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The Anthropocene as the End of Nature? Why Recognizing Interventionism Is Key in Coming to Terms with the Anthropocene

Keje Boersma

In this article, I address and argue against the tendency to understand the anthropocene as inaugurating the end of nature. I conduct two key moves. First, by way of an engagement with the concept of anthropocene technology I explain how understanding the anthropocene as the end of nature prevents us from recognizing what the anthropocene is all about: interventionism. Secondly, I illustrate how a nondualist understanding of the human-nature relation allows us to recognize interventionism as the hallmark of the anthropocene without falling back into the hierarchical human-nature conceptions that underlie interventionism. A nondualist framework that conserves the human-nature distinction helps us in our ability to relate critically to contemporary science and technology in the anthropocene. I illustrate the conceptual narrative of the article through the specific case of gene drive technology development.

INTRODUCTION

The concept of the anthropocene,¹ often translated as the “age of humans,” has been hotly debated over the past two decades following the proposal to adopt it as a formal designation of our current geological time period and research in Earth System Science indicating our planetary system to be in the process of “tipping over” into a new state (Crutzen 2002; Crutzen and Stoermer 2000; Steffen et al. 2011; Waters et al. 2016). The basic idea is simple: human planetary influence and presence has become so pervasive that it merits renaming our current (geologi-

¹ The notion of the anthropocene is contested and often reinforces interventionist attitudes that are critically discussed in this article. I therefore use the concept non-capitalized (following the suggestion by Ruddiman et al. (2015)), to indicate that I do not necessarily embrace the label while still wanting to talk about what it designates.

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cal) time period after ourselves. In the debate surrounding the concept, referred to hereafter as “the anthropocene debate,” the anthropocene is often treated as a radical rupture of reality and thought (Hamilton, Gemenne, and Bonneuil 2015).² Centrally among the alleged victims of the anthropocene is the idea of external nature—if human influence is everywhere, there is nothing left that would qualify for the label. In proclaiming this “end of nature,” the debate about the anthropocene appears to echo longer-standing debates about the role and implications of the modern view of nature as distinct from humans.

If we follow the anthropocene debate along these ontological lines, we are inclined to embrace the position that the anthropocene *finally* realizes what scholarship critical of Western metaphysics—feminist, eco-philosophical, indigenous, cultural-anthropological, and post-structuralist perspectives (e.g., Asdal 2003; Cadena 2019; Cajete 1999; Casetta 2020; Descola 2014; Goldman and Schurman 2000; Haraway 1991; King 1990; Murphy 2003; Plumwood 1993; Todd 2016; Wildcat 2009; Wilson 2008)—has been attempting to bring about for decades: the end of the untenable and undesirable idea of a human-nature distinction (Latour 1993). And given the often emancipatory motivations behind this scholarship critical of Western metaphysics, we are further inclined to rejoice in the end-of-nature anthropocene implication. The above inference is one we should not make, however, and to see why *recognizing interventionism* is key. I therefore engage in this article with the anthropocene debate by addressing the tension between viewing the anthropocene as the end of nature and viewing it as epitomizing human interventionism. As I will argue, rethinking humans’ relation to earth systems and processes does not require giving up the distinction between humans and nature, but requires redefining the hierarchical relationship between the two. Losing sight of this means the interventionism inherent in certain responses to the anthropocene can hitchhike along on views that are critical of modern ontologies but in fact oppose such interventionism.

In Section 1, I briefly sketch the specific end-of-nature thesis found in the anthropocene debate and its apparent similarity to the anti-dualism of scholarship critical of Western metaphysics. I subsequently introduce the concept of *anthropocene technology* (Preston 2017) to defend the position that human interventionism forms the hallmark of the anthropocene in Section 2. I conclude this section by arguing that recognizing interventionism requires a human-nature distinction, presenting a major challenge for interpreting the anthropocene: we need a human-nature distinction to recognize interventionism, but this distinction is apparently rendered meaningless by the anthropocene. Section 3 is devoted to developing a perspective that opens up the challenge through the introduction of Plumwood’s (1993) antidualist position, which allows us to differentiate between *dualism* on the one hand and *distinction* on the other. With the concepts of anthropocene technology, interventionism, and antidualism in hand, I return in Section 4 to the anthropocene

² This book collects essays from scholars working in the humanities and social sciences, and forms a major inspiration for this article. See also Hamilton 2017.

debate and its particular version of the end-of-nature thesis. I conclude the article in Section 5. Throughout the article, I illustrate the argument by brief reflections on a specific contemporary technological development: gene drives. These reflections are based on a critical reading of literature on the implications of gene drives and my ethnographic engagement with two research groups involved in gene drive development.³

My main message is fairly straightforward: the particular end-of-nature thesis found in the anthropocene debate does not provide a good foundation for environmental-philosophical and -ethical thinking for the anthropocene and we should therefore refrain from embracing it. To develop my argument, I connect scholarship from different domains: environmental philosophy, humanities, and social science scholars writing on the anthropocene, critiques of modern metaphysics, and ecomodernism. In navigating this conceptual space, I use a number of labels to distinguish between different (scholarly) positions and/or debates. “The anthropocene debate” refers to the debate in the social sciences and humanities about the meaning of the concept and how we should understand its implications, including authors that are not social scientists/humanities scholars proper, but who have in their writing about the anthropocene made ontological and moral claims that could be (and have been) regarded as stepping on social science’s and humanities’ turf.⁴ This anthropocene debate is obviously a highly diverse debate with myriad voices and perspectives involved. The particular end-of-nature thesis I focus on does not define this debate or form its essential characteristic—although it is arguably a highly dominant trope in this debate (as I will illustrate in the next section). The “ecomodernist (anthropocene) position” can be considered part of the wider anthropocene debate, but is characterized by a particular connection between the end-of-nature thesis and calls for interventionism—in particular by technological means—and is for purposes of conceptual clarity presented as a position distinct from the wider anthropocene debate. With “scholarship critical of Western or modern metaphysics” I refer to a wide and diverse range of scholarship that challenges the radical human-nature and subject-object distinctions considered to underlie the Western, modern worldview. Finally, with “antidualism” I mean a position that challenges the idea of radical separation between the two sides of what in the aforementioned modern view has been split apart.

³ This article is part of a broader project in support of my PhD dissertation, in which I look at gene drive technology through the lens of the role and meaning of human intervention(ism) into nature and the implications of the anthropocene for our conceptions of nature, the human-nature relation, and environmental ethics. Part of my research has been devoted to conducting ethnographic studies of two university-based research groups working on bioengineering in general and on gene drive development specifically. The aim was to gain access to the life worlds, views, and assumptions of these groups of bioengineers. The detailed results of these studies will be central to a different, future publication; here, I only touch on a select number of quite general observations fitting the theme and style of the article. Documentation of fieldwork material is available upon request of the author.

⁴ This for instance includes Paul Crutzen’s publications since 2000, which have popularized the concept as well as, one suspects, the fervor of the criticisms it has received.

1. THE ANTHROPOCENE AS THE END OF NATURE

In their introduction to the edited volume *The Anthropocene and the Global Environmental Crisis: Rethinking Modernity in a New Epoch*, Hamilton, Bonneuil, and Gemenne provide an overview and interpretation of the anthropocene's "radically new implications for our worldviews" (2015: 3). In exploring these implications, they couch the stakes of the anthropocene in the language of the untenability of the human-nature distinction and the ontological sea-change this realization would entail. The anthropocene suggests "the end of nature as no more than the external backdrop for the drama of human history, and the end of the social-only shackles of modern understanding of society" (4) and the imperative to think natural and human history as "one and the same geo-history"⁵ in which "human history and Earth history are commensurable and deeply interconnected" (6).

In his individually written exposé on the anthropocene, Hamilton avowedly affirms these conclusions when he urges us: "Forget everything you know. Nature is no longer nature. We have entered a new epoch" (2017: title page). For Hamilton, the anthropocene entails a radical rupture in both reality and thought: "1945 may be thought of as the boundary that marks a break in Earth history of the greatest profundity; it divides the life span of Earth into two halves ontologically. In other words, the being-nature of the object itself has changed" (7). In this statement, we can see how the end of nature is reflected in the tendency to replace "nature" by "earth" in contributions to the anthropocene debate. These and similar post-nature tropes are a dominant presence in the anthropocene debate: as Baskin observes, "whilst there are differences in tone between the humble and the hubristic accounts of the Anthropocene, . . . all are 'post-nature' in some sense" (2015: 14). Hornborg makes a similar point when he states "The currently unfolding discourse on the Anthropocene represents a convergence of Earth system natural science and . . . post-Cartesian social science. Both fields suggest that the Enlightenment distinction between Nature and Society is obsolete" (2015: 57). Post-nature perspectives can be found in contemporary environmental philosophy more broadly, most notably in the perspectives put forward by Morton (2009) and Vogel (2015). Ontological reflections of this sort form one of the five ways distinguished by Lorimer (2017) in which the anthropocene concept has been mobilized in the "wider intellectual event" (117) triggered by the anthropocene naming proposal, an event he calls the Anthro-scene.⁶ Other influential proposals for such "new ontologies for environmentalism" (125) have been made among others by Chakrabarty (2009: "geohistory"), Clark (2011: "inhuman nature"), Ellis (2015: "anthromes"), Haff (2014: "technosphere"), Haraway (2016: "making kin in the Chthulucene"), Latour (2017: "Gaia"), and Morton (2013: "hyperobjects").

While united in their desire to move beyond a modern understanding of nature (and thus in their being "post-nature"), only some of these new ontologies embrace

⁵ Following the influential article by Chakrabarty (2009).

⁶ The other four ways are: as a scientific question, as a reflection of the intellectual zeitgeist, as an ideological provocation, and as science fiction (Lorimer 2017).

the particular version of the anthropocene-as-end-of-nature thesis central to this article. It is important for what is to follow that this particular thesis conceives of nature and the human-nature distinction in a specific way. “The end of nature” is a combination of an empirical claim and a metaphysical claim; or more precisely, it is an empirical claim, which then feeds into the conceptual, ontological, or metaphysical claim: because nature as something untouched by human influence can *no longer be found* in an anthropogenic climate change and ecological crisis world, the metaphysical *idea* or concept of nature, which defines it as that which is not human crumbles. Our metaphysics has been disproven by reality. We thus find in the anthropocene debate two (however vaguely defined) understandings of nature and the human-nature distinction, that are strongly related: one empirical (biological, geological, physical), the other ontological or metaphysical. In the particular end-of-nature thesis I am concerned with, the two understandings are brought into an intricate connection to each other.

In etching out the end-of-nature implications, the debate about the anthropocene appears to echo longer-standing debates about the tenability, desirability, and centrality of the modern view of nature as distinct from humans. Scholars in a wide range of social sciences and humanities have highlighted the contingent historical roots of a sharp divide between humans and non-humans in European modernity and criticized this Cartesian divide through perspectives of anthropology, feminist theory, and political ecology (e.g., Asdal 2003; Cadena 2019; Casetta 2020; Descola 2014; Goldman and Schurman 2000; Haraway 1991; King 1990; Murphy 2003; Plumwood 1993). Furthermore, the rejection of this modern divide has become increasingly connected with Indigenous scholarship on holistic ontologies that emphasize interconnectedness without any bifurcation of the world in a human and a non-human domain (e.g., Cajete 1999; Todd 2016; Wildcat 2009; Wilson 2008). If we follow the anthropocene debate along its end-of-nature lines, we may be inclined to embrace the position that the anthropocene *finally* makes real what others in scholarship critical of Western metaphysics have been attempting to bring about for decades: the end of the idea of nature as external to humans.⁷ And given the often laudable emancipatory motivations behind this scholarship critical of Western metaphysics, we may feel further inclined to rejoice in this end-of-nature anthropocene implication. This is certainly what Latour’s (2017; 2018) contributions to the anthropocene debate appear to suggest. Having proclaimed for decades that we have never been modern,⁸ Latour is adamant in proposing the anthropocene illustrates what he has been saying all along.

What I want to show in this article is that the above inference—i.e., the end-of-nature thesis found in the anthropocene debate finally realizes what scholarship critical of Western metaphysics has been arguing for decades—is one we should not

⁷ Maris (2015: 129) formulates this interpretation as follows: “enter the Anthropocene era, whose narrative forms the ultimate assault on the idea that there could be something out there to be called nature.”

⁸ Meaning “the moderns” were wrong to assume they could divide the world into the two purified realms of “Nature” and “Culture” (Latour 1993).

make. The similarity in ontological projects is superficial and only in appearance unites positions otherwise highly divided in crucial respects. Of particular concern is that whereas contributors to the anthropocene debate supporting an ecomodernist position⁹—who connect the ontological end-of-nature thesis to a normative call to technologically intervene wisely and well—embrace interventionism, the wider range of scholarship critical of Western metaphysics can generally be seen to oppose it. *Recognizing interventionism* is therefore key to our understanding of the anthropocene. To make this point more apparent, I introduce the concept of anthropocene technology in the next section, after which I introduce Plumwood's account of antidualism.

2. ANTHROPOCENE TECHNOLOGY: THE ANTHROPOCENE AS EPITOMIZING HUMAN INTERVENTIONISM

Against the anthropocene as inaugurating the end-of-nature, I propose an alternative interpretation of the anthropocene, one that understands it as epitomizing human interventionism. This perspective, inspired by Christopher Preston's (2017; 2018) work, stems from an understanding of the anthropocene in its moral and historical dimensions and revolves around a conviction that an environmental ethics committed to limiting human dominance and anthropocentrism is more important than ever in today's anthropocene world. Explaining and defending this perspective and what it tells us about our particular end-of-nature thesis will form the main objective for the remainder of the paper.

Following Preston, deep forms of human intervention(ism) form the hallmark of the anthropocene in two respects. First of all, the story of "how we got into the anthropocene" can be read as the history of the intensification of human intervention into nature or the earth. This is what Preston (2017) calls the retrospective anthropocene. On this side of the equation, we recognize the variety of works within the anthropocene debate that focus on the questions of starting dates in relation to technological innovations, including fire, early agriculture, colonialism, the steam engine, and the atom bomb (see Bauer and Ellis (2018) for an overview of these various positions). Secondly, deep forms of intervention characterize contemporary scientific and technological proposals to address the problems of the anthropocene, most notably climate change.¹⁰ It is this latter connection between anthropocene and intervention that is central to Preston's engagement with *anthropocene technologies*.¹¹ What characterizes anthropocene technologies (e.g., solar radiation

⁹ As indicated in the introduction, I use the term "ecomodernist anthropocene position" to refer specifically to those who connect the ontological (no more nature) claim to the normative action claim (intervene, but intervene well). This is to distinguish them from what I refer to as "the anthropocene debate" more generally and thus from the notions put forward by authors such as Hamilton, Bonneuil, and Gemenne (2015) to which I respond in this article. The ecomodernist position is further discussed in what follows.

¹⁰ Proposals of this kind and their underlying worldview are well illustrated by the work of those associated with the *Breakthrough Institute*, see: <https://thebreakthrough.org>.

¹¹ Preston has relinquished the term "Anthropocene technologies" used in his 2017 publication for the "synthetic age technologies" after which he named his 2018 book because of the negative, perfor-

management, the creation of artificial organisms in synthetic biology, nanotechnology, gene drives) according to Preston (2017; 2018) is that their application entails reshaping a fundamental biogeochemical process that has been responsible for the earth's history, for shaping its biota and abiota, by human design. They are *deep technologies*: they do not just manipulate surface phenomena but change the dynamics of a system at a deeper level, altering the very nature of "Nature" (ibid.).

One example of such a technology are gene drives. Gene drives are a collection of recently (re)surfaced biotechnologies, allied by their specific inheritance-biasing features and hypothesized potential for genetically modifying wild populations (Esvelt et al. 2014; Min et al. 2018; NASEM 2016; Noble et al. 2018).¹² A recent development in the CRISPR-slipstream, gene drives involve a genetic modification that biases inheritance through sexual reproduction, which can be coupled to a specific genetic trait that one wants to spread through populations of organisms. What makes gene drives stand out in the cluttered and speedy mess of contemporary science and technology development is that they bring into view the possibility of bringing under human control yet another—or even, according to tradition, final—frontier: populations *in the wild*. Because gene drives are explicitly designed to surpass Mendelian inheritance and descent with modification processes, the fundamental earth process that gene drive technology would intervene into is the process of evolution—gene drives can be seen as a “radical type of intervention into ecology and evolution” (Preston and Wickson 2019: 217).

This brief characterization of gene drives illustrates how the anthropocene technology concept focuses our attention regarding specific scientific and technological developments. However, the concept cannot be thought in absence of a number of additional sensibilities that emerge when taking a step back from concrete developments. First of all, the concept conveys specific technological developments should be looked at in relation to a “widespread restructuring of ethical relationships to the surrounding world currently underway at the hands of emerging technologies” that is “part of an ongoing shift in how to think about [human interventions into nature]¹³ in the new epoch of the Anthropocene” (Preston 2017: S38). Secondly, the key difference between the interventionist technologies

mative connotations of the anthropocene concept (personal communication). The decision to maintain the concept is wholly my own.

¹² The theoretical notion of using gene drive mechanisms has been around for a while; with the advent of CRISPR as a revolution in human-directed genome editing the possibility of developing gene drives mechanisms that actually work has reemerged with fervor since 2014. See the following publications for this brief history of gene drives, including immediate attention to the technology's potential risks: Esvelt et al. 2014, Oye et al. 2014, Akbari et al. 2015, Webber, Raghu, and Edwards 2015, NASEM 2016, Esvelt and Gemmill 2017, Convention on Biological Diversity 2018, Kofler et al. 2018, Min et al. 2018, and Noble et al. 2018. Various contributions to a 2018 special edition of the *Journal of Responsible Innovation* provide further illustrations. *Journal of Responsible Innovation* 5 (S1). Special Issue: Roadmap to Gene Drives: Research and Governance Needs in Social, Political, and Ecological Context.

¹³ The original word here is “conservation,” but as Preston's 2017 text was written specifically for a report about conservation whereas its underlying wider argument as expounded in 2018's *The Synthetic Age* is about human intervention more generally, I felt the substitution here to be legitimate.

of the past and prospective anthropocene technologies is that in case of the latter “we *fully intend* the changes [to the earth] we will make” (S40, emphasis added). Finally, the weight of the argument lies with the *prospective* anthropocene, with the prospect of “a *thoroughly interventionist future*” (S38, emphasis added) and the technologies and practices it will embody.

Preston’s ultimate concern is thus the prospect of a thoroughly interventionist future. Interventionism is what is at stake in the anthropocene and in our environmental-ethical considerations of contemporary science and technology. If interventionism is key to the anthropocene, we should perhaps expand on the concept. What is interventionism, and how does it relate to particular interventions? I expand on Preston’s framework by providing a brief typology of intervention and interventionism. These will help us in our objective to understand and critically engage with the end-of-nature thesis.

“Intervention” enjoys general commonsensical and academic usage. Starting with the former, intervention as commonly conceived—in talk about military, economic, surgical, spatial, policy, or divine intervention, or organizing an intervention to aid an addicted friend—typically involves the following elements. First, interventions occur between two parties or entities, the intervener and the intervened-upon, and an intervention is thus always externally initiated from the intervened-upon party’s perspective. Second, they are cases of deliberate or intentional action; a divine punishment through a flood is an intervention, a naturally occurring flood is not. Third, the intention relates to a specific goal of bringing about a change to address a certain problem. Therefore, regardless of how positively or negatively the intervention is perceived by the intervened-upon party (if at all), an intervention always involves interference. Fourth, interventions require the power of the intervening party to actually affect the party intervened upon; without the power to actually affect the economy, one cannot successfully intervene in it. Finally, and underlying the previous elements, interventions are deliberate actions for which the intervening party claims to have legitimating reasons.¹⁴

A similar connotation of “intervention” can be found in the field of political science and international affairs. For example, Gelot and Söderbaum define intervention as “the carrying out of organised and systematic activities across recognised boundaries or borders, by one actor or a group of actors, with the goal of affecting the structures of political authority or an identifiable ‘problem’ in a target society” (2012: 136). Their definition embraces the generic understanding of intervention as *externally* initiated and *intentional*, but places more emphasis on its involving *interference and intrusion*. The authors remark crucially that

an intervention is necessarily linked to the notion of “intention” since the shared perspective behind all types of intervention is a desire to bring about change. The notion of intention is built on the idea that . . . entities can be steered, guided,

¹⁴ Note that being legitimated in this sense is not the same as being legitimate. Interventions are typically legitimated by the intervening party even if they are painfully illegitimate in the eyes of many.

managed and corrected. According to this view of the . . . world, it is possible to manage/correct a local problem with an externally initiated solution. (137)

Specifying the features of intervention also allows us to recognize interventionism as a distinct position that relates to a target domain primarily through interventions. The -ism behind “intervention” indicates interventions are not merely occasional occurrences, but take center stage in structuring relations to a target domain. In interventionism, deliberate action constitutes the dominant form of relating to a target domain, the power to intervene is embraced, and interventions are discursively legitimated. From these features follows a crucial additional core feature of interventionism, in contrast to individual instances of intervention: the establishment of a hierarchical relation. In individual acts of intervention, hierarchy is situational and does not imply a hierarchically structured relationship in general. For example, intervening with an addicted friend does not require a hierarchical interpersonal relation as interventions may very much go in both directions in a mutually respectful and non-hierarchical friendship. In contrast, interventionism regarding a friend would imply a relation that is primarily structured by deliberate action that aims to change behavior while assuming both power and legitimacy. In this sense, interventionism constitutes a hierarchical relation that is not expressed in an individual act of intervention but may be reflected in relating to an addicted friend who is assumed to be “so far gone” that their own agency vanishes to the background.

Returning our attention to the gene drive case helps us to connect intervention, interventionism, and anthropocene technology. When it comes to intervention, we can see how proposed gene drive applications fit our definition. The main proposed uses of gene drives are in health, agriculture, and conservation, where they are considered attractive for their potential to address a number of tenacious problems: vector-borne diseases, e.g., malaria, dengue, and Lyme disease; agricultural pests; and the disruptive effects on local biodiversity and ecological stability of invasive species (NASEM 2016). These problems are tenacious because they involve populations that have thus far proven difficult to bring under human control. The proposed applications of gene drives are interventions: they are externally initiated cases of organized, intentional action, based on a specific goal to alter the intervened-upon entity (both the target organism and the wider (socio)ecological problem-context) to a preferred state to address a certain problem, and thus based on an assumption of the steerability, guidability, manageability, and correctability of these entities, for which strong legitimating reasons are provided.

But there is more to be said about the kind of intervention gene drives would involve. We have seen above how, in moving away from more commonsensical notions, intervention attained a stronger normative charge in the definition of Gelot and Söderbaum (2012), who emphasize the intrusive and interfering character of intervention. Given their international politics outlook, this conception makes sense: from the perspective of the recipient country, intervention by a foreign power generally will be perceived as intrusive and interfering. The anthropocene

technology concept conveys a similar concern for intrusiveness, but now at the level of nature and natural processes. This is important because, in moving away from our initial examples of interventions—friendly, surgical, economic, political—to the case of gene drives, we also have moved from human-human interventions to human-nature interventions. For interventions of the latter kind it becomes much more difficult to suggest that some interventions are intrusive whereas others are not, seeing how natural entities, phenomena, and processes cannot give to the intervener the permission to intervene and have their own lives and movements, independent of human beings. Moreover, and closely related, it is much more difficult to conceive of a human-nature intervention such as a gene drive application as being part of a mutually respectful and nonhierarchical relation, modelled on the idea of a friendship.

However, what both the anthropocene technology concept and the transition from particular intervention to interventionism underline is that to evaluate a specific gene drive intervention in its full relevance, we need to understand it in light of wider practices and discourses of interventionism. The concepts of intervention and interventionism provide interpretative tools for the anthropocene as they allow to differentiate ways of relating to nature and earth systems and processes. Interventions constitute one of many ways in which humans relate to nature and earth systems and processes, and are ubiquitous in areas such as climate and environmental policy. Interventionism on the other hand constitutes a particular position in which human intervention becomes the primary way of relating to nature and earth systems and processes by embracing the power of human intervention through technologies as well as their legitimacy in the light of environmental and social crises.

Crucially for our account, interventionism adds a dimension to our understanding of nature and the human-nature distinction. In addition to the empirical/physical and ontological/metaphysical conceptions of nature and human-nature distinction we identified as central to the anthropocene-as-end-of-nature thesis, there is nature as that which is part of an interventionist relation. We could say that in each intervention of humans into nature, a particular human-nature distinction is present. Interventionism then lifts the situational characteristics of such individual interventions to a structural level. In a culture of interventionism, a hierarchical human-nature relation is constituted by being continuously performed through specific interventionist actions and through the wider legitimating discourse supporting it. In their ontological and normative orientation, interventions and interventionism particularly rest on a view of the world wherein entities can be steered, guided, managed and corrected, wherein it is possible to manage or correct a local problem with an externally initiated solution, and wherein it is appropriate to do so. Consequently, in interventionism, a particular human-nature distinction is constituted.

In the anthropocene debate, interventionism finds its clearest and most radical expression in the position found in ecomodernism, which embraces the idea of earth being “remade by human hands” through technologies. In referencing

Emma Marris¹⁵ and Paul Crutzen¹⁶ as representing the call for a thoroughly interventionist future, Preston (2017) is also foregrounding ecomodernism in his account of anthropocene technology. Ecomodernism finds its clearest voice in the *Ecomodernist Manifesto* (Asafu-Adjaye et al. 2015) and its steadiest home in the US-based Breakthrough Institute. The Breakthrough Institute defines itself as “a global research center that identifies and promotes technological solutions to environmental and human development challenges” (Breakthrough Institute n.d.) and its history as commencing—quite meaningfully—with founders Shellenberger and Nordhaus’s (2004) essay *The Death of Environmentalism*. For the purposes of this article, the main point is that there is a key position found in ecomodernism that connects a particular kind of fundamental ontological claim or set of claims to a particular kind of normative call for action. That is, it connects (a) the ontological thesis of the end of nature *as a result of* past human interventions with (b) the normative call to action to intervene wisely and well. Some ecomodernists are relatively modest in making this connection, others go much further in suggesting we can and should do better than nature or evolution.¹⁷ Moreover, there are those within the ecomodernist camp whose proposals have the explicit aim to *save* nature (and thus do not necessarily rely on the end-of-nature thesis), such as those of the Half-Earth Movement (Wilson 2016). But the crucial point here is that the aforementioned ecomodernist anthropocene position does two things: it considers the end of nature to be a historical occurrence caused by past human intervention; and it moves from this end-of-nature thesis to a call for interventionism (Baskin 2015; Bonneuil 2015).¹⁸ In this ecomodernist position, we recognize a strong version of a *performative* understanding of the anthropocene concept:¹⁹ because we live on a fully humanized planet already, as a result of past and present human interventions, and because we have crossed a threshold in this regard, the only responsible course of action is to intervene consciously, to be that dominant presence in the most deliberate manner. It is this performative understanding that provokes Preston’s aforementioned concern with the prospective anthropocene as a thoroughly interventionist future.

¹⁵ Science writer best known for her popular and oft-referenced 2011 book *Rambunctious Garden: Saving Nature in a Post-Wild World*. While I support her ontological project of taking “nature” out of the “untouched by humans” realm and admire her call to learn how to recognize nature in many more places and features than “pristine wilderness,” she shares with many in the post-nature/post-wild camp—a camp with many overlaps in the anthropocene debate—the tendency to move too quickly from a “post-wild understanding of nature” to an endorsement of interventionism.

¹⁶ The atmospheric chemist famous for the introduction of the anthropocene concept, and infamous for one of the most unambiguous and disconcerting moves from “human influence on the planet” to “Nature is us,” and from there to suggesting the unavoidability of the interventionism of geoengineering.

¹⁷ Mark Lynas being a prime example from among the authors of the *Ecomodernist Manifesto*, author of *The God Species* (Lynas 2011)—the God Species referring to humans.

¹⁸ Both authors provide illuminating discussions of the debate about the anthropocene and its discourse or narratives.

¹⁹ Which is one of the prime reasons why scholars object to the concept.

If we follow our typology of intervention and interventionism, we recognize how the relation and therefore distinction between human-as-intervener and nature-as-intervened-upon is deeply built into the interventionist program of ecomodernism. As we saw earlier, the notion of intervention conceptually rests on a model of the world, or at least of the specific intervention situation at hand, wherein the parties or entities involved, the intervener and the intervened-upon, are held to be distinguishable. To conceive of an intervention, we need to conceive of some kind of boundary between the two, crossed in the execution of the intervention. To recognize the interventionism of ecomodernism, to talk about it intelligibly and to consider it in moral terms, we need a human-nature distinction to guide our perception. But does not this present us with a major challenge for interpreting the anthropocene, as this is the very distinction the anthropocene is said to dissolve? To address this challenge, I suggest we look to Val Plumwood's account of dualism.

3. OVERCOMING DUALISM: RECOGNIZING BOTH CONTINUITY AND INDEPENDENCE

Challenges to interventionism can be derived from a heterogeneous body of literature that engages critically with modernity and its relations to nature from anthropological, constructivist, feminist, indigenous, postcolonial, and poststructuralist perspectives—the scholarship critical of Western metaphysics we already encountered. Rather than reviewing this complex intellectual landscape, I focus on Val Plumwood's ecofeminist antidualism as a resource for critical engagement with interventionism and for the formulation of a positive alternative.

The central problem that Plumwood (1993) addresses is the cultural practice of defining a radically different and subordinate other in relation to the self, with the various self-other relations constituting a conglomerate of mutually implying radical distinctions. Plumwood defines this practice as *dualism*, and considers it to be the essential problem of Western culture. Plumwood's antidualism provides three key insights for our account. First, dualism can be distinguished from difference more generally if we take dualism to take advantage of existing differences by transforming them into representations of a *radical* and *inferior* other. Second, dualism defines both self and other in relation to each other, and because this is done on the basis of radical separation, both inevitably wind up with impoverished identities. Third, and most importantly, not only is difference something distinct from dualism, denying difference is indeed antithetical to antidualism—overcoming dualism therefore means *recognizing both continuity and independence*. These three insights are further explained and investigated for their implications in the remainder of this section and in the next.

Plumwood (1993) considers the following five features as characteristic of a dualism: (i) denial of dependency on the other (or backgrounding); (ii) radical exclusion of the other (or hyperseparation of self and other); (iii) a negative relational definition of the other (or incorporation); (iv) objectification/instrumentalization of the other; and (v) homogenization of the other (or stereotyping). Of these five,

the first two deny dependency on the other, whereas the final three deny the independence of the other; all five characteristics represent a denial of the way the world is composed and works in actuality. In this emphasis on dualism's denying both dependence *and* independence we recognize the key conceptual contribution Plumwood provides for our consideration of interventionism and the end-of-nature thesis, which can be further glanced from the following passage:

Dualism . . . imposes a conceptual framework which polarises and splits apart into two orders of being what can be conceptualised and treated in more integrated and unified ways. But dualism should not be seen as *creating* difference where none exists. Rather it tends to capitalise on existing patterns of difference, rendering these in ways which ground hierarchy. . . . The features of dualism also provide bases for various kinds of centredness, the rendering of the world in terms of the views and interests of the upperside, the centre. (Plumwood 1993: 55)

Dualism is an *alienated* form of differentiation for Plumwood; it renders one side of a distinction superior to or dominant over the other. This understanding of dualism explains why, according to Plumwood, we cannot and should not rely on simple reversal or simple equating of the sides of the dualism to overcome it.²⁰ Equating the other to the self—the “merger strategy”—means denying difference and equating the other to a very impoverished identity; an identity that was, after all, defined to *exclude* all the features that the other was held to essentially possess. The “merger strategy is neither necessary nor desirable, because while dualism makes difference the vehicle for hierarchy, it usually does so by distorting difference. The attempt to eliminate distinction along with dualism is misconceived on both political and philosophical counts” (59). Conversely, reversal of the hierarchy entails (implicitly) acceding to the logic of dualism: you object not to hierarchization itself, but only to the particular way it turned out: you would be willing to accept hierarchy if the “right” side was on top.

For Plumwood, overcoming dualism therefore requires the recognition of a complex, interacting pattern of both continuity and difference—of the other as neither alien/discontinuous to the self, nor assimilated to/an extension of the self.²¹ Such recognition then allows for an *appropriate relationship of non-hierarchical difference*. Regarding the human-nature relation, in such a nonhierarchical view of relevant difference we would recognize our *dependency* on nature; affirm *continuity* with nature and reconceive humans and nature in more integrated ways; review the

²⁰ Plumwood (1993) devotes extensive attention to this topic in her book, specifically in terms of the history of feminism. Writing about the “traps and mazes of the escape routes,” she explains why the “feminism of uncritical equality” and the “feminism of simple reversal” reflect “two common problems in the formation of post-colonized identity: denial of difference [in the case of the former] and reversal syndrome [in the case of the latter]” (60). Couched in this language, Plumwood’s position is “there is ultimately no viable alternative to a creative and affirmative reconstruction of post-colonised identity. Affirmation is essential to counter the logic of the master subject” (63).

²¹ “Escaping the logic of colonisation thus requires a dialectical movement to recognise both the relationship and continuity denied by backgrounding and radical exclusion, and also to affirm the difference and independence of the other denied by incorporation and the definition of the other in relation to the self as lack and as instrument” (Plumwood 1993: 66–67).

identities of both humans and nature, rediscovering *positive independent sources of identity* for nature; recognize and respect nature as an *independent center of ends and needs*; and recognize the *complexity and diversity* of nature. We would recognize all these things *together*—for failing to do so would lead to misrecognition of the natural world and our place in it.

4. RECOGNIZING INTERVENTIONISM

With the concepts of anthropocene technology, interventionism, and antidualism in hand, we can now return to the initial problem of the anthropocene-as-end-of-nature thesis and its apparent similarity to critical perspectives on the human-nature opposition. I tease out this problem into three components: 1) why what I identified as the ecomodernist position is so disconcerting in light of the three concepts; 2) why this makes the anthropocene-as-end-of-nature thesis disconcerting in general; and 3) what the account means for our consideration of science and technology in the anthropocene. I illustrate these points by returning for a final time to the gene drive case.

The aforementioned ecomodernist anthropocene position relies on an interventionism that assumes hierarchical relations between humans and nature while, at the same time, claiming to overcome the human-nature distinction. From the vantage point of antidualism, such a perspective fails to respect and acknowledge the independency of the other. By appealing to a dissolution of the human-nature distinction to ground its program of action, ecomodernism contains within itself the effacement of the grounds for recognizing what its call for action is all about, i.e., the effacement of the human-nature distinction, the distinction between the intervener and the intervened-in or -upon.

However, crucially, this source of effacement does not belong to the ecomodernists alone—it is resounded in the anthropocene debate more generally, *also by authors who reject ecomodernist interventionism*, such as Hamilton (2017) and Latour (2017) (who will be mainly focused on here). They share a version of the core ontological thesis that the anthropocene marks the end of nature, and Plumwood's antidualism therefore clarifies what aches in the discourse about the anthropocene more generally, which we saw in the introduction and section 1. Firstly, some central voices mainly emphasize a newfound dependency of nature or earth on humans in the anthropocene, instead of an affirmation of the opposite (e.g., Crutzen and Schwägerl 2011).²² Secondly, in attempts at rethinking human-nature relations, the human of modernity is often left intact (Baskin 2015),²³ and while ample attention is given to discovering the earth as a complex center of needs

²² One of the most-cited examples of this newfound dependency on humans is the following from Paul Crutzen, who was introduced earlier in the article: "The long-held barriers between nature and culture are breaking down. It's no longer us against "Nature." Instead, it's we who decide what nature is and what it will be. . . . Remember, in this new era, nature is us" (Crutzen and Schwägerl 2011).

²³ Baskin refers to this tendency in the debate as follows: "Humanity is made one with modern Enlightenment man, the man for whom 'progress,' 'growth' and 'development' are the dominant goals" (2015: 16).

and as necessitating new stories to capture this identity (e.g., Chakrabarty 2009; Clark 2011; Ellis 2015; Haff 2014; Haraway 2016; Latour 2017; Morton 2013), there is a tendency to frame the earth's rediscovered identity in negative terms, as a threat (from Mother Earth to Vindictive Gaia) (Hamilton 2015; 2017)²⁴ and as one that is fundamentally human-caused or -dependent (as illustrated by Hamilton's (2017) view cited in section 1).²⁵ Finally, while the feature of continuity between humans and earth is recurrently underlined, there is a tendency to view the false choice of radical separation as only recently becoming false, as a consequence of the anthropocene (e.g., *ibid.*—this is the core issue with the end-of-nature thesis we have been exploring).

Dualism is “a process in which power forms identity, one which distorts both sides of what it splits apart” (Plumwood 1993: 32). Hamilton's claim that “now, in the Anthropocene, the fate of the Earth has become entwined with the fate of humans” (2017: 52) makes for an interesting reflection on this point. When we think about the human-nature relation, and now the human-earth relation, how we conceive of “sides of what it splits apart” is quite telling. In the case of the human-nature relation, the problem is much more fundamental than “splitting apart two halves of a whole.” For in case of the human-nature relation, the problem is precisely that humans began to consider themselves as something about which the statement “we are one side of the whole” would make sense to begin with. Humans are arguably not one side of the human-nature whole: that which they began to conceive of as the other side—nature—is *the whole*.

According to Plumwood, the concept of “the human” is problematic itself as it has been constructed in the framework of exclusion, denial, and denigration of the natural sphere.²⁶ The main problematic area of “the human” is thus the relation of humans to nature. In rethinking their relation, we therefore cannot just redefine one side of the dualism. What this means for our purposes is that it is problematic to leave the human of modernity intact on one side of the human-nature distinction

²⁴ Hamilton invokes Isabelle Stengers and Bruno Latour to convey this point: “Yes, the Earth still demands our respect, but it is a respect founded on trepidation rather than love [as Stengers suggests]. It is prudent, as Bruno Latour reminds us, to regard Gaia not as the all-loving, all-nurturing Mother Earth of the romantics but more like the half-crazed, bloodthirsty and vindictive goddess of the original Greek tales” (Hamilton 2015: 40). He further explains the origin of such metaphoricity in the work of Earth System Scientists and supports the position in his own terms:

Our understanding of the Earth we inhabit is undergoing a radical change. The modern ideas of the Earth as the environment in which humans make their home, or as a knowable collection of ecosystems more or less disturbed by humans, is being replaced by the conception of an inscrutable and unpredictable entity with a violent history and volatile “mood swings.” Earth System scientists have reached for rough metaphors to capture this new idea—images of “the wakened giant” and “the ornery beast,” of Gaia “fighting back” and seeking “revenge,” a world of “angry summers” and “death spirals.” . . . Now, when Mother Earth opens her arms it is not to embrace but to crush us.” (Hamilton 2017: 47–48)

²⁵ “1945 may be thought of as the boundary that marks a break in Earth history of the greatest profundity; it divides the life span of Earth into two halves ontologically. In other words, the being-nature of the object itself has changed” (Hamilton 2017: 7).

²⁶ And the exclusion, denial, and denigration of the feminine sphere and the sphere associated with subsistence, which for Plumwood are mutually constitutive in the broader framework of dualism.

and to only change the “nature” side, particularly when “nature” is held to have changed through the actions of “the human” of that previous dualistic conception.

One of the central (and most conceptually valuable) features of the anthropocene debate is the idea that the event undeniably urges us to recognize “earth” as complex and a source of needs in itself, and thus the importance of finding new narratives to give voice to this identity. However, the aforementioned tendency to frame the “rediscovered identity” of the earth in negative terms and as fundamentally human-dependent renders debatable the extent to which the ends and needs of the earth are understood as independent of humans and to be respected beyond an interest in human self-preservation. Furthermore, while emphasis is placed on the earth being more complex than we thought, the anthropocene debate tends to replace “nature” by “earth,”²⁷ whereby the latter risks being even more of a reduction of diversity than the modern view of nature—from complex, diverse nature to the third rock from the sun. The idea of interventionism as presupposing a passive, manipulable other points to the importance of seeing nature and earth as active. In this regard, the anthropocene debate makes an important contribution in the image of a volatile earth,²⁸ and the end of “vessel earth.”²⁹ However, the precise form in which this contribution is made by some can be rejected on antidualist grounds: first, the implication that whereas the earth used to be stable, it is now volatile, and secondly the implication that this means we should change our metaphor for earth from loving, kind mother to fearmongering, erratic, crazy woman.³⁰

Most importantly, the apparent human-nature antidualism found in the anthropocene debate turns out to be of a particular kind. It assigns to human agency the role of having caused the end of the dualism.³¹ It is more an “end-of-dualism” than an antidualism, based on a particular kind of temporal reasoning—from present and recent past to future, instead of from present to past, and from there to the future. That is, whereas the end-of-dualism in the anthropocene debate views the end-of-nature as an actual occurrence in time, which recently happened, and

²⁷ As pointed out in section 1.

²⁸ “Our understanding of the Earth we inhabit is undergoing a radical change. The modern ideas of the Earth as the environment in which humans make their home, or as a knowable collection of ecosystems more or less disturbed by humans, is being replaced by the conception of an inscrutable and unpredictable entity with a violent history and volatile ‘mood swings’” (Hamilton 2017: 47).

²⁹ Here, we see the importance of Gaia-theory and particularly Lovelock’s contributions to it for the contemporary anthropocene debate—an influence that works via Earth System Science, which is indebted to its thinking—that we find prominently in Latour 2017 and Hamilton 2017. Lovelock challenged the metaphor of “spaceship Earth,” or the Earth as a vessel, that was in vogue in the 1970s—drifting through space, managed by humans, a machine on which for humans to live.

³⁰ See footnote 24.

³¹ This is, in a general sense, the tendency of the “postnaturalism” recognized as dominant in the anthropocene debate by Baskin (2015) that we saw in section 1. However, Hamilton (2017) and Latour (2017) both can be seen to commit to such a view as well—Hamilton explicitly (see again the citation in footnote 25), Latour much more ambiguously. Of course, Latour (1993) for a long time has been claiming that *we have never been modern* (see also footnote 8), but in his more recent work on the anthropocene and Gaia (2017) he does embrace the sensibility that the anthropocene forms a radical break and Gaia is a new phenomenon, and that this break has been caused by past anthropogenic influence.

which has inaugurated a new reality, antimodernist antidualism views the “nature” of the end-of-nature thesis as *never having existed*, as ontologically mistaken and moreover morally problematic, and our understanding of this as the starting point for rethinking human-nature relations.

There is a world of difference between antidualism and end-of-dualism. To suggest the human-nature distinction has been dissolved because of past human intervention is *not* to hold a nondualist understanding of that distinction. In fact, it suggests the distinction actually existed up to the point of the mixing (the anthropocene moment), after which the two realms are no longer “pure.” Furthermore, to suggest, on the basis of the claim of the recent dissolution of the distinction, a thoroughly interventionist future—for if there is no external nature, why bother respecting it?—is dualist in disguise: while the outward ontology expresses the end of a (hyper)separation, the program of action constitutes a strong form of hierarchization and concomitant human-nature distinction.

From the critical perspective on the presumed end-of-nature emerges a positive challenge of rethinking human-nature relationships in non-hierarchical and nondualist ways that recognize both difference and interconnectedness. Generic claims of the “end of the human-nature distinction” mask the various forms the human-nature distinction can take and the different ways it can underlie or be entangled with views on how to act with or into the nonhuman world, and therefore risk obscuring both critical and constructive projects in the anthropocene debate. First, it risks to obscure interventionism as a position that does not actually dissolve the human-nature distinction but positions humans in a hierarchical relation to nature through generalized appeals to legitimated human action through technologies. The human-nature distinction is in fact at the very center of anthropocene politics that expands the agency and power of the former at the expense of the latter through the logic of interventionism. A focus on interventionism and anthropocene technology allows us—and urges us—to consider science and technology beyond their “actual immediate impact” to include surrounding mentality, legitimation and ontological assumptions about self and other. Second, it also constitutes a challenge for the formulation of any positive program in the anthropocene debate that aims to reimagine human relations to earth systems and processes beyond hierarchy between humans as intervening subjects and nature as a passive object that is intervened upon. An antidualist framework that conserves the human-nature distinction helps us in our ability to relate critically to contemporary science and technology in the anthropocene.

Returning to the gene drive case for one last time serves to illustrate this. One of the key findings from my ethnographic engagement with bioengineers working on gene drives were the recurring hints of a postmodern gloss underlying their views. This outlook relates crucially to their bioengineering background: if you view things from the perspective of engineering, you will in all likelihood see what connects instead of what divides the different substances and forms you work with and create. In the bioengineer’s ontology as I encountered it, the barri-

ers are knocked down: a tool is a tool, a system is a system, a building block is a building block, and natural vs. human-made thus becomes a moot distinction. The bioengineer's approach to the elements of biology, from ecosystems to mammals, viruses, bacteria, cells, proteins, DNA, to molecules, is one of engineering indeed, of constructing systems, of manipulating matter. For the director of one of the studied research groups, evolution is something bigger than natural evolution and refers to informational patterns more generally. Hence, in his ontological outlook, the boundary between "nature" and "culture" is irrelevant, perhaps non-existent even. For the director of the second studied research group, the concept of genetically modified organisms as some kind of (morally) special category is nonsensical: all living things, including humans, are genetically modified organisms, and at the level of the A's, C's, G's and T's of the genome, there is no normative distinction discernible between those changes nature would accidentally undergo itself and those deliberately made by human beings.

While a non-dualist ontology is considered intellectually and normatively *avant garde*, we should thus note that hints of a similar ontological position are involved in worldviews underlying contemporary biotechnology development. The attempt at radically separating the realms of nature and culture—the acknowledged domains of reality under modernity—is for Latour the essence of modernity. But in today's anthropocene world, we find a particular version of modernity where explicit assimilation³² is the key feature.³³ This is a modernity that understands the world as ontologically flat and boundaryless, but still puts humans above everything else morally. In Plumwood's terms: continuity is acknowledged, but independence is denied, and the relation is still hierarchical. The paradox of contemporary anthropocene modernity is perhaps that acknowledgement of an ontology of continuity turns out to be only part of what is needed to reflect on and deal with the anthropocene, and by itself does not lead us away from the hierarchical human-nature relations that characterized the modern mode of being.

In light of this, the core question becomes: what is it, exactly, that legitimates seeing distinction more than connection? The answer involves at least two aspects, and here we return full circle: it would involve acknowledgement of the human-nature distinction as both ontologically and morally meaningful; and it would involve a perspective that does not look at *what* is worked upon only (actually written code vs. what we choose to call "the code of life"), but also at the working upon itself—the engineering, the intervening—and the mentalities and worldviews underlying it.

³² Latour's (1993) concept here is hybridization, but to avoid conceptual confusion we have adopted a concept used by Plumwood (1993) instead. Concerning the previous sentence, Latour's term for "radically separating" is *purification*. The point I make here is thus that what is currently going on is not hybridization under the radar of purification, as Latour suggests, but a kind of purification under the radar of hybridization.

³³ A comparable point is made by Bonneuil (2015: 26) when he refers to the "post-nature narrative" of the ecomodernists as "the new spirit of modernity, based on a hybridist, relational and connectionist ontology rather than a substantial one."

The intelligibility and accuracy of the claims that gene drives would intervene deeply into evolution, bring human design deeply into the process of evolution, or replace the natural process of evolution by a human-directed one are of course up for discussion. But part of the point here is if one descends deeply enough, one will always find a way to out-reason meaningful distinctions, ontological but particularly moral ones. This is where the metaphysical and empirical notions of nature find each other, and feed into the recognition of interventionism. There is value in imagining nature as other, as external, as something we can relate to once we leave the lab and enter the real world—despite knowing this distinction is only half of the story (the other half being fundamental interdependency and continuity with that other). Regardless of how one looks upon today's technoscience—of which bioengineering forms but one, though highly revealing, exponent—there are reasons for considering what happens “in the lab” as part of the pre-intervention state, and crossing the laboratory's wall as the crossing of the boundary into the domain of morality.

However, interventionism is importantly inherent to the bioengineer's work prior to crossing that wall. While the concept of interventionism may bias our imagination towards the most easily apparent forms of intervention—such as the deliberate modification of the climate or the active continuous management of a forest—interventionism is not scalarly determined in this particular respect: while scale certainly matters for what makes interventionism into a structural or even cultural phenomenon, in terms of its *point of application* interventionism is indiscriminatory. It follows that it would be a mistake to view gene drives as only becoming salient for a consideration of interventionism once they “leave the laboratory,” once they actually become applied to “real-world” problems. Interventionism begins in the lab already.

To suggest that in a circumscribed consideration of a specific gene drive application we would not be able to say anything about its interventionism is mistaken. What a focus on interventionism and anthropocene technology allows us to do, is to consider specific scientific and technological applications beyond their “actual immediate impact,” to include both the intrusiveness or depth of their intervention as well as the surrounding mentality, legitimation, and ontological assumptions about applier and applied-to, intervener and intervened-upon. Therefore, the wider culture of interventionism in which a particular technological intervention emerges can be recognized in these dimensions more specific to the particular intervention.

5. CONCLUSION AND DISCUSSION

I have tried to show in this article that what is particularly troubling about the anthropocene debate is a particular kind of end-of-nature thesis that is similar to that of ecomodernists, who base their interventionist proposals on it, and that this should have us question the eagerness with which the anthropocene-as-end-of-nature thesis has been embraced by contributors to this debate.

The anthropocene is often viewed as inaugurating the end of the human-nature distinction. This view appears to be put forward by authors such as Latour and Hamilton in an attempt to convey something profound and emancipatory: that the Western view of humans and nature as distinct ontological and moral realms is false. In this sense, the anthropocene debate mirrors various other debates—many of them more long-standing than the current anthropocene debate—criticizing the Western separation of humans and nature. The key concern is that the debate about the anthropocene is taking a certain turn here, a turn which on the surface appears to be something which it on closer inspection turns out not to entail at all.

The anthropocene debate is marked by a particular take on the dissolution of the human-nature opposition. The end-of-nature thesis and its surrounding discourse thereby obscure interventionism as the driving ideology of the anthropocene. In terms of Latour's two purified ontological realms, it is the pure human solution's dripping into the beaker of pure nature solution that has resulted in the latter's impurity. It is thus no longer the sensibility of "humans are part of nature" guiding us, but some kind of strange opposite: nature is human (as in Crutzen's now (in)famous statement that "nature is us"). And what deserves our closest attention is that the claim "from now on it is we who decide what nature is" is based on *past intervention as legitimating future intervention*. It is this fundamental line of reasoning that underlies dominant currents in both the anthropocene debate and the ecomodernist anthropocene debate.

I have suggested we better grasp the above insights through an examination of the anthropocene technology concept, the concept of interventionism, and the antidualism of Plumwood. Anthropocene technologies make nature dependent on humans but background nature as independent. This unidirectional account of dependency and continuity becomes stabilized in the interventionist position that fails to provide recognition of nature or earth having its own story and needs. This in turn leads to a failure to recognize their complexity and diversity. A focus on interventionism and anthropocene technology allows us—and arguably demands us—to consider science and technology beyond their "actual immediate impact" to include surrounding mentality, legitimation, and ontological assumptions about self and other. As the concept of anthropocene technology showed us, the context of a particular technology is not limited to the problem it aims to solve or the situation of its development; on the contrary, this context is defined by the wider range of anthropocene technologies and the wider culture of interventionism of which it forms a part. And putting interventionism center stage helps us to realize that although we always affect and influence, we do not always intervene.

While this article has aimed to nuance the "or so it seems" that it starts out with—the apparent similarity in ontological position between anthropocene and wider scholarship critical of modern ontology—it does not take away the concern through conceptual clarification entirely. After clarification, it turns out an overemphasis on the distinction between humans and nature as the root of the problems of the West masks the various forms this distinction can take and the different ways it

can underlie or be entangled with views on how to act with or into the nonhuman world. The proclaimed end-of-nature obscures that recognition of mutual dependency and interrelatedness still requires distinctions regarding who is dependent on and related with whom.

From this critical perspective on the presumed end-of-nature emerges a positive challenge of rethinking human-nature relationships in non-hierarchical and non-dualist ways that recognizes both difference and interconnectedness. The human-nature distinction may be necessary not only for recognizing interventionism but also for reimagining human-nature relations in non-dualistic and non-hierarchical terms. As Plumwood shows, it is possible to develop a critical non-dualist account that distinguishes between humans and nature without positioning them in opposition to each other. Such an outlook is crucial for our ability to critically reflect and considerately respond to the anthropocene in light of the role of science and technology and the meaning of interventionism in our culture's worldviews and practices.

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