience invited to move along the coal stream to the source of the composition. The surface of the river is covered in hundreds of thousands of tiny coal arrowheads, which stir up whirlpools and glimmer, sending glints of light around the room.

Wax

When working on my coal garden (*Przed świtem/Before Dawn*), I needed to round off the pointy tips of coal arrowheads to make them more suggestive as vegetal representations. It occurred to me that I would achieve the best effect by moulding the rounded

tips in beeswax. I got the first bar of wax, cut it into pieces and started exploring its properties by changing its states of matter. My first small-scale experiments, whose outcomes I glued to my coal plants and painted them black to make them formally uniform with them, were followed by working with larger batches of the material, whose surface bulged with swelling structures, air bubbles, holes and humps, which resulted from pouring hot wax into a tub with cold water. Then I ran a few tests with pouring wax onto a metal plate, and in this way I achieved an expressive and, eventually, flat image. Having been poured into cold water or in contact with a flat, cold surface, wax morphed into a trace of the gesture and the clash of two contradictory forces. I also began to fold and cut thin layers of wax, in this way obtaining a few square metres of a skin-like wax material. I dyed the wax with powder pigments a few times, but I gave up on this addition with time. To make wax more pliable, I put resins – dammar gum, colophony and Venetian turpentine – into the liquid. Working with wax required accuracy and focus because when overheated, it was lost in evaporation, and it changed colour when melted at different temperatures. Finally, I used some of the effects I had achieved in experimentation with wax in a show I was developing at the time (Mędrala, 2017). The making of initially intuitive forms turned into the production of minimalist wax plates. I made more two hundred items to line the gallery staircase with them. The multiplied module of Japanese paper (washi), dipped in a wax bath, was another outcome I used in the show. Combined with each other, the elements added up to more than thirty square metres of a half-transparent, delicate fabric. I glued parts of the fabric together by sliding the edges of waxed sheets upon each other and heat-sealing them along a one-centimetre-wide strip.

Soap

My conference presentation also included soap, which tied in with my work with hard matter rather than with the Symbiocene. Soap is a sodium or potassium salt of higher fatty acids which is produced in a chemical reaction known as saponification. While soaps are not to be found in nature as ready chemical compounds, there are natural substances that exhibit properties and effects similar to soap, being surfactants that reduce surface tension of water and emulsify fats. At this moment, I am involved in projects using a different material, but my mind is slowly refocusing on soap, and I feel that my next undertaking will be about finding these natural substances and doing artistic research into their properties and potential for art. Soap can be made, for example, from vegetable ash and fat. The earliest evidence of soap production (in Mesopotamia) dates back to about 2800 BC. Animal fat and ash were used for such purposes at that time. The first soap factories were founded in England, Germany and France in the 19th century. The transformation of ash, a waste material as it is, into a purifying substance showcases the continuous circulation of matter and ties in with the logic of body/environment relations. The making of soap, as well as contact with soap, reveals the role of touch as a cognitive medium that is capable of registering both the texture and the transformation of matter. The seemingly banal, everyday stuff raises our awareness of the material and ecological interdependences inscribed in materials of this type.

In my own studio, soap appeared in 2014, preceding wax in fact. When washing coal dust off my hands, I left its specks in the pores of the soap bar, which as a result visually transformed into a stone criss-crossed with black veining. I polished its edges and burnished its surfaces. This simple gesture lay at the start of a long-lasting and consistent process of rubbing off, cutting,

buffing and then dissolving the remnants of the material in water, as well as looking for a binder and an original visual form for them. I poured out soap into small and irregular shapes first, using various proportions and concentrations of soap in water. Then, I waited for the water to evaporate and the form to shrink naturally. The sense of engaging with the skin, scars or bones engrossed me in the obsessive process of mixing chemical substances and finding right proportions with which to obtain gloop whose further moulding would generally speaking depend mostly on time. I started to see matter shaping up into life, a new being coming into life – an actor endowed with its own strange nature. Ultimately, I made a few attempts at creating something of indeterminate provenance: a huge knob of saponaceous substance that ended up as a rectangle sized 9m x 2m, which never left my studio. It lay there looking like dead, shed off scurf. It was passive although it originated from an energetic ritual engulfed in dense vapour, which made soap airborne, pierced through clothes and stuck to the body (Medrala, 2018).

Lava

I took an interest in lava during the two years I lived in Iceland. Visiting the volcanic region in the south of the island, I chanced upon a lava mine. A volcanic cone halved like a cake, it was mined for red gravel used as ballast in road construction. I dispatched it to Poland. At the time, I was busy with a photography project (Mędrala, 2019), on which I worked walking along the historic highway of Asavegur. I wanted the pictures to be displayed amid the core material of the place I photographed. The area from which I brought the lava was a plateau with glacier-capped volcanoes at one end of it and a canyon produced by

the Eurasian and North-American Plate collision at the other. I tried to liquefy the lava in my studio in Poland, but I failed and to be able to use it at all, I had to make do with its original form. So I experimented with various substances, liquefying them and combining them with lava debris, filling a mould with this mixture and cooling it. I was able to make two differently formatted lava plate modules (corresponding to the print formats, in line with the compositional design of my work). At this moment, I use colophony as a binder, but I am still looking for another combination that would be durable and safe for the work because the plates now tend to break when transported or assembled, as well as when touched by visitors' curious fingers.

Haematite

I worked with haematite, another sedimentary rock, when developing the *Wszyscy jesteśmy z wody* (We Are All of Wat) exhibition (Mędrala, 2020). I made a piece composed of seven steel water-filled vats. Small balls of haematite were suspended from the ceiling over the water and after a while started to rotate as a result of interfering with the steel. The seven vats referenced the seven continents, and the diameters of the former proportionally corresponded to the sizes of the latter. The haematite ball embodied the ancient liquid mass that filled the Earth's prehistoric oceans. Its chemical composition, rich in iron as it was, resembled that of the human blood. When the first primitive organisms emerged in these basins, they used solar energy for metabolism and, in this way, oxygen was photosynthesised. It reacted with iron, producing ferric oxide. Subsequently, oxygen permeated into the Earth's atmosphere and made it friendly to a certain group of organisms, as a result of which some of them – our ancestors – moved from the ocean to land. Those



that remained in it were sedimented for ever, forming rocks, which are one of the sources of haematite today. The name itself is derived from the Greek word *haima*, one of the terms denoting blood. When a polished solid, haematite is black, but when crushed, it is red. One of its uses involves being pulverised and compressed into red chalk called sanguine, a name stemming from the Latin *sanguis*, which also means blood.

I symbolically steep haematite – an ancient ocean enclosed in a ball – in water, which arrived on the Earth with planetoids and filled its emptied post-oceanic abysses billions of years ago. Replacing the haematitic amalgam of elements, water made the development and evolution of life on the Earth possible.

Asphalt

I only began to work with this fossil one year ago. In fact, I had thought of it many times but could never really imagine how to start the process – whether to press and heat it up or rather pour it out and wait for it to harden. Eventually, I started from deliberating what I might communicate by engaging with asphalt. ‘Asphalt, especially in its blacktop-pavement form is present nearly everywhere we are present, so baked into the tale of our species that it rules even in absence. Too often for those who live where asphalt has not yet spread, there is only mud and poverty or dust and poverty,’ as Kenneth O’Reilly (2021, p. xi) notes at the beginning of his historical study of asphalt. Civilisation will not extricate itself from asphalt, or, more directly speaking, we will not extricate ourselves from it. As profit from this black slime is relentlessly pursued, fears about the climate and peace in the world increase. O’Reilly goes on to explain that the asphalt on which we drive and walk is obtained from crude oil distillation. It is toxic waste. It has been used since the 19th century. Before that, over thousands of years, if asphalt was

used, it was natural asphalt. Natural asphalt comes from oil sands, which had begun to form hundreds of millions years ago, when organic life decomposed into light oil. They were pressed and impacted by orogenic movements, which prompted biodegradation processes. Oil, water and bacteria that fed on lighter hydrocarbon molecules went into the making of huge quantities of a heavy complex hydrocarbon called natural asphalt or natural bitumen. O'Reilly elucidates that '[f]or thousands of years the use of natural asphalt has shaped the course of human events in a myriad of ways,' and, crucially, almost all natural asphalt products, whether used to seal porous bricks, to pave communication routes in Babylon in the 6th century BC, or to any other end, were 'carbon sinks' (just like peat). However, this has radically changed as

[n]ow oil companies are converting natural asphalt into synthetic crude oil (...) or diluting it with chemicals (...). Humanity [will] not run out of stock to create synthetic crude oil and thus not run out of gasoline for many additional decades. But the king's ransom – exploding atmospheric concentrations of carbon dioxide – might be more than our species can carry (...). If oil-sand product account for a mere 3 percent of total global oil production, it is the dirtiest oil or oil equivalent, and the industry expects production to increase in the coming decades (...). Asphalt hacked or melted out of the ground for service as refinery feedstock already ranks among the Western Hemisphere's biggest carbon bombs (...). Duality has characterised our use of asphalt for at least seven millennia. But this latest duality of carbon sink and carbon bomb has raised the stakes (...). Asphalt helped shape our environment in so many ways. Now it might help destroy our environment in one simple way.
(O'Reilly, 2021, xi–xii)

This destruction, as all destruction in fact, results from ignorance and failure to think of the future of the Earth and its inhabitants (O'Reilly, 2021, xiii).

Ultimately, I made up my mind to take on this fascinating, albeit sombre, issue and express this duality in an artistic form confronting the darkness inherent in this material. So far, I have developed two pieces: (Mędrala, 2024b), which is a work about necrophiliac desire for dead matter, and *Asfaltowe nenufary* (Asphalt Water Lilies) (Mędrala 2024a).

I found myself fascinated with asphalt, captivated by its stickiness, smell and colour, by the history of its origins and its cultural context. It consists of flat and spatial components. The former is made of modules connected with each other like the wax pieces described above and polished by hand with a piece of cotton cloth; the latter are casts of tree trunks. They are also intended to resemble burned remains and troughs. At the exhibition, they are scattered all over the asphalt material, which symbolises the road that folds back on itself behind the last cast, as a result enveloping the spatial element in an asphalt shroud.

Asfaltowe nenufary/Asphalt Water Lilies a dystopian sculpture whose title alludes to Claude Monet's idyllic paintings. The piece combines the harshness of industrial materials and the fragility of nature, conveying the contrast of the natural world and the industrialised world. A product of oil distillation, asphalt is derived from prehistoric plants and microorganisms, which connects it with the water plants bathed in dark slurry. The sculpture symbolises the human-caused destruction of natural ecosystems and the transformation of organic substances into inanimate materials. The sculpture envisions a future in which nature has been replaced by cold synthetic materials, producing the image of the world where the original harmony is irreparably disturbed.

Conclusion

My artistic research is meant to propose sustainable models of coexistence, such as founded on interdependence, respect and empathy and characterised by special sensitivity to what is known as inanimate nature, which, crucially, originates from once-living organisms. The processes I depicted above are central to my research work. In this context, the focus on ecological feeling not only transforms the content and form of art but also urges its reappraisal.

With the emergent – symbiotic, processual, regenerative, trans-species and other – varieties of aesthetics, our understandings of the beauty, value, durability and purpose of artworks are changing. Although a permanent object was losing its supreme-value status as early as at the beginning of the 20th century, it has only been in the 21st century that ungraspable relations and experiences defying linear cause-and-effect sequences have been recognised as a repository of values after the end of the world, which we still do not know.

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Flax processing during 'Wild Yarns' workshops.
Zerdno, 2025. Photo by: Martyna Piątek



The process of making nettle yarn
Photo by: Barbara Kubska



Symbiotic traces from a walk in Zerdno –
'Wild Yarns' workshop, 2025.
Photo by: Hanna Sitarz-Pietrzak

'Bio-path' around the ASP campus
with Michał Książek, as part of classes,
2025. Photo by: Hanna Sitarz-Pietrzak



Anna Pohl [Academy of Fine Arts and Design in Katowice] Hanna Sitarz-Pietrzak Prototyping New Collaboration Forms at the AFAD in Katowice



Faced with increasingly complex ecological, social and institutional challenges, we realise ever more clearly that we need to look for organising models beyond the paradigm of effectiveness, hierarchy and control. Creative and educational practices are fields where relational thinking is beginning to sprout, informed by the idea that collaboration and learning processes are part of larger, living systems of connectivity and reciprocities. It is in this context that the mycelium metaphor is becoming not only an inspiration but also a lens that helps identify new forms of agency, collective action and learning.

In this paper, we offer our self-reflection on the processes unfolding in the BioCraftLab¹ and the Symbiuro², two interdisciplinary collectives that function as laboratories of regenerative practices in the research community and setting of the Academy of Fine Arts and Design in Katowice. Taking our experience of working in a network of relations, interdependences and flows as our starting point, we seek to capture the ways in which 'myceliation' of the cooperation space helps foster new organisational qualities, such as trust, bottom-up agency, resilience and emergent forms of co-creation.

Our approach is not normative. We do not propose any universal method; rather we share our process of practice-based learning and research through a narrative that shows how mutual trust

1 More about the collective at www.biocraftlab.asp.katowice.pl
2 Symbiuro might be translated into English as 'Symbureau' or 'Symoffice.' (translator's note). A project initiated in September 2024, following the appointment as Dean, as a space for prototyping new forms of collaboration and communication, fostering the development of not-only-human relationships.

Crafting yarn from pine needles, 'Wild Yarns' workshop 2025. Photo by: Hanna Sitarz-Pietrzak

myceliation

resilience

and trusting processual natural rhythms can redraw relationships between creative practice, the institution and the natural environment.

Opening to Regeneration: Two Ways of Sensing

The moment the two projects, that is, the BioCraftLab and the Symbiuro, came into being can be understood as an act of sensing and grasping the need for change and as subtle attunement to the emergent regenerative impulse. Both processes were sparked by an urge to rethink relations between creative practice, research practice, learning and the environment in which they are embedded. Importantly, the same realisation was arrived at through different pathways.

creative practice

Collective sensing

In recent years, the community of the Academy have observably and increasingly engaged in building ecological experiences and developing creative practices that accommodate the interspecies perspective and notions of the sustainable cultural and natural legacy. Yet the related undertakings and projects were long dispersed and required a new space for experience sharing and embodied cooperation for bolstering the regenerative potential through joint action.

The BioCraftLab was founded not as a task force but as a response to this feeling, to the sense that something was asking to emerge and that the scattered hyphae wanted to be entwined into a living network. The collective was born as a live ecosystem of relations, in which cooperation developed as needs and conditions arose and action was channelled by processes of embodied experience and mutual listening. The metaphor of the mycelium as a decentralised network of exchange and communication based on interdependence, the circulation of resources and flexible response to the environment (Sheldrake, 2023)

offered an image of community with agency distributed among individuals, relations and matter.

The meeting that initiated the BioCraftLab was a somatic experience since, by doing relaxation exercises in pairs, the participants became involved in the subtle process of working with the body, breath and movement, which was inspired by contact improvisation practices. The decision to first rely on this embodied manner of exploring ourselves, one another, and the world through direct corporeal sensations proved to be vital as it helped us cross the conventional limits of academic discourse and establish relations based on co-presence, sensing and mutual trust. The shared experience of energy flow and bodily co-regulation was the first instance of regenerative practice in action.

decision

exploring ourselves
one another

The meeting resulted in a spontaneously drawn up manifesto of values, with neither a list of aims nor an action plan. This choice was a conscious gesture of renouncing hierarchical planning and trusting emergent processes instead. The group opted to adopt the attitude of ‘unknowing’ and to let development take its course organically, the way fungal spores germinate.

Personal sensing

Concurrently, a process informed by a similar logic though spawned by a different experience was developing elsewhere in the Academy. Going through professional burnout was the time that saw people compelled to take a pause and inquire how they should go on working and living in general. Overburdened, they experienced ever greater fatigue with every attempt at more ‘effective time management.’ Something had to change. The quest for answers began, but they were sought in natural bodily rhythms and genuinely regenerative things, rather than in new productivity-enhancing methods. Regular outings to

the forest, meditation, being-there without any particular goal to pursue and the like practices opened a space for altered perception, one more receptive to the subtle signals of subterranean happening.

After years of implementing Creative Leadership ideas and searching for participation- and co-creation-based functioning modes, it was only the experience of burnout that clearly indicated the need for a deeper change, not only for remodelling the methods of work but also for reconsidering the leader's role and the essence of the organisation.

The discovery of Jean Liedloff's (1975) book on the life of the Yequana people in South America was a real turning point. There is no word for 'work' in the Yequana language as they do not distinguish between living and working. Women laugh, talk and move supply and gracefully as they fetch water from the river, navigating the difficult terrain and carrying children slung onto them. They do not suffer under the strain of duty. The community spirit is brought forth as companions distribute the load to bear for the benefit of the village as a whole. Liedloff (1975, pp. 10–12) observes that, in our culture, rivalry destroys this elementary pleasure of joining forces and makes us squander our energy in unnecessary tensions.

The discovery that there were cultures which did not endorse our values of productivity and progress confirmed our inner belief that exhaustion resulted not from insufficient efficiency but from the very paradigm in which we worked. In this way, the process of unlearning was initiated, along with questioning the notions that rest was separate from work, that one's performance needed to be constantly 'improved,' and that effectiveness was the gauge of value – that one must be a different person at the workplace, relinquishing emotions and personal responses.

The systemic approach refined this understanding and added a new quality to it. Rather than a structure to be managed, the Academy came to be seen as a living system of interdependences that operates by natural principles, like forest ecosystems do. In the systemic approach, the leader does not control or manage things but senses where the system needs support, where flows are obstructed, and where potentials arise. This view called for developing a different kind of attention – tender watching, receptiveness to subtle dynamics and readiness to listen to what remains unvoiced.

New connections

The two processes – the establishment of the BioCraftLab as a collective response to scattered initiatives and the burnout-engendered personal change toward a new notion of leadership – were stirred by the same impulse. Both were acts of sensing that the old paradigm of hierarchy, control and productivity did not work anymore. Both looked for answers in natural models, such as the mycelium metaphor, seasonal rhythms of the forest and deeper communal practices. Both also started from embodied experience, where the body was a source of wisdom and not an obstacle to surmount.

As the next natural step, the BioCraftLab collective initiated the mapping of the regenerative potential that came forth as material and symbolic nodes of exchange began to form. One such node took the physical form of a notice board placed in the Academy which funnelled the flow of information, resources and invitations to cooperation. This simple device also gave a stimulus to a gradual networking of initiatives and relations. Concomitantly, one could note the formation of the Symbiuro, the dean's office informed by the spirit of shared responsibility and flow. From that moment on, the two collectives began to

inspire each other, sharing their knowledge and resources and developing common regenerative processes.

The Myceliation of the Cooperation Space:

Process, Network, Interdependence

myceliation

The mycelium metaphor usefully helps conceive of an organisation not as a rigidly bounded structure but as a living and processual arrangement of relations, in which flows of knowledge, energy and resources are circular, instead of hierarchical. In this sense, the 'myceliation' of the cooperation space does not entail implementing predefined models but involves creating conditions for situations in which cooperation comes about from relational attunement, mutual learning and the shared sensing of the rhythms of work, the place and the surroundings.

The BioCraftLab: Materialising the network

The stage in which the network of connections initiated by the collective's formation process began to yield perceivable outcomes was the BioCraftLab's fructification moment. It did not take long for collaborative synergy to develop between new individuals and partners. Side by side with the Academy's usual business, interdisciplinary initiatives were launched in the spirit of co-responsibility and trust in collective processes, including the BxD conference,³ the Material Lab exhibition⁴ and workshops held as part of the Rawa

3 In 2024, the Business x Design Conference, a cyclical event held by the Design Faculty of the Academy, was focused on the theme of 'Sustainable Future.' The event highlighted the role of design in developing responsible, ecological and regenerative solutions. The programme included talks by experts, presentations of designs and discussions on the influence of design on business and education. Organised by the Academy of Fine Arts and Design in Katowice on 29th November 2024, the conference was curated by Agata Chmielarz and Anna Pohl / BioCraftLab.

4 The Material Lab exhibition, which was shown at the Academy of Fine Arts and Design in Katowice and at the 2025 Lodz Design Festival, brought together works by students of Design, which showcased their experimental approach to the design of materials. The biomaterials and recycled materials on display found new uses, and some of the exhibits referenced artisanal traditions, in this way supporting the preservation of the cultural heritage. The exhibition as a whole

River Festival, resulting in the Memorial to the Lost Sources (Pol.: Pomnik Utraconych Źródeł).⁵

In everyday practices, myceliation involved the incorporation of embodied and relational experiences into the rhythm of academic work. Alongside research and artistic projects, regenerative engagements flourished, from the joint growing of flax, learning of crafts and gardening to walks, forest bathing and sessions of working with the body. These activities can be interpreted as ways of materialising somatic and relational knowledge, in which the learning process morphs into the experience of being-together with other people, plants, materials and places.

Working with local natural resources, such as pine needles, flax and minerals used for wild glazing, proved to be particularly important. These processes tended to be spontaneous, and the way they unfolded resulted from curiosity and dialogue with the context. Crucially, process, experiment, openness and learning through doing are key properties of the regenerative organising model. Gathering plants and natural materials for dyeing or wild glazing, spinning plant fibres, weaving mats for forest bathing and the like engagements were laboratories of embodied awareness and sites where cooperation with nature and the natural environment triggered reflection on interdependence and on the local, embedded dimension of creative, research and educational practices.

showcased the regenerative potential of creative work and designers' capacity to contribute to making design more sustainable. Held at the Academy of Fine Arts and Design in Katowice in November 2024 and at the Lodz Design in May 2025, the show was curated by Katarzyna Petka-Bura and Anna Pohl / BioCraftLab.

5 Inspired by the history of the Rawa River and held by the BioCraftLab collective as part of the Rawa River Festival, participatory workshops for seniors created a space of reclaiming together the memory of the lost landscape features and the identity of the region. Referencing the history of the Rawa River, the participants rediscovered and made new sense of the forgotten. These pursuits produced a temporary Memorial to the Lost Sources, which symbolically restored the memory of the old riverhead. The workshops were curated by Barbara Kubska, Martyna Piątek, Anna Pohl and Paweł Szeibel / BioCraftLab.

myceliation

embodied practice

myceliation In this sense, the myceliation of cooperation space in the BioCraft-Lab led to a transformation in learning from the project-based linear model to a processual and emergent one. In this framework, learning is not a discreet stage, but the system's mode of being in constant exchange with the surroundings. Reflection and retrospection are natural rituals of practice, and any obstacles are regarded as information that makes further development possible.

The Symbiuro: Transformative listening

Transformation commenced intuitively and without any plan. First came the opening of doors, physical and, likewise, symbolic. Letting light in. Removing the barrier of desks. Putting in tables, instead, with equal chairs around them. Bringing in plants, not as decoration but as living companions to space, breathing together with humans. Cones, stones, branches, pine needles that call nature inside and remind us of the larger setting in which we all exist. This space encouraged creating things together rather than heeding somebody's decisions. These physical changes conveyed a more profound transformation of the office from a site of power into a meeting point.

Personal items – photos, inspirations – entered the stage to communicate: this is a place of people, not functions. A bookshelf started to grow, organically, into a bookcase with books on regeneration, on community-building and bonding, on personal and spiritual development, on plants and ecopsychology, its growth driven by needs and questions that appeared in meetings and talks.

Yet change in the physical space was but one dimension of the transformation. Change in the mental space was as fundamental, with a revision of the notions of leadership and the dean's role in the system.

The systemic approach opened the perspective that deeply resonated with observations of nature and the mycelium metaphor. This approach prompted the recognition of unchangeable, natural principles that protect the system, ensuring that it is coherent and based on the flow. These principles correspond to three fundamental forces. *Time* means respect for the predecessors, for history and the sequence of events. *Place* conveys the right that every element has to take a proper position in the system consistent with its contribution and function. *Exchange* ensures balance between what we give and what we take. Many organisations work within the field regulated by these forces but do not realise this fact at all. Ignoring them causes leadership impotence, conflicts, staff turnover and many other difficult effects.

time

place

exchange

The same forces are at work in the mycelium. The mycelium respects time, with the oldest links being the most stable ones and new hyphae accruing on what was there before. Every element takes its proper place, with the overall organisation resulting not from hierarchy but from function and position. Exchange is sustainable as resources go where they are needed, always in line with mutuality, flowing from excess to deficit.

Unlearning Hierarchy: Power as Illusion, Leadership as Service

The process of unlearning hierarchical and productivity-focused collaboration models can be understood as a practice of courage and conscious transgression of entrenched institutional models, which have long determined the operations of academic and design communities. This courage is not about heroics but about quiet preparedness to give up control and embrace the dynamic of processes that evade planning and are not bound to unambiguous outcomes.⁶

⁶ Based on online meeting materials: *Opening for Regeneration*, M. Lopes Cardozo, K. Wessels, B.van den Bergh, School of Regenerative Education, October 2025.

Communication is incessant and ubiquitous. Hierarchy is an artificial construct imposed on what is an ongoing flow of relations and exchanges. Vitaly, 'all organisms are touching because all are bathed in the same air and the same flowing water' (Margulis, 1998, p. 2).

The BioCraftLab: The resilience of the system

Unlearning hierarchy in the BioCraftLab means easing tensions between structure and spontaneity and between need for coordination and trust in the collaboration forms that emerge in the course of time. In practice, this is expressed in giving up on action plans and ascribed roles, while making room for processes of mutable intensity and uneven rhythm. The composition of the collective is fluid, participation irregular, and the flow of information and engagement variable.

This seeming instability is in fact the source of the system's resilience as every individual brings in what they are able to at a given moment, and the network of relations is sustained by the rhythm of exchange, instead of by the structure of surveillance. The collective's functioning relies on the logic of organic flow, whose continuity hinges not on ceaseless operation but on the capacity for regeneration following dormant phases, like the mycelium, which persists in hiding in order to thrive anew when conditions improve.

Unlearning hierarchy also entails a reintegration of embodied knowledge, where centrality is restored to practices which were relegated to the margin, such as working with the body, meditation, simple activities, such as handicrafts, gardening and walking. Their return to the academic setting is not only a gesture of resistance to the logic of productivity but also an attempt to revive relations with the self, others and nature. The shift to practices embedded in ritual and relations with nature



reinstates the affective dimension of co-creation, with sensing as an epistemic mode and presence as a research method.

These changes in modes of operation can also be understood as self-organising regeneration, a process in which tensions between limited resources – time, energy and presence – and enthusiasm combined with the sense of meaningfulness add up to produce a dynamic balance. Rather than a barrier, acceptance of these constraints is part of the ecology of action and helps the system function consistently with the rhythm of the participants and the surroundings.

Symbiuro: From management to relational attunement

relational
attunement

A moment comes when one begins to grasp the natural interconnectivity of everything and everybody in a system. Change in one part affects the whole. Power and control are an illusion since nobody is capable of really controlling what is going on in a complex, living system. One can only serve and contribute to its health.

An organisation's health is about the sense of vitality across its dimension. In a healthy system, everybody who has contributed to its development is recognised. Its history is openly discussed, without passing over its difficulties. Roles are created in a conscious connection with the goals of the entire system. Balance is maintained between what everybody gives and what they receive. Everybody feels secure and is willing to give of themselves. In a healthy system, leaders are stronger, respected

and useful, though not as charismatic heroes who set directions and make key decisions.

Systemic coaching shows a fundamental difference as the traditional notion of leadership stems from the individualistic worldview, in which the focus is on predefined goals instead of on systemic forces and collective learning. One common belief is that change must be 'driven by and supported from the top' while change in fact happens when the system needs it for health and survival (Whittington, 2012, pp. 12–13).

Abandoning the illusion of power and control was the most challenging lesson. It involved accepting that the dean's role was not about managing people but about serving the system – listening, sensing where support was needed, where flows were obstructed, where individuals could not find their proper footing, and where exchange was imbalanced. As part of this process, attention to the latent dynamics needed to be developed so as to hear what remained unvoiced. Observations of well-functioning self-organising helping communities showed that effective collective action was based on inverting the traditional pyramid, as a result of which the ultimate decisions lay with the community and its collective conscience, while service entailed representing and reinforcing this collective decision-making (Wspólnota Anonimowych Alkoholików, 2022, pp. 48–50).

Thus, service is primarily about listening, about responding to whatever naturally emerges, supporting bottom-up initiatives and removing obstacles, rather than about giving orders. This required unlearning many habits, such as control drive, fear of chaos and belief that the leader must know answers to all questions.

Language also underwent an important change. The new model of direct and tender communication which anyway did not remove respect sometimes did not work. Combining personal

emotionality and expressiveness with the role that 'should' be rational, impersonally competent and composed was a challenge in some circumstances. But by embracing the right to show feelings, whether joy or uncertainty, emotion or fatigue, it was possible to open a space where others could also be true to themselves.

The Symbiuro became a place where people came without any particular aim, just to be, talk and share. Many found it difficult to unlearn the need to justify their presence and use their time productively. But, step by step, unplannable things began to happen, and spontaneous connections, projects and collaborations were launched not because anybody committed to organising them but because the space made them possible.

Fruition: Mutual Influences and Emergent Forms of Coexistence

With time, the BioCraftLab and the Symbiuro, both of which were prompted by the same regenerative impulse, began to form a network of interactions in which the flow of knowledge, resources and energies activated new creative processes. Today, their relationships resemble the feedback loop characteristic of living systems as each collective is an environment in which the other develops.

As a result of this process, social resilience is produced and is underpinned not by stable structures but by the network's capacity for continual transformation, adjustment and self-repair. In this context, creativity does not result from individual expression but ensues from collective attentiveness to flows between people, knowledge, resources and settings.

As a consequence, unlearning entails regeneration as people no longer feel pressured 'to achieve' and room is made for engagement in co-creation as a relational process in which becoming, being and breaking-up transform both collectives into systems

capable of self-awareness and thus of sustained learning, adaptation and rebirth.

myceliation Therefore, the myceliation of the cooperation space can be not only a metaphor for but also a practice of institutional regeneration, a way to make the Academy a living organism capable of self-renewal, mutual learning and persisting in dynamic balance with the environment. As the mycelium develops invisibly and responds to the environmental conditions, so the two collectives evolve through the cycles of growth, dispersal and renewal as embodied practices of regeneration in the context of academic community.

Regeneration as a practice

The regenerative approach can provide an operative framework for academic organisations on condition that the institution is thought of as a living system with the capacity for self-renewal, development and sustainable relationality with its surrounding environment. Understood as a process of restoring to systems their ability to realise their potential, regeneration redirects attention from resource management to the cultivation of conditions in which (human and nonhuman) life can evolve (Lopes Cardozo, Wessels, & Van den Berg, 2025, p. 10). For universities, this means that structures should not be established through top-down designing but fostered through practising attention to when and where a regenerative potential emerges in the development of collectives, spontaneous collaborations and gestures of mutual support. This is premised on the inversion of the traditional model and endorsement of the concept of leadership as service for the community's health rather than as power over it. This idea is known as the inverted pyramid, where leadership roles involve representing, strengthening

and protecting the collective voice and flow. This change is essentially premised on courage, which is not construed as strength but means the return to and reconnection with what has been neglected, such as the body, values, place, other forms of knowledge and natural rhythms. In this framework, organisational structures are no longer imposed patterns but turn into processes of co-creation, and the community takes shape through repeated acts of attunement, listening and co-responsibility. The regenerative approach offers no ultimate model of institutional management; rather, it activates the practice of becoming a community, one capable of perpetually renewing its vitality through sensing the moments of change, taking difficult steps with tenderness and fostering environments in which relations, knowledge and agency can circulate the way they do in living ecosystems.

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En-rooted School: A Manifesto of Symbiotic Education

*As long as trees make history, they threaten industrial
governance. Cleaning the forest is part of the work
of stopping history. (Tsing, 2015, p. 167)*

We 'have' no secret contacts. We are contacts.

We, fungi, can only survive through cooperation.

This is, I believe, a concept entirely unknown to you.

(Donner, 2025, p. 11)

This article is an imagination experiment, and an attempt to think (of) education anew from the perspective of care, multispecies coexistence and hope for a good future. We are not afraid to dream in precarious times. We believe that dreaming of a better education can be an act of courage and, importantly, of responsibility, but such dreaming is above all a way of practising the future in our view. We must arouse our imaginations and open to the unknown and the other before the system imposes its frameworks on us and whatever we do turns into yet another rehearsal of hackneyed models. Below, we propose an alternative to the currently dominant narratives of 'growthism,' the crisis of school and the crisis of Western knowledge; our alternative narrative is one of hope, which helps design long-term scenarios for the future. Our ideas are channelled and directed by dreams of en-rooted education that emphasises emplacement, results from and fosters interspecies mindsets and is symbiotic, based on mutual support, diverse, open, decentralised

and non-hierarchical. The metaphor of the natural forest will be our tender guide across this tale.¹

So let us think of education ‘together-with’² forests.³ Let us imagine the education process as the natural forest, a forest that is thick, diverse and pulsating with interdependent life, a forest full of various species of trees growing side by side, old and young, flawed and perfect, in whose shade shrubs, mushrooms, mosses and berries thrive on the soil of decomposing wood and dead bodies that sustain an invisible but vibrant life of microorganisms, maggots, grubs, earthworms and other plentiful soil biota. There is no sameness and nothing is pre-designed in such a forest, with its elements interpenetrating and intermingling in consonant coexistence. Each of them is part of a bigger whole, and individual trees together make up a woodland community whose rhythms defy control and planning. Conceived of as the natural forest, education would be an environment of cognitive (bio)diversity, a setting of multiple coexistent narratives, methods and ways of experiencing and interpreting the world. As

- 1 To begin with, let us explain some of the notions we use in our article. ‘Primary forest’ is a woodland ecosystem which has never been transformed by human activity or in which human interventions have been so insignificant that no natural ecological processes have been impacted by them. It is a forest that develops beyond and without the silviculture system and retains its original structure. Given this, the primary forest is an extreme metaphor which would render to the condition of individuals who have never exposed to any educational, cultural or social impacts. For this reason, we do not talk of the primary forest in our text. ‘Natural forest’ is a forest that came into being as a result of natural processes but may have experienced some limited human interference. So while it is not a virgin forest, its ways resemble those of the primary forest because its ecological processes are not artificially regulated anymore. The natural forest is characterized by considerable species diversity, a multi-tiered structure, natural regeneration without tree planting, the presence of dead wood and very restricted silvicultural practices. ‘Plantation forest’ is a forest artificially established by people, usually by planting one or a few selected species. It is intended to produce timber and/or other raw materials, rather than reproducing natural ecological processes. Plantation forests typically consist of similarly aged trees (monoculture), which are planted in regular rows and grow quickly through species selection and forest management practices (e.g. cutting, thinning, chemicals). All this results in decreased biodiversity as compared with natural forests. See Kulik (2012); see also Centrum Informacyjne Lasów Państwowych (2016).
- 2 We owe the concept of ‘together-with’ to philosopher Monika Rożowska-Stangret and her book *Być ze świata (To Be of the World)* (2021).
- 3 Our central metaphor of the forest as education is inspired by Tsing (2015) and Marzec (2019; 2021). Its current – revised and refined – iteration comes from Ochwat (2025).

opposed to a monoculture that produces ‘identical’ individuals and ‘standard specimens’ as the basic yardstick for everybody, such an education would be a living ecosystem, with learning resembling organic – spontaneous, unpredictable and, at times, unbridled – growth. A growth of this kind mirrors the life of fungi, which unfolds quietly, subterraneously, without hierarchies, sometimes against plans and is always replete with coincidental, intrinsically transformative encounters. Fungi grow where they like, the way they like, and with whom they like, too, as noted by Anna Lowenhaupt Tsing and Andrzej Marzec, and their expansion is an unruly one. It happens at night, stealthily, hidden from light and away from sight, as true learning does when ripening in silence and slow-paced germination processes. So let us put down roots in this metaphor and heed Tsing’s urge: ‘If you could make the soil liquid and transparent and walk into the ground, you would find yourself surrounded by nets of fungal hyphae. Follow fungi into that underground city, and you will find the strange and varied pleasures of interspecies life’ (Tsing, 2015, p. 137).

En-rooted School

Instead of turning our heads up to look into treetops, let us turn them down for a while and look at what lies beneath our feet, into the soil. This is the layer of the forest that we tend not to register as it lies hidden subsurface, shrouded in mystery; this is the rhizosphere (Smolińska, 2019, p. 10)⁴ – an underground realm of roots enveloped in subtle hyphae, which combine with plants into complex symbiotic systems. This space, rich in microorganisms and bacteria as it is, seethes with life that sustains the existence of the entire ecosystem. Olga Tokarczuk

- 4 The rhizosphere is the layer of the soil that directly surrounds roots of plants; it is where robust interactions between roots, microorganisms (e.g. bacteria and fungi) and the edaphic environment take place.

has described the mycelium as pivotal to the environmental imaginary of the 21st century:

The threads of the mushroom spawn have great strength and push their way in between every clod of earth, tangle around tree roots and restrain huge boulders in their infinitely gradual onward motion. Spawn is like mould – cold, white and delicate – underground lunar lace, damp, hem-stitched mycelia, the world's slimy umbilical cords. It overgrows meadows and wanders under human roads, climbs the walls of people's houses, and sometimes in surges of power it imperceptibly attacks their bodies. (2010, p. 104)

In Tokarczuk's rendering, the mycelium is a metaphor for the immanent, all-encompassing and extraordinarily complex interconnectedness of the living and the inanimate. What is going on underground is one of the most exquisite exemplifications of co-existence in nature and also of self-sustaining agency. Hyphae infiltrate roots, enmesh them and connect them to other plants, in this way fostering a community of flows – of substances, energies and information. In this symbiosis, fungi help trees absorb water and minerals and obtain photosynthesised products, mainly sugars, in return. Besides being a symbiosis, this also epitomises biological agency. In *Sztuka przetrwania (The art of survival)*, Anka Wandzel (2025, pp. 22–23) dwells on *the agency of nature* as a force that does not require conscious intention but bursts forth in the very existence and persistence of life.

In recent years, education for agency has become talk of the town,⁵ but agency in fact tends to be undercut in school practice,

⁵ This tendency is epitomised by the current education reform plans in Poland. Titled *Oceniać, by uczyć (Assess to teach)*, the reform is supposed to promote agency, as stated by Tomasz Gajderowicz, director of the Educational Research Institute at a recent conference in Cracow (Instytut Badań Edukacyjnych, 2025).

sometimes, paradoxically, in the very attempts to reinforce it. What we should realise, however, is that agency is not an exclusive privilege of humans. Rather, agency is a real property of the biological, material, nonhuman world. Tsing's *Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins* (2015) illuminates the key role of fungi in the history of the Earth. Specifically, conditions promoting life as we know it resulted from the agency of fungi, which penetrated rocks, breaking them up and releasing the minerals they contained, which enabled plants to settle on land. Together with bacteria, fungi wove a complex web of relationships in which life could bud and expand. Fungi also decompose dead wood, transfiguring it into nutrients on and off which new life can feed. In this sense, fungi can be considered 'world builders,' organisms that not only take part in the life-and-death cycle but also actively form their environments, creating worlds for others (Tsing, 2015, p. 137). This kind of agency is what matters to us in education; the agency we have in mind is natural and ongoing, tends to arise in darkness and is not always immediately seen with the naked eye, as pondered by Timothy Morton in *Dark Ecology* (2016) and elucidated by Marzec in his introduction to the Polish translation of Morton's book (Marzec, 2023, pp. 14, 18). This is what the mycelium can teach us since, for millennia, it has worked in hiding, unglamorously, without silvicultural maintenance and driven by its inner imperative of persisting. While ours is the age of transparency and constant surveillance, the mycelium still keeps its secrets from us, operating covertly and concealed beyond our sight and control. Its work requires neither recognition nor validation; the mycelium makes do just with the possibility of coexisting and sustaining life.

Tokarczuk's evocative phrase 'infinitely gradual forward motion' foregrounds the slowness of mycelial life, which, as she later

notes, spills beyond it because ‘the spawn slows down time’ (2010, pp. 104–105). In an episode in *Primeval and Other Times*, Ruta, who is lying on wet moss, begins to sense the mycelium, which alters her experience of temporality. She falls into ‘a waking sleep’ – suspended between slumber and consciousness – which, though momentary, seems to last for hours. The slowing-down sparks another mode of world perception. It is possible to discern the hidden – infinitesimal motions, flows, life teeming under the surface of things. Taught by the mycelium, this attentiveness does not stem from conscious effort but from immersion in another temporal modality. This free slowness does not entail stagnation but is deep being, which eludes the logic of acceleration, productivity and immediacy. In this sense, ‘the mushroom spawn takes time into its possession’ (Tokarczuk, 2010, p. 106), redirects its course, relaxes its structure and, in this way, helps see things more thoroughly. This is also how the mycelium can help us think of slow education (Dąbrowski, n.d.; Margevic-Grinberg, 2021) as a practice of reclaiming time for thinking and other ways of seeing. Instead of seeking to speed up development, the slow school aspires to deepen presence as such and rejects the pressure of immediate outcomes and standardisation. The slow school offers ample time for the germination of thoughts and their multidirectional sprawling, for hesitations and for questions with no ready-made answers and, finally, for abandoning or deflecting a thought. It derives inspiration from slow education, the idea of unschooling and the pedagogy of sensitivity (Maliszewski, 2021), where learning is a slow and attentive process.

The mycorrhiza, in which fungal hyphae entwine plant roots producing a combination beneficial to both organisms, can be likened to *horizontal thinking* with no linear structure. The hyphal mesh reinfuses education with alliances, collaborations and

symbiosis, along with collective undertakings that emblematised open network teaching without imposed patterns. The mycelium makes it possible for trees to cooperate with each other,⁶ which can be compared to a community based on reciprocal learning, rather than on rivalry and self-interest.

The rhizosphere also inspires rhizomatic pedagogy (Koseoglu & Bozkurt, 2023),⁷ a new philosophy of education that emphasises non-linear, multidirectional, community-based and relational approaches and promotes inclusive participation, where education is designed to help students bring their own experiences and interests into learning. Rhizomatic pedagogy is derived from the concept of the rhizome developed by Gilles Deleuze and Félix Guattari (1987). In their framework, the rhizome is a metaphor for a non-linear, bifurcating and dynamic organisation of knowledge, which is underpinned by ubiquitous interconnectivity. Besides the rhizome metaphor as such, Deleuze and Guattari also proposed six principles that are of central relevance to education and learning processes. These principles are connections, heterogeneity, multiplicity, asignifying rupture, cartography and decalcomania (1987, pp. 6–22),⁸ each

6 German forester and author on ecology Peter Wohlleben recalls in an interview with Paulina Machnik: ‘One thing I was taught was that trees competed against each other, so foresters must cut the forest to make sure that trees should have enough room. But once I discovered something that looked like a mossy stone but was in fact a living remnant of an ancient, centuries-old beech. It could only survive because the surrounding trees had supported it. I thought: ‘If trees compete, why don’t they let this ancient beech die?’ (...) I found studies that confirmed my observations: trees do cooperate with each other. They are a community’ (Wohlleben, 2019, p. 43). For Wohlleben’s similar reminiscences, see Waite (2022). See also Simard (2021).

7 On the concept of rhizome, see Deleuze & Guattari (1987); on rhizome and education, see also Khine (2023b).

8 The principle of connection emphasises the continual emergence of relations between elements of meaning, which in education translates into constructing networks of links between people, ideas and resources. Heterogeneity shows that there is no uniformity as knowledge and learning are polyvocal processes open to various viewpoints and experiences. Multiplicity insists that there is no central reference point in the process of knowing; learning unfolds in many directions at the same time. The asignifying rupture principle illuminates the system’s capacity to be revived after hiatuses, and for education it means that, decentralised and antihierarchical, it enables individuals and groups to reorganise on their own and continue working in contexts of their own choice. Cartography symbolises the continual charting and modification of epistemic maps, with knowledge being dynamic and learning paths open and multidirectional. As opposed

of which captures another facet of the relationality and dynamism of knowledge. On this model, knowledge does not grow toward one goal but, incessantly mobile and reciprocally entwined, expands, spreads, networks and resurges in multiple directions (Khine 2023a).

Rhizomatic pedagogy is essentially about being receptive to a variety of possibilities because the relationships it comprises are not univectorial; as hyphae spread and reach many trees, so we learn not only from teachers but also from each other. The mycelium is aptly described in Robert Macfarlane's *Underland: A Deep Time Journey* as 'a branching fan in which it is hard to speak of a main or originary stem, only of shoots and offshoots' (2019, p. 106). Accordingly, rhizomatic pedagogy is primarily horizontal, non-centric and anti-hierarchical, in this way divesting power centres of their privilege. Rhizoactivity shoots or thrives at any place and any moment in life to spawn connections with whatever is available, and the mycelium is a unique alliance, with no beginning and no end, but open to anything that comes its way, any opportunity that presents itself. In a sense, rhizomatic education hacks the traditional school, which is an educational monoculture founded on the single (from Greek *monos* meaning 'alone, only, sole') mode of 'turnkey' thinking. Instead, rhizomatic education opts for networked and symbiotic reflective practice, learning/teaching and being-together in the world. It also foregrounds shared responsibility for self and others, discouraging rivalry and competition between participants in the education process. In the traditional schooling system, curricula start from the identification of learning outcomes; these are subsequently validated and assessed only to become entrenched. In rhizomatic

to this, decalomania denotes attempts to copy and perpetuate patterns that limit cognitive freedom and convert the rhizome into hierarchical and static root structures. For a closer discussion, see Deleuze & Guattari (1987, pp. 6–22).

teaching, standardised assessment forms and conventional grades are not always desirable; nor are tests feasible.

If rhizomatic pedagogy is sometimes construed as a symptom of epistemic chaos or lack of structure, the rhizome concept is in fact – in the spirit of Deleuze and Guattari's philosophy (1987) – a critique of the hierarchical and linear model of thought. In this framework, the rhizome is a metaphor for cognitive and organisational multi-directionality in opposition to orthodoxy and the educational status quo. It repudiates the vertical, authoritarian system of school relations and embraces a networked and decentralised model of learning, in which individuals can follow their own educational paths, define their own goals and choose their cognitive strategies by themselves. A pedagogy of this kind is premised on redefining teacher/student relations and on individuals' greater responsibility for their own learning processes, which may be challenging to many students both epistemically and emotionally. While proposing rhizomatic pedagogy, we do not negate the usefulness of structuring; rather, we contest the institution of one, universal structure for all students. Structure is external in the traditional approach since it is imposed top-down and must be observed by everybody. In the rhizomatic approach, structures arise from within, and all students can construct their own learning paths, where links and relations between concepts matter more than their hierarchical ordering.⁹

⁹ Neuroatypical students may find 'purely' rhizomatic education challenging because it presupposes working in an open environment, where one must direct and organise one's explorations on one's own. Importantly, rhizomatic pedagogy does not define teaching methods in operative terms but describes the ways in which knowledge can be generated and explored. To implement the rhizomatic approach as part of a safe setting, a teacher may introduce a new notion in the frontal manner and then let students investigate its facets more rhizomatically, such as through projects, hypertexts, concept maps or their own question paths; alternatively, students can be given three assignments to perform and be free to choose other activities by themselves. Juxtaposing rhizomatic pedagogy and the need for structure central to traditional education does not suggest that they are mutually exclusive; just the opposite, they can be mutually complementary. That is why the rhizomatic education we envisage seeks to redesign education for greater inclusiveness so that structure supports difference without suppressing it.

Education as a Gift

Thinking ‘together-with’ the forest also entails heightened attention to the offerings of the forest. Humans can pick them and use them. Potawatomi botany professor Robin Wall Kimmerer relates in her *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teaching of Plants* (2013) that wild strawberries made her think of the world as a gift lying at her feet. Gifts generate enduring bonds though societies attached to private property find it difficult to grasp this idea. Yet, as Kimmerer elucidates, ‘[t]he essence of the gift is that it creates a set of relationships’ (Kimmerer, 2013, p. 28), which mould our behaviour and can have adaptive consequences. Emphatically, education should be understood as a gift and not as a commodity trapped in the circuit of capitalist logic, competition and rivalry for grades and distinctions. The logic of the gift transforms education into relational co-being, where knowledge circulates the way energy does in the forest, rebounding, mutating and renewing. The gift produces an obligation of care, of gratitude, of reciprocity. In education, it also produces an obligation of attentive thinking and reflective participation in the world. Kimmerer explains that:

From the viewpoint of a private property economy, the ‘gift’ is deemed to be ‘free’ because we obtain it free of charge, at no cost. But in the gift economy, gifts are not free. The essence of the gift is that it creates a set of relationships. The currency of a gift economy is, at its root, reciprocity. In Western thinking, private land is understood to be a ‘bundle of right,’ whereas in a gift economy, property has a ‘bundle of responsibilities’ attached. (Kimmerer, 2013, p. 28)

This kind of mindset ushers in the pedagogy of gratitude as an art of recognising that knowledge, like the world, is only entrusted to us for a time, and we are supposed to hand it down to the following generations. On this take, gratitude for the gift of learning is an ethical gesture toward teachers, parents, the community and the Earth, which nurtures, supports, offers solutions and makes our existence possible. In *How Like a Leaf* (2000), Donna Haraway evokes Heidegger to remind us that Old English words *thencan*/to think and *thancian*/to thank shared the same root, and so did their German equivalents: *denken* and *Dank*. This etymology entails a profound interrelatedness of thought and gratitude. If thinking is the supreme expression of gratitude for education as a gift, ingratitude is manifested in thoughtlessness (2000, p. 22), itself a loss of the capacity for reflection, attentiveness and empathy.

Unruly Growth

When in the forest, we should have a closer look at mushrooms themselves. To perceive them, we can helpfully avail ourselves of *arts of noticing* (Tsing, 2015, pp. 17–26), of spotting the unobvious, the hidden and the unarticulated. We borrow this idea from Tsing’s forest practices. Noticing is not about just looking at what is in front of us in a linear manner, which presupposes an aim and a progress; rather, in noticing, we must look around, the way we do when picking mushrooms. We look not only straight ahead, but first of all to the sides – downward, at where we step, among mosses, leaves and trunks, into the places where unobvious lifeforms linger in concealment. The attitude of looking around and surveying the surroundings should be adopted and practised by schools today. Instead of

teaching how to walk the straight paths of progress ('progress is a forward march,' Tsing observes [Tsing, 2015, p. 21]), schools might educate in looking around, watching, discerning and noticing. Such educational mushroom-picking ventures might hopefully foster students' new sensibility, one founded on care, attentiveness and coexistence with the more-than-human.

In Marzec's view, the phenomenon of fungi primarily comes down to a 'different' model of functioning. He highlights their self-regulation and uncontrollability:

Fungal growth is beyond human control; it is rebellious, unruly and this is precisely why [...] fungi are believed to carry hope for breaking out of the capitalist production system [...]. Fungi invite us into the world of cooperation without a clear promise of development, with each element of the network being weak and their force stemming from collaboration with others.

(Marzec, 2019, pp. 128–129)

Fungi are the greatest enemy of monocultures, and they can effectively wreck the interests of planters and growers, who consider ruthless growth, predictable development and maximised returns to be the essence of life (Marzec, 2019, p. 219). A similar mechanism is at work in education when the process of knowledge acquisition is only harnessed to utilitarian goals, such as finding a better job, being promoted or amassing capital. If learning is not prompted by the pursuit of enhanced sensibility, imagination and empathy – if it does not comprehensively engage cognitive and emotional faculties – it does not channel maturity but merely reproduces the logic of productivity. This issue is addressed by Urszula Zajęczkowska (2021, p. 39), who deplores the disastrous consequences of the competitive mindset at school, driven by personal, economically stamped aspirations.

The idea of growth conceptualised as progress, development and achievement of a predefined aim is deeply entrenched in the agricultural tradition that rules out contingency, mutations or 'things turning wild.' Agriculture, in particular arboriculture as its forest-related variety, is guided by the principle of controlled growth and selective improvement of species. In forest and fruit tree nurseries, plant-shaping processes are strictly regulated: trees and shrubs undergo grafting, pruning and surgeries to acquire some desired properties, such as resistance, hardiness, yield and predictability. Marzec (2019, p. 123) notes that this cropping pattern reflects the anthropocentric logic of control and productivity, in which randomness is considered a threat rather than a developmental potential. In this sense, 'agricultural education' is a metaphor for the system that prioritises uniformity and surveillance, eliminating spontaneity, error and wildness, the very qualities that make evolution, adaptation and survival possible in the world of nature.

Resilient School¹⁰

Let us continue on the trail of the metaphor of the natural forest as the best education model. Importantly, cooperating trees fare better in a diverse forest than in a monoculture (Sachsenmaier et al., 2024). For example, the temperature in natural forests tends to be three degrees lower on the average than in managed forests, where trees are isolated and their communal networks are disrupted. Besides, the soil is far carbon-richer in natural forests than in artificial ones, where foresters plant trees as they please. In a story within the *Zmiana klimatu już tu*

¹⁰ In *Wymiary resiliency w naukach o wychowaniu (Dimensions of resilience in education sciences)*, Agnieszka Bzymek explains that the notion of resilience is derived from the Latin *salire*, which denotes bouncing, and *resilire*, which expresses rebounding and recoiling. Resilience means individuals' tolerably good adaptation despite the risks they experience (Bzymek, 2020, pp. 18–19).

jest (Climate change is here), a series launched by Pismo. Magazyn Opinii (Writing: An Opinion Magazine), Filip Springer discussed the 'Szast' Protection Forest as an illustration of the better coping of trees in non-commercial forests:

If there are only trees of one species and the same age in the forest, and they are planted at equal distances, it means that they are all the same. If the wind blows, the same happens to all of them – they break (...). In a forest like Szast, there are more tiers, gaps and clearings. The wind subsides there. It will break a few trees, but others will withstand it. Such a forest takes a squall as a natural corrective; it will not put its very existence at risk. (Springer, 2020, n.p.)¹¹

Natural forests can better manage in times of crises, whether hurricanes, droughts, heatwaves or storms, because they possess powers of resilience and regeneration, like people who were raised in the spirit of pluralism, diverse educational models, multiplicity and dialogue. The natural forest is self-regenerating and does not need foresters or the State Forests.¹² Its renewal is based on the inner mechanisms of sustainability, mutual interdependences of species and ecosystem self-regulation. In such forests, the processes of life and decay are in dynamic balance.

11 In 2002, a hurricane destroyed forests in sixteen forest districts across three Polish voivodships (provinces). The countryside near Pisz, where the 'Szast' Protective Forest had been established, was among the most severely affected areas. The decision was made to carry out an experiment on nearly three thousand hectares of the destroyed forest by leaving it the way it was, broken and fallen, and seeing what would happen. Szast looks different; its trees are not evenly distributed, but form clumps in which they support each other. There are numerous young trees, mainly birches and oaks, in it. Dead logs are not collected, and broken ones are not cut. Research has found an increased vitality of the mycorrhiza and more forest species in the undergrowth in this forest than in others. Szast is also more resistant to hurricanes, which tend to occur ever more frequently in the times of the climate crisis (Springer, 2020).

12 The State Forests is an official forest management agency in Poland.

In forest plantations, the mycorrhiza is usually severely damaged, if not destroyed, which is one of the key problems of industrial monoculture forestry because fungi and their underground mycorrhizal networks are fundamental to forest regeneration processes. Latest research by American ecologists indicates that fungi play a fundamental role in increasing the resistance of trees to climate stress. A well-developed mycorrhizal network enables forests to adapt faster to the changing conditions of the Anthropocene by facilitating nutrient exchange, vegetable communication and organisms' mutual support in regeneration processes (Macfarlane, 2019, p. 98). Like the forest, resilient school can function as a system of interdependent helping relations and a community of diverse education actors (teachers, students, parents and local communities), whose strength comes from heterogeneity and cooperation, rather than from uniformity. Resilient school develops through relationships, dialogue and exchanges, in the semblance of an ecosystem, at the same time retaining flexibility, which is indispensable in our constantly changing world.

Education as a Forest Plantation

Education can also be conceived as a forest plantation, where plants are given no time to regenerate and trees are homogeneous, being of the same species and age and having a predefined use. The managed forest is a stable resource administered by modern forestry. It is a pseudo-forest in which nothing unexpected happens, no unpredictable encounters take place, and neither hiding nor losing one's way is possible; forest plantations are pre-designed, linear and industrial. Even their ground is tidy, with no tree stumps or windthrow lying around. They have been described by Polish reporter Maciej Zaremba Bielawski

in *Leśna mafia: Szwedzki thriller ekologiczny* (The forest mafia: A Swedish ecological thriller), relating new developments in Sweden's forests, such as monocultures and artificial stands:

But this thing is already there and takes up half of Sweden's area: rectangles filled with even rows of trees, all of them of the same age and the same species, mostly firs. Forest plantations stretch where meadows once were. Since the times of Gustav Vasa, there have not been as many trees in Sweden, and as few forests. (...) Even the National Atlas of Sweden does not include the term 'forest' anymore (...). It only features 'forest plantations.'
(Zaremba Bielawski, 2014, pp. 15–16, 18)

In this framework, the forest is an agricultural system, just like the landscape of contemporary education, which we tend to cultivate today, without leaving room for spontaneous growth. Education of this kind is based on neat rows of crops rather than on volunteers scattered and popping up here and there (Marzec, 2023, p. 53). Michał Paluch discusses educational monoculture in his 'Forest Pedagogy' to conclude that such education is geared to meeting production demands for tolerable identical objects. Such demands may involve simply trees for 'boards,' as well as youngsters exposed to the systemic process of 'labour force allocation,' in which consumer attitudes are fostered. In both cases, the goals include accelerated production, artificially stimulated competition, prevention of full maturity and/or replication of an unambiguous and one-dimensional image of the world (Paluch, 2023, pp. 31–32). It seems that contemporary forestry and the landscape of today's education alike have been dominated by the agricultural system.

These observations dovetail with Morton's analysis of the correlation between the expansion of agriculture and the development of human civilisation. Capturing this interrelatedness in the coinage of agrilogistics. Morton identifies it as the contemporary discourse of Western rationality (Morton, 2016, 38pass). Implemented consistently and unreflectingly for about 12,000 years now, the agricultural agenda is deplored by Morton as one of the major causes of the global warming. The problem arose when humans passed from their hunter-gatherer life to crop-growing and farming. It was then that the social hierarchy arose, along with the notion of land as private property, with exploitation, slavery, colonialism and consumerism following in tow. This process is vividly rendered by American sci-fi writer Ursula Le Guin in *The Word for World is Forest*, capturing the moment the agrarian order, which Morton dubs 'agrilogistics,' begins to dominate other ways of being in the world. The action of the novel revolves around the pursuits of colonisers from the Earth, who arrive on the planet of Athshe – meaning Forest and World – and forcefully impose their model of life there. Hailing from a civilisation founded on the agricultural-technological logic, the newcomers exploit the natural resources of the planet for the sake of 'progress' and reduce its vast forest, which is a space of meaning, memory and spiritual roots for the native population, to a raw material to be measured, processed and used up.

Le Guin portrays mechanisms which are well-known from the history of the Earth, including a shift from coexistence with nature to the subjugation of nature and a turn from symbiotic relations to hierarchical ones. The symbiotic way of life seems 'primitive' to the colonisers because it is incompatible with

the instrumental, capitalist notion of the world. In this sense, Le Guin's novel can be read as a literary diagnosis of what Morton deplors as the persistence of the agricultural paradigm. Le Guin's imaginary, yet keenly perceptive, fiction registers this mindset:

But when they came here there had been nothing. Trees. A dark huddle and jumble and tangle of trees, endless, meaningless. (...) But men were here now to end the darkness, and turn the tree-jumble into clean sawn planks (...) So the alien forests became wood (...). My city was destroyed by the yumens when they cut down the trees in that region. I was one of those made to serve them, with my wife. (Le Guin, 2010, pp. 15–16, 40)

The colonisers view the forest as 'nothing,' or rather as chaos, darkness and disarray, as an expanse with no meaning, value or subjectivity. Their coming is supposed to bestow sense on what, in their perspective, is but a staple waiting to be neatly arranged, sawn and converted into something.

In Morton's view, the way we think and conceptualise things originates in the agrarian mindset; it is after all not for no reason that we talk of 'cultivating ideas,' 'sowing doubts' and 'weeding errors,' refer to disciplines of learning as 'fields' and insist on 'grounding' concepts or theories (Marzec, 2023, pp. 36–37). Morton's account is not only a critique of our agricultural practices but also a critical interrogation of the agriculturally underpinned mode of thinking with its principles of order, control and exclusion. This is the force that perpetuates the binary oppositions of crop/weed, useful/harmful and human/nature. Morton labels this way of organising reality as agrilogistics, which he considers to be the thought system that caused

the great split – the separation of humans from the nonhuman world, essentially driven by the agricultural principle of contradiction and domination. As a result, the cultivation of ideas in the spirit of the Enlightenment metaphorically mirrors the cultivation of the managed forest, where things are expected to be neatly ordered, pruned and predictable. Meanwhile, what we need is thinking in the semblance of the natural forest with its diversity, unruliness, forays into the dark, openness to random encounters, coexistence and wildness, in which ideas, as the mushroom spawn, spread in all directions at the same time and establish networks of more-than-human relations (Marzec, 2023, pp. 36–37). Agrilogistics causes immiseration and simplifications (Morton, 2016, pp. 51–52).

Morton's disparaging view of agriculture is shared both by Tsing, who insists that agriculture severed culture from nature, and Haraway (2015), who has coined the term 'Plantatiocene' (see Marzec, 2019, p. 124) and argues that our age has been modelled on the plantation as a predictable monoculture that ensures a certain level of security. In such a world, we have come to 'exclude other possibilities,' described by poet Brenda Hillman (herself fascinated with lichens, which are formed of fungi, algae and bacteria) (Fiedorczuk, 2019, pp. 79–105), stopped thinking outside the box, eradicated diversity and depleted the richness of being. Instead of promoting new identities and social roles of today's students and teachers, talking of neurodiversity, developing alternative education models and relying on a wealth of methods, we introduce hierarchies, surveillance, control, fixed patterns, subject silos and the imperative of consistency with answer keys. As forest monocultures easily succumb to pests and are highly prone to epidemics, so educational monocultures can easily fall prey to violent social tension.

The Pedagogy of Compost in the Age of the Symbiocene

The two portrayals of education sketched above were inspired by two different types of the forest. One of the metaphorical images is informed by the eco-logical spirit, and the other relies on the ego-logical, capitalist model. The layers of the natural forest, with all their abundance, are an alternative to monoculture and univectorial progress, which dominate in mainstream education. We subscribe to the former idea and propose education based on symbiotic relations with others in a multispecies world. Symbiosis enables us to cross disciplinary boundaries in scholarship and thus to develop a fuller knowledge of the world. The symbiotic school is a site of *change* and *transformation*, like in the natural forest, where nothing is wasted. Each and every fallen leaf, each and every dead, broken-off branch and each and every decomposed body transition to the next phase in the cycle of life as a substrate for new processes of growth and regeneration, with burying beetles, larvae, necrophages, fungi, millipedes and bacteria initiating this transubstantiation, which was superbly described by Zajęczkowska. A silent alchemy of decomposition unfolds in the layers of leaf litter and humus, in dark and humid dirt, as new, fertile soil is produced from rotting and putrefaction. Zajęczkowska has called this process ‘a truly miraculous conversion of water into blood,’ elucidating that:

Compost is a whole separate biotope, that is, a living habitat, and although it is originally about decomposition, it is above all a creative residency of the world's elementary particles. After all, the Latin componere means ‘to put together.’ Indeed, it is through decomposition that a new tissue of easily available matter is produced, shared by all plants, then animals and at last/at the beginning gravediggers. The very coming-forth of

nature is based on the perpetual recycling of energy.

(Zajęczkowska, 2017, n.p.)

In a paper on forest pedagogy and horticultural therapy, Michał Paluch and Marlena Kilian propose the metaphor of the Compost Human, a being that consciously participates in the circulation of matter and meaning. They explain that:

The Compost Human can be understood as one that feeds, without consuming or exploiting others, but rather letting their own being be nourishment. (...) Compost is food. The Compost Human is one that decides to feed and consents to being eaten. It is a nurturer who has grown owing to a nutritive encounter with another nurturer. (...) The Compost Human understands that they are part of a broader circulation of life. (forthcoming)

As such, the Compost Human can also be interpreted as a metaphor for the teacher, the parent or the student who continually gives back and receives, transforms and becomes part of a larger cycle of knowledge and shared existence. In this sense, compost education is not so much accumulation of knowledge as ongoing remaking and becoming. Compost is an emblem of revival as a place where what has been recognised as ‘dead’ obtains a new life in a new lifeform.

In plantation (production) forests, dead timber is usually removed because it is regarded as economic stock and a raw material for further processing or sale. As an effect, decomposition processes are disrupted and the soil is not fed by organic matter, which impoverishes its structure and reduces biodiversity. We need compost in education as well; we need a slow decomposition of old ideas, paradigms and mindsets. The composting of knowledge is a practice in which past experiences are remade into

new cognitive humus. It is permission for past models, obsolescent curricula and fossilised textbooks to putrefy and make room for fresh, more organic, interdependent and symbiotic forms of thought to sprout. The pedagogy of compost is not afraid of decomposition, which it embraces as the condition of regeneration. Remains of old narratives and new microbes of ideas meet up in its soil to form a community of creative ferment. The soil of humus education is fecund and dark, holding both the rotten foliage of old concepts and vibrant dreams of what is still to germinate.

The dreaming we evoked at the beginning of this text is not an escape from reality; on the contrary, it is an act in which reality is creatively transformed. Dreams make it possible to envision a better education and to design a more sensitive school, as well as, more broadly, a more sustainable world. In this context, the notion of the *Symbiocene* is particularly useful in describing a new order following the age of the Anthropocene. Proposed by Australian philosopher Glenn Albrecht (2019),¹³ the *Symbiocene* refers to an imaginary era in which social, cultural and cognitive life will be based on relationships of interdependence, cooperation and coexistence of all lifeforms. Understood as ‘living together (...) for mutual benefit’ (Albrecht, 2019, p. 97), symbiosis opposes separation, domination and hierarchies, which are signature notions of the Anthropocene. It counters disjunction with universal connectivity – the appreciation of mutual entwinement of humans, nonhumans, plants, fungi, ecosystems and inanimate matter. The *Symbiocene* is thus a project of re-assembling what has been split up in modernity. The *Symbiocene* also entails school founded on interdependence, care and cocreation. In this approach, knowledge is not property but

13 On the concept of the *Symbiocene*, see also Skubata & Ochwat (2023) and Ochwat, Skubata, & Glenn (2024).

a relationship; the teacher is not the centre but a node in a network of interconnections. Instead of hierarchising, symbiotic education coexists; instead of rivalry, it embraces collaboration. We conclude by presenting a manifesto of symbiotic education.¹⁴

Our proposals are not to be treated as carved in stone; just the opposite, readers are most welcome to add their own points to expand this catalogue and rethink its essence in the changing environmental conditions. Let it spread like a mycelium in the natural forest; let it practice decomposition to become fertile soil for new ideas.

1. Think like a forest, not as a plantation

Think of school as a natural, diverse forest, an environment of growth, entwinement and random encounters. Let ideas spread in unexpected direction and roots grow across school subjects and curricula. Education should not be an assembly line but an organic process of coexistence.

2. Build networks, not hierarchies

Follow the mycelium in building networks of relationships in which students, teachers, plants, objects and settings learn from one another. There is no centre point in his plexus; instead, there are flows, exchanges and resonances. Symbiotic education grows out of relationships.

3. Treat knowledge as a gift, not a commodity

Knowledge is not capital to be accumulated, but a gift that goes around. A gift obligates to gratitude and care. Teach that knowledge is not a conquest but co-participation – being part of a loop where what one gives comes back remade by others.

14 Our manifesto of symbiotic education is not an agenda to be implemented but an invitation to practise thinking ‘together-with’ the world. The mycelium grows through the ground, bringing together the visible and the invisible, and, likewise, education can merge learning, care and community.

4. Allow error and the pedagogy of darkness

Not everything must be clear, measurable and predictable. Education, like the mycelium, develops in shaded places.

5. Practice noticing and the micrology of the world

Teach perceiving the tiny, the fragile, the imperceptible. Practise the arts of noticing. Look carefully around, not only forward.

6. Learn resilience, like the forest after a storm

Breakdowns, mistakes and disturbances are not a failure, but a part of the life cycle. In a diverse educational ecosystem, strength does not come from uniformity, but from heterogeneity and interdependence, like in the forest filled with various species. Resilience in education means the capacity for regeneration.

7. Re-naturalise education and foster interspecies worlds

Open school to the world. Teach in motion, in gardens, in the ruins of capitalism. May the classroom again become an ecosystem in which ideas, emotions, sounds and other-than-human voices flow around. Do not limit yourself to human experience alone.

8. Compost knowledge

Let old ideas decompose. Do not be afraid of rotting, metamorphosis and decomposition. It is in the dark and humid humus of decayed concepts, errors and doubts that new, fertile soil is formed. Compost curricula, models and textbooks, remaking them into a living thing.

9. Be unruly and caring at the same time

Like mushrooms that spread against a planter's plans, practise tender resistance to whatever destroys common life.

Question the order that kills (bio)diversity, but do that caringly so as to establish new connections and not new silos.

10. Add your own point

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**How Are Things? A Report on Earth
in Literature for a Young Readership**

*The earth is not a dream, but living flesh,
That sight, touch, and hearing do not lie (...)*
Czesław Miłosz, 'Hope' (1996, p. 59)

In 2008, Ewa Domańska argued in her by now classic paper 'Humanistyka nie-antropocentryczna a studia nad rzeczami' ('The non-anthropocentric humanities and thing studies') that interest in things and the shifts it had brought about and undergone (turn to things, materiality, performative and agency turns) resulted from the belief that our modes of thinking of the world were incompatible with the changes in the world. She cited theories proposed by Donna Haraway, Bruno Latour and Andy Pickering as her examples, along with bold experimentation in the arts. To support her argument, she compiled a veritable cabinet of curiosities with, on display, an array of cases that befuddled any methodology. Her gallery included Oscar Pistorius (a runner using carbon fibre prostheses), a person with a pig heart transplant and a synthetic diamond made of human ashes (Domańska, 2008, p. 13). She proposed that they represented hybrid and chimeric subjects, eluding the paradigms the humanities had effectively been using for quite a while, such as race, class, gender and the long-cherished organic/inorganic and human/nonhuman distinctions. Things have an important position in this interspecies tangle, one reason for their relevance being that they not only contribute to human biographies, but also have life stories of their own (Kopytoff 2004).

Latour developed a critical sociology project to make a case for restoring to things the place they deserved and mobilising the notion of agency in the process. Hence, he proposed studying human-and-nonhuman collectives and first and foremost exploring the dynamics of their interrelations. Latour encouraged the investigation of environments which the various actors brought into the networks they formed. Such assemblages, he insisted, emerged as a result of the accumulation and transformations of relations between the beings of the human-and-non-human community. Importantly, Latour viewed such relations as involving protection and care, claiming that whatever was constructed needed special concern and attention (Latour, 2005). Obviously, relations are emphasised not only in Latour's Actor-Network Theory. They are also pivotal to the frameworks proposed by Karen Barad (2007), Jane Bennett (2009) and other new materialists, as well as Haraway, who apply the lens of intimacy, entanglement and contiguity, which is forged in mutual negotiations, does not keep distance from the object of research and embraces responsibility along with commitment to 'common issues.'

Importantly, these 'common issues' result from ontology. If children of/from matter, which 'lives, is in a flux, creates new forms, is becoming and has meaning of its own' (Marzec 2023: 19), are not capable yet of establishing deep alliances, they should at least attentively examine the biographies of their companions and/as tales that foster empathy with the fragile, the broken and the imperceptible; all this is after all part of their own fate as well. If we assume that earth is this matter, the tales it inspires can be called, following Latour, 'geostories,' whose plots are woven by human-and-non-human actors. Collections of such narratives reinforce the pedagogy of earth, purge their speculative reading list of prick tales, which are exclusively

focused on Humans in History (Haraway 2016: 43) and in which 'all others (...) are props, ground, plot space, or prey' (Haraway 2016: 43). I believe that such narratives would comfortably fit in with Maria Montessori's concept of cosmic education, which overcomes the limits of human history and opens to the story of life (Duffy & Duffy, 2018, p. 76).

Do we read such stories to our children?

Digging in the Ground: In Search of Geostories

Let us have a look at fairy tales. They are a promising example as they swarm with nonhuman creatures, but at the same time they may be unrewarding because most fairy-tale protagonists, often animals and objects, are relentlessly personified, which puts the candid practice of the philosophy of intimacy at serious risk. What is similar to us is known to come across as familiar and, consequently, does not mount any particular resistance in relation-building.

This is evidently true for fairy-tale objects. Defence of the subjectivity of things may easily become an excuse for appropriating them and paradoxically doom them to share the fate of all those who could not or cannot speak up for themselves. Or maybe it is just the other way round, and the more we humanise a thing the greater our chance of dismantling the anthropocentric perspective? Or maybe we should find an object that will resist the context to which we usually bind it?

Hans Christian Andersen's tales teem with objects. The signature trait of Andersen's things is that they are forsaken, abandoned, broken and defective. Their wretched condition relegates them to the margin, whence they migrate into nothingness after a while. Briefly, they disintegrate and disappear before our very eyes. Andersen can in fact be said to have a howling and sadistic way of tormenting objects: a darning-needle, a tin toy

soldier and his beloved paper ballerina, a snowman, a fir tree, a teapot – the list can go on and on. The biographies of these artefacts verge on hagiographic tales, but no reward is in sight for dignified suffering. Before the steadfast one-legged tin soldier perishes with his beloved in flames, thrown into the fire by children who loath the old, defective toy, he must be mired in evil and ugliness. Andersen has him traverse the disgusting chasms of gutters and run into rats. He treats the darning-needle in the like manner, having her proud of her lustrous coating only to land in a sink drain and a gutter (again!). She is exposed not only to slow rusting but also to abuse from merciless street urchins. For their part, the snowman melts in spring sunshine, and the fir tree is brutally chopped up as soon as it has fulfilled its function and then burned in a fire under the copper.

These things seem to be guilty of one misstep only – failing to grasp the gravity of their situation. They inhabit it without relinquishing their old and invalid ideas of themselves, their flamboyant dreams and their huge egos. They ignore the fact that reality clings to them closely, entraps, bridles and curbs them, precluding any return to what once was. Briefly, they ignore viscosity.

Borrowed from Timothy Morton's lexicon, viscosity vividly conveys the clamped entrapment of the fairy-tale objects. Importantly, stickiness not only describes the position of humans vis-à-vis hyperobjects (Morton, 2018), into which we sink and to which we adhere, but also 'means that we are not so much attached to our mode of being and perceiving as stuck to our epistemic position' (Marzec 2021, 36). Morton does not propose the impossible. If we can neither free ourselves from viscosity nor ignore it, we must steep ourselves in it, go deeper, rescale and stick to minor issues and be ready to devote our lives to 'the small, the local and the inconsequential' (Marzec 2023, 71).

That would mean cultivating, within, new organs-tools for sensory and shared being-in-the-world. Tentacles, appendages and palps would feel the misery of the world like a seismograph and help us merge with the most needy ones.

The stickiness perspective makes one Andersen tale particularly captivating. 'The Teapot' is a short narrative about a piece of crockery that enjoyed the status of the 'queen of the table' for a while, only to go the way of all Andersen's fair-tale objects and dramatically lose its position and the rank ascribed to the porcelain tableware. The defective vessel ends up at a dumpsite, and it is from there that we hear its tale as told in the protagonist's own voice:

There was once a proud teapot; it was proud of being porcelain, proud of its long spout, proud of its broad handle. It had something before and behind – the spout before and the handle behind – and that was what it talked about. But it did not talk of its lid, which was cracked and riveted; these were defects, and one does not talk of one's defects, for there are plenty of others to do that. The cups, the cream pot, and the sugar bowl, the whole tea service, would think much oftener of the lid's imperfections – and talk about them – than of the sound handle and the remarkable spout. The teapot knew it.

'I know you,' it said within itself. 'I know, too, my imperfection, and I am well aware that in that very thing is seen my humility, my modesty. Imperfections we all have, but we also have compensations. The cups have a handle, the sugar bowl a lid; I have both, and one thing besides, in front, which they can never have. I have a spout, and that makes me the queen of the tea table. I spread abroad a blessing on thirsting mankind, for in me the Chinese leaves are brewed in the boiling, tasteless water.' All this said the teapot in its fresh young life. It stood on the table

that was spread for tea; it was lifted by a very delicate hand, but the delicate hand was awkward. The teapot fell, the spout snapped off, and the handle snapped off. The lid was no worse to speak of; the worst had been spoken of that. The teapot lay in a swoon on the floor, while the boiling water ran out of it. It was a horrid shame, but the worst was that everybody jeered at it; they jeered at the teapot and not at the awkward hand.

'I never shall forget that experience,' said the teapot, when it afterward talked of its life. 'I was called an invalid, and placed in a corner, and the next day was given to a woman who begged for victuals. I fell into poverty, and stood dumb both outside and in. But then, just as I was, began my better life. One can be one thing and still become quite another.

'Earth was placed in me. For a teapot, this is the same as being buried, but in the earth was placed a flower bulb. Who placed it there, who gave it, I know not; but given it was, and it became a compensation for the Chinese leaves and the boiling water, a compensation for the broken handle and spout.

'And the bulb lay in the earth, the bulb lay in me; it became my heart, my living heart, such as I had never before possessed. There was life in me, power and might. The heart pulsed, and the bulb put forth sprouts; it was the springing up of thoughts and feelings which burst forth into flower.

'I saw it, I bore it, I forgot myself in its delight. Blessed is it to forget oneself in another. The flower gave me no thanks; it did not think of me. It was admired and praised, and I was glad at that. How happy it must have been! One day I heard some one say that the flower deserved a better pot. I was thumped hard on my back, which was a great affliction, and the flower was put into a better pot. I was thrown out into the yard, where

I lie as an old potsherd. But I have the memory, and that I can never lose. (Andersen, 1915, pp. 188–189).

Andersen wrote this tale in Toledo when travelling in Spain and Morocco. Published at the end of 1863, it was dated 1864 (Ogłóżka, 2014, pp. 184–185). Andersen arrived in Toledo in December and was impressed by the city. With the weather being adverse, temperatures freezing and snowfall in abundance, the sickly, if also hypochondriac, Andersen was shortly down with a cold. His dampened mood, the icy air discouraging strolling and a snow cover on the historic town certainly affected Andersen's reception of Toledo's cityscape. Overcome by melancholy, he saw it as a place of ruined churches, a stone desert and waste land. This vedute resonated with the romantic sensibility and contemplation of the beauty of ruins. The tale written amid such scenery gives the impression of at least partially registering Andersen's experience of space. Consequently, his choice of a dumpsite – the locus of erosion, decomposition, decay and termination – as the setting is understandable, as is his choice of a piece of rubbish, a useless, forgotten and despised thing as the protagonist.

Though discarded and thus removed from the centre point of the world, the teapot puts up resistance. It is stripped of its old splendour and does not preside over the table, but it seems to be skilfully navigating its new and certainly challenging situation. If the substance from which it is made¹ in a way seals its role in

1 ¹ 'The Teapot' was translated into Polish again, directly from Danish, by Bożysława Sochańska in 2006. The new version importantly differs from the previous, widely known translation by Stefania Beylin, who used a German version of the tale as her source. Sochańska's rephrasing of the title is particularly illuminating. Beylin opted for *imbryk* (a tea kettle) while Sochańska for *dzbanek do herbaty* (a teapot). This difference results from Sochańska's specification of its material; she explains that the damage it sustains when falling off the table is caused by the fact that it was made of brittle porcelain. In this way, the teapot is a symbol of vulnerability and

life and the human-appointed functions place it somewhere between a kettle and cups (Droit, 2003, p. 75), the teapot itself takes 'other options' into consideration. Its fall reveals that neither the costly porcelain of which it is made nor the tableware-function it had ascribed to it ultimately defines it, and it remains open to new practices of existence.

Haraway would say that the teapot is pulled into a game called cat's cradle, which involves manipulating a tangle of strings, symbolises a non-antagonistic relationship and 'can be played on your own hands, but it's more interesting to play it with someone else' (Haraway, 2000, p. 156).² This idea essentially makes Andersen's protagonist a resistant object that eludes language, representation and the functions to which we tend to bind it. When deprived of its functionality and of its 'natural' context, the shattered shard may excite compassion and emotion. But the vessel itself is in fact open to testing new possibilities and new context and, on top of that, appreciates the alternative relations in which it engages and is curious to examine the changes they trigger in it.

The setting of the tale is a key factor. The littered yard stands as archives of sadness, filled with the useless and the shameful, and displaying the misery of objects. At the same time, the tale arising from garbage epitomises parrhesia – free, open and candid speech. It is the opposite of rhetoric, though echoes of the latter can be heard in the text, particularly in its opening passage. It resounds with the biblical style, which emphasises the

fragility in Sochańska's version. The 'tea kettle' in Beylin's translation is used not only to brew tea but also to boil water. This function suggests that it must be made of a fire- and heat-resistant material, such as tin or cast iron. If so, it would not be likely to break when falling onto the floor.

² When discussing the generation of care-oriented knowledge, Haraway mentions cat's cradle, a game in which a pattern is created between the fingers of one's hand using string to be passed to another player, who then creates their own pattern. According to Haraway, the game involves not only one's own hands but also other creatures of Terrapolis because playing it with somebody else is more interesting than playing it alone. Cat's cradle is used to emphatically communicate the importance of understanding and weaving quality nodes/ties between us.

inestimable original role of the teapot as it 'spread[s] abroad a blessing on thirsting mankind.' These false tones of a would-be Messianic tale are soon ousted by true speech, which ensues from downfall, traumatic experiences and involvement with the world. This speech is a new story, one produced bottom-up, a micro-story, so to speak, which, if properly generalised, may be recognised as being more than an individual truth rooted in one's particular experience and embedded in a particular place, but as a tale that is adaptable to other settings even though it comes from a curiosity cabinet that the dumpsite tends to be. As a parrhesiast, the rubbish-teapot talks on behalf of those that cannot talk and in doing so adopts the position of the weaker. While criticising its mistakes, it emphasises the transformation it has experienced, mutating from individualistically-minded, though also complex-plagued, braggart to a victim of a fall/accident to a relisher of fulfilment derived from the sense of making its life meaningful.

The Potential of Garbology

Fixtures of the postmodernist lexicon, 'waste production,' 'civilisation of disposable objects,' 'instant culture,' 'tyranny of the moment,' 'human waste,' 'wasted life' and 'garbage collection' (Kowalski, 2008, p. 5) have not lost their relevance today and sound even more vividly in the context of climate change and education that comprises reflection on crises and takes a lively interest in garbology as well. Indeed, crisis narratives are a good opportunity to introduce issues of overconsumption, growthism, social injustice, recycling and zero waste practices to education and sensitise youngsters to the limited resources of the planet and moderns slavery, fostering pro-ecological consumer attitudes informed by post-growthism mindsets. Magdalena Ochwat is certainly right to read Andersen's tales

in this context and to conclude that 'in such interpretations, attention can be paid not only to giving objects a 'second life' but also to the very process of repair; the teapot's lid was broken and glued together, but it was still useful, wasn't it?' (Ochwat, 2025, s. 242). Ochwat's view can be supported by Stanisław Łubieński's impressive insight that rubbish

is a human concept, entirely foreign to nature. In the natural system, everything has its aim, place and function. A healthy system is self-regulating. Matter eternally circulates in a closed-loop cycle. Surplus basically does not exist as plentiful factors make the amount of food, the available shelter and reproductive possibilities limited. Humans have learned to remove such obstacles to their own species. (Łubieński, 2020, p. 130).

The crossing of boundaries mentioned by Łubieński produces the famous city of Leonia in Italo Calvino's *Invisible Cities* (1972; Eng. ed. 1974) and the polluted Vistula with its litter-strewn banks of Powiśle in *The Doll* by Bolesław Prus (1890; Eng. ed. 1972), an image that Polish students can more readily recognise and relate to. Both representations of the city can be helpfully used as a capacious metaphor for 'munching the world out' and harmful social divisions. If dumpsites in Andersen and Prus are still plastic-free, one should bear in mind that robust research on plastic was already underway in the second half of the 19th century, with this effort culminating in a triumph in 1907. The excess of plastic is exorcised today by waste sorting and recycling though we know very well today that the idea of the circular economy is no remedy to the climate crisis because, at the end of the day, only a fraction of used-up materials is in fact recycled:

Even if we recycled all of it, economic growth would keep driving total resource use up. In any case, we're moving in the wrong direction: recycling rates have been declining over time, not improving. (...) It's because growth in total material demand is outstripping our gains in recycling. Once again, it's not our technology that's the problem – it's growth.
(Hickel, 2020, p. 156; italics original)

Lessons of Picking-up from the Ground

Andersen's teapot story is so replete with meaning that it bursts beyond the zero-waste context to which it has been chained in climate education. The useless porcelain shard into which the protagonist devolves is capable of generating new senses and, in this way, carry us to new stories. This approach to the fairy tale results from my school practice and a lesson I had with fifth-graders. More than ten years ago, I was in charge of students training to be Polish teachers and had an opportunity to conduct a class based on an Andersen tale for them to inspect. 'The Teapot' was selected. Without going into the details of the lesson, let me focus on the learners' response to the text. First, we put together a timeline of the object's biography, which was, importantly, not horizontal but vertical and, in this way, suggested its downward movement. With the timeline ready, the fifth-graders were tasked with writing a letter to the protagonist. This assignment was to precede interpretation work because I wanted to know how the life of the porcelain 'looser' was intuitively assessed by the young millennials. Their letters, addressed to fictitious locations such as Dump Street, Smelly Street or Dirty Street, were read out aloud, leaving me nothing to doubt about. Namely, none of them expressed any scorn of the protagonist; they were compassionate, though sympathy

tended to recede and make room for appreciation and advice to the teapot not to delight in the beauty of the flower it helped but to value its own devotion to the other. Revisiting the vertical line illustrating the teapot's biography on the board, the learners adamantly insisted that the protagonist's life was not a downfall but a flight up.

Clearly, the young readers endorsed the values that seemed rather exotic but some years ago when Poland was experiencing its fit of capitalist breathlessness. At the time, the school primed students for the rat race, educating them for rivalry. Slowing down, desisting, waiting out and exercising one's patience, which the children found in Andersen's tale back then, resurface today in the titles of bestselling guides and must-have handbooks, as well as in the most popular resilience-themed podcasts as their focal points. Given this, I believe that the most relevant and topical interpretation of 'The Teapot' today should highlight the moment the protagonist feels connected with other beings.

This Kind of Porcelain, If Any at All

Porcelain, the material of which the teapot was made, belongs to earth and fire as it is produced by baking a mixture of kaolin clay, feldspar and quartz at very high temperatures. This combination results in a fine and fragile substance which is harnessed to the bizarre work of a teapot. Tea-brewing is, intriguingly, an activity that does not involve gestures or motions and is only based on warmth, time and enclosure (Droit, 2005, p. 75). In a typically human way, the tableware piece is appraised by the value of the substance that went into its making. Yet if we ignore this 'social' enmeshment of the object, we can discover its different links, such as relations with rocks, earth, plants and air. The sense of connectedness with other beings seems to be premised on detachment from one's own body as highly

e-valuated and thus highly value-d by others or, in other words, on evading commodification. For Andersen's teapot, the abandoning of the economic context and existing outside the social hierarchy prompted renunciation of the self-image as a strong individual, habituation to powerlessness and rechanneling of attention onto other objects.

This change pivots on the fall, failure and breakdown, which deflect the trajectory of life in a different direction. Andersen masterfully highlights this liminal moment. Sidelined and waiting for another role to play ('One can be one thing and still become quite another'), the teapot knows that changing hands, being ever more faulty and losing more and more of its value, it will finally get another role. Indeed, it becomes a flower pot, an earth-filled house of a bulb and soon of the entire plant. If once it superbly served its functions of tea-brewing, it paradoxically never felt as needed and as alive as when it was filled with earth although '[f]or a teapot, this is the same as being buried.'

From that moment on, the teapot reconnects with earth, of which it was in fact made but serving as a tableware item it became distant from it. Now, it fuses with the chthonic. The cry 'Blessed is it to forget oneself in another!' conveys both the delight in intimacy and the courage of self-invalidation, both of which, paradoxically perhaps, promote opening to other potentials. In *Ludzie nieznacznici: Taktyki przetrwania* (Minor people: The tactics of survival), Agnieszka Dauksza talks of *Mnemiopsis leidyi*, a species of jellyfish which can grow together if one individual is threatened in order to enhance chances of tissue regeneration and survival. Dauksza transposes this practice onto human communities:

The 'self' that feels itself again in an embodied and instinctive way so as to head toward a 'we' may be not a particularly complex mechanism, but it can certainly change a lot. This is

'about rediscovering, time and again, the subversion of not being ourselves unless we are together in it. (Dauksza 2004: 283)

There are examples galore: the cooperation of algae, fungi and bacteria in lichens, holothurians splitting their bodies when at risk or, in the most general terms, the symbiotic foundation of our planet as discovered and described by Lynn Margulis in her *Symbiotic Planet* (2000).

For the teapot, being-together is co-being rather than existing alongside. It is radical and leads to real transformations. While the earth it holds inside and the roots grown by the bulb gradually crack the vessel, which is bound to be too small for the plant very soon, they are in all probability involved in an exchange of matter. As a result, the teapot morphs into a hybrid, which is anyway the aptest rendering of the essence of the body:

It is indeed the illusion of bodily separateness that is the genuine sorrow, that accounts for our loneliness, that isolates us and leads us to exploit and violate one another, the world we live in, and, ultimately, ourselves. (...) To make up for this loss, conventional theories posit an aggressive 'taking in,' a penetrating activeness, as our best and fundamental stance vis-à-vis the world. (Barrows, 1995, p 109)

In view of the continual exchange of matter and the integration of everything with everything else, desisting should be practised in respect of our tendency to fantasise on ideal forms of reality. Judith Butler says that we have enough to think about even without them: 'We need to understand and attend to the complex set of relations without which we do not exist at all' (Butler, 2015, p. 15).

Humilitas Means Humility and Humus Is Earth

Failure is a grounding factor. Andersen's teapot experienced this literally and metaphorically. Its failure initially wrought turmoil in its relationships, or perhaps exposed their illusory nature, but it also afforded the teapot an opportunity to remodel its sensibility by drawing its attention to something different from what had become habitual. Grounding means adherence to the concrete and courage to stay with the trouble, to use Haraway expression (2015). What the future will be like is obviously one of these troubling issues, and Tsing poignantly notes: 'Neither tales of progress nor of ruin tell us how to think about collaborative survival. It is time to pay attention to mushroom picking. Not that this will save us – but it might open our imaginations' (Tsing, 2015, p. 19). Tsing means matsutake, a species that grows in ruined landscapes, and mushroom pickers are those who have made themselves perfectly at home in these abandoned spaces. The tactics of survival, resistance and cooperation they effectively employ are based on relationships which, until recently, were quite unthinkable. Haraway explains that Tsing, who criticises progress, examines sources of precarity and closely watches vital practices of the excluded, those consigned to the fringes of the world, 'proposes a commitment to living and dying with response-ability in unexpected company. Such living and dying have the best chance of cultivating conditions for ongoingness' (Haraway, 2016, p. 41). Unruly fringes overgrown by mushrooms are a perfect testing ground for relational experiences because they offer a perspective from which one can clearly see the centre-produced practices of oppression and pressure and at the same time embrace interspecies interdependences, including those that lead to decomposition.

Andersen's teapot is open to unexpected company, so decomposition will likely be the next stage in its biography. Cracked into two, the teapot with a residue of earth in its porcelain shell is dumped in the yard, adding to a stack of objects of no use to anyone anymore, which are bound to merge with the soil in the course of time. We can speculate that the teapot will develop new relations, this time with the edaphone, or soil biota, that is, the totality of organisms living in the ground and impacting its structure and fertility: 'Edaphone is a laboratory of blind alchemists, a workshop that transmutes the dead into the living. Edaphone reverses the Christian 'from dust you came, and to dust you will return' into the vitalist 'from life you came, and to life you will return' (Rosińska & Szydłowska, 2020, p. 34).³

Andersen's protagonist is grounded as a result of failure. Costica Bradatan's *In Praise of Failure: Four Lessons in Humility* (2023) associates failure with humility, which the teapot's biography showcases in its surrender of the self, where the boundaries of one's body are given up in order to find meaning in the experience of challenging relationships. Like Daukszta, Bradatan reminds us that the notion of 'humility' presupposes acceptance of one's cosmic insignificance. More than that, '[t]he word itself comes from the Latin *humilitas* (lowliness), derived in turn from *humus* (earth)' (Bradatan, 2023, p. 45). One needs to be in touch with earth.

Words, Words, Words: Waste, Waste, Waste

Copenhagen has had a new urban symbol since 2017. It is Amager Bakke (lit: hill), an artificial mound housing a hyper-modern heat and power plant combined with a waste incineration plant. Besides these functions, the site is also a recreational

³ The Polish wording of the phrase is slightly different and emphasises the aspect of transformation, as it literally says: 'From dust you arose, and into dust you will turn'/'From life you arose, and into life you will turn.' (translator's note)

area, complete with a hiking trail, a 370-metre-long rooftop dry ski slope and the world's largest climbing wall (85 metres). In his write-up on the Copenhagen incinerator, titled 'Śmieciowa przestrzeń' ('Space of waste'), Filip Springer denounces the facility as a pernicious flourish of its architects' self-adoration and insincerity. If the gigantic building indeed has important functions, it intolerably towers over the landscape, ostentatiously parading its key role in the urban fabric. The cutting-edge dumpsite is not located at the fringes of the world but dominates the area, certainly without any intention to remind people of the disgraceful side effects of ongoing consumption. On the contrary, it not only celebrates the power of production, destruction, processing and reproduction but also indulges in bizarre aesthetics, which ignores the gravity of the situation. The architects' design envisaged crowning the monumental facility with a chimney that would every now and then emit a perfectly round cloudlet – the effect of waste incineration. It was supposed to resemble a doughnut, an engineering feat that may perhaps be staying with the trouble but at the same time brackets it off ironically. As Springer concludes:

When coming back to their studio, they must have known that it would not work. But they were the hostages of their own vision. Puff was supposed to crown the work. They were designing a waste incineration plant where it was going to be seen by half of the city, right? They wanted to give it something amazing. A 'wow' effect. Hence puff. (Springer, 2019, pp. 69–70).

Google Maps shows that Andersen, who lived at 67 Nyhavn Str. in Copenhagen and at a handful of other addresses in the neighbourhood, would have been able to see the facility from the distance of just below three kilometres. Would this sight have inspired him as powerfully as the romantic ruins of Toledo?

Is there a potential for melancholy, failure and metanoia in the modern architecture of the incinerating mega-plant, disguised as a recreational area?

What kind of a fairy tale would have been born there?

'Earthbound' Gaia Stories

Crucially, everything takes its beginning in earth, as Kora Tea

Kowalska insists in her *Patrz pod nogi* (*Watch your step*),⁴ a book on urban archaeology, collecting passion, rummaging through dumpsters and spinning narratives of them. Kowalska observes that 'matter churns in scrapyards, at dumpsites, underground and in cabinets. (...) This simmering of things happens despite our gestures' (Kowalska, 2024, p. 6). This simmering is noted by various disciplines, including the pedagogy of things, which argues that education theory is preoccupied with people, meaning and culture but very eagerly omits issues of materiality or reduces them to tools or threats. The pedagogy of things thus poses new challenges to the studies of all levels of education that focus on human/nonhuman relations in teaching/learning processes and encourages rereading the classics of the humanities (Makowska & Chutorański, 2019).

Thing-oriented thinking cannot be ignored in the context of the children's literature canon, either. The pedagogy of things also promotes rereading already canonical literary texts, which have long been formatted for predictable interpretations while these have often been additionally petrified by school procedures. Under such pressures, many of the texts have been emptied of their power to move and stripped of their transformative potency. Apparently, the key function of affecting readers has been taken over today by 'expedient,' alarmist, interventional and often advice-giving texts, propelled by the need of the

4 The equivalent fixed phrase is Polish even more directly references earth because it literally means 'look under your feet' (translator's note)

moment and quite smoothly answering the rough questions spawned by today's fears and concerns. This textual production may result from the belief in the power of agency, a term on everybody's lips today as a panacea for the ubiquitous sense of insecurity and fragility. Sporting the aesthetics of a manual, such writings can beguile with their easy solutions and quick-fix ready-made practices for the time of the crisis.

Certainly, such books can be useful and inestimable in education as well⁵, but the rush of agency euphoria they tend to induce may easily make one miss the fact that our condition is also one out of joint (Maliszewski, 2021, p. 30). Educator Krzysztof Maliszewski defines this state as 'incapacity to pause amid the gale of time, the constant risk of losing the intelligibility of the world and self, the provisional quality (...) of life, exposure to unpredictable invasions and, thus, inability to be in charge of one's path' (Maliszewski 2021: 30). The erasure of the scandal of accident (Maliszewski 2021: 30) is a gesture on a par with the architectural design of Copenhagen's modern waste incineration plant, which pretends to be a recreational area and every once in a while emits a playfully shaped cloud of smoke to communicate a comforting message that the world is under control again and we turn the trouble with which Haraway wanted us to stay into an attractive theme park. This theme park is in fact as attractive as it is grotesque since, according to Springer's relation, the facility, which was originally designed to process 500,000 tonnes of waste annually, has become a hostage of its own grandiosity. Namely, neither Copenhagen itself nor Denmark's other cities were able to deliver such an amount of waste; consequently, to keep the plant working at full capacity and avoid losses, the government agreed to import waste from

5 I deliberately do not name any of these books in order not to stigmatise them. I appreciate their presence on the Polish publishing market and believe they have their uses and perform their educational functions. What I call for is giving room to more complex representations beyond handbooks, popular-science publications and thesis-gearred literature.

other countries in a glaring breach of Denmark's environmental policies (Springer, 2019, p. 71).

Springer's mini-reportage is certainly not one of the Latour-advised geostories (Haraway, 2016, p. 45), that is, narratives in which, as Latour depicts, 'all the former props and passive agents have become active without, for that, being part of a giant plot written by some overseeing entity' (qtd. in Haraway, 2016, p. 45). Latour thus champions 'Earthbound' narratives, or 'Gaia stories' (Haraway, 2016, p. 45). When looking for such representations, which additionally might correspond to Andersen's 'The Teapot,' I chanced upon Justyna Smoleń's *Kruche sny* (*Brittle Dreams*) show at Cracow's Art Bunker (January–April 2025). Smoleń works with defective objects (mostly with broken or cracked china figurines), rescales their meaning and inscribes them in ever larger narratives.

The show included three collages series: *Figurki* (*Figurines*), *Hybrydy* (*Hybrids*) and *Lawa* (*Lava*). The first set comprised damaged porcelain knick-knacks reassembled into surprising forms of trans-species hybrids that thematised feminism, ecology and social norms. The simmering of objects seemed to intensify in the *Hybrydy* series, consisting of things picked up from the ground, from objects of everyday use to 'natural' finds, such as seashells. Part of the ensemble, a monumental totem pieced together from substances of diverse origins deserved particular attention as it commemorated the fleetingness of human aspirations and also symbolised 'the subordination of individual stories to a greater, dominant narrative' (Borysiewicz, 2025, p. 25). The *Lawa* series was perhaps the most moving one with its pieces clearly entangled with earth. Its stoneware ceramics and other objects merged, brought together by the tissue of organic beings. The tissue stuck around them like a magma of tree branches, fungi and bark. Immobilised and congealed, forced into strange company of random artefacts, the things

melted in with the motley of cacophonous objects and emergent narratives, slowly becoming their part. In this tangle of things, one could catch a glimpse of a porcelain teapot.

It seems to me that Smoleń's pieces are exactly the kind of geostory we need. If lava is to be the language of Gaia, let magma not only send shock waves across our world, when spurting to the surface, but also fertilise it, carrying stories great and small, both those already blended together and those still separate, making us all 'close strangers.'

How can we make things enthralling so as to foster empathy without fuelling consumer practices? What should this 'lava' – fervent Gaia-stories of things, narratives addressed to children – be like? Andersen's 'The Teapot' shows that we need:

1. To rehabilitate things – the damaged, the fragile, the discarded.
2. To have an opportunity of failure as a source of transformation, co-being and cooperation. The protagonist need not be a winner. Instead of defeating, the protagonist may coexist.
3. To bring things out from the background and make them protagonists.
4. To be no longer ashamed of tenderness for matter.
5. To discern micro-stories, learn to be attentive to subplots about the fringes of the world and listen to and for unobvious voices.
6. To focus our attention on passing from 'I' to 'we.'
7. To take reading out into the world and incorporate natural, unpredictable contexts into it, such as touch, sound, smell, temperature and texture. Let us imagine that place is a co-maker of reading.
8. To expand reading practices. Let individualistic reading be complemented with reading in a group. Let us make reading a collective experience.

Briefly, 'we must be involved in learning and remembering the ways *we might have been* otherwise' (Haraway, 2000, p. 172; italics original).

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Hug Every Tree You See – And Be Hugged In Return: Thinking with Trees from Upton Sinclair’s *The Gnomobile* to Brian Selznick’s *Big Tree*

The Climate Emergency demands that we learn the language of the trees and speak on their behalf.

(Holten, 2023, p. 255)

Children’s literature exists in a precarious relationship with its own history, with the evolving interpretations of that history, and with the larger cultural trends of the present that propel it into the future. One of these trends, a key marker of the Anthropocene, is a wholesale assault on the Earth’s forests. Trees are one of the most common, powerful, and tangible representations of the hyperobject called ‘nature’. Saving forests and planting trees have been among the key rallying calls of the environmental and climate movements. Trees have also been featured in children’s books. This essay explores a notion that representations of trees in children’s literature can be read as cultural markers of the evolution of human attitudes to the nonhuman world. It suggests, specifically, that there is a symbiocenic line of thinking in children’s literature that has sought to rehabilitate trees from objects to subjects, from resources to partners, and from things to persons. For some children’s authors, this rehabilitation was more central to a specific book; for others, it emerged in the course of the story. Some authors seem to merely stumble upon it; others explore it deeper, intentionally and from non-obvious angles. Of course,

trees feature as characters in hundreds of children's books, so no generalization is ever going to do justice to the larger picture. That said, based on my readings over the past 25 years, I have reasons to believe that representations of trees in certain works of children's literature point at a larger cultural change in ideas and assumptions about the human-tree relationship. If so, they reflect an ongoing, ecocentric shift toward symbiocenic notions of kinship with trees and shared ecosystemic agency at the time of climate crisis and biodiversity loss. In this essay, the argument is supported by a close reading of three children's books published about eighty years apart: Upton Sinclair's *Gnomobile* (1936), Katherine Applegate's *Wishtree* (2017), and Brian Selznick's *Big Tree* (2023)

Humans and Trees

Humanity has a complex relationship with forests. Stories of the oldest Neolithic civilizations carry memories of having emerged from forests or of subduing forests – the wilderness – to create settled existence. One key episode in the 4,000-year-old *Epic of Gilgamesh* is when the hero Gilgamesh and his companion Enkidu enter a great forest of cedars to challenge its guardian, the monster Humbaba. Once the monster is defeated, the cedars become building materials. The largest tree is cut down to make a gate for Gilgamesh's city. As Brian Attebery comments, 'Gilgamesh's story is the story of civilization, quite literally: of the ascent of the civitas, or city-state, at the expense of the wild world outside the city walls. The city redefines wilderness as enemy, just as the Hero remakes the defender of the wilderness into a monster' (Attebery, 2022, p. 17). This line of othering forests as dangerous wilderness has evolved through Greek and Roman myths, *The Mabinogion*, *Sir Gawain and the Green Knight*,

Dante's *Inferno*, all the way to classic fairy tales such as 'Little Red Riding Hood' or 'Hansel and Gretel,' and on to modern children's literature classics such as *The Giving Tree and Where the Wild Things Are*.

Alongside primordial dread and mystery, forests have also captured human imagination through awe and wonder. Trees are possibly among the few living beings that can outlive not just individual humans but entire civilizations. The tree of life in Christian and Jewish traditions, the tree of immortality in the Koran, the tree of life in the Norse mythology, or the tree of wisdom in the Buddhist tradition are all part of reverence for trees that has persisted over centuries in civilizations across the planet. James Frazer's *The Golden Bough* (1906–1915), an early attempt to bring together natural history and a range of world mythologies, touches on this reverence in a chapter on the worship of trees and, in another, on tree-spirits. Reverence for trees is perhaps most evident in Indigenous knowledge systems. In the Amazonian Yanomani ontology, for example, trees – or 'forest-land' (Kopenawa & Albert, 2013, p. 388) – are inhabited by the *xapiri*: spirits, whose dance guides, heals, and protects not just humanity but the flows of life everywhere (Kopenawa & Albert, 2013, pp. 30–33). In the words of shaman Davi Kopenawa, the *xapiri* 'remain by our side in the forest and (...) hold the sky in place' (Kopenawa & Albert, 2013, p. 26). In North America, all Indigenous cultures recognize the aliveness of the world and perceive trees as persons and kin to human beings. Native calendars are built on seasonal changes, and two of the six seasons in Cree and Ojibwe are named after the behavior of trees: the awakening of the maple sugarbush marks the beginning of the Minookamin, 'the good Earth awakening' season, and Taagwagin, or 'falling leaves time,' marks a transition from

fall to winter (La Duke, 2023, p. 3). In the Potawatomi language, the word for these 'beings of the Earth' is *Aakib-maadiziwin*. Robin Wall Kimmerer has shortened it to *ki* – plural *kin* – and adopted it as a pronoun for nonhuman living beings that offers an alternative to the English 'it,' 'she,' 'he,' and 'they' (Kimmerer, 2023, p. 216). Switching to pronouns that recognize the aliveness and personhood of all beings, she says, means 'that every time we speak of the living world we breathe our respect and inhale kinship, turning the very atmosphere into a medium of relatedness' (Kimmerer, 2023, p. 218). Following Kimmerer, this essay uses 'ki' and the plural 'kin' as pronouns for trees and other nonhuman earth beings.

Kimmerer's proposal is one symbiotic strategy for rediscovering our kinship relationships with nature, including what might be called a 'rehabilitation' of trees from objects to subjects. Today, outside of children's literature, this rehabilitation of trees proceeds along three broad routes. Scholars in critical plant studies explore representations of plants and ideas about plants circulating in science, popular culture, media, and arts. This line of research also includes interest in plant sensing, plant rights, and plant personhood, all of it oriented at challenging the dominant cultural-philosophical Western condition of 'plant blindness' – 'inability to see or recognize plants in one's environment, frequently combined with an inability to recognize the unique biological features of plants and to appreciate their importance in the biosphere and in human affairs' (Duckworth & Guanio-Uluru, 2022, p. 3).

New animism in its theoretical and applied forms is another line of research that helps rehabilitate trees. New animism, a term proposed by Graham Harvey, refers to 'a concern with knowing how to behave toward persons, not all of whom are human'

(Harvey, 2006, p. xi). It stands for a way of being in the world and interacting with the world based on an understanding of complex relationality between human and nonhuman beings, in which one's understanding of personhood radically challenges Enlightened modernity's conception of selfhood as a unique human capacity. In the new animist lens, instead, 'intelligence, rationality, consciousness, volition, agency, intentionality, language and desire are not *human* characteristics, (...) but are shared by humans with all other kinds of persons' (Harvey, 2006, p. xviii). New animism today is theorized through a variety of lenses, including 'philosophical botany,' as in Matthew Hall's *Plants as Persons: A Philosophical Botany* (Hall, 2011, p. 4), and collage approaches oriented at 'reforesting our stories, communities, and imaginations (...) while rewilding language,' such as in Katie Holten's edited collection *The Language of Trees* (2023, p. 255). New animism also has an applied side, especially in literary criticism. In *The Great Derangement* (2016), for example, Amitav Ghosh builds on the analogy of human-tiger encounters in the Sundarbans mangrove forest in West Bengal to suggest that the climate emergency confronts us with agential, intelligent, nonhuman entities we have so far ignored. Could it be, he asks, that 'the earth itself has intervened to revise those habits of thought that are based on the Cartesian dualism that arrogates all intelligence and agency to the human while denying them to every other kind of being?' (Ghosh, 2016, p. 31). Ghosh is even more explicit in *The Nutmeg's Curse* (2021), which overlays philosophical reflection with a history of the nutmeg trade, Western colonialism, and the climate crisis. While not exactly told from the perspective of nutmeg trees, the narrative acknowledges the nutmeg seed as 'a maker of history, (...) something that hides within itself a vitality that endows it with' (Ghosh, 2021,

p. 98). Likewise, Ghosh's most recent *Smoke and Ashes* (2023) recounts how West-China relations have been shaped by plant entanglements, especially by the opium plant as 'an actor in its own right' and 'a historical force (...) that must be approached with due attention to the ways in which it has interacted with humans over time' (Ghosh, 2023, pp. 31, 32).

The third space in which new research on trees occurs is, of course, conservation, biology, and forest science. The call to 'save our trees' is one of the oldest staples of environmentalism. It is not a coincidence that what we today call environmentalism was largely born out of public outrage over a murder of a tree in California. In 1854, an enterprising businessman cut down the largest sequoia tree in northern California's Calaveras County. He then toured the U.S. and Europe with a show displaying part of it – a 2-foot-thick, 50-foot-high bark cylinder of 30 feet in diameter and 90 feet in circumference – as 'Mother of the Forest.' The audiences were appalled. They 'either thought the bark to be a fake, or, more surprisingly, were hostile to the killing of what was billed the largest tree in the world' (Neuzil & Kovarik, 1996, p. 58). As Mark Neuzil and William Kovarik describe it, the Mother of the Forest show triggered America's first green crusade. The event led to the establishment of the Yosemite Valley as the first state park in 1864, bolstered the forces that led to the creation of the national park system, starting with Yellowstone in 1872 (Neuzil & Kovarik, 1996, pp. 60–70), and catalyzed the conservationist and preservationist movements of the 19th century, which later became part of today's environmentalism (Oziewicz, 2015, pp. 168–196). One hundred years later, the first call for personhood and legal rights of trees was made by the environmental law scholar Christopher D. Stone in an article 'Should Trees Have Standing' (1972).

Today, the interest in trees is growing. This is, in part, because trees are recognized as crucial for combatting the climate crisis and, in part, because they are crucial for preserving the planet's biodiversity. Merlin Sheldrake's *Entangled Life: How Fungi Make Our Worlds, Change Our Minds, and Shape Our Futures* (2020) is among the groundbreaking studies to introduce the concept of 'wood wide webs' of mycorrhizal networks, which constitute the web of life that supports ecosystems. We now know much more about the underground work of trees with the soil, but we also know more about their collective work on the surface. Suzanne Simard's *Finding the Mother Tree* (2021) introduced the notion of Mother Trees and collective forest intelligence 'wired for wisdom, sentience, and healing' (Simard, 2021, p. 6). Other research has revealed forests as biotic pumps, biological planetary engines that serve 'as the major driver of atmospheric circulation on earth' (Rawlence, 2022, p. 160). Fred Pearce's *A Trillion Trees: Restoring Our Forests by Trusting in Nature* (2021) is a recent overview of the global state of forests and humanity's relationship with trees, whereas online projects, such as the *Honoring Trees* exhibit (2025), offer teaching resources for engaging the public in reflection about trees and their role. Not all news is bad. Although about half of the world's forests have gone since the Neolithic revolution, the destruction of the forests peaked at the end of the 20th century. We are now apparently in the early stages of 'a great forest restoration' over the coming decades (Pearce, 2021, p. 8). According to Pearce, 'Europe has a third more trees today than it had in 1900. So does North America. (...) Our planet as a whole has more trees than it did a decade ago' (Pearce, 2021, p. 10). None of this should obscure the fact that in many parts of the world the most precious woodlands – especially tropical, boreal, and old growth forests – are still

being lost. Yet, the great forest restoration that Pierce describes in his book is real too. Although the restoration is powered by many drivers, some of them are cultural. They reflect changing societal attitudes toward trees, which is also visible in children's literature and media.

From Trees as Objects to Trees as Persons

A growing body of stories for young people orient audiences toward kinship relations with trees and plants. Just how advanced this process is can be appreciated through comparison of historical and contemporary narratives. The following section examines one such trajectory in three American novels for the young audience. Upton Sinclair's *The Gnomobile* (1936) opens with twelve-year-old Elizabeth walking among California redwoods. The adults are sipping ginger ale in a small roadside restaurant located within a giant tree. As Elizabeth walks deeper into the woods, she encounters a foot-tall gnome Bobo. Bobo tells her that he and his grandfather Glogo are the last two of their people; others disappeared as big men cut down the forests. Worse, grandfather Glogo suffers from depression and Bobo asks the girl for advice. Elizabeth suggests that a change of scenery might help and promises to bring her Uncle Rodney. A while later Rodney and Elizabeth return. Together with Bobo, they convince the reluctant Glogo that other gnomes may live in other forests and finding them would also mean finding a wife for Bobo. The old gnome agrees. What follows is 10 chapters of a road trip through California, Oregon, the High Sierras, Colorado, Minnesota, Wisconsin, and eventually Pennsylvania. On the way, all old forests are searched but no gnomes are found. Eventually, Glogo dies of despair. At his funeral in a Pennsylvania forest, Bobo discovers that the place is full of gnomes. He finds a lovely bride

and joins the 'civilized' community of 'industrially-adapted' gnomes living in caves and abandoned human mines.

As this short summary suggests, *The Gnomobile* is a book that starts with a recognition of the majesty and subjectivity of trees but is unable to reconcile it with the ideologies of progress and human expansionism, so it abandons this theme altogether. Although *The Gnomobile* opens with a dedication 'For all who love and protect our forests,' the book ends with a message that adapting to a new post-tree reality is the only path forward. In this future, gnomes live in a reservation of sorts, where they imitate and recreate the 'civilized' society of big humans. 'They have the most marvelous civilization,' Bobo tells Elizabeth, and '[t]hey live in a city quite as fine as Johnstown' (Sinclair, 1966, p. 151). Instead of extracting trees, like big humans do, the gnomes extract minerals, coal, and ores. Mr. Morgo, Bobo's future father-in-law, is 'the great capitalist who owns their steel plant' (p. 151). The community has its own factories, a church, a bank, and all other trappings of capitalism, including 'hard times' with 'many unemployed and much suffering' (p. 153). These gnomes no longer depend on the forest to harvest fern seeds and other food. Instead, '[t]hey make what you call synthetic foods (...) out of coal tar, and really, they are delicious. They are a most healthful race of gnomes' (p. 153).

This civilizing progress is the happy ending the book offers to the gnomes. I do not know what Sinclair could have done differently. Reading the book in 2025, one is struck by how the initial impulse of the first chapter – the recognition of the majestic aliveness of the redwoods, a dream of communicating with them, and a realization of the threat they are facing – is abandoned in favor of an industrial fantasy. In the first chapter, the redwood forest is recognized as 'made of the largest living

things' (p. 11), a solemn graceful, ancient, and sacred presence: 'Over it all lay the hush as of twilight, of Sunday, the inside of a cathedral' (p. 12). Accordingly, '[b]eauty and wonder absorbed Elizabeth completely'; she goes on 'reverently' into this new world. Accompanying the recognition of this sacredness is a recognition of the trees' subjectivity and personhood embodied in the gnome characters. Although the gnomes are creatures who live with the trees, in many ways they are also projected as anthropomorphized tree beings, serving as a voice or the spirit of the trees to articulate tree thoughts and tree questions about the extractive industrial civilization. Glogo, in particular, who is more than one thousand years old (p. 14), offers the views and questions that trees might bring to court against humanity – if they ever get a chance. For him, big people are all murderers: 'They murder the trees. They destroy the forests and that is the end of life' (p. 14). When asked how he is able to understand trees, Glogo replies: 'A tree speaks in actions. If you love it and live with it, its spirit becomes one with yours and you understand it and hate the madmen who murder it' (p. 29). The murder of trees by white loggers is why the gnome population has disappeared too – a not-too-hard-to-notice parallel to the fate of Native American populations.

Despite this initial premise, the plot goes on to gradually separate the gnomes from the trees. Old Glogo remains unconsolable and helpless as he learns about the scope of the lumber industry and witnesses the devastation of forests across the country. For his part, Bobo is fascinated with the human civilization. He becomes 'civilized' to the point of managing his own traveling talk show, with 50% profits accruing to himself. When Bobo joins the industrial gnome society at the end, and when Glogo dies (pp. 142–143), one can hardly think of a more glaring way

to communicate that humanity has entered a post-tree world and those who cannot adapt will perish.

Another twist Sinclair introduces is that Rodney is a lumber heir, son of Mr. Sinsabow, 'one of the lumber kings of the Northwest' (p. 20). The material means for the entire road trip are revealed to have come from the lumber business. As Rodney explains it to Bobo, '[m]y family goes on cutting down trees and if they didn't, other men would, so long as there was a single tree left on the surface of the earth' (p. 24). He consoles the horrified gnome that some forests are protected, as state or national parks. Later on, when he first meets Glogo, Rodney adds that he purchased 'one track of these redwood forests and gave it to the state to protect forever. (...) So you ought to be a little grateful to me, Glogo, in spite of my having the misfortune to be born so big' (pp. 28–29). Although initially Rodney declares a desire to learn from Glogo about the forests as they travel, the few lessons take place only in chapter 3 and are then abandoned. Glogo's explanations that plants and trees have spirits, that 'all living things exchange ideas,' and that a redwood tree 'is in fact a great system in which many spirits work in harmony' (p. 32) are supposedly heard but also relegated to folklore, as the gnomes are framed as ignorant natives. For example, Rodney uses the concept of a 'spirit' to explain how cars operate or electricity works. 'It is (...) the spirit of the sun which we use,' he tells Glogo about the car, '[m]en have learned to imprison the sun and the lightning.' When Glogo protests that nothing should be imprisoned, Rodney reframes it: 'It's not really imprisoned. (...) It is allowed to change itself into something else. It is what trees do – turning one form of life into another' (p. 36). With all these moves, as the book progresses, the concern with the trees is overshadowed by other themes.

Whether or not one considers *The Gnomobile* to deliver on its promise to advocate for trees, I want to acknowledge that the book may have been radical for its time. It was probably the first to introduce anthropomorphized nonhuman characters who speak for trees. This tradition extends, of course, through Dr. Seuss' *The Lorax* (1971), its weird parody *The Truax* (1995) published by the Hardwood Forest Association and the National Oak Flooring Manufacturers Association, and even through James Cameron's *Avatar* (2009). The strategy of representing tree personhood through a nonhuman tree spokesperson is a recognized, specific tradition in children's literature. To have a tree speak in the first-person voice is another strategy, possibly launched with Shel Silverstein's anthropocentric *The Giving Tree* (1964), in which the tree is coded as she/Mother.

Katherine Applegate's *Wishtree* (2017) is one good example. Told from the perspective of two-hundred-and-sixteen-year-old Red Oak, the novel recounts an episode in which the oak seeks to protect a Muslim girl and her family from racist attacks. Red, the oak, speaks to two children, cementing their friendship and adding context to the community history. This act of giving is reciprocated when Red is about to be cut down. Stephen and Samar's friendship empowers them to organize a community protest, supported by the protest of the entire animal community that lives in the tree, and the oak is spared. Francesca, the lot owner, recognizes Red as a nonhuman member of their community, integral to the wellbeing of the human community too. 'This tree is staying put,' she tells Samar. 'And I hope your family will, too' (Applegate, 2017, p. 205).

In *Wishtree* Applegate is unambiguous in her presentation of the oak as a subjective actor, with mentality, volition, emotions, and memory. Red's contribution to the human community is

notable, not just symbolically as the Wishtree, but historically as a companion and shelter to nonhumans and humans, including abandoned babies. Ki is also presented as a nonhuman person throughout the novel, and the narrative is focalized through Red's own words and perspective.

An even broader intergenerational view of tree personhood can be found in Brian Selznick's graphic novel *Big Tree* (2023). The story is told from the perspective of Louise and her brother Mervin, two Sycamore seeds who are released from their pod. Their lives coincide with the Cretaceous/Paleogene extinction 66 million years ago, an event that wiped out three quarters of the plant and animal species on the Earth. Before they leave, Louise and Mervin watch their Mama Tree communicate with other beings in the forest through Ambassadors – wood-wide-webs of mycorrhizal fungi – who share messages about an incoming danger. It turns out to be a massive wildfire. Escaping from it are 'hundreds of giants,' or dinosaurs (Selznick, 2023, p. 92), who will eventually break and trample the Mama Tree. 'This is it, children,' ki says. 'Mama stayed quiet as she brought up extra water from the ground through her roots. She was soaking herself from the inside, trying to protect herself and her children from the oncoming fire even though she sensed the flames might be overpowering' (p. 96).

Just before the fire hits, Mama releases her pods and all of her children are blown away in different directions. The plot then follows Louise and Mervin's adventures, as they meet different earth beings, including the mysterious Old One – Planet Earth. Eventually, Louise strikes roots and grows into a massive tree while Mervin is stuck in a rock crack for decades, maybe centuries. When they meet again, one sibling is a mature tree, the other a seed ready to germinate. They are both getting ready

to survive the approaching meteor hit that will wipe out most of the plant and animal species in their time. We do not know whether Louise or Mervin actually make it through the extinction. The book ends with another tree child sapling, picked by a human child from a crack in a sidewalk and transplanted into a pot to grow into the future.

Like in *Wishtree* – except involving a much larger community and over a much longer time – *Big Tree* frames trees as subjects and actors in their own right. Selznick highlights the formative roles trees play in ecosystems and positions them to be the guardians of life of the Earth, prepared for this mission by millions of years of evolution. In one episode, when the stuck Mervin is finally ready to hear the Earth's story, he asks what was meant by the Earth's warnings passed on to Louise and the notion that they are supposed to save the world. The Old One responds: 'I wasn't only sending out the message to Louise. I've been sending out the message to everyone. But so few have been able to hear it. (...) They all had their own distractions' (p. 433). Feeling he was one of the distracted ones, Mervin declares he is ready.

*'I know I'm alone now, and I'm very small, and I'm stuck
in a ravine without any fluff at all, but I want to help.'
'You're very small, but small things can grow. And you
can work with others. That's called a community ...'
'And we can figure out how to save the world together,'
said Mervin.
'That's the only way to do it.'
'Do you really think we can save you?'
'Mervin, I'm not sending out the message for myself.'
'You're not? But aren't you the – '
'Yes, but I will survive. I have survived since*

*the beginning. I've survived fires and floods and
eons of ice. A billion years goes by pretty quickly
for me. No, I'm not in danger.'
'But if you're not in danger, who is?'
'You are, Mervin. All life is in danger. Remember,
life began as a gift, and it must always be treated
as such. No matter how unstoppable the danger
seems, no matter how unavoidable, there's always
something you can do.'* (pp. 433–435)

For Mervin, the warning is about the impending asteroid collision.

For today's reader the warning is about something else, just as existential in meaning. When he receives the message, Mervin is transformed: 'In that moment, Mervin felt a kind of peaceful vibration he'd never felt before. It moved through his whole body and grew so powerful that it traveled beyond him and rang through the planet like a musical note, connecting Mervin, with invisible roots, to the entire world' (p. 435).

Selznick evokes the notion of roots connecting all beings and the entire world. He suggests that the sense of connection is transformative and especially needed today, unlocking a new, symbiotic way of thinking. We know it worked in Mervin's case, because the next chapter opens in our times, millions of years later, with a tiny Sycamore sapling growing in a human city. The sapling child – called 'the Child' in the narrative – is picked up by a human child. Ki is replanted into a pot and moved to a human apartment to grow stronger before the right time arrives for ki to be planted outside. The sapling child listens to a human adult tell the human child the story of *Big Tree*: 'The Child spread her leaves and stretched her growing roots into the dirt. She liked her new friend's story, which seemed familiar

somehow, as if she'd always known it' (p. 504). The reader does not know if the Child is Mervin's or Louise's progeny, yet one has a sense of unbroken continuity. When the Child falls asleep, ki dreams about the stars just like Louise did. And just like Louise, ki can hear the Old One's voice 'calling out her name' (p. 505). 'Yes,' said the Child. 'I'm listening' (p. 509).

Conclusion

The three books briefly discussed in this essay are a sample, perhaps too small to serve as evidence of a larger cultural change in ideas and assumptions about human-tree relationships. That said, the ease with which Applegate, Selznick and other contemporary authors choose to represent trees as persons rather than objects appears to signal an ecocentric shift toward symbiotic notions of kinship with trees and shared ecosystemic agency at the time of climate crisis and biodiversity loss. With these books, we have a chance to learn from, through and with trees.

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Splątanie / Entanglement

Artist Iza Koczanowska

Curator Zofia Matysa-Janczy

Close your eyes, and you might indeed mistake one for the other.

Clasping a fleecy bud may feel like stroking fur. Open your eyes, but let your imagination roam free, and you might believe that sheep grow on cotton twigs. This was in fact quite a widespread belief in the Middle Ages (*Agnus scythicus*), and there are certainly people today who will sit staring at cotton shrubs in wait for a trans-species metamorphosis.

Possible and im-possible forms of entanglements intertwining animals and vegetation, human and nonhuman beings are themes addressed not only by raconteurs of legends (once) and founders of conspiracy theories (today) but also by individuals committed to speculative fabulation. Donna Haraway, a biologist and key figure in feminist philosophy, defines this narrative genre as ‘the patterning of possible worlds and possible times, material-semiotic worlds, gone, here, and yet to come.’¹ The past, the present and the future. It is at their intersection that Iza Koczanowska situates her practices.

Koczanowska, an artist and a researcher, seeks to develop alternative scenarios for inhabiting the Earth, in which various and diverse beings co-exist on equal footing. Matters interpenetrate in search of new identities. What has already been there meets what is yet taking shape. Tested by Koczanowska, the possible configurations of cross-species relationships are rooted in old habitation practices, with, in the foreground, the model of people and the livestock sharing a rural home, a custom widespread but a few decades ago.

1 D. Haraway, *Staying with the Trouble: Making Kin in the Chthulucene*, p. 31.

Iza Koczanowska's work opposes the progressing homogenisation of the ways all ecosystems operate and defies the policy of expropriating living space. Re-engaging with the cohabitation practices of old, she also develops a library of experimental biomaterials to be used in the living areas of the future. Natural and synthetic polymers, such as agar and gelatine, are substances capable of incessant transformations and metamorphoses. The potential matter of the future is being ceaselessly reconfigured. Relationships and spatial arrangements are negotiated and renegotiated time and again. If any relations arise, they are open, with none of the parties limiting the others.



Documentation from the exhibition *Entanglement (Splątanie)* by Iza Koczanowska, Rondo Sztuki Gallery, 2025. Photo by Lukasz Zuber



Documentation from the exhibition *Entanglement (Splątanie)* by Iza Koczanowska, Rondo Sztuki Gallery, 2025. Photo by Lukasz Zuber

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Marta Wrzosek is Associate Professor at the University of Warsaw, where she teaches at the Faculty of Biology and works at the Botanical Garden. Her scientific interests include interactions between organisms, particularly the mutualism between fungi and Ecdysozoa (including insects, mites and nematodes). She is the author of *W czym grzyby są lepsze od ciebie (How Mushrooms Are Better Than You, 2019; 2025, with Karolina Głowacka)* and *Grzyby jakich nie znamy (Fungi We Don't Know, 2012, with Zbigniew Sierota)*. She collaborates with cultural institutions and was an art consultant for the production *Grzyby (Mushrooms)* at Warsaw's Teatr Powszechny in 2022. She is a co-founder of the European Mycological Association and co-founder and first president of the Polish Mycological Society.

Prof. Piotr Skubała —an Earthling, representing one of the millions of species inhabiting the Earth, who is extremely fortunate to be a Professor of Biological Sciences at the University of Silesia in Katowice. An ecologist, acarologist, environmental ethicist, ecological educator and climate activist, he is an ethics expert at the European Commission in Brussels, a member of the Team Europe Direct expert network (European Commission), a member of the State Council for Nature Conservation, a member of the Scientific Committee of the Climate Coalition. He collaborates with local, national, and international media as a science populariser and an expert on ecology, environmental protection and the climate crisis.

Prof. Mark Williams is an Earth scientist and palaeontologist at the University of Leicester (UK), where he lectures on the geological history of climate change. One of the founding members of the Anthropocene Working Group, he is co-author of several popular science books, most recently *The Cosmic Oasis (2022)* and *The Anthropocene: A Multidisciplinary Approach (2000)*.

Glenn A. Albrecht is Honorary Associate in the School of Geosciences at the University of Sydney and Professor retired of Sustainability at Murdoch University. As an environmental philosopher, he has developed the theme of the psychoterratic – the profound connection between human emotional states and the condition of the Earth. Dr. Albrecht is internationally renowned for creating the concept of solastalgia, which describes the lived experience of negative environmental change, and for developing the paradigm of the Symbiocene – a future epoch in which humans symbiotically re-integrate with the rest of life. His groundbreaking work *Earth Emotions* (Cornell University Press, 2019) has been translated into French, Spanish and Dutch. His forthcoming book *The Symbiocene: Our Only Future* (Cornell University Press, 2026) continues to inspire architects, designers and innovators working to transition from the Anthropocene to genuinely symbiotic forms of human living. He describes his philosophy as symbioism – the transdisciplinary engagement of humans "living together" (symbiosis) with the totality of life.

Andrzej Marzec is a philosopher, film critic and Assistant Professor at the Adam Mickiewicz University in Poznań. He lectures at the Academy of Fine Arts and Design in Katowice, SWPS University and the University of Arts in Poznań. His research interests focus on speculative realism, object-oriented ontology, environmental humanities, dark ecology and contemporary alternative cinema. He is the author of *Widmologia (Hauntology, 2015)* and *Antropocieri (Anthroposhadow, 2021)*, and co-editor of *Derrida and Film Studies (2025)*.

Konrad Fleszar is a designer, artist, architect and researcher whose practice is informed by his upbringing in the Bieszczady Mountains. He works within post-anthropocentric design frameworks, focusing on the integration of plants and photosynthetic organisms into urban environments. A graduate of the Faculty of Architecture at the Cracow University of Technology and the Faculty of Arts at the University of the National Education Commission in Kraków, he is currently a doctoral candidate at the Academy of Fine Arts in Kraków and a post-graduate student of landscape architecture. His research explores the boundaries of shared spaces between humans and photosynthetic organisms, developing experimental spatial models in which vegetation becomes an active participant in urban ecosystems.

Dr Marta Lisok is a lecturer at the Academy of Fine Arts and Design in Katowice, where she has been Head of the Art Theory and History Department since 2023. She graduated in History of Art from the Jagiellonian University in Cracow and in Philosophy from the University of Silesia in Katowice. She has curated exhibitions at major institutions including the Ujazdowski Castle Centre for Contemporary Art, the KODE Museum in Bergen, and BWA galleries in Katowice and Tarnów. She is the author of several publications on contemporary art, including *Bezużyteczne spojrzenie (Useless Sight, forthcoming)* and *Głębokie słuchanie (Deep Listening, 2019)*. She has co-curated conferences including *Grzyby i Inni. Ku symbiocenowi (Fungi and Others: Towards the Symbiocene, 2025)*. Her research focuses on the anthropology of the senses, and her curatorship draws on posthumanist narratives.

Michał Smandek is a visual artist exploring the interdependence of human activity and nature. His practice is rooted in the experience of travelling, during which he performs spatial modifications of the landscape and engages local communities in collaborative actions. In recent years, he has worked on projects inspired by the structure of bee life. He has received scholarships from the Minister of Culture and National Heritage and was among the ShowOFF winners at the Krakow Photomonth. He obtained his PhD from the University of the Arts in Poznań and is Assistant Professor in the Sculpture Studio, Academy of Fine Arts in Katowice.

Mikołaj Szpaczynski (b. 1989, Katowice) is a visual artist and graduate of the Faculty of Painting, Academy of Fine Arts and Design in Katowice (2017), and of the Doctoral School of Intermedia, Academy of Fine Arts in Kraków (2024). He works with films, objects, spatial actions and installations. His artistic practice is rooted in a personal relationship with nature, exploring the landscape through the physical endurance of his own body and seeking to share the creative process with nature and geological phenomena.

Justyna Mędrala (b. 1988) is a visual artist who graduated from the Graphics Department of the Academy of Fine Arts in Cracow in 2013, where she earned her PhD in 2018. Her art includes drawing, sculpture and installation, and she works with natural materials used in industry, such as coal, asphalt and crude oil. She has received grants from the Minister of Culture and National Heritage and has been the awardee of the Young Poland programme (2024), the Wrocław Drawing Triennial (2022) and the 12th Geppert Competition (2016). She has exhibited at major institutions including MuMOK in Vienna, Cracow's MOCAK and Art Bunker, and the Ujazdowski Castle Centre for Contemporary Art in Warsaw. She is affiliated with the Academy of Fine Arts and Design in Katowice.

Anna Pohl is a designer, researcher and educator working at the intersection of design, community processes and human-nature relations. As a lecturer at the Academy of Fine Arts in Katowice, she co-develops the curriculum for the Design for Identity Studio, where she initiates practices supporting sustainable place identity development and collective learning. She curates design conferences including AGRafa. Beyond (2022) and exhibitions such as *Nowe sploty (2024)* and *Material Lab (2024)*. She conducts participatory workshops and design projects implemented in collaboration with local communities and is founder of the BioCraftLab collective (2024). In her work, she combines a design perspective with a relational approach, supporting the creation of more sustainable and interdependent educational ecosystems.

Hanna Sitarz-Pietrzak is an experience designer, creative trainer and Dean of the Design Faculty at the Academy of Fine Arts in Katowice. She develops an approach to education and leadership inspired by natural patterns, where collaboration grows from mutual support without traditionally understood hierarchy and control. She leads the research project *Symbiuro. Symbiotyczna wspólnota akademicka (2024–2026)*, exploring the transformation of university organizational culture through prototyping collaborative spaces based on natural ecosystem functioning. She is the author of Creative Leadership workshop series and creates workshops for educational institutions and local governments. Graduate of Creative Leadership training at the Helen Hamlyn Centre for Design (Royal College of Art, London) and the Meritum Integrative Trainer School, she combines design creativity with systems thinking and attention to natural patterns of coexistence.

Małgorzata Ochwat holds a PhD in the Humanities and works as Assistant Professor at the Institute of Polish Studies, University of Silesia in Katowice. She is Editor-in-Chief of the journal *Z Teorii i Praktyki Dydaktycznej Języka Polskiego* and a member of the Ecopoetics School at the Reportage Institute. She collaborates with the City of Katowice on the implementation of climate education in primary schools and has been appointed member of the Ministry of National Education's Climate Education Team. She is a facilitator of the Climate Mosaic and Biodiversity Mosaic methods licensed by La Fresque du Climat and serves as secretary of the Council for the Climate and Environmental Crisis at the University of Silesia. She is the author of *Więcej–niż–tylko–ludzkie lekcje języka polskiego (More-Than-Only-Human Polish Lessons, 2025)*.

Anna Kopaczewska is a visual communication designer and PhD candidate at the Design Faculty, Academy of Fine Arts and Design in Katowice, where she has taught at the Book Graphics Studio and the Printmaking Studio since 2020. She researches and designs publications and visual communication and identification systems. She is a member of the Interdisciplinary Centre of Research on Humanistic Education at the University of Silesia in Katowice and curated the AGRafa 2024 International Design Conference. She is an international instructor of shinrin-yoku (INFOM, JP) and a leader of forest therapy and forest bathing programmes. She has worked for the Institute for Ecology of Industrial Areas in Katowice and the Ministry of the Environment on environmental projects.

Małgorzata Wójcik-Dudek is a Polish Studies scholar and literature researcher affiliated with the Institute of Polish Studies, University of Silesia in Katowice, where she is Head of the Interdisciplinary Centre for Research on Humanistic Education. She has 19 years of experience as a secondary school teacher and is a certified facilitator of intercultural education and moderator of the Climate Mosaic. She serves as Editor-in-Chief of *Paidia i Literatura*, a journal on literature for young readership. She is currently working with the City of Katowice and the Silesian Educational Authority on the implementation of climate- and environmental education in primary schools. She does research on methodologies of literary instruction, children's and young adult literature, postmemory and climate- and environmental education. She is the author of *Reading (in) the Holocaust (Peter Lang, 2020)* and co-editor of *Polish Flows (Vandenhoeck & Ruprecht Verlage, 2024)*.

Marek Oziewicz is Professor of Literacy Education and Department Chair of Curriculum & Instruction at the University of Minnesota-Twin Cities. Dr. Oziewicz holds the Marguerite Henry Professorship of Children's and Young Adult Literature and serves as Director of the Center for Climate Literacy. His recent publications include *Fantasy and Myth in the Anthropocene* (Bloomsbury, 2022), journal articles in *English Journal*, *The Ecopsychological Citizen*, *Fafnir* and *Climate Literacy in Education*, as well as multiple book chapters in edited collections.

*The capacity to
persist, coexist and
find each other
in difficult times*