Political Theory on Climate Change

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Abstract

This article focuses on discussions in political theory on climate change in the period 2005–2015, setting them in the context of broader discussions in political theory on the environment and ecology in the period 1990–2005. The themes of justice, politics, and expertise are used to organize the review. It is argued that discussions of justice and climate change could benefit from a richer connection to the literature on historical injustice; that in discussions of the politics of climate change, a comparative advantage of political theory lies in further development of the role of ethos and imagination in reshaping our understanding of the place of the status quo; and that more research into the relationship between expertise and democracy is needed. In conclusion, the idea of the Anthropocene is considered, with the need for further consideration of politics in specifying how humans are transforming the nature of the earth and atmosphere.

INTRODUCTION: DATES AND DISCIPLINES

As a baseline for assessing both the politics of reducing greenhouse gas emissions and the contribution of political theory on the subject of climate change, the year 1990 marks an important boundary—giving the present review a period of 25 years to survey. Much important work, of course, was done before 1990. In his contribution to the founding issue of the journal *Environmental Politics* in 1992, Goodin (1992b, p. 1) provocatively claimed that "green politics are old hat," already noting a shift to greater concern about "the carbon dioxide that [people] emit altering the global climate" (p. 2), on which see Bell (2013). Still, from roughly 1990 to 2005, climate change was only one topic in a wave of political theory publications on the environment that were oriented to a wider spectrum of concerns. The field was challenging anthropocentrism and debating the value and meaning of nature, pursuing environmental justice broadly conceived, and developing green political theories as alternatives to or variations on other approaches to the subject, such as socialism, anarchism, and feminism. The titles of some significant collections and monographs from this period illustrate the then-prevailing catholic approach to political theory and the environment or ecology (see sidebar, "Ecology"): *Green Political Thought* (Dobson 1990), *The Politics of Nature: Explorations in Green Political Theory* (Dobson & Lucardie 1993), *Green Political Theory* (Goodin 1992a), *Democracy and Green Political Thought: Sustainability, Rights and Citizenship* (Doherty & de Geus 1996), *Ecology and Democracy* (Mathews 1996), *Debating the Earth: An Environmental Politics Reader* (Dryzek & Schlosberg 1998), *Political Theory and Ecological Values* (Hayward 1998), *Political Theory and the Environment: A Reassessment* (Humphrey 2001).

"ECOLOGY"

"Ecology" is not an ancient Greek word. It is a neologism, coined originally in German as *oekologie*, from two Greek words: *oikos*, meaning household in a sense comprehending both the familial and the economic; and *logos*, meaning an argument or discourse, signifying here a body of knowledge or system of thought. *Oekologie* was introduced by the biologist Ernst Haeckel in 1866, whose reference to the "economy of nature" in explaining it indicates why he chose *oikos* to combine with *logos* rather than, say, *phusis* or "nature" (Hughes 1994, p. 4 with note 8, citing Haeckel 1866). In the terms of a recent commentator, Haeckel distinguished the *Umwelt*, the "surrounding outside world," from *Oekologie*, understood as "the body of knowledge concerning the economy of nature—the total relations of the animal to both its inorganic and organic environment, including in the broader sense all [of what Haeckel called its] 'conditions of existence'" (Thommen 2012, p. 6 with note 4, citing II.286 and I.8, respectively, of Haeckel's work).

Only in the last ten years (2005–2015) has climate change become a central focus for political theory. Indeed, in this decade, the previous broad concern in political theory with the issues of ecology, environment, and sustainability has tended to narrow and funnel overwhelmingly in the direction of climate change.[1] Comparing some edited volumes in this period to those in the prior 15 years, we find an exclusive focus on climate change in the titles of *Perspectives on Climate Change: Science, Economics, Politics, Ethics* (Sinnott-Armstrong & Howarth 2005), *Political Theory and Global Climate Change* (Vanderheiden 2008b), and a symposium on climate change in *Politics, Philosophy and Economics* (Christiano 2014). One feature of this shift has been relatively less attention to the value of nature in itself as the effects of climate change on human flourishing have become of increasingly immediate concern. I return to the question of nature and political theory below.

[1]There are of course exceptions, such as *The Green State: Rethinking Democracy and Sovereignty* (Eckersley 2004) and *Political Theory and the Ecological Challenge* (Dobson & Eckersley 2006).

In the two paragraphs above, I have chosen to mention only volumes and monographs whose titles make specific reference to political theory, or at least to politics. Yet political theory on climate change overlaps very significantly with other disciplines on the same subject. Indeed, even as the last decade has witnessed the shift in political theory from environmental concerns generally to climate change in particular, it has seen an even more dramatic boom in "climate ethics" as a field within moral philosophy—as demonstrated in two high-profile collections of papers, *Climate Ethics* (Gardiner et al. 2010) and *The Ethics of Global Climate Change* (Arnold 2011), and in a review essay by Hayward (2012). This is a notable shift. As recently as 2004, Gardiner (2004, p. 555) was able to assert that "[v]ery few moral philosophers have written on climate change"—a sentence that (due in part to his prodding) no one would utter today. Given these developments, it would not be sensible to attempt to trace or police rigid boundaries in the work on climate change between the fields of ethics and political theory. Concerns with justice and responsibility are deeply shared by moral philosophers and political theorists working on climate change. Their literatures on these topics are closely interwoven and draw in part on ideas that were developed long before 1990, such as the concern with future generations that was already galvanizing philosophers in the 1970s.

At the same time, the economics of climate change has also exploded as a subject of scholarship, coming into public view significantly with Stern's (2007) commissioned review of the economics of climate change and playing a more active and acknowledged role than political theory in the formation of the succession of Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Here the boundaries between disciplines are more noticeable, even though there are many common substantive concerns. Concerns with welfare, distribution, and discounting arise centrally for economists as well as political theorists (and ethicists) working on climate change. But the literatures intertwine only to some extent (as in Llavador et al. 2015), with many debates in each discipline remaining relatively siloed in the terms and approaches they use. Meanwhile, many political theorists have been discussing how the broad structure of political economy might have to adjust to cope with the challenge of climate change—sometimes in company with environmental economists who are outside the mainstream of their own discipline.

Finally, to consider political theory on climate change invites preliminary consideration of how the topic is faring in the larger discipline of political science. In a helpful review of this question, Keohane (2015) argues that, with honorable exceptions, climate change has not become a central focus in political science, by which he means the empirical subfields of that discipline. In international relations, for example, Keohane contrasts the dramatically greater attention given to the strategy of war compared with that given to climate negotiations and strategic interaction. He highlights the issues of public goods, incentives, and uncertainty as keys to a richer research program on climate change in political science. In the course of my discussion here, I endeavor to point out how a political theory perspective can likewise engage the issues of public goods, incentives, and uncertainty, and indeed enrich the political science approach to each. At the same time, I show that political theory has a richer repertoire of concerns that can also be fruitfully brought into play.

Given these connections, I focus this review on what is distinctive about political theory on climate change, but I also incorporate literature in related disciplines, especially climate ethics. I understand political theory as a discipline that intertwines normative and empirical concerns. It is a discipline interested in the full range of the constitution of political action, including the identities of individuals and groups, the social imaginaries that they both produce and are produced by, and the institutions that both shape and are shaped by these wider relationships. And it is a discipline in which all these potential sources of action are understood against the backdrop of changing historical regimes and ideas, such that the normative and empirical assumptions underlying contemporary social scientific analyses are revealed rather than taken for granted as timeless truths.

Indeed, given that Gardiner's (2004) diagnosis of the relative neglect of climate change in moral philosophy rested on the fact that the study of climate change "is necessarily interdisciplinary, crossing boundaries between (at least) science, economics, law, and international relations" (p. 556), one would expect that such boundary crossing should come even more readily to political theory than it has done to ethics. Political theory's characteristically greater capacity for openness to the empirical and to the interdisciplinary is a strength on which the subfield's engagement with climate change should continue to build. At its best, political theory is, in Michael Rosen's lovely phrase (2012, p. xvi), "the oasis where the caravans meet"—caravans of the social and political sciences, moral philosophy, and history, at the very least. The history of political theory, especially, has more to offer in exploring ideas of nature, economics, knowledge, and politics that have played roles in bringing about anthropogenic climate change and that may need to be reconceived in order to restrain or respond to it. Such discussion to date has largely been found in surveys of the history of ideas in philosophy and especially in theology and religious ethics, assessing the relative responsibility of Jewish, Christian, Greek, and Enlightenment ideas for modern ecological predicaments. Classic accounts include White (1974) and Passmore (1974); specific cases that have been examined include the Greeks (Westra & Robinson 1997) and Locke (Wolf 1995, Bovens 2011). Political theorists working on the history of political thought, and those drawing on cognate disciplines more generally, could do much to develop these discussions further.

THE SHAPE OF THE PROBLEM: POLITICAL THEORY ON THE CHALLENGES OF CLIMATE CHANGE

What are the challenges that climate change poses? I begin with a skeletal account from a game-theoretic perspective that is widely utilized across the social sciences; later we will see ways in which political theory can valuably complicate this picture. When we think of climate change as a public-goods problem, we attend to the nature of prospective solutions (a reduction in emissions or in the harmfulness of their effects) as engendering goods that are both nonexcludable and nonrivalrous. If emissions are limited so as to establish a more moderate global mean temperature range than would otherwise have been the case, then at a rough approximation everyone benefits[2]—but the classic free-riding problem of public goods hampers the reaching of such a solution, insofar as the costs each person would have to pay yield greater collective than individual benefit and so block each person's incentive to provide the good. However, it is also instructive to think of climate change as a governing-the-commons problem, insofar as the current logic of the problem is one of overexploitation of an underregulated common resource (call it the atmosphere, though I note a nuance to this below). The current incentive to overexploit attaches to a nonexcludable resource (anyone can appropriate the absorptive capacity of the atmosphere), one that is currently perceived as nonrivalrous (insofar as your emissions do not physically preclude mine). But any solution to governing this commons requires the recognition that our emissions are actually rivalrous from the point of view of achieving any global limit, and so they require some form of regulation to be

[2]In fact, if one takes only climate damages and mitigation costs into account, this is true only if the concept of "everyone" is sufficiently temporally extended into the future. Present and near-future people will lose some welfare owing to having to pay a carbon tax (or equivalent) to bring about such limitation, whereas further-future people will reap fuller benefits by avoiding the greater harms they would otherwise have suffered. I owe this point to Mark Budolfson, who points out however that current models do not yet take cobenefits (such as improvement in health due to certain mitigation measures, such as shutting down or avoiding building coal-fired power plants) into account, which could have the effect of making the current generation net welfare beneficiaries as well.

made compatible. (If we think in terms of a sustainable global carbon budget relative to the curve for probable global mean temperature that we seek to achieve, every emission by me reduces the opportunity for an emission by you.) Because the appearance of nonrivalrous emissions is part of what drives the present problem, the recognition that emissions are in fact rivalrous relative to a global carbon budget must be part of the solution.

This commons is global in scope, and its features are temporally enduring for very long periods, so that the distribution of current overexploitation and the concomitant harms, threatening the availability of this good to people who do not yet exist, raise significant normative questions. Call this set of concerns "justice." Next, the aim of achieving sufficient regulation of this commons poses a collective-action problem that can be parsed at multiple levels, from individuals to various intermediate corporate bodies to nation-states and international institutions. As noted above, this can be understood as a governing-the-commons problem, for which the free-rider problem is salient. Call this set of problems "governance" or, more classically, "politics." Finally, our understanding of the commons itself—why it is valuable, and the pace and extent of the harms that may result from failing to protect it from overexploitation—is highly mediated by the expertise of natural scientists along with that of social scientists, expertise that is both real and laced with uncertainties. This introduces the relationship between political and intellectual authority into the equation, and it is a particularly challenging relationship for conceptions of democratic equality. Call this set of problems "expertise."

These three categories—justice, politics, and expertise—are used to organize (with inevitable overlap) this central section of the present article. In each case, I begin by showing how political theorists have already worked to develop the social science account of climate change as a problem outlined above. This review is followed by reflections on areas where further research is especially needed, highlighting ways in which classic approaches or insights of political theory could be extended to climate change, and also the particular dimensions that make climate change so challenging to think about. My key points are (*a*) that discussions of justice and climate change could benefit from a richer connection to the literature on historical injustice; (*b*) that in discussions of the politics of climate change, a comparative advantage of political theory lies in further development of the role of ethos and imagination in reshaping our understanding of the place of the status quo; and (*c*) that more research into the relationship between expertise and democracy is needed to help us better address climate change.

Justice

Justice has been a major—perhaps the major—focus of political theorists working on climate change in at least the last decade, in both its distributive and its corrective dimensions. On the distributive side, we find a vigorous literature about the ideal distribution of moral rights, and sometimes of concomitant political rights, to some currency of goods (or bads) related to climate change. As in discussions of distributive justice more generally, the proper currency of justice in this area is itself a subject of debate. Should it be a right (or "permit") to emit carbon or greenhouse gases themselves (Vanderheiden 2008a), or should such emissions be subsumed into a broader distributive scheme (Caney 2009)? Or is the appropriate conception of rights relative to the assimilative capacity of the global greenhouse gas system (Blomfield 2013)? Or should attention instead focus on a right to some kind of "physical stuff" such as "nature itself" (Holland 1999)? There is a related but distinct question about the currency of the values that greenhouse gas regulation should aim to protect. As in more general discussions of well-being, positions range from various direct measures of welfare to resources to the broader set of arrangements underpinning a set of valued capabilities (Holland 2008, Schlosberg 2009).

Equally contentious is the identity of the subjects of the distributive justice claims related to climate change. Who are its potential beneficiaries and its potential liable agents? Among the sufferers of the harm of climate change—and the beneficiaries of any mitigation of such harm—are not only present-day but also future people. Many political theorists and philosophers have grappled with how to conceive of such future generations: in terms of their connection to those in the present, be it via generational descent (Rawls 1971) or a relationship of care (Groves 2011); by adopting a contractualist ethical stance in which concern for future persons can be included (Kumar 2003); or simply in a timeless relationship of abstract equality to people today (Barry 2002). This debate has been shadowed by the "nonidentity problem" (Parfit 1982, 1984; 2011, Vol. 2, pp. 217–43), which points out the moral puzzles arising from the fact that different sets of future people will come into existence in different possible futures, whose actualization depends in part on the particular actions that we and others take or refrain from taking (see generally the articles in Gosseries & Meyer 2009). And beyond future people conceived as individuals lie questions of the future continuation of other life forms on Earth, sometimes articulated in terms of "option value," and indeed the value of the future existence of humanity itself (Scheffler 2013).

Setting aside the difficulty of identifying the future people to whom obligations are owed, economists and philosophers as well as political theorists have debated the appropriate discount rate for taking their welfare (or some alternative currency of justice) into account (in economics, see Nordhaus 1994, 2008, 2013; Dasgupta 2008; Arrow et al. 2013; in philosophy, see Broome 1994, 2012; in political theory, see Thompson 2010). These discussions have generally relied on several assumptions that are now coming under increasing scrutiny. These include the assumptions that future generations will be wealthier than present ones and that capital will continue to be productive in the face of worsening ecological conditions. Both assumptions are staples of much economic analysis but are arguably dubious in the face of the risks of potentially catastrophic climate change (Mulgan 2011, Tremmel 2013).

The corrective dimension of justice involves obligations to compensate others or in some other way rectify having caused them certain kinds of harm. Vanderheiden (2004, p. 155) has considered the epistemic dimension of responsibility for mitigation, arguing that notwithstanding the kinds of uncertainty that are integral to the scientific enterprise, inaction in the face of strong expert recommendations constitutes "inexcusable negligence." McKinnon (2009, 2012) has focused especially on principles of compensation. Others suggest a move, not from distributive to corrective justice, but from distributive justice to an analysis couched in the language of natural rights and power inequalities (Wissenburg 2006).

Having identified what currency might be owed, and to whom, both distributive and corrective justice require an account of who would owe the debt and why. Much debate has focused on the validity and priority of three basic principles: "polluter pays," "beneficiary pays," and "ability to pay" (Hayward 2008, Vanderheiden 2008a). Caney (2005, 2010), who has long advocated priority for "ability to pay," has recently expanded the terms of the debate by contrasting a general approach to "burden-sharing justice" with the approach that he advocates, "harm avoidance justice" (2014). The question of how an individual application of such principles relates to their application at a collective level (such as that of the state) has also been a major concern. For example, it raises the problem of the liability of relatively poor people in relatively rich countries. The philosopher Henry Shue argued even back in 1999 that those unable to fulfill their minimum needs had no obligation to help their wealthier compatriots address their nations' responsibility for the global costs of climate change (Shue 1999). The converse problem—the liability of relatively rich people in relatively poor countries—has likewise become important in the context of international negotiations on climate change as well as global ethics (Chakravarty et al. 2009).

The very identification of the "rich" and the "poor" invoked in the previous paragraph is contentious. As Dubash et al. (2014) recount, the negotiators of the *Summary for Policymakers* document of Working Group III of the IPCC Fifth Assessment Report confronted just this issue when debating how different groups of countries should be categorized by income in representing their contribution to climate-changing emissions over a given period. Grouping countries according to their 2013 income level would show upper-middle-income countries as responsible for "three-quarters of global emissions rise from 2000 to 2010," whereas grouping them according to their income level in a certain year in the 2000–2010 decade, such as 2005, "would show that three-quarters of the 2000–2010 global emissions rise arose in lower-middle-income countries. . . and a further 20% in low-income countries" (Dubash et al. 2014, p. 36). The political significance of this representational choice for distributing both responsibility and potential aid was highly salient for a number of member countries in these varying brackets.

Similar controversy over how and whether to apply principles of distributive and corrective justice has arisen in the case of the United States' putative responsibility to other countries for mitigating or compensating for its contribution to anthropogenic climate change. Building on work done by Posner & Sunstein (2008), Posner & Weisbach (2010) have criticized distributive justice claims against the United States for being unable to justify how to distribute costs and benefits, both internally within the United States and potential beneficiary countries and across time for future inhabitants of each country. They have likewise criticized corrective justice claims in this context for difficulty in determining the precise benefits reaped; causation of harms; and identity of the actual victims of harm in relation to anyone who might come forward as a claimant (p. 1595), insofar as the claimant poor countries may not equate to the specific likely victims of climate change. Although philosophical responses to their arguments have been robust (Frisch 2012, Fleurbaey & Zuber 2013), such arguments are a reminder that climate change has a politics well beyond its existence as a topic in political theory.

How might political theorists further enrich their consideration of the claims of justice that arise in relation to climate change? The literature on responsibility for historical injustice is an underutilized resource here (Young 2011). The questions of how collectivities can be responsible over time, and how this responsibility relates to the responsibility of their individual members, can be illuminated most fully by bringing together ethics, the philosophy of agency, and the political theory of historical injustice—as is done, for example, by Nolt (2011, p. 62), who argues that greenhouse gas emissions constitute the "domination of posterity." Comparisons of anthropogenic climate change to past moral and political wrongs, such as slavery, have so far been developed by historians (McNeill 2000, Mouhot 2011) rather than by political theorists. Yet the case of slavery, as one example, offers provocative parallels to climate change on multiple levels.

Slavery was woven into the fabric of the global economy in specific ways, as are fossil fuels today (the precise nature and extent of this role in each case invite further specification). Nineteenth-century discussions of how to end slavery were very much concerned with the prospect of paying compensation to slave owners for the investment that they had made in owning humans based on what had been legal theretofore (Turner 2008). Yet the idea of according respect to their expectations of such profit seems abhorrent to most now. This case, and others, could inform further reflection in political theory on the expectations that have led people to invest in or depend on a certain fossil fuel regime, and to what extent those expectations are "legitimate" (a topic that Meyer & Sanklecha 2014 treat for individuals but not for entire polities).

Politics

Under the heading of politics, I discuss two interconnected sets of issues: agency, motivation, and ethos; and institutions, democracy, and the commons. An important bridge from justice

to politics consists of the relationship between individual moral and political responsibility, and the relationship between such individual responsibility and collective duties and outcomes. Moral philosophers have become preoccupied with the question of whether individuals have a moral obligation to take action on climate change (normally conceived as reducing their own emissions), a question answered with a provocative negative by Sinnott-Armstrong (2005). Establishing such obligations hinges on how to calculate and assign responsibility for the harm done, or, more precisely, for the probabilities of harm engendered (Broome 2012). It also hinges, especially for consequentialists, on the nature of causation and responsibility—whether, and in what circumstances, small contributions can be held to make individuals morally responsible for such collective outcomes (Glover 1975; Parfit 1984, pp. 67–86; Kagan 2011). Although individual emissions reduction is sometimes contrasted with political action on climate change, the same critique of the rationality of individual action can apply to political action as well: If I do not expect others to act, the reason I have for taking initiative can seem to be lacking. Yet until someone takes the first step, the problem is not whether I should free ride on the efforts of others, but how anyone can be induced to establish a safe ride at all. In other words, how the individual frame of these discussions relates to the necessities and motivations of collective political action needs further examination of a kind that political theorists could valuably offer.

Concern with agency moves us more broadly into the domain of politics understood as seeking the motivations and incentives for bringing about systemic change. Here political theorists engage with the incentives problem highlighted as key to the political science analysis of climate change by Keohane (2015). But they tend to do so in a distinctive way, not thinking so much about particular financial or reputational incentives (though some do) as about broader sources of motivation for both institutions and individuals to be willing to take required action on climate change. Political theorists have begun to pay particular attention to a topic that arises only indirectly in the collective-action problem analytics, namely that of ethos, understood as the "structure of response lodged in the motivations that inform everyday life" (Cohen 2008, p. 123). Ethos arises in part from ingrained senses of value, and shapes in turn the values that individuals, social groups, and institutions are willing to acknowledge and act on. For this reason, the philosopher Dale Jamieson (2002, 2010, 2014) has been a leading figure in calling for a rethinking of values and virtues in relation to nature and more recently to climate change. As he and others have argued, political theory can enrich the approach of social science and public policy by challenging their often overly managerial focus on cost-benefit analysis, which is informed by an overly narrow definition of costs and benefits. The identification (indeed, the very perceptibility) of costs and benefits is always shaped by a particular ethos and way of life that underpins and informs a far wider set of values, habits, and assumptions, which themselves have particular histories and can be subjected to present-day ethical and political interrogation. A bias toward inertia—bringing with it assumptions about entitlements to the continuation of the status quo—can be challenged by new forms of sociopolitical imagination and initiative (Lane 2012).

Political theorists have developed this call for a new ethos suitable to sustainability and to the challenge of climate change in varied vocabularies. Some defend the possibility of a liberal ethos that is also sustainable (Arias-Maldonado 2013) against more radical critiques arguing that a sustainable ethos requires a rejection of capitalism and a more extensive development of a kind of ecological democracy (Eckersley 2005). Many political theorists have linked the call for a new ethos to a refashioning of the ideal of citizenship along varying lines. These include Dobson (2003), who calls for a refashioning of citizenship as an asymmetrical, nonreciprocal, nonterritorial idea of responsibilities over rights, and Hayward (2006), who defends "ecological citizenship" as a form of status. [Wolf et al. (2009) use a case study to assess the Dobson–Hayward debate.] Other ideas

in this space include the conception of "corporeal citizenship" advanced by Gabrielsen & Parady (2010) and the feminist ecological citizenship advocated by MacGregor (2014).

A new ethos may draw in part on reconceiving the relationship of humans to nature, and so returning to some of the broader themes of green political theory from the era before the intensive focus on climate change. Jamieson (1992) has long called for a new value of "respect for nature," drawing on work by the philosopher Paul Taylor (1981). Yet, in wider discourses in environmental history and politics, the idea of "nature" has come under scrutiny. Examples include William Cronon's (1995, p. 20) assertion that "'nature' is a human idea" and Bill McKibben's (1989) popular assertion of "the end of nature." New approaches to the material and to the very ideas of the environment and of nature are a dynamic area of current research in political theory (Bennett 2010, Schlosberg 2013).

If ethos matters, it matters in part because it informs institutions—perhaps with special vigor when these institutions are democratic and so designed in some sense to reflect the attitudes of the general public. Institutions and democracy are topics in political theory on climate change in their own right. The question of how to redesign regional and global institutions to cope with climate change has been addressed by political theorists and political scientists alike (Nanda 1983, Aldy & Stavins 2007, Bulkeley et al. 2014). Familiar problems of democratic politics arise in the context of climate change, such as the relationship of citizens of a democracy to actions or obligations assigned in their name to the state (Beckman 2012), or the claims of groups that may be specially vulnerable to harm by democratic decisions or omissions, or that may seek to mobilize in response to such harms, as considered in discussions of environmental justice. Other problems—such as those raised by the prospect of democratic decisions that are irreversible by future majorities—are less standardly discussed in democratic theory but raise special challenges to it (Ellis 2016).

An analysis in terms of institutions, democracy, and indeed political conflict may, finally, be especially valuable in complicating the schematic account of a public good and of a commons given at the outset of this section. The entity affected by carbon emissions is often equated simply with the atmosphere (as suggested by Vanderheiden's book title, cited above), and that in turn is equated to the discussion of air as a standard economics and political science textbook example of a public good. Public goods are defined by being nonrivalrous and nonexcludable. Air is a classic example of nonrivalrousness, since my breathing the air does not diminish your ability to breathe the air. But in the context of particulate pollution that has been enabled by technological advances and political (mis-)regulation, I may be able to avail myself of cleaner air to breathe than you can, if I am able economically to afford and/or politically to acquire appropriate technological tools such as facemasks and air purifiers—tools that will have come into existence through economic and political facilitation. What was once, as it were, a public good by nature may lose some of its effective characteristics as one due to politics.

Consider now greenhouse gas emissions, sometimes conceived and regulated as forms of "carbon pollution," as in the Clean Power Plan issued as a final rule by the US Environmental Protection Agency on August 3, 2015. Certainly, the natural effects of putting more carbon into the atmosphere (say) are nonexcludable at a high level of abstraction; if more carbon is put in, we all suffer from any ensuing harms, whereas if less is put in, we all share in any ensuing benefits. But in fact, the complexities of systemic feedback loops mean that the distribution of harm and benefit is unlikely to be even; your benefiting may not be excludable by me, but I may be able to predict that it is more or less likely than my benefiting. A further complication is that, as Blomfield (2013) points out, the real resource in question is not simply the atmosphere but rather the "assimilative capacity" of the global system for assimilating greenhouse gases, "which encompasses not only the atmosphere, but also the ocean, soils, and vegetation" (p. 288). The harm done by a given

emission, and any consequent liability for mitigation, compensation, or adaptation, depends on this assimilative system, which she points out is not entirely "unowned" within the system of territorial state claims in the way of the atmosphere itself. It is rather, at least in part (think of soils and vegetation), both the subject of ownership claims by individuals, groups, and nation-states and the product of previous human agency interacting with that system, as in the case of indigenous practices of land stewardship, for example. Blomfield's insight reveals that aspects of the global system's assimilative capacity are already subject to management regimes that must be considered in any further efforts to establish emissions regulation. Climate itself is as much a political and cultural construction as a "natural" one (Hulme 2015).

Furthermore, the adaptive responses to such effects of the potential overloading of the absorptive capacity of the global assimilative system may be excludable as well as rivalrous—so diverging from classic commons problems but also making certain forms of governance more feasible. Seawalls, raised buildings, generators, even investment in building and distributing renewable energy (which has a mitigating as well as adaptive function)—all these are at least in part rivalrous and excludable goods. In these respects, climate change does not pose a simple public good problem. It is a problem of governing a rivalrous commons, and in so doing, also regulating the rivalrous and excludable goods—and bads—that will become ever more valuable in the adaptive response to the challenges that it poses.

Expertise

My final area, expertise, is one to which political theorists thinking about climate change have so far devoted relatively little attention—much less than to justice and politics (although again there are important overlaps, especially with the latter). The role of scientific experts in democracy was a central concern for John Dewey (1927) and was reflected in Habermas' early work (1987 [1968–1969]; drawn upon by Crick & Gabriel 2010), but it has been relatively neglected in recent work on democratic theory (exceptions include Brown 2009). Deliberative democrats and epistemic democrats tend sometimes to elide the distinction between scientific and other kinds of truth claims (e.g., Schwartzberg 2015), or else to focus primarily on purported moral and political truth claims rather than the truth claims made by natural science [e.g., Estlund (2008, p. 106), whose investigation centers on "the centrally important political truths"]. Indeed, these literatures generally tend to exaggerate the ease of deliberating about so-called facts so as to draw attention to the putatively more challenging case of deliberating about values. But the relationship between facts and values is much more complex than these discussions assume it to be.[3] To advance political theory on climate change, deliberative and epistemic democrats would do well to turn their attention to the truth claims of natural science and how these can and should feature in the judgments made by democratic citizens and political leaders.

The early work of Habermas (1987) remains a useful starting point, but his focus then was on the power and control afforded by science. He glossed the relationship between technology and democracy by asking, "how can the power of technical control be brought within the range of the consensus of acting and transacting citizens?" (p. 57). Science, however, is not a simple matter of technocratic capability; it is also very much concerned with uncertainty and the limits to knowledge. In the case of climate change science in particular, uncertainties about feedbacks, tipping points, and the contributions to complex causal chains are of grave importance to policy

[3]The same could be said of the relationship between means and ends, another lens often used to contrast the concerns of the natural sciences with the concerns of political theory.

(this is independent of the overwhelmingly manufactured uncertainties raised by climate change deniers). In other words, climate change science tells us as much about what we may not be able to control as about what we can and do control. How democratic publics and politicians can assess scientific uncertainty claims, and claims by natural scientists generally—that is, how we assess expertise—deserves more attention within political theory (efforts so far include Anderson 2011, Christiano 2012, Lane 2013). So does the question of the responsibilities of scientists, both in communicating to democratic publics and as democratic citizens themselves, an issue also canvassed briefly by Habermas (1987). The ethics and efficacy of scientific communication about climate change have become a major topic of research in social psychology and in science studies (Moser & Dilling 2007), and to a lesser extent in philosophy and political theory (Keohane et al. 2014). The political theory dimensions of this topic would bear further development, for example by drawing on the history of political thought for the resources of rhetoric to inform the ethics and effectiveness of climate change communication (Lamb & Lane 2016). To give due attention to scientific knowledge in democratic (and indeed nondemocratic) politics, we cannot simply adopt a technocratic framing. Yet how to combine science and democracy with recognition of the social and political roles of imagination, ethos, and uncertainty remains in need of further inquiry.

THE ANTHROPOCENE AND ITS DISCONTENTS

One rising discourse tying together politics, expertise, and perhaps even justice in relation to climate change is that of the Anthropocene (see sidebar, "The Anthropocene"). This is the proposed name for a new geological epoch that some geophysicists contend should now be recognized to have succeeded the Holocene, being defined by "the central role of mankind in geology and ecology" (Crutzen & Stoermer 2000, p. 17). Although geophysicists continue to debate whether the Anthropocene should be adopted as a formal geological category, and if so, whether it should be considered to have begun some 8,000 years ago or as recently as the late 18th century, the idea of human beings as relatively newly dominant agents in shaping the earth's geology and ecology is a profound and startling one.

"THE ANTHROPOCENE"

The idea of the Anthropocene was proposed and continues to be evaluated as a scientific classification of the current geological epoch by geophysicists and geologists (Ruddiman 2013). The term was coined in print by Crutzen & Stoermer (2000), who proposed a broad starting date of "the latter part of the eighteenth century" (p. 17). In a subsequent article (Crutzen 2002), James Watt's invention of the steam engine in 1784 emblematized the start of the Anthropocene. Historians have adopted the term, engaging in debate with the natural science community as to whether the systematic human effects on geology and ecology that are visible from 8,000 years ago justify an assignment of the Anthropocene as having already begun then (Steffen et al. 2007, Ruddiman 2013). An important contribution to bringing the idea of the Anthropocene into wider discussions of history and the environmental humanities is Chakrabarty's (2009) "four theses": (*a*) "anthropogenic explanations of climate change spell the collapse of the age-old humanist distinction between natural history and human history" (p. 201); (*b*) "the idea of the Anthropocene, the new geological epoch when humans exist as a geological force, severely qualifies humanist histories of modernity/globalization" (p. 207); (*c*) "the geological hypothesis regarding the Anthropocene requires us to put global histories of capital in conversation with the species history of humans" (p. 212); and (*d*) "the cross-hatching of species history and the history of capital is a process of probing the limits of historical understanding" (p. 220).

The term has leapt from the natural sciences into the humanities, becoming a flagship term (both used and critically evaluated) in the emerging movement of the "environmental humanities," where discussions range from ecocriticism in medieval literature (Nardizzi 2013) to education (Greenwood 2014) to anthropology (Krauss 2015). Environmental historians, in dialogue with natural scientists, have been especially receptive (Steffen et al. 2007). Political theorists too have begun to avail themselves of this idea (e.g., Symons & Karlsson 2015, Semal 2015). Nevertheless, political theorists could do more to enrich critical discussion of the Anthropocene in two ways.

The first is to connect it to the venerable concern with the philosophy of history, a topic that was central to the discipline for centuries but has recently become neglected (a point I owe to Nancy Rosenblum; see Mulgan 2011 on the "broken future" for one exception in philosophy). The second is to develop the politics of the Anthropocene further: the politics explaining which humans, and how, have gained the capacity to shape geological and biological processes, and the politics explaining why it is so difficult to reverse the direction of this shaping.

To be sure, environmental humanities scholars have already been keen to challenge, or to nuance, the idea of the Anthropocene insofar as this presents humanity as if it were a singular collective agent. Many have charged that such a portrayal of species agency risks obscuring the grossly unequal responsibility for anthropogenic carbon emission among different groups of human agents, as well as the grossly differentiated vulnerability to its worst impacts, both on a domestic scale and internationally. Such critiques have been made of the influential article of Chakrabarty (2009), although the article itself tried to anticipate and deflect them. But humanists and posthumanists have not so far developed a general account of the politics of human agency that could gather and explain such critiques. Political theorists are well suited to advance a more general claim about the role of politics within a broader philosophy of history relevant to assessment of the Anthropocene hypothesis: that insofar as humans are political animals, what may appear to be direct action on biological or geological forces is virtually always mediated by politics.

Consider, for example, the debate among classicists and students of the climate of the ancient Mediterranean world in Roman North Africa. An earlier view was that shifts in the ecological balance of the region in late antiquity simply reflected determinist effects of changes in climate. Against that view, the Roman historian Brent Shaw asserted a role for human biological agency. He countered the argument for the simple "effects of a deteriorating climate" in causing the disappearance of large mammalian fauna by arguing that such effects "cannot be sieved out neatly from the one major discernible cause, the hand of Man" (Shaw 1981, p. 385). Shaw had in mind changes in hunting and agricultural practices. Political theorists can add that such changing practices themselves reflect political choices, possibilities, and actions. Because humans are political as well as biological animals, the political dimension of our agency—with its inherently plural and often conflictual aspects—is as characteristic of our species as is its biological and now its geological effects.

The implications of this are Janus-faced, for politics is only partly within our control. This is the unheroic and neglected side of the Anthropocene hypothesis. If humans have become capable of shaping global geology and biology in the direction of increased global mean temperature, it does not necessarily follow that humans can or will prove equally capable of slowing or reversing that trend. If "we are as gods" in relation to the earth, as Stewart Brand (1968) asserted, it does not follow that we will be able, as he advised, to get good at it. We may turn out to be more like Greek gods—rivalrous, quarrelsome, and sometimes ultimately hapless—in our inability to control or reverse the effects of our actions.

The grim fact is that for all the discussion in academia and in politics, the most dramatic reductions in global emissions to date have been brought about by external technological and economic factors, rather than by political negotiation or individual action. Even direct political or

administrative action is dwarfed by these external factors, such as the global recession, the collapse of the Russian economy, and the fracking revolution. This has led to a notable turn in the political theory literature on climate change toward what I call second-order concerns: efforts to explain why we are broadly failing to take sufficient action on climate change, and in some cases to propose ways of coping with this failure.

To classic accounts of the peculiarly difficult features of climate change as a moral and political problem (Gardiner 2011), we can add specific diagnoses of climate-action-related procrastination (Andreou 2007), complacency (Doan 2014), and mourning (Willox 2012). Others have made a case based on the uncertainty of the outcomes and thresholds of individual action, for the sensibility of hope over despair (McKinnon 2012), and for the need for new modes of discourse, including the prophetic, to address climate change (Kamminga 2008, Hulme 2009). Others still have argued that we must accept that "the struggle against climate change failed" and begin to come up with ways to live with that reality (Jamieson 2014).

The politics of the Anthropocene remain to be fully charted. Doing so will require an enriched understanding of the demands of justice. This understanding might be gained by integrating the literature on historical injustice more fully into discussions of climate change. It will involve an enriched understanding of the possibilities (and the potential limits) of politics, one that must include the background context of ethos and the role of nature and that can be enhanced by drawing more fully on the history of political thought. It will require a way of taking seriously expert knowledge while giving appropriate recognition to uncertainty, and integrating all of this within a robust account of citizenship and democratic politics—if democracy is indeed to prove capable of addressing climate change in time, a prospect that is far from certain (Runciman 2013). Ideally, we would take these steps while recalling the broader set of environmental and political concerns from an earlier epoch of green political theory and ensuring that these are not wholly lost in the glare and urgency of climate change. Insofar as political theorists on climate change exert ourselves to draw most fully on our distinctive disciplinary combination of normative, historical, and institutional perspectives, to that extent we can help illuminate both the nature of the problem and potential ways in which to respond.

DISCLOSURE STATEMENT

The author has occasionally been employed as a consultant by public and private bodies, including energy companies. In the 10 years prior to the publication of this review, she acted as a paid consultant to an energy company once (to Shell International B.V. for a workshop in 2014).

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