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Posthuman Sustainability: An Ethos for our Anthropocenic Future

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Abstract
Confronted with an unprecedented scale of human-induced environmental crisis, there is a need for new modes of theorizing that would abandon human exceptionalism and anthropocentrism and instead focus on developing environmentally ethical projects suitable for our times. In this paper, we offer an anti-anthropocentric project of an ethos for living in the Anthropocene. We develop it through revisiting the notion of sustainability in order to problematize the linear vision of human-centric futurity and the uniform 'we' of humanity upon which it relies. We ground our analyses in posthumanism and material feminism, using works by posthumanist and material feminist thinkers such as Stacy Alaimo, Rosi Braidotti, Donna Haraway and Jane Bennett, among others. In dialogue with them, we offer the concept of posthuman sustainability that decenters the human, re-positions it in its ecosystem and, while remaining attentive to difference, fosters the thriving of all instances of life.

Keywords
Anthropocene, environmental ethics, environmental humanities, posthumanism, sustainability

Dale Jamieson (2016) suggests that 'what makes the Anthropocene a moment of crisis is the recognition of humanity's collective power that is oddly and perhaps paradoxically matched with a widespread feeling of powerlessness'. While the term 'Anthropocene' – first suggested by scientists Paul Crutzen and Eugene Stoermer (2000) – names our present planetary status characterized by human-induced climate change and overall environmental degradation, it also serves to eject the human

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from the central place it used to occupy in the western metaphysical tradition, Christian and secular alike. The Anthropocene repositions the human vis-à-vis the nonhuman world – once the extent of the damage we have caused is acknowledged. The ongoing environmental disaster has human activity as its single major cause and exposes a radical vulnerability of humans in the face of droughts, fires, floods and other natural catastrophes driven by climate change, and the ongoing loss of land, food resources, breathable air and drinkable water that result from it. The humanity of and in the Anthropocene is a force capable of inducing major shifts to the planetary system and is therefore a truly terramorphic force. However, confronted with the hyperobject of environmental change, to use a concept coined by Timothy Morton (2013), humans also turn out to be extremely vulnerable and, Jamieson (2016) would suggest, overwhelmed by the feeling of powerlessness they experience when acknowledging the extent of the damage. The Anthropocene thus denotes a series of crises: firstly, the environmental crisis composed of an array of often interlinked phenomena, such as climate change, massive dumping of carbon dioxide, radiation, the use of plastics and associated pollution, land degradation, loss of biodiversity, species extinction, deforestation, toxic pollution, ocean acidification and over-exploitation of fisheries. Then there is a political crisis manifested in an inability to address and effectively deal with these problems on a global scale and an ethical one, as we struggle to reconceive our relationships to nonhuman others or at least try to find the moral compass to put a halt to our exploitative relation to the natural world to ensure the continuity of our species. It also evokes an epistemological, ontological, and cosmological crisis, putting on the agenda the question of what we are and what our place is as humans in this new geological epoch which renders us inadequate, powerless and at risk.

It is in the face of this crisis that Jamieson (2016) diagnoses our 'powerlessness', recognizing that for all the technological and scientific power we have we still lack the means to redress and fix the environmental change. However, we want to read this claim differently as indicating that the technological and scientific power and knowledge of humans, driven by a human-centered worldview, clashes with and is possibly undermined by the recognition that we are and always have been powerless as the vulnerable and interconnected beings that we are. We have been powerless since there have been so many more agents than the mere human agent and since the agentic capacities of other beings have often surpassed our own very limited powers and thereby have impacted us in ways we have not suspected. Our actions have also had impact that exceeded whatever willful direction we were giving them. Humanity's supposed collective power, understood as something we can control and direct at will, would therefore have been something like a collective hallucination in which we wrongly posited ourselves as separate from and

masters of the world of which we are a part. Within feminist theory, there is a long-standing tradition of practicing the modes of thinking that dispel such hallucination through exercising a critique and rejection of andro- and anthropocentrism – be it in western science and philosophy (Merchant, 1980; Plumwood, 1993), in dominant theorizations and treatment of nonhuman animals, as well as other species (Haraway, 2006; Gaard, 2011; Weil, 2010), or through pointing to the violence and devastation that such dreams of mastery bring as they give support to imperialist and colonial projects (McClintock, 1995; Weheliye, 2014). This critical approach disenchants the 'human' and, when applied to define the crisis that the Anthropocene brings about for humans, recognizes that we have not only misconceived of the world but of ourselves. We have lived in a fantasy projecting our misconceptions on ourselves and on the world. Exercising our knowledge has always been a way to impact ourselves, negatively or positively. However, we have now brought upon us the possibility of our own extinction.

The fear that the earth will no longer be able to sustain us and we, as humans, will go extinct should be grounded in a recognition of the fact that our world is already disappearing at a rapid rate. The extinction of species is so serious and dramatic that it is now estimated that the rate of extinction is between 100 and 1000 times higher than what it should be (Primm et al., 2014). Unlike the previous five great extinction events – defined as a situation in which dramatic numbers of species of plants and animals die out within a relatively short period of geological time – the current extinction is driven almost entirely by human activity through fragmenting habitats, overfishing, introducing pathogens and non-native species, overhunting and climate change (see Barnosky et al., 2011). When one species goes extinct, the entire web of ecological dependencies is compromised. For example, the disappearance of large animals entails the loss of seed-spreading mechanisms for plants, contributing to a decline in plant populations (e.g. Heise, 2016; Tsing et al., 2017). When earthworms die due to the use of herbicides and insecticides, birds who feed on them become poisoned and, as a result of the diminished quality of soil, other species lose their home as well. Such chains of events amount to what Rachel Carson (1962) called a 'silent spring' – a mass, and often unnoticed, extinction. The extinction crisis prompts a recognition of the profound interdependency between various types of bodies – dead and alive – including: human, animal, plant, as well as bodies of land and water. It also prompts questions of extinction and survival, risk and shared vulnerability, responsibility and care. Against this backdrop, many recognize a need for new modes of theorizing and living that would abandon human exceptionalism and anthropocentrism and instead focus on thinking through and with multi-species communities of which the human is only a part (e.g. Alaimo, 2010; Hird and Roberts, 2011; Neimanis et al., 2015; Plumwood, 2009).

Western humans have historically ignored the entangled beings that we are and posited ourselves as separate and sovereign minds. Stacy Alaimo (2016: 4) speaks of the loss of sovereignty we experience in a world we no longer control and that is getting back at us as

> a moment that erodes the sovereign individual subject, as an invitation to intersubjectivity or trans-subjectivity and even [. . .] to a posthumanist or counterhumanist sense of the self as opening out unto the larger material world and being penetrated by all sorts of substances and material agencies that may or may not be captured.

In this paper, we develop an anti-anthropocentric project of an ethos for living in the Anthropocene. While Dipesh Chakrabarty (2014: 4) calls on us to 'make room within our inevitably anthropocentric thinking for forms of disposition towards the planet that do not put humans first', we develop our anthropo-de-centralizing argument through revisiting the notion of sustainability. We look at its temporal dimension and problematize the 'we' of humanity, in order to arrive at a more suitable and kinder vision of living and acting in times of environmental crisis. We ground our analyses in posthumanism and material feminism – thereby also acknowledging the long and rich tradition of feminist, queer, decolonial, and anti-racist theory on which they are built,[1] and use works by posthumanist and material feminist thinkers such as Stacy Alaimo, Donna Haraway, Claire Colebrook, Rosi Braidotti, and Jane Bennett, among others. In dialogue with them, we conceptualize models for thinking interconnectivity that escape human exceptionalism which we hope will alleviate the human feeling of powerlessness.

Sustainable Future

The risk of extinction, and human extinction in particular, is clearly intertwined with questions concerning the future. For this reason, we wish to look at the notion of sustainability offered as a solution to the environmental crisis and widely adopted in policy-making. We unpack the anthropocentric underpinnings of this concept, the vision for the future it offers, and by examining the notion of future generations upon which it is built, we reflect on the vision of temporality on which it relies.

In environmental discourses, sustainability is conceived as the ability of a given ecosystem to maintain its essential functions and processes over time. This emerges from the Latin *sustinere*, which means 'to hold up' or also 'to bear' or 'endure'. However, many international documents and development projects rely on a different definition of sustainability that directly points to human environmental management, such as to secure access to natural resources for future generations of humans.

Such concepts of sustainability emerged in the influential environmentalist article 'A Blueprint for Survival' (Goldsmith et al., 1972). Written by the editors of *The Ecologist* journal and endorsed by the leading scientists of the time, this article drew attention to the urgency and magnitude of environmental problems: 'Radical change is both necessary and inevitable', wrote the authors, 'because the present increases in human numbers and per capita consumption, by disrupting ecosystems and depleting resources, are undermining the very foundations of survival' (Goldsmith et al., 1972: 15). Sustainability became a concept widely adopted in official policy-making, inspiring the United Nations' Stockholm Conference on Human Environment in 1972 and the later work of the UN Brundtland Commission in its goal to unite countries in the quest for a sustainable future. It was this commission that, in 1987, came up with the most oft-quoted definition of sustainable development, defining it as a tool to ensure that humanity 'meets the needs of the present without compromising the ability of future generations to meet their own needs' (WCED, 1987: 43).

Articulated in this way, sustainability revolves around the question of responsibility toward future generations, typically assumed to be human generations. Therefore, sustainability is understood as an approach, by current generations of humans, that seeks to secure access to natural resources for future generations of humans. Under this model, sustainable human activity is one that ensures that 'our children' will be able to inhabit the world as we do. However, as Chakrabarty (2014: 9) notes, 'the climate crisis requires us to move back and forth between thinking on these different scales all at once', namely, the timescales outlined by deep time and long duration, human life-span and the life-spans of other species, this generation and the next one, the total time humans have inhabited the world and how long we may have left. The notion of sustainability, as some critiques argued, fails to adequately address this challenge because of its implicit anthropocentrism and its overstating of the role of economy (Seghezzo, 2009). One aspect of this is green capitalism with its idea that 'by demonstrating to the public that such ''natural capitalism'' is more profitable than the old economy, green corporations can lead the rest of us toward a sustainable future' (Mendovi, 2010). This approach, however, fails to address the structural inequalities produced by the capitalist system and its inherent violence (see e.g. Federici, 2004). Julie Sze and her collaborators acknowledge that while the notion of sustainability emerges from within the capitalist framework and supports it, it may, however, also carry a potential to escape it. They write:

> In many ways, sustainability and its closely linked cousin, sustainable development, are both simultaneously radical and reformist. They are potentially radical because they posit that there may be

> environmental limits to economic growth but reformist in that they presuppose the existing capitalist system. (2018: 7)

It is on the radical rather than the reformist thread that we pull as we develop our take on sustainability and problematize the human-centered understanding of this term that revolves around human responsibility for future generations by invoking the theorizations offered by Stacy Alaimo (2010, 2016), Claire Colebrook (2014, 2017), and Donna J. Haraway (2015, 2016), which conceptualize the human being as radically entangled in the world with nonhuman others. The posthumanist inclusive notion of sustainability that we offer takes into account a politics of location (Rich, 1986) and situated knowledges (Haraway, 1988) that recognize the particular geo-socio-political entanglements each being is part of and thereby dismisses any idea of a universal human future. Furthermore, this notion considers future generations to also include nonhuman animals, plants, and ecosystems. By expanding the scope of 'future generations' we shift our understanding of temporality, thereby responding to Chakrabarty's call mentioned above. An inclusive posthuman approach to sustainability decenters the human, re-positions it in its ecosystem and, while remaining attentive to difference, fosters the thriving of all instances of life. This position, akin to Rosi Braidotti's (2013) zoe-egalitarianism,[2] entails that we reject the use of 'resources' to refer to nonhuman others, be they nonhuman animals, plants, ecosystems, minerals or the earth system as a whole. In the following sections we elaborate on two crucial components of posthuman sustainability: multi-species interconnectedness and a critique of the linear vision of human-centric futurity. We do so by using a posthumanist mode of thinking – thinking through and with marine polyps and forest ecologies.

Material Connections

For material feminist thinkers, interconnectedness translates into an ethical principle. While Karen Barad (2003), for example, uses the term entanglement to express the idea that materiality is not composed of objects but rather constituted by dynamic processes of materializations that constantly create materiality, time and space, this living matter is described as 'vibrant' by Jane Bennett (2010). She says:

> I believe it is wrong to deny vitality to nonhuman bodies, forces, and forms, [. . .] I believe that encounters with lively matter can chasten my fantasies of human mastery, highlight the common materiality of all that is, expose a wider distribution of agency, and reshape the self and its interests. (Bennett, 2010: 122)

Bennett's explicit goals are ethical and political for, as Cecilia Åsberg (2017: 186–7) explains,

> entanglements of self and other, body and technology, cultures with worldly nature, and pasts, presents, and futures emerge here as a kind of starting point [...] these entanglements, these onto-epistemological processes of 'becoming with' (Haraway, 2008: 15), are always also relations of obligations: they do come with an ethic and with a demand on us to rethink our analytical practices for less exclusive results.

Bennett wishes us to be attentive to matter and its power and thinks that doing so

> can inspire a greater sense of the extent to which all bodies are kin in the sense of inextricably enmeshed in a dense network of relations. And in a knotted world of vibrant matter, to harm one section of the web may very well be to harm oneself. Such an enlightened or expanded notion of self-interest is good for humans. (Bennett, 2010: 13)

This idea that all bodies are kin[3] and that matter has agency is very prominent in material feminist theory, challenging anthropocentric understandings of agency. Diana Coole (2005) puts it in terms of 'agentic capacity' while Samantha Frost (2016) speaks of 'intentless direction'. All beings have the capacity to act, to impact others, even if they may not be exercising a willful agency like the human that decides to pluck a flower and offer it to a loved one and carries through its intention. The agentic capacity of beings is most often intentless: it follows the mechanics of atomic energy relations and biochemical processes. The human too is animated by this intentless direction which often modulates its willful agency.

Stacy Alaimo's (2016) recent work pushes this line of thinking. She talks of the 'exposed subject [which] is always already penetrated by substances and forces that can never be properly accounted for' (Alaimo, 2016: 5). As she points out, 'the Anthropocene suggests that agency must be rethought in terms of interconnected entanglements rather than as a unilateral ''authoring'' of actions' (Alaimo, 2016: 156). She quotes Jessi Lehman and Sara Nelson, who claim that the Anthropocene 'simultaneously expands and radically undermines conventional notions of agency and intentionality' (quoted in Alaimo, 2016: 156). What is needed is for us to think the human being as material, as 'subject to the agencies of the compromised, entangled world'; we need to embrace 'an environmental posthumanism, insisting that what we are as bodies and minds is inextricably interlinked with the circulating

substances, materialities, and forces' (Alaimo, 2016: 158). This requires a radical change in how we conceive of ourselves, our world and our relations to and within it. To quote Alaimo again, 'Thinking as the stuff of the world entails thinking in place, in places that are simultaneously the material of the self and the vast networks of material worlds' (Alaimo, 2016: 187). Such an approach challenges the idea of a (self-)sustainable human being, favoring the understanding of our place in the world as an interconnected, entangled, transcorporeal being and becoming in a web of material relations. To think this interconnectedness through and how it forces us to rethink temporality and notions of futurity, it is useful to consider marine polyps and forests as examples of nonhuman beings which are complex systems encompassing numerous beings of various scales and natures. As such, they illustrate our interconnectivity potently.

Polyps as Models of Posthuman Interconnectivity

Coral polyps are marine invertebrates that, more often than not, live in colonies.[4] They are soft-bodied animal creatures with a mouth that also serves as an anus and with tentacles to grab nourishment. Polyps have an exoskeleton made of limestone, called callicle, that protects their translucent bodies. When they live in colonies, forming coral reefs, they interconnect and communicate via their callicles. A colony of polyps is one living organism composed of a multiplicity of 'individuals' that also extends beyond the polyps themselves since it hosts billions of colorful algae that inhabit it. This is what gives the coral reefs their spectacular coloration. Polyps, and the reef they constitute when they form a colony, are highly sensitive to their environment and fluctuations caused by environmental stress may lead to bleaching of the reefs when the algae inhabitants are evicted in response to pollution or temperature change in the water, for example. Polyps interact with and react to their environment and other beings that color them or nourish them.

In her study of cup corals, Eva Hayward (2010) observes that 'Corals are a composition of faculties, a tuning with environment that can be described as inhabiting what Jacob von Uexküll called an "Umwelt"' (Hayward, 2010: 584).[5] They tune with their environment through their material anchoring and communication between the polyps composing them but also through their multiple interactions: with algae, fish, particles that nourish them, water, tides, pollutants, water temperature, etc. Matter, for cup corals,

> is not only a dynamic becoming (Barad, 2003) but is also a transmedium mediation – a mediation through which surfaces are not produced as refrains, but as lenses. Passing through creates remainders of filterings that result in texture. Boundaries remain refracted interfaces of passage, prepositional orientations. Texture is the

> unmetabolizable more of animate forces moving across bodies and objects. (Hayward, 2010: 585)

The coral is shaped and textured by its encounters and constantly changes as it adjusts to those encounters and the beings taking part in them. The reef and its multiple components are exposed subjects, as per Alaimo (2016), entangled and transcorporeal. They are materially interconnected with one another in the colony, making up one living organism firmly anchored to the seabed after the initial polyp attached itself to a rock and then proliferated.

While it is debatable how much consciousness or subjective experience of oneself a polyp may have, specifically due to their lack of a brain, they are acting creatures that relate to other beings they are attached to or host as well as to their overall environment. They act by attaching themselves to a rock and creating a colony. They act by evicting hosts in reaction to environmental change. They act in welcoming them back. Now this agency may not be of the same kind as that of other animals, if only because of its limited scope, and its ensuing subjective existence may thereby be extremely limited. However, as we see it, there is no reason to deny that a polyp may have an experience of itself and that some thinking may be occurring at that marine level. Indeed, why would a brain be necessary to 'think' or 'experience' if we argue that the materiality of bodies and what they experience is the most foundational aspect of our experiences? Further, it can be argued that the limited agency of the polyp – one that is limited individually but expanded via the collective action of the colony – is no more limited than that of any other being, including that of our human selves. The agency of a polyp is of the agentic capacity kind and exercises at the very least intentless direction, as discussed above.

There are, of course, incommensurable differences between coral polyps and humans, but comparing them can serve to emphasize entangled materiality in a generative way. This is especially useful for the human in order to free ourselves from the fantasy of human exceptionalism we discussed earlier. Human beings are the same entangled and materially interconnected beings as marine polyps. Like polyps, we host organisms that may be said to give us our 'colour', namely our microbiological constitution as a multiplicity. Polyps are attached to a material foundation in a literal way while we are mobile creatures, but our mobility is always and ever grounded in materiality: we are always of a specific location. And like polyps, that grounding constrains and shapes our agency just like it shapes our being.[6] One may want to argue that the materiality to which we attach, as polyps or humans, is not the same because one presumably does not change while the other fluctuates greatly. Indeed, the dynamic becoming of the materiality to which the human attaches unfolds at great pace, especially given the human's

mobility. We are not fixed in a location the way a marine polyp is and our mobility exposes us to a greater variety of materiality and interactions with other beings we encounter through our movements, at least potentially.

But supposing that the materiality to which the polyp attaches does not change, or changes very little, is ignoring the different time scale over which change occurs. The rock to which a polyp attaches undergoes change on a geological timescale which is, for humans, most of the time invisible. It may take more than a lifetime to experience change in a rock that sits in a desert, for example. But is this even true? The activity of micro-organisms on the surface of a rock alters its surface constantly. We may, however, fail to pay attention to such microscopic changes. This lack of attention is not a lack of occurrence of change. This all points to intersecting and interconnected agencies, agentic capacities, intentless directions, and temporalities and the dynamic becoming that ensues from encounters between beings. It should also be noted that, whether they are attached tightly to their material foundation like polyps or whether they enjoy mobility on the surface of their material anchoring, both polyps and humans, and all other beings, are entangled in a multitude of material encounters. The polyp that is attached and immobile, except for its moving tentacles, still interacts with the water it is in, the other polyps it is connected to in the coral reef it forms, the food particles that come its way, fishes and algae that live in the reef or merely visit it *en passant*. This is all also true of the human and all other beings.[7]

Forests and the Question of the Future

As we have seen in the above analysis, a living being partakes in an intricate web of material interconnectedness. In times of environmental crisis, we feel compelled to ask about what happens when this web becomes compromised. In order to do so, we direct our attention towards a different nonhuman ecosystem, the forest, in search for vital components of our posthuman environmental ethics. Already in the 18th century, forestry and its understanding of natural resources as finite 'set the stage for later concepts of sustainability' (Sze et al., 2018: 7); but thinking (with) forests is important for us for yet another reason: we see it as representing an experimental mode of posthumanist thinking in which we practice theory with our – always nature-cultural – objects (see Haraway, 2016).

Anna Tsing and her collaborators (2017) refer to landscapes affected by species extinction as 'haunted'. When a population of one species dwindles or disappears entirely, the whole delicate ecological system suffers. Although only very few of the species at risk of extinction capture public and media attention (such as the black rhino, tigers, Asian elephants, etc.), when species disappear their sudden absence doesn't go

unnoticed in their habitat and reverberates through the whole web of their relations, now disturbed or destroyed. The existence of such haunted landscapes complicates the simple, linear temporality implied in the notion of sustainability popularized by the UN Commission. While sustainability tends to be seen as an action or set of actions whose aim is to secure survival for future (human) generations, we suggest revisiting this idea from an anthropo-de-centric perspective that disrupts a consecutive understanding of time. According to Jacques Derrida's (1994) hauntology and its reworking by feminist new materialist thinker Karen Barad (2010), the past, the present and the future are radically interconnected and influence one another. All these vectors of time are open for a possibility of reconfiguration (the past included). In what follows we build on material feminist and posthumanist thought to support Barad's claim that 'an ethics of entanglement entails possibilities and obligations for reworking the material effects of the past and the future' (Barad, 2010: 266). Such an approach inspires us to think sustainability through interconnectedness that grows in all temporal directions rather than in the linear terms of a succession of generations.

Taking into consideration the complex systems of forests is helpful. Forests play a crucial role in action against climate change (Peh et al., 2015); they absorb carbon emissions and react sensitively to a changing climate; due to their ability to purify air, they are taken as guarantees of species survival. This is expressed in the metaphor of 'the green lungs of the Earth', for example. A forest is an entangled ecology in which various species of plants, bacteria, fungi, and animals communicate with one another, while dead matter nourishes the living. To illustrate this, we can consider how many forest plants form relationships with certain species of fungi that live inside them or twist around plant roots and communicate with one another through a 'mycorrhizal network', creating a web that some researchers humorously call the 'wood wide web' (Helgason et al., 1998). Survival depends on this ability to live-with and co-depend on other creatures and unfolds against a twisted temporality in which death is a foundation for the future, and the future impacts the present. Dead trees and leaves give nutrients back to the ecosystem through decomposition, allowing for new plants to grow. Animals' survival relies on their ability to predict or make an informed guess about the future – 'in the realm of life', Kohn (2013: 194) comments, 'it is not just the past that affects the present, nor is time frozen. Rather, life involves, in addition to these, the special ways in which the future comes to affect the present as well'.

Human activity has, beyond a doubt, been destructive for these arboreal nonhuman communities. There are, however, other models of inhabiting the world, in which the human is not a destructive force, but rather one that impacts nature in ways that support its lively ecologies. In his forensic architecture project, Paulo Tavares (2016) describes a

haunted landscape in south-west Amazonia. Aerial photographs taken in the 1980s captured large earthmarks carved out in the deforested patch of land. These geoglyphs turned out to be traces of monumental infrastructures built by Indigenous people inhabiting the territory before the colonial invasion (900–1500 CE). The function of these objects is not known to scientists today and it is conjectured that they might have served military or religious purposes, but one thing is certain: these structures comprise a vast, complex and intricate network. While the logic of colonialism proclaims the forest as an empty, unclaimed territory to justify its conquest, this infrastructure built by a people long gone, whose presence has been systematically erased, proves to be an intentional design, 'demonstrating that before the European colonial invasion this region of Amazonia was inhabited by Amerindian societies whose spatial designs produced remarkable transformations in the forest landscape' (Tavares, 2016). Indigenous ways of inhabiting this land trouble the logic of most environmental discourses that urge us to reduce the human impact on the environment in order to not leave a mark. In contrast, Indigenous inhabitants of this forest built a civilization that changed the forest landscape in substantial ways, modifying its composition, biodiversity and soil makeup (Maezumi et al., 2018). Tavares (2016) writes:

> The evidence shows that [I]ndigenous modes of inhabitation, both in the pre-colonial past and in the modern present, not only leave profound marks in the landscape but also play an essential role in shaping the forest ecology. Vast tracts of forests and savannahs in Amazonia that we perceive as natural are in fact cultural landscapes with a deep human past. The botanical structure and species composition of the Earth's largest biodiversity refuge is to a great extent a heritage of [I]ndigenous design.

Thinking about the human as an element that can be beneficial for the environment challenges the habitual ways of understanding sustainability as a call for preservation rather than for transformation. A precolonial society keeps impacting the environment, acting through its forest architecture. This is not a matter of the past; indeed, for Indigenous peoples and others who experience systemic exclusion and bear the burden of environmental crisis, 'to believe that we and our societies have futures, we need to witness a sufficient degree of our relationships and histories in the physical manifestations of ecologies' (Whyte et al., 2018: 163). The geoglyphs are one such manifestation.

In this light, evoking Derrida (1994), we ask: Whose future does sustainability sustain? Are we bound with responsibilities not only towards future generations of humans, but also past ones? And what about our obligations towards generations of nonhumans?

Various temporal scales and orientations weave through questions of extinction, survival and the future. Bearing in mind their ethical and political dimensions, we further inquire about the meaning of sustainability's investment in the good of the future generations by looking at contemporary environmental struggles in another forest and offering an analysis of a performance entitled *Mothers on Tree Stumps* (2017). This performance was organized by Polish artist Cecylia Malik in protest against a massive logging of the Białowieża Forest in Poland, a unique ecological system and the last remaining piece of the primeval forest that once covered nearly all of Europe. Despite the United Nations and the European Union protection, in 2016 the Polish government gave the green light to a big logging operation. This, in turn, provoked a vehement protest on the part of local communities, environmental advocates and international organizations well-aware that profit-driven deforestation is a major global problem. In Malik's performance, a group of women seated on tree stumps in a clear-cut forest breastfed infants. While this can be interpreted as a straightforward call to fight and protect the forest in the name of future generations of human babies, we would like to suggest a different reading that pushes for a multi-species rather than human-oriented understanding of sustainability. In order to do so, this performance needs to be situated in the political context in which it happened.

Currently in Poland, the women's movement has become a major force in opposing the conservative and anti-women's rights policies of the government. While this mass movement was initially mobilized against the threat of a complete abortion ban, it subsequently grew to support other causes and form ally-ships with various social movements. In the era of #MeToo, Polish feminists stand *en masse* to fight back against misogyny and rape culture. To add to this, it is important to understand Malik's performance in the context of discussions about breastfeeding in public – which some people find unacceptable and consider to be 'indecent exposure'. In other words, Malik's piece speaks to a context in which men feel entitled to female bodies and grant themselves the right to decide questions that concern them. Malik reclaims the female and/or nursing body against this cooptation. Ironically playing with multiple images of motherhood, such as the metaphor of Mother Nature and the cultural trope of the Polish mother – one that sacrifices herself for the good of her children – in Malik's performance, activist 'mothers' stand up to protect and care for the forest. As the protesters use their own and their infants' bodies to protect the forest, they expose the common root of both misogyny and environmental destruction as resting on the patriarchal logic of domination (see Merchant, 1980). In our interpretation, the performance also allows us to consider an intertwined temporality of social struggles through engaging in a form of protest known from earlier women environmentalist organizing, in

particular the Chipko movement in India. Rather than a simple interpretation that the forest must be protected to safeguard the future of our children, the *Mothers on Tree Stumps* can inspire us to think about environmental care practices in terms of standing up in solidarity with the forest and its multi-species communities. In this case, sustainability is about 'upholding' one another, supporting and surviving together rather than positing the human as separate from nonhuman others.

Futurity, Generations and Justice

Pre-Columbian practices of caring for the forest through cultivating it show a different model of an inter-generational, truly pluri-temporal practice of sustainability than the one offered by the WCED definition. While some environmental discourses point to overpopulation as one of the major factors that contribute to environmental change and argue in favor of depopulation (Ehrlich and Ehrlich, 2004), queer and feminist scholars sometimes follow with a plea to 'make kin, not babies' (Haraway, 2015: 162; 2016: passim; see also Edelman, 2004). Such positions, we argue following Indigenous, POC, and anti-racist scholars (Agard-Jones, 2017; Chakrabarty, 2016; Whyte et al., 2018), must be qualified against the history of discrimination and violence that deem some populations as undesirable and/or disposable. The idea that children as such are an undesirable group of people and that some people should not have children – for example people with intellectual disabilities or genetic illnesses, queer folks, Indigenous peoples, or ethnic minorities – supports horrendous injustice and violence that has been inflicted upon these groups – including taking children away from their families, forced sterilization programs, destruction of communities and genocide. For this reason, an anti-natalist position should always be articulated with extreme caution, recognizing and being accountable for this history of violence directed at particular groups of humans. That this violence forecloses the future of some populations, most often in the name of the future and well-being of another, must be integrated into our posthuman understanding of sustainability.

In *Better Never to Have Been*, Benatar (2008) argues for a radical anti-natalism, implying that it would be best if humanity became extinct. From the perspective of zoe-egalitarianism such as that offered by the posthumanist views we have discussed, in which the human being loses its privileged position, what is it that would justify working toward sustaining a being that has proven itself to be so harmful to itself and others? As Nietzsche (1969: 153) puts it, 'The earth has a skin; and this skin has diseases. One of these diseases, for example, is called ''Man''. It is crucial, however, to remember that the disease here is the 'man' of humanist philosophies, the human being as the master (see Weheliye, 2014; Wynter, 2003)! Åsberg (2017: 187) warns us that 'In a flurry of recent

Anthropocene humanities and social science research, I dare say that we by totalizing humanity risk all too firmly putting a phantasm of human agency at the center stage again by naming it the Age of Man'. We reject such totalizing and narcissistic 'Man' and advocate an approach to our existence and relations with other beings with a view to the flourishing of all beings, (post)humans included.

Conclusion: Practicing Sustainable Posthumanities

With Braidotti (2005–6), we understand posthumanist sustainability as 'a re-grounding of the subject in a materially embedded sense of responsibility and ethical accountability for the environments s/he inhabits'. This re-grounding of the human subject repositions our practices of knowledge production as always situated in the lively web of interdependencies. Scholars invested in the project of posthumanities[8] argue that reinventing the notion of the human constitutes a critical intervention in the humanities, at once a theoretical and a practical one, as the reorganization of our thinking must also challenge and transform our praxis, including in academia. To conclude this essay, we would like to turn to the question of practicing sustainable posthumanities as a form of 'everyday utopia' (Cooper, 2013).

According to feminist epistemologies, our ontologies, theoretical interventions, and ways of thinking and doing science are always situated and co-shape our practices (Haraway, 1988). There is no clear-cut separation between theory and practice, knowledge and political action. Following Haraway, Puig de la Bellacasa (2017: 69) explains: 'That knowledge is situated means that knowing and thinking are unconceivable without the multiple relations that make possible the world we think with'. This interdependency is a condition of thinking and caring – the two are not separate but rather, 'relations of thinking and knowing require care and affect how we care' (Puig de la Bellacasa, 2017: 69). Inspired by this node between thinking, knowing and caring, we experimented with posthumanist methods of thinking with creatures of the sea and the forest, trying to be accountable for their pasts and futures as much as for our own, human one.

As we recognize that our present is the future and the future is the past, that there is 'a linkage across present and past in the act of constructing and actualizing possible futures' (Braidotti, 2005–6), our practices are also ways of engendering the future. We envision practicing posthuman sustainability as stemming from an ethics of extinction. Philosopher Claire Colebrook (2014: 43) speaks of 'an ethics of extinction' rooted in the looming extinction we are facing in the present 'without assuming the ethos of the present' (Colebrook, 2014: 43). This ethos entails abandoning a humanist type of ethics that privileges the human and instead adopting a counter-ethics in which 'one would [. . .] consider

what is worthy of concern or survival, what of the human, the multitude, or the living would enable an ethos that was not the ethos of the present' (Colebrook, 2014: 43). As more and more human and nonhuman populations flee their homes due to climate change, we need to reorganize our concepts, theories and policies to be able to host them. We envision practicing posthumanist sustainability as an intergenerational, interdisciplinary work of care. Care, as Puig de la Bellacasa teaches us, is 'a manifold of *doings* needed to create, hold together, and sustain life and continue its diverseness' (2017: 70). For this we need all hands on deck: the complexity of Anthropocenic phenomena in their ecological, political, economic and affective dimensions requires ecologists and scientists, social scientists and humanities researchers, activists and communities to work together.

Diverse practices, including those performed by mothers protesting a forest cutting, coral reef scientists, city-dwellers creating bee corridors, land and river protectors, or people standing in solidarity with communities who suffer disproportionality from environmental degradation, debunk the individualistic, human-centric understanding of sustainability modeled on the economy of debt and inheritance. Instead, they already bring forth posthuman sustainability practices: oriented not towards a future conceived in a linear fashion but rather emerging from the entanglement of beings and the plurality of temporal dimensions of the past, present, and futures and its different scales: geological time, human time, and bees' time are not the same. In it they recognize the non-heterogeneity of the future, and the violence that occurs whenever 'our future' becomes more important or worth protecting than that of some other being.

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Notes

1. For more on feminist legacies of environmental thinking see, e.g., Åsberg (2017); Gaard (2014); Iovino and Opperman (2014).
2. At the center of her political proposition, Braidotti places zoe, the vital force which, traversing the imposed categorizations and existing identities, creates affiliations and connections in the world. In her own words, 'Zoe-centered egalitarianism is, for me, the core of the post-anthropocentric turn: it is a materialist, secular, grounded and unsentimental response to the opportunistic trans-species commodification of Life that is the logic of advanced capitalism' (Braidotti, 2013: 60).
3. It is important to recognize that ideas of kinship between all worldlings, the role of more-than-human collectives, the notion of animals and other entities as knowledge producers and bearers, the concept of nonhuman agency, and the conceptualization of the human as an element, rather than the center of ecological systems, are central to many Indigenous ontologies; see e.g. Cajete (2000); Kimmerer (2013); LaDuke (1999). Specifically in relation to sustainability, see Cajete (1999); Whyte et al. (2018). Some scholars suggest that while encounters between posthumanist feminisms and Indigenous scholarship come with risks (of whitewashing and cultural appropriation or of stereotyping and romanticizing Indigenous philosophies), they may also be generative of fruitful dialogues; see TallBear (2015); DeLine (2018).
4. See Coral Reef Alliance (n.d.); see also National Geographic (n.d.).
5. Hayward's approach is focused on interspecies relations and their haptic encounters in the specific environment of a saltwater lab.
6. Indeed, more and more studies demonstrate how our bodies are permeated by multiple elements from our environment at a cellular level. See a brief compilation here: https://sciencing.com/effects-pollution-body-8792.html.
7. In a forthcoming essay, Daigle further elaborates on polyps and what Friedrich Nietzsche (1997) refers to as the human's 'polyp arms', suggesting that we grow and wither with every experience just like polyps do, thanks to the nourishment their tentacles bring them.
8. We follow Braidotti and Gilroy (2016), Halberstam and Livingston (1995) and Wolfe (2010) in their understanding of posthumanities as an undercurrent within the humanities whose main characteristic is a rejection of the exclusionary logics behind the idea of universal Man.

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