Philosophy's Other Climate Problem

Climate change will be among the most influential forces shaping human life in the 21st century and beyond, if not *the* most influential force. Philosophers typically recognize this fact, and some have responded to it by producing a body of genuinely excellent work. Despite this, the profession has not responded adequately. Too few philosophers are engaged with climate change, and the work of those who have is insufficiently mainstream. Moreover, a wide range of philosophical problems central to climate change remain almost untouched by anyone. More than 15 years ago, Gardiner (2004) issued a "call to arms" to moral philosophers, urging them to respond with an urgency that matches the seriousness of the problem. Today we repeat that call, this time addressed to all philosophers.[1] Climate change is not just a moral challenge, or an environmental issue. Rather, as one leading environmental engineer recently put it, it is the landscape on which our future unfolds.[2] It permeates every aspects of our lives, and philosophers must respond.

We begin by briefly laying out likely pathways correlated to potential degrees of global warming, based on relatively conservative climate modelling, none of which is our own (§1). We then consider the discipline of philosophy's response to the climate crisis. Despite the fact that excellent work has been produced in some areas, the discipline's response has thus far been incommensurate with the gravity of the problem. (§2). We then discuss some obligations anthropogenic global warming (AGW) creates for philosophers as individuals and as a professional community (§3). Finally, we consider specific topics and questions about climate change that some philosophers have considered in great depth, but which warrant wider attention (§4).[3]

1. Climate Pathways

The earth today is about 1-1.1°C hotter than it was in the 19th Century.[4] In the United States, the effects of this warming are evident: Superstorm Sandy, the California wildfires, Hurricane Harvey.[5] To dwell on Harvey for a second: as David Wallace-Wells (2019) points out, this was a once-every-500-year event. That is, it was a storm of such

[1] Only with some hesitation do we repeat militaristic language such as a "call to arms," but we do it here to give due credit to Gardiner's important work. Note also: while Gardiner (2014) is addressed to moral philosophers, it touches upon a wider set of topics (e.g., philosophy of economics).

[2] https://twitter.com/costasamaras/status/1246532602871386112

[3] There is one thing in this paper about which we are very confident: we have surely overlooked some valuable existing philosophical work on climate change. We apologize in advance to whomever's work this may be, and we hope critique of the gaps in this paper helps bring more attention to that work.

[4] Hereafter we refer to temperature in Celsius, unless otherwise noted.

[5] Extreme events (droughts, wildfires, floods) have always occurred and would continue to occur in the absence of climate change. But the rapidly developing field of event attribution has increased scientists' confidence in such attributions (Medicine et al., 2016; Ummenhofer and Meehl, 2017), including the attribution of individual events to climate change (Diffenbaugh et al., 2017). Even without the ability to attribute specific weather events to climate change, however, we have had overwhelming reason—for decades now—to accept the science of AGW and to take action.

magnitude that normal climate models predict it should happen only once every 5 centuries. Harvey was the 3rd once-every-500-year storm to hit Houston since 2015.

The *current* effects of climate change are clear outside the United States too. Take the recent Australian bushfires as an example, the size and severity of which are unprecedented. Prior to these fires, climate modelling predicted increasingly severe bushfires in Australia due to hotter and dryer weather, the cause of which is AGW (Harris and Lucas, 2019; IPCC, 2014). 2019 was the hottest, driest year ever on record in Australia (BOM, 2020). Average temperatures across the entire continent reached a record-high 107° F.

Besides killing an estimated one billion animals, the bushfires will have a dire and long-lasting effect on human health. The tiny particulates generated by the fire are implicated in a range of health problems: lung cancer, heart, disease, stroke, and of course respiratory diseases. Major Australian cities (especially Canberra, but also Melbourne and Sydney, with a combined population above 9 million) have been exposed to elevated levels of these particulates, and the eventual death toll via this route will be in the thousands (Quiggin, 2020). More pedestrian, but nevertheless serious, effects are also evident. The extremely poor air quality force people to stay inside, in order to breathe filtered air. Extreme heat has had the same effect, forcing people to rely heavily on indoor air conditioning. This has serious effects on well-being. As many people now know from the stay-at-home restrictions during the Covid-19 pandemic, when you can't go for a run in the park, or sit at an outdoor café, or simply take a walk with friends, you're liable to be less happy. You're also more vulnerable to social isolation and loneliness. Trust and cooperation decrease.

In addition, large fires like these (and those in the Amazon rainforest) exacerbate global warming by releasing huge amounts of CO_2 into the atmosphere. Australia's bushfires are estimated to have released as much as 1 billion tons of CO_2 (Freedman, 2020). For comparison, in 2018, before the fires, Australia was the world's 16th largest emitter of CO_2, releasing 421 million tons.

What we see in Australia and elsewhere today is a shadow of what's likely in store in the near future. We think the following set of predictions is relatively noncontroversial. It is drawn from analysis done by Carbon Brief, which summarizes recent modelling and UN IPCC data.[6]

The 2016 Paris Agreement adopted the goal of "holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 °C above pre-industrial levels."[7] At 1.5° above pre-industrial levels, it is estimated that 271 million people will regularly be exposed globally to water scarcity, extreme rainfall will increase in frequency in the Americas by 20-25%, and the annual likelihood of "unprecedented" summer heat in Europe will be 47%.

[6] https://interactive.carbonbrief.org/impacts-climate-change-one-point-five-degrees-two-degrees/
[7] https://unfccc.int/process/conferences/pastconferences/paris-climate-change-conference-november-2015/paris-agreement

2° of warming is the level the UN has warned we must avoid. It entails, among many other things, a 27% increase in favourable conditions for malaria transmission over drylands (and an 8% increase in humid regions), 150 million increased deaths worldwide from air pollution, and from 234% to 406% increases in extreme warm temperatures in Australia (that is, over and above what we are seeing now).

3° of warming predicts southern Europe in permanent drought and droughts in Northern Africa lasting 60 months, 6 times more wildfires in the United States than today, and sea-level rise sufficient to require massive infrastructural adaptations for the continued inhabitation of Miami, Bangkok, Manila, Mumbai, Ho Chi Minh City, Jakarta, Alexandria, Vancouver, Amsterdam, Shanghai, and many other (especially equatorial) cities.

4° of warming is harder to conceive, with estimates of grain yields worldwide 50% lower than present while the global economy shrinks by 30%. This scenario guarantees climate refugees in the hundreds of millions, if not more.

Predicting the likelihoods of reaching these thresholds is difficult, in part because we don't know how much carbon human beings will burn in the coming decades. At present, the world has used up 91% of its "carbon budget" for staying under 1.5°. This is the total amount of CO_2 that could be put into the atmosphere before 1.5° is exceeded.[8] At our current emissions levels, we'll use up this budget in 9-10 years. It is highly unlikely that we'll stay under 1.5°.[9]

The International Energy Agency's 2019 "World Energy Outlook" identifies three scenarios for how much carbon the world might put into the atmosphere by 2040 (IEA, 2019): one which represents "current policies," with no new national energy policies worldwide; one ("stated policies") in which the world's nations meet their Paris Agreement commitments; and a third ("sustainable development") in which dramatic carbon emissions mitigation policies are enacted before 2040. According to analysis by the Breakthrough Institute—an organization thought by some to be overly *optimistic*—by the year 2100, global temperature is predicted to reach between 2.9 and 3.4° above pre-industrial averages in the first, "current policies" scenario; between 2.7 and 3° in the "stated policies" scenario; and between 1 and 2.6° in the best case, "sustainable development" scenario (Hausfather, 2019).

We now invite you to return to the paragraphs above to recall what kind of world each of these temperature thresholds predict.

It is crucial to see that we are locked in already for severe impacts: even if – per impossible – we were to halt all emissions today, temperatures and sea levels will rise for centuries to come. Indeed, most models predict that seal level rise will continue for approximately 1000 years.[10]

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[8] The IPCC's more technical definition of the world's "carbon budget" is the level below which there is a 66.6% chance of staying below 1.5°. There is also debate about the most accurate way to calculate the world's carbon budget.

[9] For accessible discussion of reasons to be doubtful we'll limit warming to 1.5°, see Roberts (2020).

[10] Sea level will rise for centuries because the Earth's oceans and ice are not in equilibrium with the atmosphere, and a new equilibrium will take something on the order of ~1000 years to re-establish (Rob Jackson, p.c.).

There are, of course uncertainties in these predictions. Miracle technologies like cold fusion could be invented. Or, more likely, new technologies like direct air capture of carbon—basically machines for pulling CO_2 out of the air—or small modular nuclear reactors, could be made commercially viable (and the other problems they represent overcome). Investments in research on these technologies is an imperative, given that there is no plausible scenario in which human beings will not be fighting to reduce carbon in the atmosphere 20, 30, or 50 years from now. Unfortunately, there are few signs that these technologies could be deployed at scale any time soon (Morgan et al., 2018; Roberts, 2018). Likewise, various forms of "geoengineering," such as solar radiation management, may come to be an important supplement to CO_2 mitigation and adaptation to climate change.[11] But it is not a replacement for these efforts. The technology is not yet developed, nor are the risks of (at least some forms of) geoengineering nearly well-enough understood. It is also important to recognize that concepts like solar radiation management are narrowly targeted; blocking the sun does nothing to combat other problems related to climate change, such as ocean acidification (i.e., the absorption of CO_2 by the earth's oceans).

The uncertainties cut in the other direction too. Many climate scientists think that one or more "positive feedback" effects are likely. Such effect arises from processes that would be triggered by warming that would in turn rapidly escalate increased warming. The melting of permafrost is one potential cause of positive feedback. About 1/5 of the northern hemisphere is permafrost (ground that has been frozen for a half million years or more). Once thawed, soil microbes in permafrost can turn stored organic carbon into CO_2 and methane (a greenhouse gas 34-86 times more heat-trapping than CO_2, pound for pound). The release of these gasses may then speed further warming. Another potential source of positive feedback is the melting of the Greenland ice sheet. A recent and terrifying discovery is that the Greenland ice sheet is now melting seven times faster than previously estimated (Shepherd et al., 2019). Major figures in climate science have suggested that warming of 3-4 degrees isn't unlikely, because if we hit 2 degrees, positive feedback effects could ensure temperatures rise to a catastrophic 4 degrees, even were we cut to emissions to zero once we hit 2 degrees (Steffen et al., 2018).

2. Climate Change in Philosophy

First the good news. Many philosophers have responded admirably and excellently to the urgency of climate change. For example, climate ethics, an interdisciplinary endeavour bringing together philosophers, political scientists, geographers and the like, is a flourishing subdiscipline, with its own major figures, landmark works, and conferences. There are also a number of important anthologies and collections where this work is to be found (Arnold, 2011; Gardiner et al., 2010; Moss,

[11] See, for discussion Harvard's Solar Geoengineering Research Page. . See also discussion below about philosophical work on geoengineering (§4).

2015). A longer-running tradition in "environmental ethics" encompasses a broader set of questions about the relationship between human beings and nature, anthropocentrism, and sustainability and economic growth.[12] Like climate ethics, environmental ethics has developed its own societies and canon, and even its own journals, and is commonly taught in philosophy departments.[13] Outside climate ethics and environmental ethics, there is excellent work on climate change in epistemology, philosophy of mind, and political philosophy.

The problem is this: despite the excellence of this research—which we describe in more detail below (§4)—few philosophers beyond specialists engage in these debates and with these works. Climate ethics flourishes, for example, but only as a subdiscipline given too little attention outside its own circle. While a significant number of philosophers have risen admirably to the challenge of climate change, the discipline as a whole is falling well short.

Why do we say the discipline isn't doing enough? Consider a few metrics of the mainstream's interest in climate change. In the 5 top ranked general journals of philosophy, according to the 2018 Leiter Reports blog (*Philosophical Review, Mind, Nous, Journal of Philosophy,* and *Philosophy and Phenomenological Research*), a total of 25 articles published between 2012 and 2020 (excluding book reviews) mention "climate change" anywhere. *Not one* contains the term "climate change" in its title, and most of the 25 that mention "climate change" anywhere merely mention it in passing.[14] In ethics, the situation is a bit better, but mainstream neglect is clear here too. Since Gardiner issued his 2004 call to arms, the top 2 journals in ethics (*Ethics*, *Philosophy and Public Affairs*) have published a total of 5 papers substantially on climate ethics. PhilPapers, the largest open access archive of works in philosophy, contains 2,437,730 total entries. A search for "climate change" returns 994 entries (.04%).

The same problems are evident in hiring. On PhilJobs, the discipline's main hub for hiring, 6501 positions have been advertised since 2013, including faculty positions, fellowships, PhD funding, etc. Of these, 47 mention "climate change." Of these 47, 10 mention the terms "climate" or "environment" in the desired Area of Specialization. This means that, since 2013, 1 out of every 138 positions *mentions* climate change—arguably

[12] See Brennan and Lo (2016) for review.

[13] See, for example, the journals *Environmental Ethics* and *Environmental Philosophy*. For societies, see the International Society for Environmental Ethics and the International Association for Environmental Philosophy. The website for the International Society for Environmental Ethics provides a helpful bibliography of canonical works. See also Brennan and Lo (2016) for references.

[14] While other excellent journals publish more work on climate change than these—including the *Journal of Applied Philosophy*—the prestige of these 5 generalist journals is important. It is indicative—though defeasibly so—of what the discipline values. Note also: in utilizing the Leiter journal rankings, we do not mean to endorse their accuracy as a measure of anything more than some facts about the sociology of philosophy, nor do we mean to make a statement about journal rankings in general. Finally, these data do not distinguish between publications and submissions. It is possible that many philosophers are attempting, but failing, to publish work on climate change in these journals. We have access to one (albeit indirect) data point that suggests otherwise: in the past 10 years, authors submitting to the *Australian Journal of Philosophy*, another prestigious general interest journal, have selected "climate change" as a keyword only 5 times.

the greatest threat facing human civilization—at all, and 1 out of every 650 positions lists "climate" or "environment" in its desired AOS.

While we emphasize, once more, the quality and depth of the work that *is* being done on climate change, the issue is largely neglected in the most prestigious venues for journal publication, in overall publication volume, and in hiring.

Perhaps this neglect reflects the pace with which disciplines evolve. Another possibility, however, is that too many philosophers—like too many people in general—misunderstand the nature and severity of the climate crisis. We doubt there are a great many climate change 'skeptics' working professionally as philosophers. Professors lean left across disciplines, especially professors in the humanities and social sciences (Langbert et al., 2016). And leaning right is the strongest predictor of climate change skepticism (Kennedy and Hefferon, 2019; Lewandowsky et al., 2013). Anecdotally, we know of very few philosophers who are skeptical of the basic scientific consensus about AGW.

At least, we are confident that there are few skeptics in philosophy if 'skepticism' is defined in the ordinary way. On the standard construal, an agent counts as a skeptic if she rejects at least one of the following three propositions:

> (1) The climate is changing, in a way that is expected to produce significant harms;
> (2) Human activities, especially the burning of fossil fuels, are a significant contributor to these changes;
> (3) It is possible and desirable to intervene – especially, but not only by reducing carbon emissions – to reduce the extent of future harms.[15]

But if we understand 'skepticism' more narrowly, there are grounds for thinking that there may be many skeptics among our colleagues.

Define a climate change skeptic as someone who explicitly *or implicitly* rejects the consensus science of climate change. Defined in that way, it is not enough to accept the conjunction of (1)-(3) to count as a non-skeptic. We think that few of our colleagues have absorbed the import of the state of the science today, as revealed by their behavior and their explicit claims, and that this gives us grounds for thinking they may count as skeptics. Depending on how one cashes out the behavioral requirements for genuine belief, *we*, the authors of this paper, may count as skeptics.

We suspect that something like the following constitutes at least a common view amongst philosophers:

[15] Of course, someone might in principle not count as a sceptic while rejecting proposition (3). But such a person would have an extremely unusual normative view: they could accept the reality of climate change while rejecting (3) only because they are not moved by suffering of present and future generations, including their own children (if they have any). While there are philosophers who believe that non-existence is better than existence (e.g. anti-natalists) we are unaware of anyone who thinks that less suffering is not better than more, so we doubt that these possible non-sceptics are actual within philosophy.

> *Climate change is a serious problem. If it is not addressed, by the year 2100 many people across the world will suffer ill-effects. These effects will be largely borne by poor people outside the developed world, though the developed world will not be insulated from them.*

This view is not wrong; it is wrong only insofar as it is taken to imply certain further claims. Among the claims that we think that those who would assent to this proposition also accept are the following:

> (1) If we *do* address climate change, then we will avoid any significant ill-effects.
> (2) If we do *not* address climate change, we in the developed world will see few or no ill-effects for the next 4 or 5 decades.

We are confident that these propositions are false. They are out of step with the scientific consensus and with what is happening already (e.g., dramatic increases in the scale and severity of wildfires; see §1). We think many of our colleagues tend to miss three things: that the harms are already with us; that immediate action cannot prevent severe impacts; that catastrophe is near at hand, in the absence of immediate action. Climate change is not a problem only for future generations: it is here right now.

Regarding (2), it is true, we believe, that richer nations, and richer people within nations, will be better equipped to adapt to climate change, and therefore may suffer less, especially in the near term. But even this is not universally true. For example, wealthy people in coastal areas may be forced to relocate very soon (e.g., in Miami, FL). Forced relocation is plausibly a form of suffering. (It obviously involves very significant economic costs). Moreover, climate change may have indirect effects that cause widespread and near-term suffering. For example, increases in "climate migrants" seeking refuge in the United States may lead to increases in reactionary ethno-nationalist politics, which in turn has ill effects on basic rights, moral inclusivity, the economy, and more.

Why do we think that many of our colleagues accept some version of (1) and (2)? One reason is because of how philosophers often express their concerns about climate change. We often hear things like "if we don't stop climate change, future generations will judge us harshly." Much more rarely do we hear, *my children* or *yours will be harmed*. Or, *you and I are going to suffer.* (We are not as young as we wish, but we both hope to be around in 2050.) Similarly, we rarely hear our colleagues say that climate change is a desperate emergency. Or, stronger, which we think is true: that *mitigating and adapting to climate change represents the greatest collective moral imperative human beings currently face*. While our colleagues typically recognize that climate change is a serious problem, they give little sign of recognizing just how serious it is and where it ranks in importance as a challenge to humanity.

It is tendentious, to say the least, to claim that any particular questions and issues ought to demand more attention from philosophers. On the one hand, we are pluralists about philosophy generally, and celebrate a diversity of kinds of approaches to a diversity

of topics. We adamantly do *not* argue that everyone must work on topics related to climate change. One reason for this is that work on topics that are apparently far removed from application can turn out to be unexpectedly important for pressing issues. On the other hand, as an intellectual community, we do not want to fiddle at the margins while the world burns. As a discipline, we are mostly publicly funded, and we are members of communities that are already being impacted. Both these facts entail obligations to ensure that our work addresses the changing climate. We note, moreover, that many philosophers are (rightly) proud that they address matters of real practical significance and are intrinsically motivated to make a difference. If we're right, then as a whole the philosophical profession is misallocating its time and attention. We want our profession to address issues of real importance, but we have greatly underestimated the importance of climate change to their work and to the world. Given these kinds of considerations, what ought we be doing as the world edges slowly (but not all that slowly) into disaster? This is itself, of course, a philosophical question about the nature and scope of our moral obligations, as well as a question about the relationship between philosophy and "current affairs."

In short: AGW is arguably the greatest challenge we face to the well-being of human beings, not to mention to the sustainability of the earth's ecosystems. As an intellectual community, we are not doing nearly enough.

3. Imperatives and Obligations for the Professional Philosophical Community

It may be that the most important thing philosophers can do in the face of AGW is not something we ought to do *qua* philosophers, but as citizens and as members of a distinctive community (i.e., the discipline of professional philosophy). That is, activism may be the priority.

While the effects of individual action may be small (see below), some individual choices are nonetheless essential for society-wide decarbonisation. Take the example of air travel. While there are more effective ways to reduce one's carbon footprint, air travel is unusually germane to university professors, particularly those at elite universities who fly a lot. Within some philosophical circles, discussion has been ongoing about reducing conference travel to curb emissions; indeed, both the American and British Philosophical Associations have made recommendations for reducing air travel.[16] More could be done, though. The APA, for example, could make funds available to support video-conferencing. Perhaps a pledge to avoid non-necessary conference travel—analogous to the Gendered Conference Campaign—is in order. We suspect it would be valuable, moreover, for individual philosophers to be vocal about their intentions to reduce work-related travel (as some have been). Research in the social sciences suggests that contagion is a powerful

[16] For recent discussion, see Marshall, 2019. The APA recommendations can be found here: https://cdn.ymaws.com/www.apaonline.org/resource/resmgr/docs/Good_Practices_Guide_-_Sec_9.pdf. The BPA recommendations can be found here: http://bpa.ac.uk/wp-content/uploads/2019/11/BPA-environment-travel-guidelines-2019.pdf.

social force (Frank, 2020). If philosophers make their concern about climate change known, and visibly support endeavours to reduce the discipline's carbon footprint, it is possible that the relevant social norms will catch on.

Of course, the arguments in favour of such a reduction in work-related travel are not specific to philosophy. Similar efforts are underway in political science, for example. It is crucial, of course, that such efforts be sensitive to need. Senior members of the profession, who have benefitted from travel already and have much less to lose from forgoing it, clearly have a much weightier obligation to cut back than junior colleagues, who may need to travel (Ciurria, 2020). Moreover, much as we said above that we call for greater philosophical attention to climate change *humbly*, given that we are relative newcomers to the area, we are similarly chastened by our own struggles to reduce air travel. Both of us—the authors of this paper—continue to travel by plane for work, perhaps more than we should. Striking the right balance is difficult, given current commitments, norms, and incentives. Our point is not that no one has considered these questions. Rather, it is that a wider and more robust conversation in the profession about air travel is needed, both to provide insights on how to negotiate tricky questions and to help to change the relevant norms and incentives.

Another area of concern for both individuals and the philosophical community is what Eitan Hersh has called "political hobbyism" (Hersh, 2020). This is the tendency to spend one's political energies consuming, discussing, and emoting about politics with like-minded peers, often online. AGW is particularly prone to political hobbyism, as it's relatively easy to decry (for example) the US withdrawal from the Paris Agreement, but much harder to know what to do to influence climate policy as an individual.

The problem with hobbyism is that it stands in stark contrast to what works to create social change and political power: investments in local organizing, such as attending community meetings, taking over political party committees, and recruiting and volunteering on behalf of state legislative candidates. Even far less-intensive political activities, such as calling one's representative and writing letters, have been shown to have significant effects on government policies (Greenberg and Levin, 2019). Hersh finds, for example, that in 2018, a third of survey respondents report spending two hours consuming news and thinking about politics. Of those, virtually none report spending even a trivial amount of time working or volunteering for any political organization. Hobbyism is particularly common amongst well-educated white liberals. Why? Because well-educated white liberals, Hersh argues, are comfortable enough with the status quo that they don't feel the need to engage in the hard work of politics.

For much the same reasons that we suspect, but can't confirm, that many (or even most) philosophers accept the basic science of AGW, we suspect that many (or even most) philosophers spend far more time as political hobbyists than as political activists. We know that *we* do. Philosophers are well-educated (thankfully), liberal (as we discussed above), and mostly white (unfortunately), and therefore are likely comfortable enough with the status quo to lack strong motivation to engage in more effective strategies. We ought to try to avoid being political hobbyists, to the extent that we are. And we ought to create norms to promote effective political activity, rather than

hobbyism, as a community too. This injunction extends naturally to the politics of AGW. In New York City, for example, local laws 92 and 94 were recently passed, amending the rules for the Department of Buildings to require all new construction (and substantial renovations) to include either a green roof or solar panels. Agitating for changes like these in building codes, zoning laws, etc. is non-hobbyist political power-building.

We recognize, of course, that there are many philosophers who are not comfortable or leisured, not comfortable with the status quo, and whose identities make activism riskier. This last fact – that the comfortable risk less by activism – increases the obligations of the comfortable to be activists.

We recognize that there is a *lot* more to say about the nature of individual and collective moral obligations. We've given no arguments to justify our claims about what individual philosophers, or what the philosophical community, ought to do. Rather than present such arguments, we will simply note that the assertion "philosophers are obligated to address climate change by engaging in activism" implicates a range of philosophical questions, questions which we hope philosophers will consider. What are our obligations? Do we have a right, for example, to prioritise personal projects over urgent political projects? This question may or may not require a position on whether we ought to be consequentialists, for example. Some philosophers have given questions like these serious consideration.[17] More need to.

Our call for activism also touches upon philosophical questions about the relationship between individual action and social-structural reform as it pertains to climate change (Brownstein et al., n.d.). This is an ongoing topic of discussion with respect to prejudice, for example, which can be understood as both "in the head" of individuals and woven into the fabric of economies, cultures, and social structures.[18] We are under no illusions that climate change will be "solved" by individuals taking fewer trips on planes. (Remember: climate change can't be "solved." It's already happening and cannot be stopped. The question is not whether, but *how much*.) New international agreements, robust and radical national decarbonisation plans, and entirely new markets (e.g., for both storing and selling captured CO_2) must be created. The interdependence of these structural reforms and individual action is difficult and crucial to understand. Philosophers can help here too. For example, is there an instructive analogy between individual action to reduce one's carbon footprint and voting in a national election? Both have small effects on the system in question, and yet both might be worthwhile activities nonetheless.

4. Philosophical Work

We have already raised two topics for philosophical thinking with respect to climate change: the nature of individual and collective obligations and the relationship

[17] See, for example, Broome (2012); Gardiner (2013); Hedberg, (2018)
[18] See, for example, Davidson and Kelly (n.d.); Haslanger (2015); Madva (2016).

between individual and structural reform. There are numerous other important ways that philosophy, *qua* philosophers, can contribute to understanding and responding to climate change. How should climate change inform the *content* of our work?

As we have been at pains to say, there now exists high-quality work on many philosophical questions related to climate change. We describe some of this work below. Our intention is not to provide a comprehensive overview of the literature, but to demonstrate the point that difficult and crucial philosophical questions about climate change abound, only some of which have received sustained attention.[19] These and related questions ought to be far more central to the discipline than they are currently.

Ethics

Gardiner (2004) issued his call to arms to moral philosophers, and moral philosophers responded.[20] But a great deal of work remains to be done.

The 2014 report of the IPCC identified a set of ethical questions pertaining to climate change (Fleurbaey et al., 2019).[21] We suspect that only a tiny percentage of ethicists are actively working on these questions. Some are basic; for example, establishing that climate change endangers human well-being is itself an ethical question (Broome, 2015). Some involve trade-offs; how much risk should societies tolerate (Buchak, 2019)? Many require detailed knowledge of the relevant science, such as work on the ethics of geoengineering (Callies, 2019; Gardiner et al., 2020; Jamieson, 1996; Preston, 2016). Climate change also presents difficult questions about the nature of the good life, which may be necessary for an understanding of how it is threatened and what is at stake in responses to it. For example, some people have suggested that the single biggest contribution wealthy individuals can make to emissions reduction is refraining from having children (McKibben, 1999). On some views, children are central components of a good life. Does that entail that there can be no obligation to refrain from having children (Hedberg, 2019)? How are these obligations, if they are genuine, to be balanced?

Further, as we noted above, climate change very likely involves great losses: of life, opportunities, and nature. Should we reconcile ourselves to these losses, attempting to preserve a sense of well-being in their face? What is a life well lived in a time of suffering? What might be the role for specific moral emotions—such as pride, shame (e.g. Jacquet and Jamieson, 2016), regret, blame, and vilification—in a world of likely regression on basic indices of well-being (such as health, safety, and well-being)? Are there important opportunities for increased well-being to be found in today's fight to mitigate the effects of climate change? Opportunities to feel fellowship and to create community through political advocacy?

[19] Indeed, the topics we discuss below are chosen with a non-specialist audience in mind. A survey of philosophical work on climate change for a specialist audience would look different from what we provide here.

[20] For overviews of this work, see Brown, 2013; Gardiner and Weisbach, 2016; Jamieson, 2014.

[21] See https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter3.pdf

Consider too debates about moral responsibility. Moral responsibility for a state of affairs is usually held to require satisfaction of two conditions. Agents must possess sufficient control over the state of affairs, and they must understand the nature of the action and its stakes. That is, they must satisfy the control condition and the epistemic condition (e.g. Fischer and Ravizza, 2000). Debates over moral responsibility typically involve either cases in which both conditions are clearly satisfied, or centre around deviant causal chains (especially so-called Frankfurt scenarios; Frankfurt, 1969). That might be an appropriate approach when the aim is clarification on the nature of moral responsibility and its relationship to causal determinism. But we want our account of moral responsibility to be applicable to real world cases, which are often much messier, and climate change represents an especially important and complex challenge to such accounts.

It is unclear to what degree agents satisfy *either* the control or the epistemic condition with regard to climate change. The causal contribution each of us makes is infinitesimal, at most.[22] Moreover, our causal contribution does not make any discernible difference to the scale of the harms. In large dynamic systems like the climate, especially systems shot through with feedback and feedforward mechanisms, individual contributions may make no difference at all by themselves, not even a tiny one. Does this fact entail that we have no individual moral responsibility at all for climate change? This is a difficult and interesting question with clear practical ramifications. Unsurprisingly, given its philosophical interest and its practical significance, it has attracted attention. Sinnott-Armstrong's (2005) sceptical position on individual responsibility set some of the agenda; (Jamieson, 2013) articulated a different set of reasons for skepticism; important responses have subsequently been published.[23] Despite the quality of this work, it has received barely any attention in the specialist literature on moral responsibility.

Analogous issues arise with regard to the epistemic condition. In fact, the tricky questions about the control condition just mentioned are directly relevant here too. One question is whether we *do* exercise sufficient control to count as responsible; quite another is whether we are well placed to understand whether we have such control. There are also, of course, questions about denialism, and the impact that sincere but false skepticism makes to our responsibility. This, in turn, opens on to questions about the nature of epistemic obligations and our responsibility for our beliefs (see Robichaud and Wieland, 2017 for discussion that can be extended to the kinds of issues raised by climate change beliefs).

Recently, there has been renewed interest in our responsibility not as individuals but as groups (e.g. Isaacs, 2014; Sepinwall, 2016). Climate change is an important challenge for such accounts (Cullity, 2019). There are a variety of groups which might be responsible for climate change instead of (or as well as) individuals. For instance, the fossil fuel companies themselves, who seem to have understood the nature of the

[22] But see (Broome, Forthcoming) for a dissenting view and Brownstein et al (ms) for discussion.
[23] For responses specifically to Jamieson (2013), see Arnold (2011) and Gardiner (2011).

problem early and worked against effective action despite that fact (Oreskes and Conway, 2011), might be blameworthy. There are difficult general questions about how corporations can be held responsible, and whether any such corporate responsibility is reducible to the responsibility of key decision makers within them. There are also difficult questions about how to hold them responsible: how can a corporation be punished, for instance? We hope scholarship in legal philosophy increasingly takes up these questions. In addition, climate change represents a difficult case in which corporate responsibility is shared between multiple collective agents: think tanks, governments, political parties, and so on. It therefore raises pressing issues about how corporate responsibility might be distributed.

Epistemology

Epistemology has undergone something of an applied turn in recent years. It has expanded its remit, from the analysis of 'knowledge' and related concepts to prescriptions for the regulation of belief (Ballantyne, 2019; Roberts and Wood, 2007). It has also grappled with how the social environment affects the way people believe and behave within it. The epistemic significance of disagreement (Christensen and Lackey, 2013; Matheson, 2015) and questions about how we acquire belief via testimony (Coady, 1992; Lackey and Sosa, 2006) are examples of this. For the most part, however, these debates have taken place at a fairly abstract level. Climate change represents an opportunity to tackle these kinds of questions in real life form. Attending to the complications it represents may not merely make the picture messier; it may actually enable better reflection on the conceptual issues involved.

Obviously, climate change raises both issues concerned with testimony and with peer disagreement. Most of what most people (including us) believe about climate change, we believe on the basis of testimony (see discussion in Winsberg, 2018). This kind of case is a far cry from the usual assertions that feature in much of the philosophical literature. Climate change also raises interesting issues to do with peer disagreement. For instance, what is the epistemic significance of the near consensus among climate scientists? What differences do and should (a) numbers and (b) levels of expertise make to the beliefs of ordinary people?

Climate change is also an extremely important and interesting case study for the so-called novice-expert problem (Goldman, 2001). It is an arena in which people with contrary opinions present themselves as experts, requiring us to choose between them. Various proposals have been put forward as to how we should go about this (Guerrero, 2017), some with an explicit eye to climate change (Anderson, 2011), but there is much to be done. There is a very rich social scientific literature on how beliefs are acquired and updated, much of it focused on climate change belief, which theorists have not yet sufficiently incorporated into philosophical work (see Bardon, 2019; Levy, 2019 for some beginnings).

Nearby, in the philosophy of science, questions about the status and reliability of models of historical, present, and future climate change are crucial for understanding where we are headed (e.g. Lloyd and Winsberg, 2018; Parker, 2018). We hope

philosophers with expertise in scientific modelling will increasingly turn to examine the epistemic qualities of climate models. Questions about the assumptions and values that underlie them—about the nature of probability, risk and uncertainty, etc.—are manifold (Winsberg 2018).

Philosophy of Mind

There are issues closely related to the epistemological questions just noted, but which seem more the province of philosophy of mind than epistemology. For instance, responses to climate change raise problems concerning the nature of belief. As we suggested above (§2), we suspect that many philosophers assert that climate change is a pressing problem, but don't engage with the issue either theoretically or practically. Is this a problem? Does this mismatch between assertion and behaviour indicate a lack of genuine belief? Many philosophers advocate an interpretivist approach to belief (roughly, an agent's beliefs are those mental states with the right direction of fit and which make best sense of her behaviour). Climate change provides a test case and a challenge for such cases.

There is a rich and growing literature in cognitive science (e.g. McCauley, 2011) and in philosophy (Sterelny, 2018; Van Leeuwen, 2014) on the nature of *religious* belief, motivated in important part by evidence of similar sorts of mismatches between professed belief and behaviour. It is, however, plausible that religious beliefs have features that differentiate them in nature from beliefs about the mundane world. They might represent commitments, for instance, rather than states with a genuine mind to world direction of fit (e.g. Crane, 2017). For these reasons, one might not expect them to guide behaviour. But climate change beliefs seem much less amenable to this kind of approach, and may prove a better case for discussion than religious beliefs, insofar as the aim is to illuminate the nature of ordinary belief.

The apparent recalcitrance to evidence of denialist beliefs also provokes challenges within the philosophy of mind and cognitive science. What kind of cognitive architecture can account for such recalcitrance? Similarly, philosophers might contribute to, and learn from, efforts to understand how persuasion works, when it does. When people come to accept the scientific consensus, or, better, are moved to action, is it because they have updated their relevant beliefs about the scientific data? Or perhaps their relevant sense of identity has shifted, such that they can now see themselves as the kind of person who cares about climate change? Or perhaps it is because they are conforming to new social norms within their social group. The relationship between belief, on the one hand, and processes like identity salience and perceptions of social norms, on the other, is not well enough understood (but see, for example, Davis et al., 2018; Raymond et al., 2014 for promising extentions of research on the evolution of social norms to explaining motivations for sustainable behavior).

Political Philosophy

Climate change presents difficult questions about distributive justice, some of which have indeed received sustained and high quality attention from philosophers (e.g Blomfield,

2019; Caney, 2012; Heyward and Roser, 2016; Shue, 2014; Vanderheiden, 2016, 2008). This is a rich area of interdisciplinary inquiry. For example, most economists support putting a price on carbon. (Few energy analysists think a carbon tax is sufficient for effective decarbonisation, but, so far as we know, most think it necessary.) The core challenge to carbon taxes is political, not economic (Rabe, 2018). A promising idea is to tie the price on carbon to a public dividend. On such a proposal, the money raised by taxing carbon is distributed to citizens in the form of a monthly or yearly dividend check. A virtue of this approach is that heavy users of fossil fuels and other carbon-intensive products are net losers (the tax to dividend ratio is low for them), while light users are net winners (the ratio is high for them). But this tax-and-dividend approach raises questions about distributive justice. Should all citizens receive equal amounts of carbon dividends? Or should those people who are most impacted by climate change receive more?

This is a pointed question because wealthy people tend to have the biggest carbon footprints. And yet, for some time at least, and in some (but not all) places, they will be the most insulated from the ill effects of climate change. This might speak in favour of paying higher dividends to those less wealthy people who have benefitted the least from our carbon-intensive economy and yet will suffer the most. However, this approach might render the politics of a carbon tax more difficult, as interest groups will vie for greater shares of dividends.

Such thinking demonstrates the relationship between climate change and racial justice, too. The distribution of wealth in places like the USA is highly racialized. A just carbon tax dividend scheme might rightly benefit non-white Americans. But this too may make its political prospects daunting (here it is worth flagging that the relationship between climate change and racial injustices is an issue that requires much more careful attention than it has thus far. The movement for climate change has been criticized for being too white and too focused on issues that are not urgent for Black people. We recognize that Black people face obstacles to participation (for instance, they may risk far more violent responses from police when protesting, as the use of 'white shields' in the Black Lives Matter protests suggests (gordon and Perugini, 2020), and that Black people in many places face more immediate problems. It is also true that some White supremacists have attempted to hijack the rhetoric of climate change for racist purposes. But it is also true that the impact of climate change will be fall disproportionately on non-white people, in developed and (especially) developing nations. Climate change is not in any sense an issue for White people).

Broader questions in political philosophy are also pressing. Does inaction in the face of climate change represent a human rights violation against those who are harmed by it (MacKinnon and Petersmann, 2019)? Is democracy up to the task of combatting climate change? Initial and valuable work has focused (appropriately) on the inadequacy of policy responses in some democratic countries and the values these inadequate responses represent (Morrow, 2019; Williston, 2015). In part because of these inadequate responses, a haunting possibility is that in the not too distant future, the severity of the climate crisis will be used as an excuse for anti-democratic measures.

Philosophers ought to get ahead of this possibility with serious ideas about what democracies can and can't do in the face of existential crises.

Similarly, in countries like Australia and the USA, political polarization is a central cause of national climate policy inaction. A core element underlying polarization is geographic, cultural, and informational "sorting." Increasingly, Americans live and work and interact with co-partisans alone. They have increasingly few points of meaningful contact with opposing partisans. The institutions through which opposing partisans do currently interact—such as social media—are failing them. Arguably, these points of contact are exacerbating, rather than decreasing, polarization. New institutions for social contact need to be conceived and created with an eye trained on the current and future interaction of climate change and polarization. Philosophers can help with this imaginative work.

Finally, as some groups of scholars have begun to consider, it seems possible, perhaps even likely, that the 21st Century—in no small measure due to climate change—will require a fundamentally new "moral political economy."[24] Neoliberalism—or if this is too vague a term, the tight relationship between capitalism and liberal political states—is increasingly under threat. What will be the new animating ideas around which political economy is organized? What *ought* these new animating ideas be?

5. *Conclusion*

It bears repeating: philosophers have already considered most of the questions we raised above. But the role their existing work plays in the philosophical community at large is out of proportion to the nature of the climate crisis. Moreover, we have not presented anything like a comprehensive discussion of the ongoing and potential points of contact between philosophy and climate change. We hope others will fill in the large gaps. Philosophers have had important things to say during the previous great crises in modern human history, from the Ancient Greeks to the contract theorists to critical theorists and beyond. This is all the truer when we look outside the Western tradition, for example, to the contrasting responses of Confucian and Daoist thinkers to the warring states period in China. It is overwhelmingly convincing, in our view, that climate change is *the* crisis of our era. We should be feverishly contributing what we can.

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[24] See, for example, the Moral Political Economy project at Stanford's Center for Advanced Study in the Behavioral Sciences (https://casbs.stanford.edu/programs/projects/creating-new-moral-political-economy). Philosophers have also proposed ideas for new institutions for the 21st Century aimed at addressing climate change, such as Broome and Foley (2016) "World Climate Bank" and Gardiner's (2014) "Global Constitutional Convention."

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