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Encountering the "Anthropocene": Setting the Scene

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There are few concepts that have made such a rapid career as the "Anthropocene." Coined barely two decades ago by Paul J. Crutzen and Eugene Stoermer (2000), the Anthropocene has become one of the most influential, most cited, but also most controversial terms in environmental policy, theory, and practice. In global change research, where the concept was invented, the Anthropocene encapsulates the unprecedented changes to the earth's biosphere following the industrial revolution and the past sixty years of economic activity, consumption, and resource use (Steffen et al. 2004; Brondizio et al. 2016). In contrast to the past 12,000 years of relative climate stability – known to geologists as the Holocene – the Anthropocene symbolizes the profound and accelerating human transformations of the earth's climate and environment. Demonstrated changes in atmospheric composition, stratospheric ozone, the climate system, water and nitrogen cycles, marine ecosystems, land systems, tropical forests, and terrestrial biosphere are all taken as indications that modern civilization is altering the functioning of the earth system at a rapid speed (Steffen et al. 2011 and 2016). In the Anthropocene, we are told, humans are no longer spectators of a natural drama to which we have to adapt. The fundamental and irreversible human imprint on natural systems and processes has turned us into a geological agent and master of a world increasingly of our own making (Dalby 2014).

Despite the rapid elevation and uptake of the Anthropocene in scientific discourse, however, it remains an ambivalent and contested formulation that has given rise to a multitude of unexpected, and often uncomfortable, meetings and conversations. In geology, scholars are debating the stratigraphic evidence of the proposed "geology of mankind" (Lewis and Maslin 2015; Waters et al. 2016), with an international working group of the Subcommission on Quaternary Stratigraphy exploring whether the human signature in the earth's strata is significant enough to formalize the Anthropocene as a "material time-rock unit" within the geological time scale (Zalasiewicz et al. 2017). In the social sciences,

scholars have engaged in parallel debates over "the Anthropos" that propels this new social geology. Rather than accepting the scientific staging of the Anthropocene as the unintended outcome of a unified humanity – a planetary "We" – social theorists have highlighted the unequal geographies, political-economic relations, insecurities, and bodily labors that underpin the current era in planetary history (Malm and Hornborg 2014; Lövbrand et al. 2015; Moore 2016; Harrington and Shearing 2017). Across the humanities, philosophers have drawn upon the Anthropocene to further rethink the Western division between natural and human history (Chakrabarty 2009) and to imagine new ways of becoming "human" in connection with earth and its multiple ecologies (Gibson et al. 2015; Haraway 2016; Clark and Yusoff 2017). At a time when human societies are "irrevocably folded into the Earth's systems" (Dibley 2012: 143), the Anthropocene has become an urgent call to vitalize traditional concepts of ethics, care, and virtue (Rose et al. 2012).

How, then, can students of environmental politics contribute to these multiple and often contested Anthropocene encounters? Can we just carry on with politics as usual in view of the profound and possibly irreversible transformations of the earth's climate, oceans, terrestrial systems, and species? Or does the Anthropocene proposition prompt a reconsideration of the assumptions and practices upon which our scholarship rests? These questions are important motivations for this book. We note that the Anthropocene disrupts concepts central to the study of environmental politics, such as nature, environment, power, democracy, and justice. The rapid unmaking of nonhuman life-forms raises uncomfortable questions about the possibility of wild nature untainted by humans, the capacity of technology to fix the damage done, and the ability of our political institutions to govern the environments we make and give voice to those who suffer from the environments we destroy. Some have argued that our scholarship needs a new language and novel analytical categories to grapple with the world that we are continually remaking. Familiar concepts such as *nature* and *environment*, which have long served as building blocks for elaborated arguments, theories, discourses, and ideologies (Meadowcroft and Fiorini 2017: 3), now fail to capture the scale and complexity of earth system transformations (Biermann 2014; Galaz 2014) and the "social nature" that is turning upon us (Burke et al. 2016).

In this volume we take this challenge seriously by examining how established political categories and assumptions in green political thinking hold in view of the Anthropocene formulation. We refer to *green political thinking* neither as an ideological position (Dobson 1990) nor as a coherent theoretical project (Barry 1999). Instead, we ask what it means to "think green" at a time when nature no longer functions as a stable backdrop for political analysis or as a given source of moral instruction (Wapner 2013; Trachtenberg 2015). Our volume is not the first to

address the politics of the Anthropocene. Numerous publications have invited us to explore what this new epoch in planetary history means for political thinking and practice (e.g., Dalby 2009; Biermann 2014; Galaz 2014; Arias-Maldonado 2015; Purdy 2015; Nicholson and Jinnah 2016; Harrington and Shearing 2017; Hickmann et al. 2018; Arias-Maldonado and Trachtenberg forthcoming). In this expanding scholarship, disagreement prevails over the political potency and usefulness of the Anthropocene concept as such. While some welcome this new term as an invitation to rethink conventional philosophical and political categories (Wapner 2013; Clark and Yusoff 2017), others insist that it encapsulates everything that is wrong about contemporary environmentalism and planetary eco-managerialism (Lepori 2015; Luke 2015).

This book does not take sides in this debate, but pursues a different aim: to examine how the Anthropocene formulation has been encountered by environmental politics scholarship over the past fifteen years, and the various analytical struggles and confrontations that it has given rise to. Here, the word "encounter" does not only connote an unexpected meeting, but also combines elements of discovery, exchange, struggle, and even conflict (Walters 2012: 5). The core argument of the volume is that the Anthropocene has left profound traces in multiple political terrains and provoked unexpected, and often critical, conversations about some of the most pressing issues of our time. Where these conversations will lead us is too early to tell. The politics of the Anthropocene remain emergent, ambiguous, complex, and risky. It is at this uncomfortable juncture, however, filled with troubling contradictions, that we expect green political thinking to develop and thrive in the years to come.

Has Nature Really Ended? The Anthropocene in Science, Philosophy, and Literary Fiction

The Anthropocene is a term that has brought with it grand debates about what it means to inhabit a planet radically transformed by human activity. For many, it marks an existential moment for modern civilization and its promise of human emancipation from the shackles of nature (Dibley 2012; Tsing 2015; Hamilton 2017). Zalasiewicz et al. (2010: 2231) stage the Anthropocene as a new phase in planetary history when natural and human forces are so intertwined that the fate of one determines the fate of the other. It is a dangerous era, we are told, when humanity is undermining the planetary life-support systems upon which we depend (Steffen et al. 2004; Rockström et al. 2009). The proposition that our social, economic, and political processes now are woven into, and coevolve with, some of the great forces of nature is at once ambitious and ambiguous (Hamilton et al. 2015). On the one hand, it suggests that humans have turned into earth-shaping

agents with the power to "heat the planet and to cool it right down, to eliminate species and to engineer entirely new ones, to resculpt the terrestrial surface and to determine its biology" (Vince 2014: 6). On the other hand, it radically unsettles the epistemological and ontological ground upon which this human world-making project rests and invites humility in face of our dependence upon earth and its multiple ecological systems (Baskin 2015; Tsing 2015).

In this volume, several chapters engage with the challenging claim that wild and untainted "nature" is coming undone. In a time when late modern society is altering the biosphere and its environments at a rapid speed, many seem to agree that the grand separation between nature and society, inherited from the Enlightenment era, no longer holds. The entangled relationship between human and nonhuman worlds is fostering novel understandings of nature, humanity, and the earth.

The Anthropocene and the Earth System Sciences

The functioning of the earth is changing, and we as humans are the change-makers. This is the radical finding from the global change research community that paved the way for the formulation of the Anthropocene at the turn of the millennium. In an edited volume from 2004, leading representatives of the International Geosphere-Biosphere Programme conclude that "profound transformation of Earth's environment is now apparent, owing not to the great forces of nature or to extraterrestrial sources but to the numbers and activities of people" (Steffen et al. 2004: 2). In Chapter 2, Noel Castree illustrates how this grand claim is linked to developments within the earth system sciences during the past thirty years. The chapter lays out in great detail how this "science of integration" has affected ecological thinking and resulted in a radical reinterpretation of the relationship between humanity and nature. The "earth system," comprised of the tightly linked atmosphere, hydrosphere, biosphere, and lithosphere, is today no longer understood as external to human societies. The magnitude, spatial scale, and speed of human-induced change to the earth's biogeochemical processes and cycles have collapsed the modern distinction between nature and culture. This is what makes the Anthropocene proposition such an arresting one, suggests Castree. Nothing, it seems, is immune to human influence any more. Humans have entered the "engine room" of the earth system and are now drivers of the "planetary machinery" (Schellnhuber 1997; Steffen et al. 2004).

This recognition has profound ontological implications. Within the earth system sciences, Castree finds that the conception of nature as external – a totality beyond the realm of human influence – is increasingly outdated. Nature is a thing of the past, a trait of the Holocene against which "epochal change" is evaluated. In geology, efforts to assemble and assess geological signals in sediments of

human changes to the earth system are still ongoing, and it is too early to tell whether these signals (e.g., novel minerals and materials, geochemical signals reflecting industrial development, changing atmospheric composition) will persist throughout geologically significant time intervals (Zalasiewicz et al. 2017). Even so, notes Castree, geologists have now achieved sufficient scientific momentum that the possibility of the Holocene's end is considered a realistic one. Enter the Anthropocene – a post-natural world where humans have a dominant earth-shaping influence.

What should social scientists do with this daunting prospect brought to us by our scientific peers? Castree predicts that existing ideas about political actors, subjects, and institutions will be challenged in the years to come. The colossal ontological implications of nature's ending reset the compass for any attempt to understand "the political." However, he also cautions against a passive acceptance of the epochal claims of earth system science and insists that social scientists demystify the scientific facts that underpin the Anthropocene. Time has certainly come to "geologize" political thought and hereby engage more thoroughly with the material dynamics of our changing earth (Clark and Gunaratnam 2017). However, such engagement also requires that we "politicize" the unfolding social geology that results from our encounters with the Anthropocene.

The Material Philosophy of the Anthropocene

The proposition that nature has morphed into human environment has brought the environmental sciences and humanities together in interesting and unexpected ways. In Chapter 3, Manuel Arias-Maldonado explores at length the intersections and tensions between Anthropocene science and new materialist philosophy. While these bodies of scholarship share an interest in the Anthropocene, their entry points to this new geological era differ rather dramatically. Firmly grounded in the Enlightenment tradition, earth system science approaches global change as a mounting empirical demonstration of the damage done to the earth and its complex life-support systems. When Crutzen and Stoermer announced the "geology of mankind" in 2000, they could draw upon century-long scientific observations of human alterations to the global environment (Crutzen and Stoermer 2000). New materialist scholars, for their part, are also interested in the very materiality of our changing environment. However, embracing key insights from post-structuralism and social constructivism, they bring with them a view of the material world in which modern dualisms such as body/mind or nature/culture are transcended and part of a relational and ever-changing flux. Old passive nature, as described by the mechanistic tradition, is here replaced by lively and vibrant matter in constant transformation (Bennett 2010).

This view, notes Arias-Maldonado, drives new materialism to the controversial claim that agency is distributed across a vast range of entities and processes. In contrast to earth system science – which often is accused of cultivating the exceptional human powers that have brought about the Anthropocene in the first place (Baskin 2015) – new materialist philosophy ascribes generative powers and inventive capacities to a whole "political ecology of things" beyond human control (e.g., wind, rain, nonhuman species, technological artifacts) (Bennett 2010; Burke and Fishel, Chapter 5). By challenging the human subject as the center of all things, work in this field seeks to foster greater humility and responsibility towards the earth and its multiple life forms (Gibson et al. 2015). The Anthropocene is thus not the culmination of modern civilization or human rationality but a sign of our limited powers and inevitable embeddedness in the web of life.

While new materialists hereby depart from the anthropocentrism that informs Anthropocene science, Arias-Maldonado notes that both traditions converge in a hybrid ontology of nature-cultures (Arias-Maldonado 2015). In the Anthropocene, a neat separation between natural and human history is no longer possible or desirable. In place of this Cartesian dualism, a hybrid world is unfolding, where social and ecological processes are deeply entangled and interconnected. When earth system scientists and new materialists speak of "the end of nature," claims Arias-Maldonado, it is this hybrid ontology that they have in mind (Arias-Maldonado 2015). Despite the grandeur of the statement, it is a simple idea: nature can no longer be defined by its independence from human beings and society. This is an important ontological claim that challenges the social constructivist scholarship that has influenced environmental thinking in recent decades. It is not the cultural construction of nature but the ultimate materiality of it that signifies the Anthropocene, suggests Arias-Maldonado (Arias-Maldonado 2015). He thus foresees that a material version of constructivism will shape our thinking of environmental politics in the years to come. Such a tradition directs attention to the force of things/matter (e.g., animals, plants, minerals) in political life and opens up new possibilities for imagining the relationship between scientific and political practices (see Burke and Fishel, Chapter 5). At a time when nature and society are deeply entwined, a post-natural understanding of environmental politics and nature conservation is unfolding.

Anthropocene Traces in Literary Fiction

Contemporary stories of planetary transformation do not only circulate within the environmental sciences. In Chapter 4, Alexandra Nikoleris, Johannes Stripple, and Paul Tenngart encounter the Anthropocene through modern literary fiction. By engaging with the expanding field of climate fiction ("cli-fi"), they suggest,

we can better explore what led us to the Anthropocene, what it means to be here, and where we should go next. Fiction has the power to narrate everything that can go wrong, claim Nikoleris, Stripple, and Tenngart. Fiction can take effects to their extremes, whether it is an earth without insects or a spaceship on its path to certain death. By following particular persons in particular contexts, literature lets us experience the global implications of the Anthropocene through a situated specificity that is often not our own.

Following the eco-critical tradition in literature and cultural studies (Glotfelty and Fromm 1996), this chapter makes use of literary protagonists as inspirational examples to give planetary visions of global environmental change a "sense of place" and "an ethics of proximity" (Heise 2008). Through Robinson's *Science in the Capital*, for instance, Nikoleris, Stripple, and Tenngart give us a glimpse of how we may transcend an excessively "rational" modern society and enter into a world where spiritual and emotional connectivity guides our actions. The reader learns that doing something about climate change could be the starting point for a better society and new forms of humanity. The story tells us that no matter how well humans try to plan the evolution of socio-ecological relations, it is not desirable to be in total control. Rather than perfect planning, we need to rethink our relationship with the earth and its inhabitants, not as stewards but as cohabitants.

Many of the novels analyzed in this chapter reject both the idea of humans being outside nature and the notion that humans and nature are so intertwined that they are inseparable. Nature proceeds, prods back, reacts in unforeseen ways to what humans do, claim Nikoleris, Stripple, and Tenngart, showing that while humans might now be a geological force, it is far from being the only one. Several of the characters that we get to know in this chapter imagine and embrace a "zoopolis" that can sustain close interrelationships between humans and animals, new forms of connectivity, different social arrangements, and new forms of being political in a hybrid world. The political effects of this expanded Anthropocene imagination are, of course, difficult to trace. Narrating global environmental change through the lives of fictional individuals does not bring us closer to any direct political responses. As illustrated in this chapter, eco-critical accounts of the Anthropocene can, however, participate in the search for stories and images of an environmentalism that links global patterns of connectivity to local places, ecologies, and cultural practices (Heise 2008).

Anthropocene Politics: Revisiting Familiar Categories and Concepts

Many scholars have presented the Anthropocene as a turning point or rupture in the history of earth, life, and humans that demands we set accustomed understandings aside and develop original political thinking (Bonneuil and Fressoz 2015;

Hamilton 2017). In the second section of this volume, several authors respond to this invitation by revisiting established political concepts in view of their encounters with the Anthropocene. These chapters demonstrate that the hybridity, complexity, and nonlinearity of contemporary socio-ecological relations bring profound challenges to established conceptions of power (as conceived in International Relations) (Burke and Fishel, Chapter 5); political time (Galaz, Chapter 6); democracy (Mert, Chapter 7); and the eternal quest for global justice (Baskin, Chapter 8). While political theory may have been late in responding to the fundamental ontological reorientation postulated by the Anthropocene (Hamilton et al. 2015), these chapters demonstrate that green political scholars certainly have taken up the challenge.

Thing-Power in World Politics

In Anthropocene discussions, environmental change and globalization merge into one (Dalby 2009). The flows across boundaries of people, goods, fuel, and pollution create new forms and degrees of interdependence among formally sovereign countries, extending to areas beyond national jurisdiction, such as the high seas and Antarctica (Biermann 2014). As local actions become linked to social, economic, and political processes on transnational or even global scales, we also see growing problems of displacement, distancing, and disconnection between decision-makers and "environments," between perpetrators and victims, between consumers and producers (Christoff and Eckersley 2013: 11). New configurations of power are one major consequence, which stand at the center of Burke and Fishel's contribution (Chapter 5).

In a world where social and ecological systems are increasingly entangled, traditional conceptualizations of power are radically outdated, claim Burke and Fishel. The essentially and often purely anthropocentric theorization of power in world politics makes it almost impossible to see power as something that operates systemically, structurally, anonymously, and accidentally; as something that can bring about unintended effects and consequences; and as something that can also account for the impacts of nonhuman agency. In the Anthropocene, they argue, eventually nonanthropocentric power will resist anthropocentric power in its complexity, its nonintentionality, and its heterogeneity. Yet, a novel focus on the power of nonhuman agents, argue Burke and Fishel, leads also to profound consequences for political practice, and eventually for political ethics. A new focus on what they call "thing-system power" requires us to go beyond traditional bargaining among state governments and their diplomatic representatives. Instead, activism, resistance, and subversion are becoming equally important, as well as novel ways of representing nonhuman agents (animals, ecosystems, and so forth) in what Burke

and Fishel envision as "cross-national and ecosystem-centered deliberative democracy" (however this might concretely evolve in global political institutions and agreements).

Given their broad and far-reaching vision, Burke and Fishel remain inherently skeptical of the chances of reform within the context of existing intergovernmental treaties, agreements, and institutions, which grant – in their view – still too much freedom to states to control and exploit the ecosystems within their jurisdictions. A new theory of power, claim Burke and Fishel, is hence needed – along with a new practice of politics that becomes much more radical, subversive, and resistant than what most current organizations in civil society and social movements are known for. Burke and Fishel's vision can hence be seen as a radical interpretation of the consequence of our encounters with the Anthropocene – even though the concrete implications of this radical critique remain to be elaborated in future research.

Reconsidering Political Time

The Anthropocene creates novel interdependencies not only across space, but also across time. The notion of historic responsibility, central to the politics of climate change, has since the 1990s created ties of responsibility between present generations and the activities of their ancestors. The history of fossil fuel burning in Europe has, argue many developing countries, resulted in a climate debt that industrialized countries now should repay by extra mitigation efforts. As demonstrated in Victor Galaz's contribution to this book (Chapter 6), the Anthropocene also links current people with future generations over many centuries. Sea-level rise, for example, is expected within a time-range of a hundred years and more, necessitating planning horizons that exceed the lifetime of present generations. This "deep-time" horizon of the Anthropocene gives the democratic legitimacy of environmental policies an intergenerational dimension. What rights and responsibilities do present generations – and their representatives in parliament – owe to their unborn successors? Contemporary debates on climate engineering offer a case in point; that is, purposeful modifications of the earth system by means of, for instance, aerosol injections into the atmosphere (which would block parts of the sun's light and hence cool the planet), massive planting of fast-growing trees or crops to increase uptake of atmospheric carbon dioxide (combined with later sequestration and storage of the carbon), or direct capture of carbon from the air through massive deployment of air capturing devices. Whatever the merit of such technologies – none of which is yet sufficiently understood – all would only be employed at scale in the second half of this century, and they would need to be functional for many decades afterwards. In other words, the current discourse on climate engineering is nothing less than a debate on the type of large-scale

technologies that the next generations, inevitably, would need to employ in order to keep the climatic conditions sufficiently stable. This linking of past and future generations within current political decisions is one of the key characteristics of the Anthropocene condition. Current political systems – as well as the field of political science – are poorly equipped to deal with these novel challenges of politics in "deep time."

Victor Galaz (Chapter 6) adds another, equally fascinating element of the role of time in the Anthropocene: "ultra-speed." More and more of the key processes of modern societies are taken over by powerful computers, which operate at the speed of split seconds. Major transactions in global markets occur in just tiny fractions of a second, following complex algorithms that become every day more influential in shaping our lives. Warfare is computerized and follows reaction times of fractions of seconds. Major infrastructures in heavily urbanized spaces are equally functioning according to the algorithms of "ultra-speed." Again, political systems and political scientists still have to grapple with the new condition of "ultra-speed" decisions, which might be equally challenging to the "deep-time" context in which the Anthropocene places human societies and politics.

New Scalar Challenges for Democracy

The Anthropocene also poses novel and profound questions for democracy. This concerns, for one, democracy at the national level and the key functions of the state (Eckersley 2004). Novel complexities and uncertainties may grant a more prominent role to experts and technocrats, reducing the influence of citizens. The deep-time character of problems requires new types of democratic legitimacy for actions that affect future generations. Increasing needs of adaptation to earth system transformations could support authoritarian discourses, and the increasing reliance on private governance raises new questions about the democratic legitimacy and accountability of such new steering mechanisms. Not the least, the global character of the Anthropocene, with all its resulting interdependencies, erodes the steering capacities of governments. This has raised the question of whether the United Nations, built in its core around notions of sovereign equality of states and intergovernmental diplomacy, is still the appropriate model of global governance in the twenty-first century, in particular with a view to the Anthropocene challenges. Reform proposals abound, from the introduction of weighted majority voting to the establishment of a world parliamentarian assembly, or a global forum of civil society as a second chamber next to the United Nations General Assembly, or a global deliberative assembly (Biermann 2014, chapter 5).

This new reality is the starting point of Ayşem Mert's contribution in Chapter 7. The Anthropocene implies that new polities are emerging across the world which