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Wouldn't Future People Like to Know? A Compensation-Based Approach to Global Climate Change

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I am submitting herewith a thesis written by Trevor Grant Hedberg entitled "Wouldn't Future People Like to Know? A Compensation-Based Approach to Global Climate Change." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Philosophy.

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Wouldn't Future People Like to Know?
A Compensation-Based Approach to Global Climate Change

A Thesis Presented for the
Master of Arts
Degree
The University of Tennessee, Knoxville

Trevor Grant Hedberg
December 2013

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DEDICATION

For my best friends

Bryce Baker, Colby Berry, and Jordan Huzarevich

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I thank the members of my committee for their support and encouragement on this project and the help they have provided me throughout my graduate career. In particular, I thank John Nolt, whose mentorship has been crucial to my personal and professional development. I am confident that John's influence has made me a better philosopher and (more importantly) a better person.

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ABSTRACT

Anthropogenic global climate change (GCC), understood as changes to the Earth's climate system resulting from greenhouse gas emissions caused by human beings, has emerged as one of the most pressing environmental problems in human history. Proposed responses to climate change typically focus on either mitigation or adaptation. Mitigation refers to the process of lessening the effects of GCC, most often by reducing our emissions of greenhouse gases. Adaptation refers to the process of helping those who will be adversely affected by GCC adapt to the environmental changes to avoid being harmed. There is, however, a third approach to the issue that has been unduly neglected in the literature: compensation. This approach focuses on what we can give to the victims of climate change to rectify the wrongful harms they have endured (or will endure). Since it is no longer possible to prevent all the adverse effects of climate change, compensation will be a vital part of any satisfactory global response to it, even one that pursued mitigation and adaptation to the fullest extent possible and began immediately.

Beyond addressing general questions about the compensatory duties generated by climate change, I consider whether knowledge transmission between generations can serve as a suitable form of intergenerational compensation and how it relates to other possible forms of intergenerational compensation. Ultimately, I defend five main claims. First, we have duties to compensate future people for the harms caused by GCC. Second, the transmission of knowledge from the current generation to future generations is a suitable means of compensating future people for the rights violations caused by GCC. Third, we cannot provide sufficient compensation to nullify the harms caused by GCC. Fourth, despite initial appearances to the contrary, striving to meet compensatory duties through intergenerational transfer of knowledge would not be irrelevant from the standpoint of public policy; pursuing these duties would carry

great practical significance. Fifth, duties of compensation should be undertaken primarily by the richer, developed nations, especially those that have historically contributed the most to GCC.

PREFACE

A dystopian future has served as the setting for many science fiction novels, films, and videogames. Whatever form the media takes, the central features of the story tend to be the same: decisions made by those in the past have left the present barren and degraded. Often, the basic infrastructure of nations and communities has all but collapsed, and the characters struggle for survival in a world where the basic luxuries of 20th- and 21st-century life seem like those of fairy tales.

What causes the dystopian future varies, but some methods have proven more popular than others. Often, these dystopias are a result of a nuclear war, as in Nevil Shute's (1957) *On the Beach* and Russell Hoban's (1980) *Riddley Walker*. Recently, nuclear fallout has become a popular backdrop for video games, particularly those in the *Fallout* series. In other cases, such as Mary Shelley's (1826) *The Last Man* and Stephen King's (1978) *The Stand*, the world has been ravaged by a deadly disease. *The Matrix* and *Terminator* film franchises offered yet another approach to the doomsday scenario, highlighting the possible dangers that advanced artificial intelligence could pose to human survival. Of course, the particular cause of the cataclysm is not always specified. Readers of Cormac McCarthy's (2006) *The Road* will never learn what caused the massive decrease in population or collapse of society. Of course, this omitted fact only reinforces the plight the characters face: they don't care about *why* life is so difficult; survival has become all that matters.

Strikingly, when perusing lists of post-apocalyptic fiction, one may notice that few tales feature the event that seems to be our most likely path toward a dystopian future: global climate change. There are a few exceptions. Saci Lloyd's (2009, 2010) *Carbon Diaries* series takes place in an alternate UK that has enacted carbon-rationing in the wake of severe weather disasters. The

setting of J. G. Ballard's (1962) *The Drowned World* is an Earth that has been ravaged by sea level rise. Although the sea level rise does not originate from emitting greenhouse gases, the submerged cities of America and Northern Europe are eerily similar to the possible outcomes of runaway climate change. The blockbuster film *The Day After Tomorrow* (2004) also dealt directly with climate change, albeit without much loyalty to realistic projections of its impacts. (The entire world is devastated in three days by several superstorms that arise as a result of climate change; the swiftness and severity of the damage may make for a more thrilling plot, but it is not consistent with established climate science.)

There are many possible reasons why climate change has been neglected in the realm of post-apocalyptic fiction. Perhaps it's too recent a phenomenon to have fully resonated in the minds of writers and readers. Perhaps the gradualness of climate change lacks the same force or atmosphere of an abrupt nuclear holocaust or plague. Or perhaps climate change is too close to the truth for people to really want to think about it. Often, the immersion in post-apocalyptic fiction is easier when one doubts that such a world could really come to pass. When playing the video game *Fallout 3*, one is not particularly worried that the world could soon become a desolate wasteland where vagabonds must fight 10-foot-tall rifle-wielding humanoid mutants just to secure daily rations. The enjoyment in playing comes in part from the fact that the game is a clearly a fantasy. But climate change is no longer mere fiction: a warmer, disaster-ridden world creeps ever closer to reality.

Climate change may be the greatest moral challenge humanity has ever faced. Its effects will last for millennia. Billions of people and countless nonhuman animals will be affected. Some people will lose their homes; others will suffer from drought and famine; many will die. Animal species will go extinct; natural wonders such as coral reefs and the arctic ice sheets will

be ravaged or eliminated entirely; changes in species migration and adaptation will forever alter ecosystems.

In light of these facts, collectively we must confront, to borrow a term from Stephen Gardiner (2012, p. 247), *Humanity's Challenge*. In broad terms, this challenge refers to our need to adapt to our conditions on Earth – namely, the limitations of the environment – in the midst of our rapid population growth, technological advancement, and environmental destruction (Gardiner 2012, p. 246-247). Among other things, meeting this challenge will require us to reduce our population growth, limit our pollution, and develop means of living that can be sustained by our environment. This thesis deals with an aspect of *Humanity's Challenge* that has been noticeably neglected. It proceeds from the perspective that, however much we may do to meet the *Challenge*, there will be some people who are wrongfully harmed by climate change.¹ These people, I will argue, deserve compensation for these harms. Thus, part of meeting *Humanity's Challenge* will involve rectifying the harms that cannot be avoided.

My contribution to meeting *Humanity's Challenge* is fairly modest, as it must be – climate change is too substantial and troublesome an issue to allow otherwise. My approach focuses entirely on what we owe *people*. The nonhuman world will likely be affected by climate change in even more severe ways than the human world, and though it would seem odd to speak of “compensating” nature, it seems quite plausible to think that some restoration of the natural world (insofar as it is possible) will be required. The anthropocentric focus of current discussions of climate change is indeed regrettable, but I must leave the task of addressing animals and

¹ Moreover, there are many people who are already suffering as a result of climate change.

nature to others.² There is still much about the human side of things that we have not settled, and it is that realm in which I hope to make a contribution. My approach is based almost exclusively on compensation, an underexplored moral dimension of climate change, and I am also concerned particularly with compensation based on epistemic – rather than monetary – goods. My hope is that this relatively nuanced approach will reveal some new options for our moral response to climate change and make us better able to meet the *Challenge* we now face, particularly since (as I discuss in Section I) efforts at mitigation and adaptation are not proceeding well.

Many are skeptical about the extent to which philosophy can contribute to solving problems of public policy and politics, and philosophers often have only a minimal role to play when it comes to putting a policy into practice. However, when done properly, philosophy can draw attention to aspects of public moral issues that are commonly overlooked or misunderstood, including potential solutions that would otherwise remain unexamined. Near the end of the thesis, when I make my policy recommendations, readers will find my suggestions only tentative, for I suspect that policies emanating from my theoretical conclusions would need to be discussed in detail by many who possess greater knowledge of the available options, the feasibility of those options, the policies' potential for abuse, and so on. Therefore, my primary aim is theoretical: I want to consider what compensatory duties (if any) we have to future people as a result of climate change, what role they might play in our ethical response to climate change, and what options we have regarding how we provide that compensation. I will make some policy recommendations, including with regard to what nations should shoulder the greater burden of

² Some have already begun this task. Gjerris, et al. (2011) suggest that our current animal agriculture practices must be modified as part of our effort to adapt to climate change and mitigate greenhouse gas emissions. In addition, Nolt (2011b) draws attention to the general neglect of nonanthropocentric approaches to climate change and proposes some further routes for developing a suitable nonanthropocentric climate ethic.

compensation, but in practice, these suggestions may have to undergo substantial alteration to be feasible. Nevertheless, they provide some first steps in thinking about how a large-scale compensatory effort (based on compensation of epistemic goods) could begin and, more importantly, an ethical explanation of why such an effort should begin that way.

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SECTION 1: INTRODUCTION

Our world is getting warmer. This fact, perhaps more than any other, poses a unique and powerful moral challenge to our contemporary way of doing things. The increase in our planet's average temperature may seem inconsequential, given its gradual nature and the fact that its most significant impacts will occur after we are gone, but this impression is misleading. Compared to other significant changes in the global climate, those currently occurring on Earth are happening at far faster rates than anything in human history. The effects, which will be devastating in impact and widespread in scope, are approaching at a much swifter rate than we once anticipated. No longer is it the case that changes in the climate will only affect the welfare of distant future generations: the problem is upon us now, and we cannot delay dealing with it any longer.

The Basic Problem

Anthropogenic global climate change (GCC) results from the emissions of greenhouse gases (GHGs) into the atmosphere. GHGs include (among other gases) carbon dioxide, methane, ozone, and nitrous oxide. These gases, which now exist at much higher levels than they did prior to the industrial revolution, absorb infrared radiation from sunlight that passes through the Earth's atmosphere. Normally, this effect is beneficial: it helps stabilize the climate and sustain an environment in which we can survive. But increases in GHGs have caused the Earth to warm significantly within the last 200 years. According to the fourth assessment report of the Intergovernmental Panel on Climate Change (IPCC), the average global temperature increased from 1906-2005 by $0.74^{\circ}\text{C} \pm 0.18^{\circ}\text{C}$ (2007b, p. 3). Initially, this amount may not seem significant, but the most recent ice age resulted from a global temperature that was only 5°C

lower than the average global preindustrial temperature. Small differences in the global climate can have enormous impacts.

The majority of the increase in global average temperature is a result of our emissions of carbon dioxide into the atmosphere. Pre-industrial levels of carbon dioxide were about 275 parts per million (ppm) by volume in the atmosphere. At the time of writing, we are rapidly approaching 400 ppm of carbon dioxide in the atmosphere.³ To make matters worse, despite several international conferences conducted with the hope of generating policies to reduce emissions, no substantial progress has been made. We are gripped by widespread political inertia. Although I will leave detailed descriptions of the effects of GCC for a later section, it is uncontroversial that unchecked climate change will cause millions of people to die and millions more to suffer severely (DARA 2012).⁴

In light of these facts, it is somewhat baffling that no substantive global action has been taken to address the problem. Nevertheless, when the intricacies of the problem are fully understood, it is not surprising that our traditional ethical systems and political institutions are ill-equipped to meet the challenge. Stephen Gardiner (2011a) characterizes GCC as a “perfect moral storm” because three of its distinctive features not only make understanding the problem difficult but also make us prone to inaction and (potentially) moral corruption.

The first of these features is the *global* nature of the problem, which gives rise to questions about what nations should bear the burdens of addressing GCC and what framework can be put in place to address the problem at the international level. Moreover, since no

³ In fact, some locations have recorded readings of 400 ppm. See National Oceanic and Atmospheric Administration (2013).

⁴ Even if we begin extreme mitigation efforts now, some of these effects are currently happening and will continue to happen for some time. I will return to this point in Section 2 when I discuss the harms of GCC.

individual or group of individuals can emit enough GHGs to cause GCC, the problem takes the form of an environmental tragedy of the commons: it is in everyone's individual interests to emit GHGs to better their lives, but disastrous consequences follow if everyone uses them this way.⁵ To echo Dale Jamieson (1992), "Today we face the possibility that the global environment may be destroyed, yet no one will be responsible" (p. 149). GHG emissions also vary from country to country, meaning that all nations are not contributing equally to the problem, and the potential impacts of GCC also vary across nations. In some cases, countries that have emitted very little (relative to other countries) risk facing some of GCC's most severe impacts.

The second noteworthy feature of GCC is that it is an *intergenerational* problem: the economic and social infrastructure that created it was put in place long ago, and many of those who caused (or at least contributed to) GCC are dead. These two factors make it difficult to determine just how responsible the current generation really is for GCC and what sacrifices are morally required of the beneficiaries of GHG emissions with respect to resolving the more general problem. The intergenerational dimension also raises questions about what we owe to future people, what moral standing merely possible people have, and how we should assess the morality of actions that determine the identities of these people.⁶

The third feature that gives rise to the perfect moral storm is *theoretical*. Cost-benefit analysis (CBA), the dominant economic approach to public policy, suggests that any steps taken to reduce carbon emissions should be minimal because the costs of adapting to the warmer world will be lower.⁷ But CBA is a controversial method that has been widely criticized.⁸ Perhaps most

⁵ For articulation and discussion of this kind of moral problem, see Hardin (1968).

⁶ This last concern, known as the nonidentity problem, will be discussed in detail in Section 2.

⁷ Bjørn Lomborg (2001) is one of the major defenders of this view.

⁸ For a survey of some of the standard criticisms, see Gardiner (2011a, pp. 247-298).

poignantly, when many people will suffer and die as a result of choosing the most economically advantageous policy, it seems difficult to justify such a policy *solely* because of its economic benefits. The moral costs, one thinks, are too high. CBA also employs social discount rates, which are ethically problematic. According to a social discount rate, the value of benefits and losses (which CBA measures in monetary terms) decreases at a specified rate of n percent per year. The result of employing a social discount rate is that the economic welfare of future people has little importance in CBA compared to the economic welfare of presently existing people. Intuitively, the welfare of future people seems like it should count equally to present people (since the time of one's existence is morally irrelevant), and it is thus unsurprising that finding a sound argument to support the use of social discount rates proves rather difficult (Parfit 1984, pp. 480-486). Unfortunately, ethical theories are not in much better shape: nearly all theoretical inquiries in the history of moral philosophy have focused on questions of right and wrong with respect to presently existing human beings. The temporal extension of these theories often proves problematic, as many recent explorations have demonstrated.⁹

Given the global, intergenerational, and theoretical difficulties raised by GCC, we face a plethora of tough questions about the morally appropriate response and how that response should be implemented. We also face a powerful temptation to continue with business as usual. Carbon-emitting technologies have made our lives far better and more convenient than they used to be, and those who will be most severely impacted by our actions – those in the distant future – will have no means of retaliating against us. We can reap the benefits of our GHG emissions and endure few of the negative consequences of them.

⁹ See, for example, the essays in Axel Gosseries and Lukas H. Meyer's (2009) *Intergenerational Justice*.

It would be impossible to provide an answer to every crucial question about GCC, even in a book-length work.¹⁰ Thus, my aim here will be substantially more modest. I will examine how we ought to respond to GCC by means of compensating those that are wrongfully harmed, an approach that appears both important and relatively unexplored in the current literature of the topic. In the remainder of this introduction, I contrast my compensation-based approach to GCC with adaptation- and mitigation-based approaches (which are the more common avenues for addressing the topic) and present my objectives for the rest of the project.

The Standard Approaches to Global Climate Change

Following Simon Caney (2012), I believe we can identify three distinct approaches to GCC. First and foremost, we can respond to GCC by trying to reduce our emissions of GHGs and bolster GHG sinks so that they absorb more of the gases. This approach is known as *mitigation* and focuses on lessening the effects of GCC. When it was discovered that preventing all changes to the climate was impossible, mitigation took center stage in policy discussions. It's not hard to see why: the most direct way to combat the problems caused by GCC would be to stop them before they become too severe.

An alternative to mitigation is *adaptation*. We might define this concept as follows: “where an agent is threatened by a climatic change, an action counts as [a]daptation if it prevents that climatic change from undermining or restricting that agent’s ability to do what they are entitled to do” (Caney 2012, p. 257). Adaptation can take many forms. Building sea walls can serve as a means of adaptation by protecting vulnerable communities from rising sea levels. In

¹⁰ Stephen Gardiner’s (2011a) *A Perfect Moral Storm*, one of the most comprehensive examinations of GCC, is 489 pages, and less than 100 of them touch on potential solutions to the problems raised by GCC. The bulk of the book is an attempt to simply get clear on what the problems *are*.

areas where GCC will expand a disease's transmission zone, adaptation may include inoculating the local communities against that disease.

Mitigation and adaptation are not mutually exclusive, and an adequate response to GCC will likely require that we pursue both these strategies to some degree. But there is a third approach that has been largely neglected in policy discussions about GCC: *compensation*. Often, we rectify past wrongs by compensating the victim for the wrongful harm they suffered. If mitigation and adaptation efforts fall short and some people are thereby "prevented from doing that which they are entitled to do," then those individuals harmed by GCC will be owed compensation (Caney 2012, p. 258).

Of course, merely preventing someone from doing what she is entitled to do will not always ground compensatory duties. A disease could prevent a person from doing what she is entitled to do, but it is not clear why anyone would owe her compensation for this. But unlike GCC, disease need not be caused by human agency and need not be a wrongful harm inflicted on another person. In the case of GCC, compensation is owed because the following three conditions are met: (1) people will be prevented from doing what they are entitled to do (2) as a result of intentional human actions with foreseeably bad consequences, and (3) their being prevented from acting in this way is morally unjustified. I will ultimately defend (1) by examining the ways that GCC violates human rights. (2) does not require an elaborate defense: in the wake of current climate science, we can no longer pretend that our GHG emissions are not contributing to GCC or that we are wholly ignorant of the consequences of GCC. We know GCC is happening, we know its causes, we know its consequences, and we are not being coerced into causing it. My defense of (3) will, to some extent, be entwined with my discussion of human rights, but I will also dismiss some potential justifications of our activities (e.g., the nonidentity

problem, compensatory benefits objection). After all, many activities meet conditions (1) and (2) but seem morally justified nonetheless (e.g., incarcerating criminals). I will argue, however, that GCC is not one of these activities.

Beyond focusing on general questions about the compensatory duties generated by GCC, I want to consider whether knowledge transmission between generations can serve as a suitable form of intergenerational compensation and how it relates to other possible forms of intergenerational compensation. Other compensation-based approaches have focused almost exclusively on monetary compensation, typically in the form of a fund that the victims of GCC can use to ameliorate the harms they suffer.¹¹ Intuitively, this form of compensation seems the simplest and most direct, but as I will later argue, there are some good reasons to wonder whether this form of compensation alone is the best way of fulfilling our compensatory duties to future people.

Nevertheless, one might be skeptical of the value of a project focused on compensation. After all, mitigation and adaptation are more direct ways to address GCC, and if they are successful, there will be no need for compensation. Thus, wouldn't the best way to address climate change be to focus on resolving the problems associated with those approaches?

A number of responses are in order. First, it is no longer possible to fully prevent the adverse effects of GCC. In fact, there are already people being affected. Hence, even if we were to put all our efforts into adaptation and mitigation tomorrow, there would still be compensatory duties generated by GCC. Second, at the moment, it is extremely doubtful that we will head full-throttle into mitigation and adaptation efforts anytime in the immediate future. Thus, over the next several decades, it appears the scope of our compensatory duties will increase dramatically.

¹¹ For some examples, see Baatz (2013), McKinnon (2012, pp. 72-106) and Farber (2008a; 2008b).

Third, because GCC presents such special difficulties and has consequences of such a devastating and wide-reaching nature, we ought to consider as many feasible methods of addressing the problem as possible, even if these responses seem unorthodox at first glance. A recent examination of human engineering – biomedically modifying human beings to make them better at mitigating GCC – serves as a good example of this idea (Liao, Sandberg, and Roache 2012). Whether human engineering should actually be adopted, the authors contend it ought to be examined and carefully considered among our other options. The ongoing discussions of geoengineering – the intentional, large-scale modification of the climate system to reduce the effects of GCC – are similar in spirit: given the problems we face, we should be willing to consider a wide range of potential solutions.¹²

Theses and Outline

In this thesis, I defend five main claims. First, we have duties to compensate future people for the harms caused by GCC. Simplified, the supporting argument for this claim runs as follows. The adverse effects of GCC deprive both presently existing and future people of their human rights. As a result, they are deprived of things to which they are entitled. Since we have a moral duty to prevent GCC from depriving these people of these things, we violate their human rights.¹³ Compensatory duties arise from these human rights violations. This argument and some important objections to it are addressed in Section 2.

Second, the transmission of knowledge from the current generation to future generations is a suitable means of compensating future people for the rights violations caused by GCC.

¹² For an overview of geoengineering, see Keith (2000).

¹³ Admittedly, the “we” in this sentence is somewhat nebulous. Though I mean it to refer to collective humanity, it will become clear in later sections that I think most responsibility for GCC originates with developed nations.

Although in certain contexts it will not be the *best* means of intergenerational compensation, it may sometimes prove the most feasible and can serve as an important component of a satisfactory compensation policy. These claims, as well as a general explanation of the value of knowledge and how knowledge transmission relates to other potential forms of intergenerational compensation, are addressed in Section 3.

Third, we cannot provide sufficient compensation to nullify the harms caused by GCC. Compensation cannot, in other words, make the negative effects of GCC morally innocuous. I argue for this claim in Section 4.

Fourth, despite initial appearances to the contrary, striving to meet compensatory duties through intergenerational transfer of knowledge would not be irrelevant from the standpoint of public policy; pursuing these duties would actually carry great practical significance. Part of its importance would be symbolic – representing a substantive first step toward solving the climate change problem – but fulfilling these duties would also have some major impacts for public policy. I defend this claim in Sections 5 and 6. Section 5 addresses the symbolic importance of codifying an epistemic compensation scheme for GCC, and Section 6 focuses on the potential ramifications for public policy.

Fifth, duties of compensation should be undertaken primarily by the richer, more developed nations. In Section 7, I articulate four different moral considerations that create a virtually overwhelming case that responding to GCC is primarily the duty of developed nations. Since compensation will be a significant component of the general global response to GCC, it follows that it will also be primarily the responsibility of developed nations to provide compensation to the present and future victims of GCC.

Beyond defending the claims discussed above, I also consider what role compensation should play in our broader response to GCC. This discussion takes place primarily near the end of Section 3, but it is revisited in Section 8. Section 8 also features a brief summary of the entire thesis and some reflections on our predicament with respect to our rapidly changing climate.

SECTION 2: INTERGENERATIONAL DUTIES OF COMPENSATION

In this section, I argue that we have duties to compensate future people for the wrongful harms caused by GCC. I begin by addressing a fundamental philosophical problem in intergenerational ethics rooted in the dependence of future people's existence on our present actions. In responding to this objection, I introduce a threshold notion of harm based on human rights and use this definition of harm to ground future people's claims to compensation.

The Non-Identity Problem

The non-identity problem is one of the most discussed philosophical conundrums in intergenerational ethics. Its most well-known presentation originates with Derek Parfit (1987, pp. 351-379), but Gregory Kavka (1982), Robert Adams (1979), and Thomas Schwartz (1978) also discovered and articulated the problem. It arises from the observation that many of our actions affect the identities of future people – that is, they affect which particular people come into existence.

Parfit (1987) begins his articulation of the non-identity problem by defending the following claim: “If any particular person had not been conceived within a month of the time when he was in fact conceived, he would in fact never have existed” (p. 352). Following Parfit, let's refer to this as the Time-Dependence Claim. This claim rests on the assumption that one's genetic constitution is an essential part of one's identity. In other words, had a different combination of my parents' genetic code been united at conception, I would not have been born; my parents' would have still had a child, but that child would not have been *me*. Given the child's different genetic makeup, he or she would have been a completely different person. One could raise metaphysical doubts about this claim, but I do not intend to challenge it. I do not see this claim as one of the non-identity problem's vulnerabilities.

The time-dependence claim proves important in the context of intergenerational ethics because most accounts of harm are based on a counterfactual comparison. These accounts assume the following Harm Principle (H1): a person P is harmed by action A only if P is made worse off by A than P would have been had A not been performed.¹⁴ According to this principle, when trying to determine whether P was harmed, we must consider how P would have fared if A had not been performed. First, we imagine all the nearest possible worlds where A has not been performed. If we judge that P is worse off in each of these possible worlds, then she has *not* been harmed by A; in contrast, if we judge that P is not worse off in each of these possible worlds, then she may have been harmed by A.¹⁵

We can begin to see how the combination of time-dependence claim and H1 generates the non-identity problem, but an example will bring it into a clearer light. Consider the *Slave Child* case:

In a society in which slavery is legal, a couple that is planning to have no children is offered \$50,000 by a slaveholder to produce a child to be a slave to him. They want the money to buy a yacht. Should they sign the agreement, accept the money, and produce the child? On the assumption that life as a slave is better than never existing, their doing so would not harm the child. For if they turned down the slaveholder, they would either produce no children or—if they later changed their minds about becoming parents—produce other children. Thus, all involved—themselves, the slaveholder, and the slave child they would produce—would benefit from the arrangement (Kavka 1982, p. 100).¹⁶

¹⁴ I borrow this formulation for the Harm Principle from Nolt (2013, p. 114).

¹⁵ Since H1 specifies only a necessary condition for a harm to have occurred, it is possible for this condition to be met but the person to have not been harmed. Examples of this circumstance are not hard to imagine: a person can freely consent to an arrangement that makes her worse off than she would have been absent the arrangement, and it is not clear that this person would *always* be harmed by such an arrangement. In other words, H1 is not obviously sufficient for A to be deemed a harm. Nevertheless, there are those who argue that H1 is properly read as specifying as *both* a necessary and sufficient condition for P being harmed (e.g., Kloocksiem 2012). For our purposes, however, my (weaker) version of H1 is all that needs to be discussed because the non-identity problem does not require that H1 also specify a sufficient condition for harm.

¹⁶ I have omitted two footnotes from this quotation. In one of them, Kavka notes that even if the couple tried to conceive the identical child that would have been enslaved if they agreed to the arrangement, it is extraordinarily unlikely they would succeed – things would not be exactly the same as they otherwise would have been, and so a different child would be conceived.

When we tie the time-dependence claim and H1 together, we lose the ability to say that the child has been harmed even though she is now a slave because being a slave is a necessary condition for her existence. Remember that the time-dependence claim states that we must all have been born within one month of when we were actually born in order for our identities to remain the same; otherwise, someone else would have been born, and we would never have existed. Thus, the slave child would not have existed if she had not been conceived in close temporal proximity to when she was actually conceived. If we suppose that the parents would never have had a child near this particular time absent this arrangement, then – assuming that the child’s life as a slave is worth living – she is not made worse off by this arrangement because her existence is better than nonexistence. Under such circumstances, we are left with a perplexingly counterintuitive conclusion: the child, on this account, has not been harmed by being born into slavery.

The non-identity problem does not just threaten our commonsense convictions about cases like *Slave Child*, however. Consider a case of long-term environmental policy, which we’ll call *Depletion*:

As a community, we must choose whether to deplete or conserve certain kinds of resources. If we choose Depletion the quality of life over the next two centuries would be slightly higher than it would have been if we had chosen Conservation. But it would later, for many centuries, be much lower than it would have been if we had chosen Conservation... Suppose that we choose Depletion. Is our choice worse for anyone? (Parfit 1987, pp. 362-363).

While there seems something seriously wrong with depleting resources and lowering the welfare of future generations in this way, the non-identity problem suggests there may *not* be anything wrong with doing so. If future people still have lives worth living and choosing Depletion causes a completely different set of people to come into existence than would have existed if we had chosen Conservation, it does not appear that anyone has been harmed by our actions. After all, no one is worse off in Depletion than they would have been if we had chosen Conservation; the

people who must deal with the depleted resources in Depletion would not exist if we had not chosen such a policy.

In many ways, choosing *Depletion* parallels a choice *not* to mitigate our emissions of GHGs. People in the near future will be better off if we continue emitting GHGs, and future people will have a lower quality of life as a result. Moreover, altering our economic and social infrastructures such that we no longer emit as many GHGs (e.g., by developing alternative sources of energy that do not require fossil fuels) would significantly alter what future people come into existence. Plausibly, within a few generations of implementing such a change, none of the people who would have existed in the unmitigated-emission world will come into existence; the inhabitants of the mitigated-emission world will be a completely different set of people. As a result, future people whose quality of life is reduced by our GHG emissions will not be harmed by our emissions, for they depend on these emissions for their very existence.

Because of its deeply counterintuitive conclusion and its potential impact on what we owe future people, the non-identity problem has received a myriad of responses. According to a common line of reply, it is possible to condemn acts for their consequences on particular people (including oneself) even when one's own existence depends on the act being criticized and one is made better off by the act's performance.¹⁷ I will eventually pursue and endorse a variant of this response, but before proceeding I intend to challenge the significance of the non-identity problem on its own terms. For the moment, I will assume the basic argument for it succeeds and try to show that we still have significant obligations to future people under these conditions.

¹⁷ For some examples of these responses, see Jumar (2003), Nolt (2011a, pp. 71-72), 't Hooft (1999, pp. 50-51), and Woodward (1986).

The Limits of the Nonidentity Problem

Let us imagine that we are unable to find firm grounds for rejecting the non-identity problem. Would it follow that we have no (or very few) obligations to future generations? I doubt it. The non-identity problem is not as applicable to pressing intergenerational moral concerns as many often believe. After all, GCC is no longer a moral concern of only future people. The world of today is changing: the polar ice caps are melting, droughts and severe storms are becoming more prevalent, and animal species are going extinct – all because of changes in the global temperature. We no longer have the luxury of pretending that GCC is a moral problem that concerns only distant future people. Anyone who lives until 2050 (which will likely include much of Earth’s current population) will doubtlessly live to see some severe impacts of GCC. In some parts of the world, currently existing people have already been affected, even if it may be difficult to trace precisely who has been affected and in what ways.¹⁸ Presently existing individuals (and individuals who will come into existence no matter what policy on climate change we adopt in the near future) do not require our continued GHG emissions to exist, so the non-identity problem does not apply to them. Thus, the harms they are suffering (or will suffer) from our continuing emissions of GHGs would have to be justified by appealing to something other than the non-identity problem.

Nevertheless, even if some are harmed by GCC, the non-identity problem still bears significantly on just *how many* people are harmed, and since I will later ground compensatory duties to future people in the harms suffered through human rights violations, it could likewise bear on the scope of our compensatory duties to future people. Far fewer future people (i.e., only

¹⁸ I’ll explore this claim in greater detail later in this section.

those whose identity was not dependent on GCC in some way) are owed compensation if the non-identity problem cannot be resolved.

But this thought may be too hasty. Suppose that some presently existing people are owed compensation and that at least a portion of that compensation goes unfulfilled. Their heirs may inherit rights to that compensation. Bernard Boxill has used similar reasoning to argue that African Americans are owed reparations for the previous enslavement of their ancestors (Boxill 2003, pp. 69-85). Their ancestors had justified claims to compensation for the wrongful harms caused by slavery. This compensation was never provided. Thus, much like descendants often acquire rights to the property of their predecessors, present-day African Americans have a right to receive compensation for the wrongful harms of slavery. Janna Thompson (2002), who also defends some forms of reparations on the basis of inheritance (pp. 113-129), notes how this argument bypasses the non-identity problem:

The claims of descendants depend on their being the heirs of their forebears – not on their being the particular individuals that they are. The fact that they might not have existed if the injustice had not been done does not undermine their claim (p. 108).

Boxill and Thompson's arguments are not uncontroversial, of course, but I highlight this line of argument to sketch a potential means of grounding compensatory duties to future people despite the non-identity problem.

My first response to the non-identity problem was that it does not apply to a large number of people who will be affected by GCC.¹⁹ My second response is that it does not apply to those people who ultimately have lives not worth living. One of the crucial aspects of the non-identity problem is that those whose existence is dependent upon the otherwise harmful action must have

¹⁹ Although I have limited my remarks to discussing GCC because that is the focus of this project, I see no reason to think that an analogous response could not be made with regard to many other intergenerational moral problems (e.g., resource depletion).

lives worth living – if they do not have lives worth living, then they can claim to have been harmed on the grounds that it would have been better for them not to exist. If they did not exist, they would be spared a life where their suffering outweighs their overall enjoyment.²⁰ Thus, in cases similar to *Depletion* where future people have lives not worth living, we have plausible grounds for claiming that things really would have been better for those particular people if we had not performed the actions that caused them to exist. It is difficult to specify what constitutes a life “not worth living,” but one characterized by extreme suffering – for instance, from severe dehydration, starvation, or disease – seems like a plausible candidate for such a life, especially if one has such a life from the time of birth (or shortly thereafter) and continues to live in this state until death. GCC, especially if it is unmitigated, will cause outcomes like this for some future people: some of them will be condemned to lives not worth living and be able to plausibly claim they have been harmed by GCC, even if we endorse a counterfactual-comparison account of harm.²¹

Third, even if we are unable to identify anything wrong with the argument supporting the non-identity problem, we might still be reluctant to accept the conclusion. Confronted with a strong intuitive judgment that harms are being done to the affected parties in *Slave Child* and *Depletion*, some philosophers might think that the argument is simply mistaken. Henry Shue

²⁰ There are some difficulties in comparing one’s welfare in a world where one exists to one’s welfare in a world where one does not exist. The comparison seems inappropriate because one does not have any welfare at all when one does not exist. Nevertheless, some have defended the view that we can equate one’s welfare when the person does not exist to 0. For some defenses of this view, see Roberts (2003), Feldman (1991), and Holtug (2001). For some critics of this view, see Bykvist (2007, pp. 339-445), Broome (1999, p. 168), Cohen (1996, p. 22), and Heyd (1992, pp. 30-33). While I find nothing unintelligible about comparing two possible worlds – one in which I exist and one in which I do not exist – and making a judgment about which one would be better for me, addressing the deep theoretical issues here would take us too far afield.

²¹ I may be understating the argument’s import. Some authors, such as Benatar (2006, pp. 60-92) and Tännsjö (2002), have argued that we greatly overestimate how good our lives actually are. If these views are correct, then it is much easier to have a life not worth living than is commonly thought, and thus, the non-identity problem will apply to an even narrower range of cases.

(2010), for instance, remarks that “individual nonidentity has no implications at all for what we ought to do. At most, it has some implications for how we explain our moral judgments” (p. 159, en. 3). On Shue’s view, what the non-identity problem reveals is that we need to explain our moral judgments about intergenerational ethics in a different way than using H1. If one prioritizes intuition over theory, then this response to the non-identity problem will be appealing. One might be sympathetic to Thomas Nagel’s outlook on counterintuitive discoveries:

I believe one should trust problems over solutions, intuition over arguments, and pluralistic discord over systematic harmony... Given a knockdown argument for an intuitively unacceptable conclusion, one should assume there is probably something wrong with the argument that one cannot detect... If arguments or systematic theoretical considerations lead to results that seem intuitively not to make sense... then something is wrong with the argument and more work needs to be done (Nagel 1991, p. x).

Although the deep questions about the appropriate methodology in ethics cannot be pursued at length here, I must pause to acknowledge that I do not endorse this defense. It is simply too uncompromising: our intuitions, whatever their merits, can surely be mistaken in some circumstances. At a certain point, stubbornly denying a theoretical conclusion that is well-defended and has been subjected to careful scrutiny becomes irrational denial, no matter how contrary to intuition the conclusion may seem.

There is, however, a more balanced methodology that might provide a better response to the non-identity problem. Many philosophers are attracted to the method of seeking reflective equilibrium.²² According to this approach, we try to achieve a balance between our pre-theoretical judgments and the conclusions of compelling theoretical arguments. The goal is to achieve a balance between these two forces – a theory that captures and explains our pre-theoretical judgments as well as possible. Sometimes, we will recognize that our pre-theoretical

²² John Rawls is often credited with coining this term. See Rawls (1999, pp. 40-46).

judgments are unsustainable. Perhaps they are inconsistent with other values we hold or indefensible in the wake of certain powerful arguments. Other times, we may discover that our theories have misled us – they have permitted something that cannot, on any plausible account, be morally permissible.²³ With respect to the non-identity problem, we find ourselves in a state of reflective disequilibrium: we have a strong theoretical argument at odds with a deeply held intuition. How should we respond to this state of disequilibrium?

One plausible response would be to regard the harms of GCC as seriously morally wrong even if they ultimately turn out not to be. In taking this route, we are effectively adopting a precautionary principle.²⁴ Given that the non-identity problem remains a contentious issue, it seems appropriate to err on the side of caution and assume (for the moment) that the adverse effects of GCC are genuine harms, particularly because the magnitude and severity of these effects will be enormous. Since our considered judgments about cases involving the non-identity problem and our theoretical accounts of what constitutes harm appear at odds with one another, we ought to refrain from jeopardizing the lives and welfare of so many future people until we are more certain that we really are not causing them any harm. We may also be worried that our endorsement of the non-identity problem is a rationalization – a reason to embrace our self-interested GHG emissions because doing so doesn't actually make any future people worse off. This reasoning sets a “frightful moral trap for future generations” because distant future people will rarely have grounds for complaining about what happened in the distant past, for those

²³ To offer one common example of this phenomenon, some defend abortion because they do not believe it results in the death of a person: a fetus lacks the cognitive capacities required for personhood. Defenders of this view are sometimes criticized on the grounds that infants will also fail to meet the requirements for personhood and so their view must entail that infanticide is morally permissible. But because we have such strong convictions that infanticide is wrong, this personhood-based argument must be mistaken. The counterintuitive conclusion is thus used as a *reductio ad absurdum* against the original defense of abortion.

²⁴ This thought is echoed in Davidson (2008, p. 482).

particular future people would not have existed if things had been different ('t Hooft 1999, p. 51). The self-serving nature of this reasoning gives us all the more reason to suspect that something in it is amiss, even if we are unable to pinpoint precisely what it is.²⁵

Virtue theorists and their sympathizers may also wonder how much work the moral notion of “harm” really adds to these identity-altering cases. Surely, even if we come to think that the child in *Slave Child* is not harmed by her parents in that case, it does not follow that the parents’ action cannot be morally criticized. We could rightly ask, “What sort of person cares so little about the fate of his or her child?” The answer will not portray the person in a positive light, for such a person is surely too callous, too indifferent to the fate of her child. Virtuous parents would not, if they could avoid doing so, bring a child into existence for the purpose of selling the child into slavery.

We can ask a similar question about *Depletion*. If we were to pursue such a policy, we may ask, “What does this choice reveal about our collective moral character?” Again, the answer is unflattering. Following Gardiner (2012), we might think such people demonstrate vices of recklessness, callousness, and shallowness (pp. 244-245). Jason Kawall (2012) suggests that such behavior, at least as it manifests in the case of GCC, may demonstrate the vice of “modest greed” – the vice of excessively pursuing goods that are (at most) only modestly important (pp. 227-231).²⁶ In *Depletion*, the current generation already has a very high quality of life: their

²⁵ David Boonin has recently offered an explanation for why so many philosophers have intuitively recoiled from accepting the conclusion of the non-identity problem. If his diagnosis is accurate, then this would give us some reason to abandon the precautionary approach because we would have stronger grounds for trusting the theoretical verdict generated by the non-identity problem. See Boonin (2008).

²⁶ Gardiner (2012) makes a similar point regarding GCC: he suggests our emissions of GHGs may reveal a commitment to “at best minor values, at worse meaningless fluff” (p. 246). We may, he argues, be bringing about environmental catastrophe in pursuit of things that are not actually very valuable (e.g., large homes maintained at 71 degrees Fahrenheit year-round).

pursuit of a minor increase in welfare that results in a rapid drop in the welfare of distant future generations may indeed express a form of greed.

The takeaway from these virtue-oriented assessments is simple: the parents in *Slave Child* have strong moral reasons not to conceive a child under those circumstances, and the current generation in *Depletion* has strong moral reasons to choose the policy of Conservation. These verdicts hold even on the assumption that the child in *Slave Child* and the future people in *Depletion* are not harmed by what happens to them.²⁷

The replies presented so far have assumed that the basic underlying sentiments of the non-identity problem cannot be challenged. I put them forward in the hope that even those unconvinced by my imminent and more direct response to the non-identity problem will still believe that GCC is morally objectionable, even with regard to those people whose identities depend on its occurrence, and that it will still cause *some* harms to future people that could still potentially ground compensatory duties. I now attempt a straightforward refutation of the non-identity problem by challenging its assumed definition of harm.

Human Rights and a Threshold Account of Harm

Recall that the non-identity problem assumes a counterfactual definition of harm. Specifically, it assumes the truth of H1: a person P is harmed by action A only if P is made worse off by A than P would have been had A not been performed. I reject H1 because I do not think this counterfactual comparison is necessary for claiming that an action harms a person. Thus, I propose the following two principles to capture the notion of harm:

²⁷ It may be possible to construct a case involving the non-identity problem that is not vulnerable to obvious virtue-ethical objections, but if it is possible, I am aware of no such formulation of it. Parfit's (1987) *14-Year-Old Girl* (p. 358) and Boonin's (2008) *Wilma* (p. 128), for instance, are vulnerable to these same kinds of virtue-ethical critiques.

H2: If a person P is made worse off by action A than P would have been had A not been performed, then P is harmed by A.

H3: If a person P has a human right violated by action A, then P is harmed by A.

H2 retains the counterfactual comparison that is usually invoked when we discuss whether someone has been harmed. Clearly, if you have been made worse off by an action than you otherwise would be, then you were harmed by that action. But H2 is only a *sufficient* condition for one being harmed; it is not a *necessary* one (as H1 suggests). H3 specifies another sufficient condition for one being harmed – when one’s human rights are violated, even if their violation is required for one to exist.

Two features of H2 and H3 are worth noting. First, these two principles may not exhaust the circumstances in which one can be harmed. Some philosophers have proposed other non-comparative accounts of harm that might provide conditions that could be added this list. Seana Shiffrin (1999) argues that “harm involves conditions that generate a significant chasm or conflict between one’s will and one’s experience, one’s life more broadly understood, or one’s circumstances” (p. 123). Elizabeth Harman (2009) suggests that a sufficient condition for an action’s causing a harm is that “it causes the person [affected] to be in a bad state” and gives examples of “pain, mental or physical discomfort, disease, deformity, disability, or death” (p. 139). While I will not rest any of my case on these accounts of harm (or similar ones), I stress that there is no conflict between these accounts and my own because H2 and H3 are presented only as *sufficient* conditions for harm, not necessary ones.

Second, it may be possible to set the threshold specified in H3 to be lower than human rights violations. Shiffrin and Harman’s accounts suggest as much, since they can be interpreted as threshold views of harm and will clearly identify some actions as harms that are not grievous

enough to be human rights violations and do not rely the counterfactual comparison required by H1. For my purposes, however, I do not think it necessary to try to lower the threshold of harm to encompass any actions other than the violations of human rights.

The reason to adopt this threshold account of harm (beyond the fact that it can accommodate the intuition that the future people are being harmed in *Slave Child* and *Depletion*) is tied to the nature of human rights and how they morally function. While the concept of human rights is fairly complex, Simon Caney (2010) offers a succinct encapsulation: “[H]uman rights specify minimum moral thresholds to which all individuals are entitled, simply by virtue of their humanity, and which override all other moral values” (p. 165). Henry Shue (1996) provides further clarification in his account of basic rights:

Basic rights are a shield against at least some of the more devastating and common of life’s threats, which include...loss of security and loss of subsistence. Basic rights are a restraint upon economic and political forces that would otherwise be too strong to be resisted. They are social guarantees against actual and threatened deprivations of at least some basic needs. Basic rights are an attempt to give to the powerless a veto over some of the forces that would otherwise harm them the most (18).²⁸

Caney and Shue identify the key elements of human rights: they are a form of social protection from fundamental destructive harms and offered to every human being. Specifically, they prevent the weak or defenseless from being harmed unjustly by those with greater power or authority. These rights are not created by a contract; they are bestowed on everyone simply by virtue of being human.²⁹

²⁸ Shue’s use of the term “basic rights” instead of “human rights” is inconsequential. His account of basic rights is consistent with standard conceptions of human rights, and his emphasis on basic rights illustrates that the topic of his book concerns the rights that he feels are the most fundamental – namely, the right to security and the right to subsistence.

²⁹ There are some tough questions here about whether merely “being human” is sufficient to have human rights. Some have argued, I think persuasively, that species membership alone is insufficient for making robust claims about moral status (e.g., Singer 2009). I am inclined to think that human rights are only acquired (or at least only acquired to their fullest extent) once a human being reaches the status of personhood and that extraterrestrial

Human rights are tied to fundamental human interests – interests that all human beings have in virtue of the kinds of creatures they are. Virtually any argument defending human rights will depend in some substantial way “on emphasizing that the interest to which the right is asserted is genuinely important, vital, indispensable, etc.” (Shue 1996, p. 8). Everyone has a vital interest in not being enslaved, killed, arrested arbitrarily, deprived of access to food and water, or punished in cruel and degrading ways. Thus, the prohibitions in the United Nations (1948) Declaration on Human Rights regarding slavery (Article 4), torture (Article 5), arbitrary arrest (Article 9), and many other immoral activities seem important enough to be secured by human rights.

There are some human rights that may not seem tied as crucially to vital human interests as others, such as the right to periodic paid vacations (Article 24) or the right “freely to participate in the cultural life of the community” (Article 27), but we do not need to worry about the more controversial human rights. The main rights violated by GCC will be the most fundamental: the right to life, the right to health, and the right to subsistence.³⁰ Everyone has a right not to be killed for arbitrary reasons, a right not to have his or her health seriously threatened by the actions of others, and a right not to have the means of subsistence denied them by others (Caney 2010, pp. 166-168). Given that these rights are quite basic and relatively uncontroversial, we can infer that violations of these rights *prima facie* constitute a very serious harm. It does not matter if some particular person cannot be born in the future unless they are

creatures that fulfill the requirements of personhood would have these rights. Nevertheless, I will continue to use the term “human” rights for the duration of the thesis. This concern is, at most, peripheral because many (if not the vast majority) of those human beings affected by GCC will be persons at some time during which they are affected.

³⁰ To clarify, my position is not incompatible with a view that approaches climate change by appealing to a more robust repertoire of human rights. I merely intend to focus on the least controversial rights in this thesis. I leave the task of broadening my approach through the incorporation of further human rights for another time (and perhaps for another philosopher).

born in a condition where their human rights are violated: what matters is that the person, by virtue of being a human being, has certain vital interests that demand moral protection and that these vital interests have not been adequately protected. Insofar as the person's human rights, which are meant to protect these vital interests, are violated as a result of intentional human action, the person can be claimed to have been harmed because they have been forced to live in morally unacceptable circumstances. They have fallen below a moral threshold that no person should sink beneath.³¹ After all, human rights are supposed to be socially guaranteed and generally take precedence over other moral values.

In summary, future generations are entitled to compensation for the harms suffered through GCC because these harms will often be severe and unjust violations of their human rights. (Naturally, this reasoning also entitles currently existing people who are harmed by GCC to the same compensation.) People's lives, health, and access to subsistence will be jeopardized, and these harms are particularly egregious because human rights are supposed to be the first moral value to be secured. Since we are collectively responsible for these human rights violations, and future generations have no means of defending themselves against our violations of their rights, we owe future generations some form of compensation.³²

Two Objections to a Rights-Based Approach

Before proceeding, two substantive objections to a rights-based approach to GCC must be addressed. The first questions whether future people, in cases where their identities depend on the performance of a past rights violation, would waive their rights. The second questions

³¹ In constructing this argument, I have benefited from a similar presentation offered by Derek Bell (2011, pp. 104-110).

³² At this juncture, one may entertain the thought that these rights violations can be effectively nullified if our compensation is sufficient. I will address this thought in Section 4.

whether it makes sense to ascribe rights to people who do not yet exist. I argue that both these objections are unconvincing.

Parfit (1987) draws on the story of a middle-aged man who had been born to a 14-year-old mother (p. 364). In response to a British politician who was pleased in the reduced number of teenage pregnancies the previous year, this man argued that his life was now well worth living, despite the young age of his mother when he was born and the difficulties he faced as a child. He found it outrageous to think it would have been better for him not to be born. If we claimed that the mother's act was wrong because she violated a right that her son had (perhaps the right to a good start in life), her son could declare that he had waived this right, which would undermine a rights-based objection to her act. The worry, then, is that future people who depend on rights violations for their existences might (in retrospect) be willing to waive their rights. In those cases, it does not seem that their rights would actually be violated, just as two married individuals do not violate one another's rights to privacy (Parfit 1987, p. 364).

This rights-waiving objection has some appeal: there are certainly some contexts where our waiving our rights seems to permit what would otherwise be right-violating behavior. Nevertheless, the objection should be rejected for two reasons. First, when we make decisions about future people waiving their rights, we have to *assume* they would agree to this arrangement. They cannot consent to waive their rights at the time the decision is made, and since people vary with respect to what they value and what kind of life they deem one worth living, assuming they will agree to waive their rights is problematic. It is also worth recognizing that rights-waiving usually occurs *before* the rights-violating procedure is undertaken. Rare cases where these measures are not required typically include life-threatening situations, such as emergency surgery performed on an unconscious patient in critical condition. The extreme

nature of these exceptions only demonstrates how infrequently such procedures can be morally condoned.

The rights-waiving objection also faces an additional problem, one that is perhaps more fundamental. In some cases, a person's waiving their rights does not seem to negate the occurrence of a rights violation. Consider *Quicksand*:

One day, while trekking through the jungle, Allan encounters a man trapped in quicksand. The sinking man begs for Allan's help, but Allan is reluctant to offer it. He lacks the proper equipment and could not pull the man out without at least a little risk of falling in himself. After some deliberation, however, Allan offers to help the sinking man on the condition that if Allan helps him escape the quicksand, the man will become Allan's servant for the remainder of his life. As he sinks deeper, the man reluctantly agrees. Allan saves him and then demands that the rescued man adhere to their agreement (Palmer and Hedberg 2013, p. 407).

There is a clear sense here that the trapped man has waived his right not to be a servant, but is it really plausible to think that there is no rights violation occurring here? Sure, this man has agreed to be Allan's servant, and given his options, he would not alter his choice. But this does not seem like the kind of rights-waiving that dissolves a rights violation: it is not the same as when two people agree to get married and are therefore no longer violating one another's rights to privacy. In *Quicksand*, Allan has exploited the sinking person he's encountered: he has used the man's perilous circumstances as a means for getting him to accept an agreement that he would never ordinarily agree to.

Thus, the question is whether cases like *Slave Child* and *Depletion* mirror the exploitative nature of *Quicksand* or better resemble the waiving of rights in the marriage case. There are at least two parallels between *Slave Child* and *Quicksand*: the arrangements are not mutually consensual, and both parties have (essentially) no available alternatives but to accept the arrangement. These points aren't unrelated. Part of the reason why Allan's deal with the sinking man is not fully consensual is that the sinking man is in grave peril and has to accept the offer to

avoid death. Future people in *Depletion* have a comparable range of alternatives: they will either exist in the presence of a rights violation or not exist at all. And as we discussed earlier, future people obviously cannot consent to the arrangement at the time of the decision.

The general problem with the rights-waiving objection is that it assumes that accepting a particular arrangement that involves a rights violation automatically nullifies the rights violation. Of course, the individuals who have their rights violated in these kinds of cases might later consent to the rights violation, recognizing that they really had no legitimate alternative, but it seems they could nevertheless claim to have had a right violated and (on that basis) claim to have been harmed. The fact that a child who is enslaved would prefer her life to total nonexistence seems irrelevant to assessing whether a rights violation occurs; the more appropriate factor to consider is whether her being enslaved prevents her from satisfying a vital interest that ought to be morally protected.

Another common objection to rights-based approaches to intergenerational moral problems is that nonexistent people cannot have rights. Rights can only belong to people who actually exist. This worry originates from the indeterminacy of future people – that is, the uncertainty regarding what particular people will come into existence. One’s temporal location, after all, is not a morally significant factor with respect to rights: a person living in 2100 will, notwithstanding some radical, unforeseen changes in human physiology (that morph what vital interests future people have), have the same rights as a person living today. Intriguingly, the moral irrelevance of temporal location is sufficient to demonstrate why future people can plausibly be assumed to have rights.

We can begin with a simple and uncontroversial case. Call it *Bomb 1*:

A terrorist named Alec rigs a sophisticated bomb beneath an elementary school. To ensure plenty of time to cover his tracks and escape, he rigs the bomb to detonate in one year. One year later, it does detonate, killing some and injuring others.

It should be uncontroversial that Alec's action violates the rights of those caught in the bomb's explosion. Now consider a similar case, called *Bomb 2*:

Years after *Bomb 1*, Alec again places a bomb beneath an elementary school. This time, however, utilizing advancements in scientific technology, Alec rigs the bomb to detonate in 30 years. After remaining undiscovered for 30 years, the bomb detonates, killing many students and injuring several others.

Bomb 2 involves the same immoral action as *Bomb 1*. Alec's action in *Bomb 1* clearly violates human rights; does his action in *Bomb 2* also violate human rights? There are only two differences between the cases. First, the time interval is longer in *Bomb 2*. But the time at which someone exists is morally irrelevant with regard to human rights; people 30 years from now will have the same human rights that we have. The second difference between the cases is that the people caught in the explosion in *Bomb 2* did not exist at the time that Alec rigged the bomb: none of them were born until the bomb had already been in place for almost 20 years. We now face the pivotal question: does this last fact – the indeterminacy of the people who would be affected by the bomb's explosion – give us reason to think that Alec did not violate any human rights in *Bomb 2*?

I do not see how a negative answer to this question can be avoided. We could speak of two ways that the identities of the bomb victims could be indeterminate. Their identities could be *epistemically* indeterminate, meaning that we cannot be certain who the victims will be from our current temporal location. It seems obvious that epistemic indeterminacy of this sort applies to Alec's actions in *Bomb 2*, but we could also speak of the victims' identities being *metaphysically* indeterminate. If their identities are indeterminate in this way, then at the time of Alec's decision,

it is still uncertain (metaphysically) who will come into existence; it is not causally determined what particular people will exist when the bomb detonates.

Epistemic indeterminacy is clearly irrelevant to whether Alec violated human rights in *Bomb 2*. The fact that he did not know what particular people would be wandering the school's halls in 30 years has no relevance at all to whether he violated any human rights because he knew, beyond any reasonable doubt, that the students attending the school would be people.³³ Joel Feinberg (1981) illustrates this point by drawing a parallel between uncertainty regarding the identities of those who are *spatially* distant from us:

We can tell, sometimes, that shadowy forms in the spatial distance belong to human beings, though we know not who or how many they are; and this imposes a duty on us not to throw bombs, for example, in their direction. In like manner, the vagueness of the human future does not weaken its claim on us in light of the nearly certain knowledge that it will, after all, be human (p. 148).

Matters would be much different if we were uncertain whether there would be future people, perhaps because of an impending asteroid collision with Earth or large swaths of the population suddenly becoming incurably sterile. But we are not in these circumstances. Given the projections regarding world population, the existence of future people in the foreseeable future is as close to certainty as one could reasonably demand.³⁴

Similarly, the metaphysical indeterminacy of future people's identities is irrelevant.³⁵

Whatever the particular identities of the children who will be born, all of them will be human beings. As human beings, they will have similar vital interests to other human beings, and one of

³³ Robert Elliot (1989) uses the example of a booby-trapped time capsule to illustrate the same point I'm making here: it's possible to violate a future person's right even if that person is not yet born at the time that the right-violating action is performed (p. 162).

³⁴ Data regarding world population can be retrieved from a myriad of sources. One useful and comprehensive world population estimate comes from the United Nations: <http://esa.un.org/unpd/wpp/index.htm>. It is also possible to find various world population clocks online, such as the U.S. Census Bureau's: <http://www.census.gov/popclock/>.

³⁵ It also rests on the controversial claim that causal determinism – at least at the macro level – is false. I am, however, happy to grant this claim for the sake of argument.

these vital interests will be protection from severe physical harm. Thus, Alec's action violates the human rights of his victims by flagrantly disregarding this vital interest.

It should now be clear that Alec's action is a violation of human rights. Although his victims were unknowable to him and their identities perhaps not yet metaphysically determined, he had overwhelming evidence that his victims would be people. As people, they are just as much the bearers of human rights as other people, no matter when they exist. Future people do not yet exist, but they will have human rights when they come into existence. As a result, we can violate their human rights through our current actions, though we may be unable to identify whose particular rights have been violated until far in the future.³⁶

Current and Projected Harms from Global Climate Change

The general warming of the atmosphere poses perhaps the greatest environmental and long-term moral threat humanity has ever faced. There is an overwhelming literature on the possible, probable, and presently occurring effects of GCC. Here, I will limit myself to highlighting the effects that constitute the most significant human rights violations.

We can start by considering deaths caused by GCC. The World Health Organization (2005) concluded from a study conducted in 2003 that GCC may have been responsible for more than 150,000 deaths in 2003 and that this number was only likely to increase in the future. A later report from the World Health Organization (2009) tells a similar story: based on the results detailed in their report, they conclude that the annual global death toll from GCC reached

³⁶ Beyond the other authors cited in this subsection, I have also benefited from consulting Steve Vanderheiden's treatment of these issues. See Vanderheiden (2008, pp. 125-132).

140,000 by 2004.³⁷ A recent study by the Global Humanitarian Forum (2009) paints an even grislier picture: this study places the estimate annual death toll at 300,000 people, the majority of whom live in developing nations. Astonishingly, one report puts the annual death toll from GCC even higher – 400,000 (with the vast majority again occurring in developing nations) – and projects that the annual death toll could reach 700,000 by 2030 (DARA 2012). There is bound to be disagreement about which figure is most accurate, but the more important observation is that there are clearly people – and a large number of them – already dying as a result of the changing climate. Moreover, the death rate is only projected to increase.

Reports from the IPCC not only back up these death tolls but also draw attention to other harms that present and future people will endure. The IPCC (2007a) states that “climate change over the next century is *likely* to adversely affect hundreds of millions of people through increased coastal flooding, reductions in water supplies, increased malnutrition and increased health impacts” (p. 65, original emphasis). The phrase “to adversely affect” could mean (among other things) “to make homeless,” “to sicken,” “to injure,” or “to kill.” The IPCC (2007b) also notes that these harms will not be limited to the next century (p. 47).³⁸ These consequences are a natural result of the increases in severe weather events, frequency of heat waves, rise of the sea level, and so on; all these effects are well-documented.³⁹ Even those that are not harmed in the most obvious ways (e.g., death, starvation, dehydration, disease) may still lose things that are vitally important. Some island nations, such as Tuvalu and Vanuatu, are in danger of becoming entirely uninhabitable; even if their people can be relocated without being physically harmed,

³⁷ Beyond unearthing this data from their report, one can also find the major conclusions listed concisely on the World Health Organization’s October 2012 fact sheet regarding GCC and health: <http://www.who.int/mediacentre/factsheets/fs266/en/index.html>.

³⁸ The long-term effects (i.e., those persisting for millennia) of GCC should not be underestimated. See, for example, Archer (2010) and Zeebe (2013).

³⁹ Beyond the IPCC reports, some examples include Webster, et al. (2005) and Meehl and Tebaldi (2004).

they will lose their territory and are at risk of losing their cultural heritage and national identity.⁴⁰ These are not insignificant losses.

Much more could be said about the current and projected impacts of GCC, but these facts are enough to demonstrate that GCC will violate at least three of the most fundamental human rights. First, those that die will have their rights to life violated, since that right requires (at a minimum) that people not have their lives taken away for arbitrary (or otherwise unjustified) reasons. Second, many will have their right to health violated. Those exposed to new strains of disease, more severe heat waves, and stronger storms may be injured or otherwise have their physical well-being impaired. Minor threats to one's health might not be serious enough to constitute a rights violation, but these will hardly be minor threats; in many instances, they will be severe enough to cause death. Third, many will have their right to subsistence violated as a result of droughts, disruption of agricultural practices, and other threats to food security. They will lose the ability to provide for even their most basic needs.

These pervasive and fundamental violations of human rights – both those of present and future people – generate obligations for those responsible for GCC. They must compensate those who have had their human rights violated, insofar as this is possible. (It is not possible to compensate those that have died, for instance.) It is true that the effects of GCC have only become well known within the last 25 years, and if the proliferation of knowledge about GCC had triggered a substantial global effort to mitigate GCC and adapt the vulnerable populations, perhaps no compensation (beyond perhaps extensions of the adaptation implemented) would be required. In the actual world, however, where no such effort has begun and where emissions are

⁴⁰ Issues concerning what political obligations other nations may have to assist these island nations has become a popular topic among philosophers in the last decade. For some examples, see Risse (2009), Byravan and Rajan (2010), and Kolers (2012).

only increasing (despite knowledge of their effects), it is clear that compensatory efforts must be undertaken.

Two big questions now demand attention. First, what form should the intergenerational compensation take? Second, who should bear the burdens of providing this compensation? These questions will be answered in time (in Sections 3 and 7 respectively), but first I will briefly clarify why I describe my approach to GCC as one based on *compensation* rather than *reparation*.

Compensation and Reparation

Before examining what forms the intergenerational compensation for GCC can take and appraising them, I should clarify why I describe my approach as *compensation*-based rather than *reparation*-based. I have stressed, for instance, that the compensation owed to the victims of GCC is owed to them on the basis of their having their human rights violated by the intentional actions of other human beings, but reparation is the concept that logically implies that the victim has been wrongfully harmed. Compensation is a broader notion: it may be owed in cases where the victims have not been wrongfully harmed (Boxill 2010, sec. 3). Thus, wouldn't *reparations* for GCC be a more appropriate label for this approach?

Despite tying my own compensation-based approach to wrongful harms (a trait tied more intricately to the moral notion of reparation), there are two reasons for identifying the approach as one of compensation rather than reparation. First, reparation connotes that the wrongful harms have *already happened*: it is typically understood as backward-looking. Often, reparations are discussed with regard to historical injustices, such as potential reparations for slavery and are distributed to those who were wrongfully harmed in the past. But in the case of GCC, some of the compensation (including the epistemic compensation that will be my focus) has to be

preemptively stored and distributed later because the wrongful harms, though certain or virtually certain to happen, have not *yet* occurred. Since compensation can be forward-looking as well as backward-looking, it seems like the more appropriate notion of moral restoration for this case.

Second, reparation often aims to restore the harmed party to the status they would have had if they had not been wrongfully harmed, insofar as this is possible. Some forms of compensation in response to GCC may have this feature: monetary compensation can be offered as a means of reacquiring possessions and property similar to those that were destroyed, and reintegration into a polity can return to a person some of their national identity and status as a citizen, even if their home nation is engulfed by rising sea levels. Knowledge-oriented compensation, however, will not have this feature. It is not as if we pretend to restore what a person has lost because of GCC simply by giving that person a copy of Plato's *Republic* and stressing the significance of the epistemic goods contained therein. Preserving and transmitting knowledge across generations is connected to making the harmed people better off and giving them access to valuable goods, but doing so is not thought to fully ameliorate what has happened to them and will rarely (if ever) fully repair the moral damage that has been done.

With this clarification noted, we can now turn to the first of our two big questions: what form should intergenerational compensation for GCC take? To answer this question, we must consider a cluster of related questions. What features must something possess to be a suitable form of intergenerational compensation? Given these features, what forms of compensation are suitable? And how will knowledge-based compensation, which is my focus, ultimately fit into this picture? These are the central topics of Section 3.

SECTION 3: WHAT FORM SHOULD INTERGENERATIONAL COMPENSATION TAKE?

In this section, I try to identify the best means of compensating future people for the wrongful harms of GCC. Ultimately, I argue that the appropriate form of compensation will vary substantially depending on what particular harm the victims of GCC suffered, though epistemic compensation will nevertheless have an important role to play in a general compensation scheme. I begin this task by considering what criteria a suitable means of intergenerational compensation would have to meet. Afterward, I argue that knowledge meets these criteria and examine how it fares with respect to other suitable forms of intergenerational compensation.

Criteria for a Suitable Form of Intergenerational Compensation

Compensation for *past* harms can usually take many forms, but intergenerational compensation presents a unique challenge. Future generations, especially those in the distant future, may have vastly different values than our own, and we cannot communicate with them to determine what particular items they would like us to preserve on their behalf. Hence, our first task regarding intergenerational compensation is determining what could serve as suitable compensation for future people. This compensation will have to meet at least three criteria.

First, a suitable form of intergenerational compensation must be something that will be valuable to future people. If there is no significant value in what we pass onto future people, then it is difficult to see how we have provided them any compensation at all. Compensation requires (at a minimum) giving them something that ameliorates the harm that has been done by making them better off in some way.

Second, whatever we use to compensate future people must be something that we can reasonably expect to preserve across generations. Otherwise, there is too great a risk that our

compensatory efforts will be either ineffective or outright futile. Of course, our compensatory efforts could fail for some unforeseeable reason, but if we know presently that there is a good chance we won't be able to fulfill them through a certain means, then that is sufficient reason to search for alternatives.⁴¹

Third, the compensation offered cannot be morally owed to future people on other grounds (e.g., by duties of justice). This third condition is not as obvious as the previous two, but the point can be sufficiently illustrated with the following case. Suppose that Fred borrows \$100 from his friend Betty. A few weeks later, Fred absentmindedly grazes Betty's car when pulling into his driveway. The damage is rather minor; repairs will cost \$100. Now I think it's fairly clear that Fred cannot say to Betty, "Well, here's \$100. Looks like I've paid off my debt and compensated you for hitting your car." The \$100 that Fred owes Betty as compensation for car repairs should be *added* to the \$100 he already owed her. Paying off the original \$100 debt does not clear his moral slate. Betty should not be satisfied until Fred gives her \$200 to cover both the original debt and the car repairs.

In a similar fashion, if we owe future people something on the grounds of a general duty of justice (or some other moral duty) and offer to fulfill this duty as a means of compensation, future people might rightly declare that this is not compensation at all. They were owed the fulfillment of that duty on other grounds, independent of the wrongful harms for which compensation is owed. As a result, after the duty of justice has been fulfilled, they have a claim to something *additional* to serve as compensation.

⁴¹ It would still be morally preferable to pursue means of compensating future people with significant risks of failure than it would be to pursue no compensation at all, but the assessment here is primarily comparative: provided that there are means of compensating future people that are not at great risk of (foreseeably) failing, we should favor those means of compensation over others.

Does Knowledge Transmission Meet the Criteria?

We are now in position to consider what forms of intergenerational compensation meet these criteria. Monetary compensation, which is perhaps the most obvious type of compensation that could be offered, appears to meet these criteria. Unless we abandon our current global economic system (or radically reform it) money will be valuable to future people. Moreover, money can be accumulated over time and passed on to future generations without tremendous difficulty, and strict monetary compensation will not be owed to future people as a result of other moral duties.⁴²

One may object that this assessment is too hasty: our current forms of currency, which are mostly electronic, may not always have much value to future people. After all, many old currencies no longer have any financial value. This worry may be reasonable if we are considering future people's circumstances many centuries into the future; our economy might look much different at that time, but in the more immediate future, such radical economic changes are far less likely to transpire. Monetary compensation seems appropriate for at least our short-term compensatory aims. However, the long-term fragility of our economic systems and forms of currency could be seen as one reason to favor other forms of compensation.

We can now turn to epistemic compensation for the wrongful harms of GCC. While I believe knowledge transmission also meets these three criteria, the argumentative path to this conclusion is not straightforward. Before treading that trail, however, I must clarify my use of the term "knowledge" in the context of this project.

⁴² Even if some form of money is owed to future people on the basis of other moral duties, we could simply offer them *more* money than what is strictly owed. This additional money would constitute the actual compensation.

Clarifying What Knowledge Is

Epistemologists have not arrived at a consensus on the definition of knowledge. Many once thought justified true belief sufficed for knowledge, but Edmund Gettier (1963) provided two cases in which a person has a justified true belief about a proposition but nevertheless does not appear to know that proposition because the justified true belief arose nontrivially as a result of epistemic luck. As a result, many now believe knowledge requires justified true belief and a “degettiering” condition, though this response has not been universal.⁴³ Determining how to solve the “Gettier problem” – the problem of what fourth condition (beyond belief, truth, and justification) is necessary to protect a theory of knowledge from Gettier-like counterexamples – has proven quite difficult.⁴⁴

Trying to solve the Gettier problem and specify a particular theory of knowledge would be far too ambitious a task to undertake here, but fortunately, it is not necessary. Whatever knowledge is, our intergenerational compensation cannot (strictly speaking) directly cultivate the necessary mental states in future people. It is not as if we will be time-traveling to the distant future and injecting knowledge directly into their minds with some special syringe. The best we can do is provide future people with *access* to knowledge – that is, access to the resources necessary for them to acquire knowledge themselves. Thus, my account will not be significantly affected by what particular conception of knowledge is correct. One way or another, it will involve the preservation of information over a long period of time and deliberate action taken to

⁴³ Some notable dissenters include Roderick Chisholm (1966) and Stephen Hetherington (2001).

⁴⁴ There have been too many attempts to resolve the Gettier problem to list them all, but Hetherington (2005) has provided a helpful overview of the many responses in the *Internet Encyclopedia of Philosophy*.

ensure that future people will have access to this information.⁴⁵ With this bit of clarification out of the way, we can now turn to the first criterion that knowledge must meet to be a suitable form of intergenerational compensation.

The Value of Knowledge

According to one prominent line of thought, knowledge is valuable for its own sake, independent of whatever instrumental benefits it might have. On this account, knowledge has value independent of its usefulness; knowledge of anything, even if it is not put to any practical use, has value. Although I find this view attractive, I am hesitant to ground knowledge's compensatory value on non-instrumental grounds.

One might think my hesitation originates from worries about counterexamples. For instance, a person could have knowledge about the number of blades of grass on his lawn, but would this knowledge really have any value? It might if it somehow became practically useful (perhaps as being an answer to a question on a bizarre game show), but if it does not, is it really plausible to say this knowledge has any value? These kinds of cases can cause one to worry that knowledge (or at least some knowledge) is only instrumentally valuable.

This kind of worry is understandable, but I think these observations are perfectly consistent with knowledge's having non-instrumental value. Knowledge of seemingly trivial propositions may appear to lack non-instrumental value because we recognize that pursuit of such knowledge is typically not an activity we would encourage. We think the person who counts blades of grass should not (all-things-considered) pursue this activity. But this does not

⁴⁵ This information will not be limited strictly to facts or things that we generally perceive to be true. It is critical that future people also have access to information that was historically influential even though it was incorrect: much can be learned by understanding the mistakes of the past, regardless of what subject one is studying.

show that knowledge lacks non-instrumental value; it only shows that some knowledge, because of how it is usually disconnected from practical matters, is not as worthy of pursuit as other tasks (including the cultivation of knowledge that is both instrumentally and non-instrumentally valuable).⁴⁶

Nevertheless, I think a defense of epistemic intergenerational compensation for GCC must appeal to the instrumental value of knowledge. Even if all knowledge is non-instrumentally valuable in some sense, there is a significant possibility that future people will not regard all knowledge in this way, and even if they agree that knowledge has non-instrumental value, they may think its value too minute and inconsequential to be a suitable form of compensation. They could be wrong about these judgments, of course, but it still seems like their preferences would make a moral difference.

To see why, let us return to our case of Fred and Betty. Now let's suppose Fred paid off his \$100 debt and is now thinking about how to compensate Betty for the repairs to her car. Maybe he purchases a \$100 gift card for amazon.com and offers it to Betty. She has no account on the site, however, and so she does not see the value in the gift card. She wants cash instead. Now Fred might know Betty's spending habits and stress that she will actually get more for her money on amazon.com than elsewhere. His claim might even be true, but if Betty insists on getting her compensation in cash, then Fred seems required to comply, so long as he is able to do so.

⁴⁶ One may also wonder whether the non-instrumental value of knowledge admits of degrees. The instrumental value of knowledge comes in degrees, since some knowledge is of greater practical use than other knowledge. Perhaps the non-instrumental value of knowledge functions in a similar fashion. On that account, even if all knowledge has non-instrumental value, some knowledge might have such a low degree of non-instrumental value that it ceases to be worth pursuing except in the rarest of circumstances: almost any other pursuit will be a better way to spend one's time.

Admittedly, matters are more complicated with regard to future people. We cannot ask them about their preferences, so we have to make an educated guess about what they are. Given the uncertainties involved, we can reasonably claim that there is a nontrivial chance that many future people will consider knowledge to be a very poor form of compensation if it is of no practical use. If that knowledge is of practical use, however, matters are very different: knowledge that has instrumental value to future people is unlikely to be devalued by them. Fortunately, at least for the purposes of my argument, we can ground the value of knowledge entirely in instrumental terms by appealing to knowledge's status as a collective social resource.

The social significance of knowledge can be traced back to W.K. Clifford's classic article "The Ethics of Belief." Although not one of his main claims, Clifford (1877) suggests that beliefs are to be understood as social entities that have an intergenerational dimension:

[N]o man's belief is in any case a private matter which concerns himself alone. Our lives are guided by that general conception of the course of things which has been created by society for social purposes. Our words, our phrases, our forms and processes and modes of thought are common property, fashioned and perfected from age to age; an heirloom which every succeeding generation inherits as a precious deposit and a sacred trust to be handed on to the next one, not unchanged but enlarged and purified, with some clear marks of its proper handiwork. Into this, for good or for ill, is woven every belief of every man who has speech of his fellows (p. 292).

Primarily, Clifford is alluding to the dependence of the knowledge of the current generation on the knowledge acquired and preserved by previous generations. The vast majority of our current knowledge originates from, or is dependent on, the investigations of those in the past, and the knowledge future generations will possess depends significantly on our efforts to improve our current knowledge and preserve our discoveries. In this manner, the beliefs we form and preserve not only influence our contemporaries but also those not yet born.

Building on Clifford's observations, we can conceive of knowledge as an intergenerational collective good. Stephen Grimm (2009) provides a helpful analogy to illustrate

this approach: he compares true beliefs to clean water.⁴⁷ Just as it would be wrong for me to pollute a supply of clean water (even if I personally have no need for this water), it is wrong for me to be epistemically irresponsible in forming beliefs. Even if I have good reason to believe that polluting the water would not harm anyone, this action is still wrong:

[G]iven the unpredictable nature of the needs of others, and given how contamination of this sort can spread in unpredictable ways, others very well might turn out to depend on this water. And since clean water plays such an indispensable role in human well-being, we plausibly have an obligation not to pollute in this way, but rather to treat the water with due respect (Grimm 2009, p. 260).

If we conceive of knowledge as a social good analogous to clean water, acting in an epistemically irresponsible way is wrong because it damages the social good of available knowledge. True beliefs, like clean water, are necessary for continued human well-being, and there is no enduring human society which will not value these resources. Thus, though Grimm does not emphasize the collective good of true beliefs as one that endures over time, nothing prevents us from adding this detail. True beliefs, after all, are a valuable resource not only to those presently existing but also to those who do not yet exist.

Before proceeding, some clarification is in order. One familiar with some recent work in epistemology may wonder why the compensatory effort focuses on *knowledge* transmission. There are at least three other prominent candidates for this kind of compensation scheme: true belief, justified true belief, and understanding. Let's consider the appeal of each in turn.

One might favor true belief for intergenerational compensation because she believes that true belief is just as practically useful as knowledge and that true belief would be easier to

⁴⁷ One might worry that the analogy is inappropriate because Grimm focuses on true beliefs rather than knowledge. However, since true belief about a proposition is almost universally thought to be a necessary condition for knowledge, this dissimilarity does not amount to much. Nevertheless, I will have more to say about the relationship between true belief and knowledge at the end of this sub-section.

transmit than knowledge.⁴⁸ True belief may appear just as valuable as knowledge because one acting on a true belief about a proposition will fare just as well as one acting on knowledge about that proposition.⁴⁹ True belief may seem easier to transmit across generations because it has fewer constituents than knowledge, meaning that future people can acquire true beliefs more easily than they can acquire knowledge.

In contrast, one might favor justified true belief because she thinks that justified belief is more valuable than true belief, equivalent in value to knowledge (perhaps because the degettiering condition adds no value to knowledge), and easier to transmit across generations. Justified true belief might be more valuable than merely true belief because justified beliefs will be more stable than merely true beliefs and more likely to be properly connected to other true beliefs. Justified true belief may also seem easier to transmit across generations than knowledge because it does not require a degettiering condition.

Finally, one could favor Jonathan Kvanvig's position. Kvanvig (2003) holds that the real epistemic good we should be seeking is understanding: "a body of information together with the grasping of explanatory connections concerning that body of information" (p. 200). Kvanvig's view is significantly motivated by skepticism about the value of knowledge, but one could conceivably think understanding more valuable than knowledge without this skeptical incentive in the background. Since understanding is more valuable, it is the more worthy epistemic good to transfer across generations, even if it is more difficult to secure for them.

⁴⁸ One might also hold the view that large enough quantity of true beliefs is sufficient for knowledge. Richard Foley (2012), for instance, holds that the only thing we need to turn true belief into knowledge is more true belief. If we do not know a particular proposition, we must be missing some crucial true belief related to that proposition. Of course, if his view is correct, then debating whether we want to transmit true belief or knowledge across generations becomes a rather moot point.

⁴⁹ This observation can be traced back to Plato's (380 B.C.) *Meno*.

Given these considerations, why do I favor *knowledge*-based intergenerational compensation? Frankly, my reason is simply that the term has a broader, more colloquial connotation than its rivals. The core idea of my proposal is that we compensate future generations through transfer of epistemic goods. Among the four candidates, it makes little difference what specific goods we are trying to transfer. Since all these epistemic goods are related, trying to preserve one for future generations will almost surely cause them to also possess the others (though perhaps in varying degrees). Moreover, we must remember that the process of securing these epistemic goods for future people requires some activity on the part of future people, since we cannot give epistemic goods to future people directly. All we can do is secure information and give future people access to it; as a result, the epistemic state they achieve with regard to different propositions will be largely out of our hands. As a result, though I will continue to base my proposal on epistemic good of knowledge, its central content would not meaningfully change even if it were based upon another epistemic good.

Feasibility of Knowledge Transmission

Whereas much argumentative work was required to show how knowledge was sufficiently valuable to be a suitable form of compensation, it meets the second criterion quite easily. We have been successfully preserving and transferring knowledge across generations for millennia, and given the advances in modern technology, it is now easier to store, reproduce, and access information than ever before. As a result, there is little doubt that transferring knowledge across generations is feasible, although there are ways to improve our current means of doing so (discussed in Section 6).

Owed to Future Generations on Other Grounds?

At this juncture, knowledge meets two of the three criteria for being a suitable form of intergenerational compensation: knowledge will be valuable to future people, and its transmission across generations is feasible. The final criterion is that we must not owe knowledge transmission to future people on the basis of other moral duties. Otherwise, our supposedly compensatory efforts would not really be compensation at all: they would be things that we owed future people for other reasons, meaning that something beyond them would be required to provide compensation.

Clifford (1877) clearly holds that we have a duty to improve our knowledge base for posterity's benefit independent of anything related to GCC. Specifically, he claims that we have a duty to "enlarge" and "purify" our knowledge base on behalf of our successors (p. 292). He provides no detailed explanation for why we have this duty, however, so this assertion seems rather groundless. Nevertheless, one could try to fill this argumentative gap on Clifford's behalf. There are at least three distinct arguments one could make to establish the existence of such a duty. First, we have these duties because we ought to reciprocate the benefits we have acquired from previous generations by providing them for future generation. Second, we might have these duties because we ought not to free ride on the hard work of past generations. Third, these duties might arise from our gratitude to past generations for what they have provided for us; the morally appropriate response to this gratitude is to do our best to provide similar benefits to subsequent generations. I will consider each argument in turn, starting with the appeal to intergenerational reciprocity.

According to one view of intergenerational reciprocity, we should repay future generations for the benefits we receive from past generations. Obviously, there's no denying that past generations have provided us with many benefits, but does a duty to provide similar benefits

to future generations really follow from that fact? To work toward an answer, let's reflect a bit on more basic instances of reciprocal obligations.

The most obvious cases where we acquire obligations to reciprocate are those where someone intentionally provides us with something beneficial. Recognizing what the other party has done, we then (at least sometimes) acquire an obligation to bestow some comparable benefit upon them. Reciprocity is, in some sense, based on rewarding someone for how they have acted toward you. With these thoughts in mind, we can quickly identify three problems with the argument.

First, were the benefits that we received from past generations *intentionally* bestowed upon us? Were they genuinely done for our benefit? In some cases, they surely were, but there have likely been many cases where important contributions to these projects were made simply because it was in a scientist's, researcher's, or artist's self-interest to make such a contribution (for money, fame, etc.). When the benefits passed on from one party to another are unintentional, it is questionable whether any duties of reciprocity are generated.

Second, though we have been provided with many benefits from past generations, we have also been given many burdens. The development of technology, for instance, has been a continuous intergenerational project for several centuries, and it now threatens us with environmental problems of severity and scope that we have never before encountered. To use another example, the ongoing project of human agriculture has led to unprecedented amounts of animal suffering, which many consider morally abominable. Some people are also not in position to enjoy many of the benefits (e.g., scientific progress, artistic endeavors). A person who grows up in extreme poverty, for instance, is unlikely to think these gifts from past generations provide

her with much of value because these past generations did not secure social conditions that ensure her basic needs are met.⁵⁰

Third, in the standard cases of reciprocity, we have an obligation to reciprocate to the person who initially benefits us. Suppose that a friend of mine gives me a gift. It would be very strange to then give a gift to someone else and then claim that I was reciprocating the gift-giving action of my friend. And it would be outright puzzling to claim that I had a *moral obligation* to give a gift to someone else: if any obligation to reciprocate exists, surely I have this obligation with respect to my friend. In a similar manner, if we have any duties of reciprocity with regard to the knowledge we have inherited from our predecessors, then these duties seem owed to them, not to future people. In light of these three problems, the reciprocity-based argument seems unable to ground a duty to improve our knowledge base on behalf of future people.

At this juncture, a perceptive reader may claim that my remarks in this paragraph reveal a way that knowledge transmission could fail to meet the third criterion. What if we do have some duties to past generations to advance our knowledge base? In that case, this advancement would be owed because of a moral duty other than the compensation due future people. This worry rests on a misunderstanding of the third criterion. This requirement on the suitability of intergenerational compensation captures the sentiment that it is not permissible to *meet a separate duty owed to future people* and then claim that meeting that duty somehow compensates them for other harms they have suffered. Matters are different when we owe a duty to two different parties, as in this proposed case. In such a case, we would have compensatory duties to

⁵⁰ My remarks here (and in the prior two paragraphs) are in part derived from a commentary I delivered at the 2013 Pacific Division Meeting of the American Philosophical Association Martin Benajmin's "Responding to Marx (Groucho, not Karl) on Obligations to Posterity." I thank Martin Benajamin for helpful discussion of these issues at this conference.

future people and non-compensatory duties to past people, both of which could be satisfied through improving our knowledge base.

We can illustrate the intelligibility of this sentiment by recalling the case where Fred owes Betty compensation for damage done to her car. Imagine that Fred's wife Wilma had a deep appreciation for Betty's car. Just before her death, she made Fred promise that he would help Betty keep it in pristine condition as long as possible. In such a case, Fred has two moral duties – one of compensation to Betty and one of keeping his promise to Wilma – that are both fulfilled by giving Betty the appropriate compensation to fix her car. It would be ludicrous for Betty to claim the compensation was illegitimate just because Fred had made this promise to Wilma. In a similar manner, it would be ludicrous for future people to claim a form of intergenerational compensation was illegitimate because whatever constituted the compensation was also owed to some past person (or group of past persons).⁵¹ Given the concerns raised in the preceding paragraphs, however, I doubt that general duties to past generations will frequently manifest, meaning that that these sorts of morally fortuitous circumstances (where we can satisfy intergenerational moral duties to both future people and past people with a single action) will be rare.

A second argument that could ground some knowledge-related duties to future people originates with Axel Gosseries (2009). He claims that we can sometimes be free riders when we allow certain goods given to us by past generations to deteriorate or when we directly damage these goods. Being a free rider is morally objectionable, and thus, we can have obligations not allow these goods to be damaged. He illustrates this argument by describing a castle that a

⁵¹ Nevertheless, future people could voice concern about our *intentions* in these cases. After all, how would they know that we would have fulfilled our compensatory duties absent the duties to past generations? I'll revisit the importance of our intentions with respect to compensatory duties in Section 5.

generation inherited from their ancestors. On his account, “it could be meaningful to claim that by destroying the castle or even letting it fall apart, the present generation would be free-riding on earlier generations. For it would take advantage, without adding anything itself, of the efforts they would voluntarily have put in this castle” (p. 132). Since it is objectionable to take advantage of the work of past generations, they should maintain the castle and not let it deteriorate.

Clearly, the “castle” in his example could be an analog to knowledge acquired from past generations. Our predecessors have secured a great deal of information that we routinely use for our benefit; if we allow this information to fade from our minds or otherwise fail to preserve it, then we might be acting as free riders. If that’s correct, then it seems we have a duty to maintain this knowledge base so as not to free ride on the work of past generations.⁵² Even if this argument is ultimately successful, it has little impact on my proposal. Notice that the duty under discussion is only one to *maintain* our knowledge base – not to *improve* it. Notice also that if we modify Gosseries’ original case such that the present generation must not just maintain but also *improve* the castle (e.g., by constructing new towers), the intuition that such an obligation exists fades away. After all, they are not free riders if they maintain the castle; they may be required to leave the castle as they received it, but they are not required to leave it *better* than they received it. The compensation we are considering is in the form of improvement upon what we have received from our predecessors, not mere maintenance of the knowledge we already have in our possession.

⁵² Though I charitably concede this point here, some of the considerations raised against the reciprocity-based argument leave me uncertain whether this free-rider argument succeeds.

Appeals to reciprocity and to the avoidance of free riding failed to ground a duty to improve knowledge on behalf of future people. Can an argument that appeals to gratitude fare any better? There is a clear intuitive sense in which, at least if we reflect on the matter, we are grateful to have many of the benefits that we now enjoy that past generations did not have: higher life expectancies, ease of transportation, greater educational opportunities, less discrimination, and so on. Perhaps continuing our advancement of knowledge is the morally appropriate response to our gratitude for what past generations have left for us, and perhaps a failure to do so reveals our ingratitude – a moral defect in our character.⁵³

Drawing on my responses to the other two arguments in this section, we can mount a decisive case against the argument from gratitude. I earlier mentioned that past generations have passed many burdens onto us in addition to the many benefits. Thus, a general attitude of gratitude toward our predecessors may be misplaced. Their efforts have established the global and economic institutions that now give rise to many devastating environmental problems, including GCC, biodiversity loss, and resource depletion. The benefits of modernity are also not felt in all parts of the world, particularly in nations gripped by poverty and famine.

Gratitude toward future people might also not be the kind of gratitude that warrants repayment. If I want to hold my wedding ceremony outdoors, I can be grateful when the weather cooperates. When the highway patrol officer is distracted by his ringing cell phone as I speed by, I can be grateful for avoiding a speeding ticket. In both these cases, I am grateful merely that the state of affairs that arose worked to my benefit; I am not grateful to a particular person for doing something on my behalf.⁵⁴ As a result, I do not owe anyone anything. My feeling of gratitude

⁵³ I thank Ezra Markowitz for drawing my attention to this objection.

⁵⁴ I owe this point to Claudia Card (1988, p. 117).

tracks only a fortuitous coincidence: I was just fortunate that things worked out in my favor and am not taking it for granted.

The knowledge we have today is a result of people's actions in the past, not just good fortune brought about by nature (such as when the weather cooperates with my wedding plans), but their actions may be more of a fortuitous coincidence than this analysis suggests. Remember that the advancements of knowledge we have benefited from have likely not been the result of altruistic actions on behalf of our predecessors: it was in their self-interests to improve their own knowledge as a means to improving their quality of life. Thus, since past generations did not advance knowledge for our sake, we are simply fortunate that their self-interested motivations, combined with the temporal limitations of human life and the nature of human reproduction, have enabled us to reap these benefits (at least with respect to knowledge). Being grateful at this outcome is appropriate, but it does not generate any moral obligations.

By way of two final points, I will merely echo remarks made with regard to the earlier arguments. First, if we have any duties of gratitude, they would seem to be duties to past generations – not future generations – since it is the actions of past generations that we are grateful for. Second, even if we had duties of gratitude to maintain our knowledge base, some additional argument would be required to show why we would have a duty to *improve* our knowledge base. Gratitude for what we have might legitimately require leaving things no worse than they were when we acquired them, but why would it require that we *improve* these things? Improvement would seem supererogatory.

Given that these arguments are unsuccessful, we have no grounds for thinking that we have a general obligation to improve our knowledge base on behalf of future people. Thus, unless some further argument is presented and substantively defend, we can only support the

claim that we have a duty to *maintain* our current knowledge base (and even this position encounters some significant obstacles). Therefore, knowledge meets all three criteria for being a suitable form of intergenerational compensation. Now we must consider how it compares to other means of intergenerational compensation.

Other Candidates for Compensation

Epistemic goods are not the only form of intergenerational compensation worth considering. Drawing on Tremmel (2009, pp. 66-67), we can identify the following types of capital that could be passed on to future people:

1. Natural capital: biodiversity, natural resources, carbon sinks (and others)
2. Real capital: consumer goods, investment goods, infrastructure
3. Financial capital: monetary goods
4. Social capital: quality and quantity of social contacts
5. Human capital: abilities, knowledge, health
6. Cultural capital: institutions (such as political systems, economic systems, legal systems), aesthetic goods, historical goods
7. Knowledge capital: knowledge that is not person-bound

The epistemic compensation I am advocating is best identified (using Tremmel's terms) as *knowledge* capital. We can provide compensation through knowledge capital by preserving information, improving the accuracy of the information we have, and undertaking projects to further increase the quantity of information at our disposal. This may ultimately translate into *human* capital, since future people will (we hope) take the information we preserve and cultivate it into person-bound knowledge, but this process is not something we can do for them.

We should note that classifying these various items as “capital” is controversial. Capital traditionally has an economic connotation frequently refers to means of provisions of human welfare. While we can conceive of biodiversity and natural resources in terms of how they may benefit human beings, there are reasons to think we should not view them exclusively in this way. These things are at least valuable to other living creatures (who depend on them for the perpetuation of their ecological niches), and many believe such things are valuable in non-instrumental ways. Labeling these seven items as “capital” also suggests they are all fungible and can be traded among one another, which is a controversial position.⁵⁵ Although my approach in this thesis is anthropocentric, I want to remain agnostic about whether these different types of capital are fungible; the primary purpose of this capital-based classification scheme is merely to have a tidy way of distinguishing different candidates for intergenerational compensation.

As I mentioned near the beginning of this section, *financial* capital (i.e., monetary goods) meets all three criteria for being a suitable form of intergenerational compensation (at least for the near future). Future people will value it, its transfer across generations is feasible, and monetary compensation will not be owed on other grounds. Even if *some* money is owed to future people on other grounds, we could always just give them *more* than what they are otherwise owed. The extra funds would then function as compensation. Are there any suitable forms of intergenerational compensation beyond epistemic goods and monetary goods? Let’s consider the possibilities.

Natural capital does not seem to be a suitable form of intergenerational compensation. Preservation of biodiversity or natural resources will likely not meet the third criteria: we will

⁵⁵ Tremmel (2009) is sensitive to this concern (pp. 69-76). It is among several reasons why he favors an approach to intergenerational justice that focuses on securing human well-being rather than securing an appropriate amount of different forms of capital.

owe these things to future generations on other grounds. Suppose we intervene to prevent some species from going extinct; could this be a way of compensating future people by maintaining biodiversity? If the species were going to become extinct for reasons other than human action, then perhaps this would be reasonable compensation, but the overwhelming majority of extinctions are human-caused (many of them as a result of GCC). We cannot seriously think that we would have compensated future people sufficiently for GCC just because we did not destroy as many species *as we could have*.⁵⁶ The same point holds regarding natural resources: could we really say that we had sufficiently compensated future people for GCC because we had not depleted resources as much *as we could have*? Minimally, we seem to owe them a fair share of natural resources – whatever quantity is necessary for their basic human rights to be secured.

Natural capital is also unlikely to meet the second criterion: securing its transfer to future people is not feasible. Given the current trends of population growth, species extinction, and resource depletion, it is not realistic to think we could preserve and improve natural capital such that it could serve as suitable compensation for future people. It may be reasonable to assume that future people would value natural capital for a variety of reasons (many of them originating from the ways natural capital would be conducive to their survival and flourishing), but these other considerations make it an unsuitable means of intergenerational compensation.

Real capital fares better than natural capital with regard to our three criteria. It will be valuable to future people, and it can be feasibly transferred to them. But there are two big problems. First, some forms of real capital should *not* be passed onto future people: many aspects of our economic infrastructure require large-scale revisions that move future people *away*

⁵⁶ This would be analogous to Fred telling Betty that he compensated her for the damage to her car by refraining from crashing his car into the side of her house later that day.

from lifestyles with such extraordinary rates of consumption and high carbon footprints. Second, insofar as these goods and infrastructure are required for future people to have their basic human rights met, these things are owed to future people on other grounds.

Similarly, *cultural* capital will be valuable to future people and can feasibly be transferred to them. Perhaps some of our institutions are in need of reform and should not be transferred in their present state (assuming their shortcomings can be remedied), but there are other forms of cultural capital – particularly aesthetic and historical goods – that will not require any remedying. Given human history, we are unlikely to cease valuing art or our own history anytime soon. Moreover, these goods can be secured rather easily (especially given the recent improvements to communications technologies), and for reasons similar to those mentioned earlier in this section with regard to knowledge transmission, it is difficult to see how we could be obligated to *improve* these goods for the sake of posterity on non-compensatory grounds. Thus, some forms of cultural capital are suitable forms of intergenerational compensation.⁵⁷

Only *social* capital and *human* capital remain. Securing social capital might seem a bit mysterious. We obviously cannot ensure that future people all have friends or good relationships with their parents. Nevertheless, by improving communications technologies, we would give them the ability to communicate with more people and thereby enable them to maintain relations with people whom they would otherwise be unable to contact. Some future people may indeed value the ability to have these relationships, and it is unlikely we have any obligation to secure their ability to have these relationships on grounds other than compensatory duties. However, there is an obstacle regarding feasibility: we must maintain the technological infrastructure

⁵⁷ This observation may not be of much practical importance. We have established fields of study (e.g., history, archeology, anthropology) that will continue to make vast strides with respect to understanding and preserving cultural capital independent of anything to do with climate change.

needed for these communications technologies, and given the uncertainties regarding how long our current technological infrastructure will last (especially after our fossil fuels are depleted), this transfer of social capital might not be something we can ensure indefinitely.

Human capital would be valuable to future people; in fact, it might be the most valuable type of capital they could be given, since it would probably have the most direct effect on their welfare. The problem is that human capital cannot be secured. The best we could do would be to create conditions in which human capital is likely to be improved. We could improve our medical knowledge in the hope that future people will use it to increase their life expectancies and eliminate diseases. We could improve our social institutions in the hope that future people would use them to provide greater equality of opportunity and better protect people's basic freedoms. But in both these cases, we are securing other types of capital in the hope that they will later lead to an improvement in human capital. That seems to be the best we can do with regard to improving human capital, so it cannot be a suitable form of intergenerational compensation.

Appraising Our Options

To recap the previous subsection, we have a fairly long list of goods that might serve as suitable forms of intergenerational compensation: epistemic goods, monetary goods, aesthetic goods, historical goods, and institutions (among others). How do we determine what form of compensation is best? Though we can identify some considerations that suggest certain forms of compensation often fare better than others, I argue in this section that the type of compensation most suited to the victims of GCC will depend almost entirely on *how* the particular people are harmed by GCC.

The harms caused by GCC will vary widely across the globe. Some nations will suffer longer, more severe droughts. Others will encounter more frequent and more severe storms. Some people will be exposed to new strains of diseases, while others will have their homes and property destroyed. The inhabitants of some low-lying island nations may even have to relocate, as their islands will become uninhabitable.

Given the diversity of the effects of GCC, it would be somewhat naïve to think that one form of compensation could adequately cover everything. For those who have lost property, monetary compensation makes the most sense: they can use it to replace what they have lost. For regions where the hotter climates are disrupting their agriculture, the best form of compensation would be assistance in helping them develop heat resistant crops or a new method of farming. If this process takes a long time to implement, then nourishment should be provided to the people in need. Securing this nourishment would require allocating some funds for this purpose well in advance of the crisis and creating legal mechanisms to ensure that these funds are used to provide aid to those that are in need of it.⁵⁸ If we are not focused on any particular region and want to solve the general GCC problem, advancing knowledge with regard to renewable energy sources and restoring carbon sinks, as well as implementing what we already know is effective, seems more appropriate.

Admittedly, all of these forms of compensation will surely involve a monetary *component*, but what matters is what that money is used for. Monetary compensation refers to giving the victims of GCC money directly; they can then do whatever they wish with these

⁵⁸ Although this method is probably the best we could do to secure this benefit, it is not nearly a foolproof way to ensure that these people do not go hungry. The fund could be depleted before such a crisis arises, or an abundance of crises may require that the funds either be distributed elsewhere or distributed in an insufficient quantity to those in a particular region.

funds. Catriona McKinnon (2012) offers an example of how this might work when she speaks of establishing a fund “to which future generations can apply if harmed by the emissions of past generations, and to which members of the current generation must contribute, all else being equal” (p. 82). McKinnon’s approach is significantly influenced by John Rawls’ just savings principle. Specifically, she claims that “taking steps to avoid placing future generations at risk of harm, and making provision for adequate compensation to address risks we have already created, are in fact requirements generated by the just savings principle but not *qua* principle of distributive justice” (p. 34-35). The core idea of the just savings principle, on Rawls’ account, is that the current generation has a duty of justice to maintain the just institutions that they have established and to set aside an amount of material and culture capital to be used by future generations to correct unjust institutions and likewise preserve the just institutions in existence.⁵⁹ McKinnon’s proposal is thus an extension of the just savings principle beyond its original purpose. If her arguments are successful, then the current generation has an obligation to save material capital to rectify the risks imposed on future generations by GCC. Future people who are adversely affected by GCC will receive their compensation by applying for it through proper legal channels.

⁵⁹ It is worth noting that the just savings principle is *hollow* in the following sense: it does not by itself tell us the precise amount that a given generation must save. Rawls (1999) explicitly states that he does not think it currently possible to “to define precise limits on what the rate of savings should be” (p. 252). Instead, the just savings principle tells us *how* to determine what these limits should be. We determine them through our deliberations in the original position – a hypothetical arrangement in which a group of free and equal people attempt to arrive at principles of justice. (In the original position, the parties know certain general facts about human psychology, biology, economics, etc., but they do not have knowledge of their personal characteristics, dispositions, or social and historical circumstances; this condition is present to ensure that the parties’ judgments will be impartial.) The parties in the original position ask themselves how “much they would be willing to save at each stage of advance on the assumption that all other generations have saved, or will save, in accordance with the same criterion” (Rawls 1999, p. 255). The just savings principle thus specifies a decision procedure for regulating the rate of savings as society progresses.

It is inconsequential to my project whether McKinnon's arguments ultimately succeed.⁶⁰ I present her position because it is one of the few examples of a compensation-based approach in the philosophical literature. The crucial question is whether monetary compensation is the *only* form of compensation that is necessary. In some cases, money does not seem like the best means of compensation. Those who have had their right to subsistence violated could only use money if it would actually help them buy the goods they need, but sometimes, these goods will be inaccessible to them even if they have money – for instance, when droughts or famines make the goods of food and water too scarce for everyone to get the amounts they need. In those cases, the proper compensation would be giving the affected population the goods they have been deprived of and helping them produce these goods themselves. When the range of a disease increases and affects a larger population than it once did, the affected people do not obviously have use for money: what they need is direct medical assistance. These compensatory measures cannot be provided directly. As mentioned earlier, the closest we could come to providing this aid directly would be establishing a fund, backed by a robust legal mechanism, that guarantees aid will be provided to those in need if such a catastrophe arises.⁶¹

Where does epistemic compensation fit into the picture? In some cases, it is entwined with the other approaches we have been considered. Medical advancements and scientific research into heat resistant crops, for example, are in some sense epistemic goods. Advancement of our knowledge in these areas helps us better respond to the needs of those affected by GCC. Earlier, I also spoke of knowledge as a collective social good. In some of these cases, the transfer

⁶⁰ Notably, however, since her approach does not appear incompatible with mine, if her arguments are successful, they could serve as alternative means to reach some of my conclusions.

⁶¹ Here, it is worth mentioning that the distinction between adaptation and compensation starts to blur. The key difference is that adaptation is undergone *before* the harms occur. It is preemptive, a preparation that is undertaken so that the relevant populations will be prepared for GCC. Compensation, in contrast, is offered in response to a harm of GCC that a population endures.

of some types of knowledge (e.g., the history of ancient Greece, Ernest Hemingway's biography, a recipe for a delicious cheese omelet) across generations does not seem to help them respond to GCC.⁶² Thus, in circumstances where we can provide forms of compensation that are more directly tied to helping the affected groups ameliorate their situation, those are the forms of compensation that we should implement.

Knowledge transmission will be a more preferable form of compensation when we think of compensating future people *as a whole* rather than focusing on individuals who deserve compensation or vulnerable populations who deserve compensation. The collective advancement of knowledge in general – including knowledge that has no obvious impact on solving GCC – would be a project we pursue in addition to these other, more direct forms of compensation because we recognize that it will not be possible to compensate all the victims of GCC. Even excluding those who die (and therefore cannot be compensated), it would be virtually impossible to identify every single person who has had a human right violated by GCC. Thus, while it makes sense to prioritize forms of compensation that will help future people respond to the harms of GCC (e.g., protected funds to distribute to adaptation projects, research concerning the development of heat-resistant crops), it also seems that we must pursue something further. We must develop a general compensation scheme that will benefit all future people to some degree because we know that more focused forms of compensation will not adequately compensate everyone. Knowledge transmission and preservation seems like an ideal candidate for this kind of scheme. It meets the three criteria for being a suitable form of compensation, and we will not have to make judgment calls about who to distribute the knowledge to. Unlike monetary

⁶² These forms of epistemic compensation are also likely to be passed on to future generations independent of any policy changes we make in response to GCC.

compensation, which requires us to specify a particular person or group who will receive the funds, there is no need to limit who has access to knowledge. Money is a finite resource in an important respect: the more given away, the less of it there is to distribute. But knowledge is not finite in this way: our stock of knowledge is not something that we deplete by passing it onto others.

Even despite these considerations, it still seems (other things being equal) that the majority of the resources devoted to compensatory measures should be invested in forms of compensation that offer more direct relief for the victims of GCC. Precisely how much any given nation invests in any particular compensatory scheme will vary considerably based not only on the needs of the victims of GCC but also on the particular circumstances of the compensating nation. Some nations may find themselves ideally situated – because of their economic structure, culture, or technological infrastructure – to put more resources toward a general knowledge-based compensatory scheme. Others may simply set aside a portion of their gross domestic product to be used for monetary compensation. Some nations might have already invested significantly in sources of renewable energy and think furthering this research is the most effective type of compensation they can offer.

Ultimately, we must be willing to accept a context-sensitive approach to what form the intergenerational compensation takes. Monetary compensation will not always be the most appropriate form of compensation, but epistemic compensation will not always be the best form either. Both these forms of compensation will have a role to play in a fully developed response to GCC. I will return to the topic of how these different types of compensation fit into the overall response to GCC in Section 8. At that juncture, we will have considered the ramifications a knowledge-based compensation scheme would have for public policy (Section 6) and how

compensatory duties should be distributed internationally (Section 7). With that information in hand, we will be in better position to evaluate the role and implementation of a knowledge-based compensation scheme in the context of a more holistic response to GCC.

But before addressing those matters, two objections must be rebutted. First, it might be argued that sufficient compensation would be sufficient to nullify the harms caused by GCC. If true, this argument would render the pursuit of adaptation and mitigation unnecessary, which would be a rather striking result. We shall soon see, however, that the argument is unsound. Second, one might argue that epistemic compensatory duties are irrelevant because we will fulfill them regardless of whether any compensatory scheme concerning them is adopted. Section 4 focuses on the first objection. I leave the second objection for Section 5.

SECTION 4: THE COMPENSATORY BENEFITS OBJECTION

If we take the notion of compensating future generations seriously, we may wonder whether the harms caused by GCC could be justified because they are outweighed by the benefits that we bestow to posterity. Call this the *Compensatory Benefits Objection* (CBO).⁶³ CBO consists of two controversial claims:

- (1) The benefits we provide to posterity are comparable in magnitude to (or greater than) the harms we are causing them.
- (2) Therefore, the harms we are causing are morally permissible.

The benefits described in (1) can refer to any form of compensation, and if the argument succeeds, then GCC does not give rise to any compensatory duties because we are already providing enough on behalf of future generations – enough that the harms future people suffer are morally nullified.

Determining what constitutes adequate compensation according to CBO is a difficult task. Whatever total loss in general welfare we cause to posterity must be effectively matched or outweighed by a general gain in welfare that we also cause. Calculating the overall effect of our actions on the welfare of future generations would be a statistical nightmare: it would be difficult to have confidence that our actions really will produce more good than harm even if some abstract calculation suggests this prediction will come true. Of course, we can offer some extremely large benefits to future generations. Compared to their predecessors, they may have higher life expectancies and greater access to creative arts. Their human rights may be better protected, and information may be more readily available to them. These benefits (and many

⁶³ I borrow this term and the basic framework for the objection from Nolt (2011a, pp. 69-70). John Broome (2012) also discusses this objection, although he refers to it as the “compensation argument” (pp. 60-61).

others) are far from trivial, but it remains unclear how we can compare these benefits to the harms inflicted by GCC with reliable accuracy.

Nevertheless, even if we limit our considerations exclusively to human welfare and give (1) an extremely favorable interpretation of the available data, it is unclear that the benefits we bestow to posterity outweigh the harms caused by GCC. The impacts of GCC will be catastrophic and far-reaching. Within the next century alone, hundreds of millions of people will likely face reductions in the supply of fresh water, flooding caused by the rise in sea level, and other severe detrimental impacts on human health (IPCC 2007a, p. 65).⁶⁴ Many will die, and many more will suffer severely. Furthermore, since the effects of GCC will extend well beyond next century, we can plausibly assert that GCC will adversely affect billions of people. While there is nothing logically impossible about us benefitting posterity in a way that eclipses these harms in terms of a utilitarian calculation, to claim that such an outcome is certain or even probable seems unrealistic. When we consider some of the other intergenerational harms we are causing (e.g., resource depletion, uncontrolled population growth, loss of biodiversity, widening inequalities between the rich and poor), defending the truth of (1) becomes even more farfetched.

Moreover, CBO faces another difficulty with (1): even if humanity as a whole is better off in the future, we have overwhelming evidence that many individuals will have their most fundamental human rights violated by GCC. Thus, these individuals would clearly *not* be compensated by the actions of previous generations, even if most people would be.⁶⁵ Often, we do not regard it as morally permissible to violate an innocent person's rights to make others –

⁶⁴ We also cannot forget the many disastrous effects I outlined near the end of Section 2.

⁶⁵ John Broome (2012) articulates a similar concern about this line of reasoning, stressing the justice is “a duty owed to individuals, and it requires each individual to be compensated” (p. 61). Compensatory duties, on his account, are duties to provide restitution for every *individual* affected.

even a large group of others – better off, so one wonders why that practice would be permissible here. Admittedly, we can imagine fanciful thought experiments where it is morally permissible (or perhaps even morally obligatory) to sacrifice individual welfare for the sake of aggregate welfare – perhaps torturing the son of a terrorist who has planted a nuclear device is the only way to get the terrorist to reveal the bomb’s location before it detonates in a highly populated area. However, the extreme nature of these cases demonstrates just how deep our resistance to this line of reasoning runs.⁶⁶ But rather than being an extreme case where we must harm someone to save many others from catastrophe, this purported justification of GCC is merely a self-serving moral rationalization of a thoroughly unjust process – an attempt to avoid taking responsibility for morally inept behavior.

The biggest problem for CBO, however, is more fundamental than just the difficulty affirming (1). Even if some elaborate calculation process were to demonstrate that (1) is true, CBO would still fail because the argument is invalid: (2) can be rejected even if (1) is true. The first pitfall of (2) is that it rests on the assumption that the only relevant moral consideration is general *human* welfare. We cannot simply assume the harms caused to non-human animals and other life forms are morally insignificant. Even if human beings are generally better off, that will not be the case for other species on the planet: we have no basis for justifying the harms imposed on the nonhuman world.

A second difficulty with affirming (2) is that certain aspects of the environment could not be properly compensated for if they are lost. If increases in ocean temperature lead to massive

⁶⁶ Here, we may be reminded of cases like H. J. McCloskey’s (1957) example of a judge faced with the dilemma of either framing an innocent African American for rape or allowing violent, racially charged riots to commence (pp. 468-469). Only an extreme act utilitarian position would hold that the judge ought to frame the innocent person (and this is one of the primary reasons such a view should be rejected).

destruction of coral reefs, can we really say that this environmental degradation can be justified by some compensation in terms of human welfare? If polar bears become extinct, can this outcome be justified because we made the lives of future people better in some other way? In these cases and many others, the environmental losses do not have a value which can be sensibly compared to some quantity of human welfare: the loss is of a fundamentally different *kind* than what could be compensated for by an increase in human welfare.

Maybe the thought of a CBO sympathizer is that we can infer (2) from (1) – at least with regard to human beings – because future people would, if given the choice, consent to this tradeoff. They would agree to the increased benefits of material wealth, technological advancement, and other benefits packaged with environmental degradation, more severe weather, and other significant harms. This idea, however, is far from sufficient to save CBO.

First, it is extremely doubtful that all future people (or even a majority of them) would consent to this tradeoff. The future people who will not have lives worth living probably would not consent, and those whose friends and families will not have lives worth living might also be hesitant to consent. Even those who enjoyed good lives might object to this tradeoff because of their love of nature and desire to see the natural environment preserved.

Second, the approach of even *assuming* consent in the first place is problematic, even if it is probable. After all, we cannot acquire the consent of future generations to accept this trade, and hypothetical or probable consent cannot be regarded as morally equivalent to actual consent. If I were to approach a stranger on the street and break her arm, I have done her an injustice even if I then offer her \$1 million as a form of compensation.⁶⁷ Even if she agrees that the compensation outweighs the harm she endured, I can still be morally criticized for my action

⁶⁷ I draw this argument and example from Nolt (2011a, p. 70).

because I assumed she would consent to the tradeoff. It is far from certain she would have: what if she is a passionate painter and is never able to paint as well once I break her arm? This possibility cannot be ruled out, and as a result, my moral culpability is not erased by the compensatory benefit I offer her.

Our assessment reveals that we have no grounds for thinking CBO succeeds. On our most generous estimates, (1) remains highly questionable, and even if (1) is true, (2) is false. We may have duties of compensation as a result of GCC, but fulfilling these duties (or even going beyond what these duties require) will not absolve us of the harms caused by GCC.

SECTION 5: THE ROLE OF COMPENSATION

Compensation does not nullify the harms of GCC, but we do have a duty to provide compensation to future generations. From a moral standpoint, mitigation and adaptation will not be enough to rectify the predicament faced by our posterity. We should think of this compensation as a means of partially atoning for our negligence and wrongdoing. Of course, it is difficult for us to admit that our actions unjustly harm future generations and that it is beyond our power to prevent all these harms at this juncture. Nevertheless, acknowledging one's past moral failures and making amends for them is clearly better than denial or apathy.

While we cannot absolve ourselves of the harms of GCC, providing compensation demonstrates that we recognize the harms we have committed and wish to ameliorate the situation. Imagine if I were to break a stranger's arm deliberately and *not* offer him any compensation. While compensating him does not exempt me from moral criticism, we would look upon a person who offers compensation far more favorably than one who does not. In fact, if someone deliberately and severely harms another and sees no moral significance in offering compensation for the harm inflicted, we would wonder whether the person understood even the most fundamental aspects of right and wrong.

Despite these points, one may press a different sort of objection at this juncture: what difference does it make? Or, to put it another way, why does it matter whether we have any knowledge-related compensatory duties to future people? There is no reason to think either that we will stop improving upon our own knowledge base or that future people will not benefit from our efforts to do so. Thus, it appears that we will fulfill these compensatory duties independent of how we respond to GCC. Matters might be different with regard to other forms of compensation, but this discussion of compensating future people through knowledge transmission appears to be

mere theoretical banter with no substance. In short, the existence of these compensatory duties seems irrelevant to us because their existence has no impact on our behavior. Call this the *Irrelevance Objection* (IO).

Before presenting my responses to IO, it will be helpful to get clearer on the exact structure of the argument. Structurally, IO looks like this:

- (1) We have compensatory duties to future people as a result of GCC.
- (2) Some of these duties could be fulfilled by transmitting and preserving knowledge for future people.
- (3) We will fulfill our knowledge-based compensatory duties for the foreseeable future whether or not we make changes to our current practices.
- (4) Therefore, knowledge-based compensatory duties have no relevant role to play in the discussion of how we should respond to GCC. [1-3]

Claims (1) and (2) follow from arguments made in earlier sections. Since I think the arguments underpinning (1) and (2) are correct, the objects of my examination will be (3) and the general form of the argument. Let's start with (3).

Even if we assume that we will continue to transmit knowledge successfully for the foreseeable future, it is not reasonable to think our current efforts are sufficient for the task of compensating future people for the harms of GCC. Given the enormity of the harms of GCC and the lack of any robust policy changes that will help with mitigation or adaptation, it is not reasonable to think that our compensatory duties will be minimal. In ideal circumstances, where all duties of mitigation, adaptation, and other forms of compensation are properly undertaken, perhaps we would not have any duties of epistemic compensation that stretch beyond what we currently do, but we are so far removed from these ideal circumstances that we ought to do all

we reasonably can to compensate future people for the inevitable harms of GCC. We must also recall from Section 4 that compensation (in any quantity) is still insufficient to morally nullify the harms caused by GCC. Thus, we should not adopt the complacent approach to compensation that (3) epitomizes: some changes to the status quo are required to meet our compensatory duties. I discuss some of those possible changes in Section 6.

Even if (3) could be defended, there is a deeper flaw with IO: it is an invalid argument. The truth of (4) does not follow from the truth of the premises. Even if we were guaranteed to provide adequate knowledge-based compensation to future people for the foreseeable future, it does not follow that my prior arguments would be inconsequential from a practical standpoint. An underlying assumption of IO is that the only morally relevant feature of a compensation scheme is whether we give the wronged parties what they are owed. Certainly, that is an important part of it, if not *the* most important part, but it does not exhaust the morally relevant considerations in play. There are at least two others: what our policy says about us (i.e., the present generation) and what message our policy sends to the wronged party (i.e., future generations). Both these considerations are tied to whether a compensatory scheme is satisfactory, and thus, as I will argue, we would have significant moral reasons to codify some policy changes focused on knowledge-based compensation for GCC even if we were certain to fulfill this compensatory effort for the foreseeable future absent these policy changes.

Who Are We?

The mere fact that one performs an action that adheres to a moral duty does not necessarily make an action morally good. Immanuel Kant (1785) demonstrated this long ago with his example of a shopkeeper who only refrains from overcharging a child because he fears the negative effects his behavior could have on his business (4:397). If word were to spread that

he overcharged a child, people might be reluctant to shop at his store. Since the shopkeeper is motivated to charge fair prices only out of his own self-interest, his action is not morally good: it lacks moral worth. To an extent, we could even criticize the shopkeeper for having this motive. Suppose we learn that this shopkeeper would, provided that he were to never be discovered doing it, swindle every child who purchased from his store. We would presumably react by condemning the shopkeeper's character: even if his behavior accords with what duty requires in this instance, his character reveals that this connection is tenuous. He is not motivated to do what is morally right *because* it is morally right.

To clarify, it is not the case that the presence of a self-interested motive automatically erases an action's moral worth. Even if I keep my promises out of respect for my moral duties, I may have self-interested reasons to keep promises. Perhaps I would feel guilty about breaking promises or do not want to risk retaliation from the person (or people) I would wrong by breaking my promise. But unless these are my *only* reasons for keeping my promise, their presence is morally irrelevant: so long as I would do what was morally right in the absence of those self-interested motives, it is plausible to think that my act is morally good. My behavior has a stability that the shopkeeper's lacks, and so my character does not have the same moral defect as his.⁶⁸

Kant's case of the shopkeeper is relevant to IO because IO assumes that, with respect to our compensating future people for the wrongful harms of GCC, acting in accord with our moral requirements is all that matters. It thereby overlooks some important moral questions. What do

⁶⁸ I am uncertain whether Kant would agree with my assessment here, although contemporary Kantian Thomas Hill (2010) has recently argued that our moral motives need not be always our chief thought according to Kant's theory. On Hill's view, all that Kant's ethics requires is that our moral principles serve as foundational constraints on our behavior, ensuring that we will act on self-interested inclinations only when they do not conflict with the principles.

our motives to compensate future people reveal about our moral character? Is this the kind of moral character we should want to cultivate in ourselves and express in our actions? And, as Gardiner (2012) asks, are we the scum of the earth?

If we think it unimportant to establish a legally enforceable, international policy specifying procedures and standards for compensating the victims of GCC because we are confident that we will fulfill the requirements of compensation anyway, we express at least two vices. First, we are being reckless. We are not warranted in being so confident of our ability to fulfill our contemporary duties, and given what is at stake, we should not take our compensatory duties lightly. Second, we reveal our selfishness. Not codifying a compensatory policy would suggest that we really do not care much about future people at all. What matters is doing what is in *our* best interests; helping future people is fortuitous but nonessential. Since doing what is in our short-term interests (and not in the long-term interests of anyone) has been one of the central contributors to GCC, this kind of reasoning must be resisted.

In contrast, if we codify a compensation policy in response to GCC, we express a crucially important virtue: *accountability*. In this context, this virtue refers to the quality of taking full responsibility for one's actions. One of our biggest problems regarding GCC has been our reluctance to take responsibility for the harms that have been caused; since GCC is an intergenerational and global collective action problem, individuals' contributions to the problem are relatively minute, making it easy for no one to seem responsible for the problem despite its enormity. Regarding GCC, we have also been prone to rationalize our individual contributions to the problem – suggesting, for instance, that individual GHG emissions cause no harm or that refraining from our own individual emissions will make no difference toward solving the

problem⁶⁹ – rather than acknowledging the ways in which our contributions are morally blameworthy. A person who is accountable will not offer these sorts of excuses; they will acknowledge what they have done and take the action needed to rectify the situation. Legally enforceable penalties or sanctions on violations of a compensation policy would convey a general willingness to be held accountable for the harms of GCC: we would not only acknowledge our role in contributing to this moral problem but also convey a willingness to accept punishments for failing to properly respond to the problem. In this manner, codifying a compensation policy can serve as a fruitful first step toward taking responsibility for being complicit in this ongoing environmental catastrophe.

Sending the Right Message

Social policies do more than govern our actions. They also convey messages. This role of social policies is often neglected, but some moral philosophers have recognized its significance and examined the morality of policies in light of the messages they send. Thomas Hill (1991), for instance, argues that the moral permissibility of affirmative action programs may be tied to the message that they send to those whom the policies affect. Since the message sent by an affirmative action policy will vary considerably depending on what the justification for the policy is, he holds that the moral reasons we use to support the policy make a substantial difference to whether the policy can be morally justified.

In a similar manner, David Boonin appeals to the message behind euthanasia policies to articulate an argument against the legalization of voluntary active euthanasia. In allowing individuals in certain circumstances to receive assistance in ending their lives, Boonin (2000)

⁶⁹ Defenders of these views include (among others) Baylor Johnson (2003), Walter Sinnott-Armstrong (2005), and Joakim Sandberg (2011).

fears that we send a morally offensive message to those in the same circumstances who do not wish to die – the message that their lives are not as valuable as those of people in normal circumstances (pp. 163-165). After all, we would not provide this assistance to healthy, fully-abled people, no matter how sincere or thoughtfully considered their request to be euthanized was.

Stephen Nathanson also appeals to the moral significance of messages, but rather than addressing affirmative action or euthanasia, he tackles the death penalty. Nathanson (2001) highlights the symbolic importance of our policy regarding the death penalty in the following passage:

For people on both sides, whether we impose or refrain from imposing the death penalty seems to say something about our values, about the kind of people we are, about the nature of society. The death penalty is in part a field on which we champion some of our most central social and ethical ideals. We think that retaining or abolishing the death penalty conveys an important message, and we want it to be the right message (pp. 131-132).

Nathanson then argues that abolishing the death penalty conveys two important messages: first, it affirms proper respect for human dignity (p. 138), and second, it communicates the importance of minimizing acts of violence (p. 145).

For our purposes, it does not matter whether Hill, Boonin, and Nathanson's arguments are ultimately successful. These anecdotes illustrate a basic point that transcends the particular issues they address: policies about ethical issues have a symbolic element to them. They express social values and send powerful messages. Our policies regarding GCC are no different, and because of the global and intergenerational nature of GCC, the messages sent by these policies will surely be larger in scope and significance than policies in the United States on affirmative action, euthanasia, or capital punishment.

We now come to one of the central reasons to codify a compensatory policy regarding GCC *even if* (as the proponent of IO holds) we would fulfill our compensatory duties without such a policy: doing so would send the morally appropriate messages to both present victims and future generations. The first message would be that we recognize our past wrongdoing and understand the need to rectify it. Given my remarks in the previous subsection, the importance of this message should not be underestimated, but the more crucial message is probably the second one: in codifying a compensation policy, we express a *commitment* to actually rectifying the problem. This message is crucial because GCC is a problem that leaves us vulnerable to serious moral corruption (Gardiner 2011a, pp. 301-338). We have spent plenty of time studying GCC scientifically, evaluating the economic efficacy of various responses to it, examining the ethical implications of the problem, and considering how the political obstacles to its resolution could be overcome. Yet after two decades of research and discussion, our attempts to reach a global agreement have only ended in abysmal failures. Against this background, articulating a genuine commitment to do something about the problem – a commitment that goes beyond mere conjectures or empty promises – is absolutely essential.

We are uniquely positioned with regard to epistemic compensation because it would not be a particularly difficult type of compensation for us to provide for future people. It would not be particularly costly for us, and we have some self-interested reasons to advance our knowledge anyway. As I suggested briefly in Section 3, epistemic compensation will not be sufficient to address GCC: it will need to be supplemented by other forms of compensation, and ideally, efforts at mitigation and adaptation will also be undertaken.⁷⁰ If taken seriously, however,

⁷⁰ I will return to the question of how epistemic compensation fits into a more general compensation scheme (and how a general compensation scheme fits with mitigation and adaptation) in Section 8.

codifying a policy with regard to epistemic compensation could serve as a stepping stone to more substantial efforts at addressing GCC. Thus, counter to what the proponent of IO claims, codifying such a policy could have a substantial practical impact. At this juncture, any established policy the violation of which would carry enforceable legal penalties would be an enormous step toward a more substantial, large-scale solution to GCC.

We may now start to wonder exactly what actions these compensatory efforts will involve. Is the defender of IO right to assert our business-as-usual means of preserving knowledge are all that will be required of us? I think not. In the next section, I examine some changes that would make us better able to meet our epistemic compensatory duties.

SECTION 6: COMPENSATORY DUTIES TO FUTURE GENERATIONS

Having rejected the *Irrelevance Objection* in the previous section, I now turn to two important questions regarding the implementation of knowledge-based compensatory duties. First, what changes should be made to better facilitate intergenerational knowledge transmission? Second, how should compensatory duties be allocated at the global level? I leave the latter question for Section 7; for now I focus on possible policy changes that would facilitate our meeting these compensatory duties.

Knowledge-Based Compensatory Duties

Speaking broadly, we can improve our current knowledge by doing one of three things: we can eliminate or correct the false beliefs we hold, increase our stock of true beliefs, and give more people access to our accumulated knowledge. How might we accomplish these tasks with regard to policy changes?

Knowledge Preserves

One of the most basic forms of epistemic compensation we could offer would be to preserve knowledge in secure locations. We already have preserves to maintain other valuable commodities (e.g., wildlife) for the sake of posterity, and we already try to preserve knowledge in this manner to some extent (such as in museums and libraries). But our current preserves are not particularly resilient. A knowledge preserve more suited to this task would be one that was much less destructible, perhaps an underground facility that would be unaffected by GCC and other potentially destructive forces (e.g., nuclear war). We would also need multiple preserves so that the destruction of any particular one would not be threatening.

One might think that our digital archives are sufficient for this task. Perhaps we can let Google archive all the available information electronically and not bother with anything else.

The problem with such an approach is that our digital technology may not be around forever. As reliant as many of us are on iPhones, cable television, and the internet, these aspects of human life are very new, and given the rapid pace at which resources must be consumed to maintain them, we would be unwise to assume that our current technological progress will prove sustainable through the next few centuries or that our current forms of preserving media will always be enough. It is precisely this sentiment that has led to the creation of the Physical Archive of the Internet Archive. The Internet Archive is a nonprofit organization devoted to preserving webpages and making texts more widely available to others. It has recently started acquiring physical copies of books and films in the event that we one day need those hard copies again (Streitfeld 2012). Any serious effort to preserve knowledge for future generations must not be content to keep all information in a digital format; should they ever lose the ability to access that digital media, what we store will be of little use to them.

Advancing Knowledge

Beyond preserving knowledge, we can also advance our knowledge in many different areas. However, not all knowledge is equal in its compensatory value. The knowledge that carries the most weight in this regard will be knowledge pertaining to the environment, especially knowledge that helps us make our current technologies less environmentally destructive. Given that the burning of fossil fuels is what has been most responsible for GCC, serious research into alternative forms of energy is crucial. We will need to switch to alternative forms of energy within the next 50 years (and perhaps sooner), and though nuclear energy may help with the transition process, the difficulty in disposing of nuclear waste suggests that research into less dangerous means of supplying power might be more valuable. This task of transition will largely be one that future people need to undertake, but they will be placed in this

circumstance because of *our* actions. Thus, aiding them in the transition process seems crucial. Whatever resources we put toward epistemic compensation for GCC, there's a strong case that the bulk of these resources should be used for the advancement of scientific knowledge that could help reduce the impacts of GCC, help the affected people cope with the environmental changes, or otherwise make our technological advancements more environmentally sustainable.

Advances in other fields (e.g., medicine, psychology, physics, mathematics, communication) will still be valuable to future people, but they will not be effective remedies for the harms caused by GCC. Thus, given that we have better forms of epistemic compensation available, those are the ones that we should pursue. Efforts to advance knowledge in these other fields should still be undertaken, but they should not be the primary focus of our compensatory efforts. The best way to continue the advancement of knowledge in those fields is to simply let things continue on their current trajectories. Substantial revisions to the enterprises of psychological, philosophical, and historical research (among other fields) should not be undertaken as part of our efforts to compensate future people for the harms of GCC.

One might counter this point by claiming that we could implement policies to limit the amount of disinformation passed onto future people. The elimination of false beliefs surely constitutes an improvement in our knowledge base. The problem with such a proposal is that serious restrictions on what information can become public threatens the open exchange of ideas and infringes on individuals' rights to free speech and open expression. However good it might be for us to eliminate the blog posts and YouTube videos about conspiracy theories and climate skepticism, the drastic reductions in liberty required to enforce a ban on these things suggests the policy would be unduly restrictive. Moreover, in many fields, understanding the views of others

– even if those views are false – is crucial to further clarifying and strengthening the views that prove to be correct.

Geoengineering Research

One particular form of scientific knowledge about GCC deserves its own separate treatment. The Royal Society’s substantive report on geoengineering defines the process as “the deliberate large-scale manipulation of the planetary environment to counteract anthropogenic climate change” (Shepherd et al. 2009, p. 1). Geoengineering includes (among other possibilities) ocean fertilization, injection of aerosols into the atmosphere, and atmospheric carbon capture. In all cases, the goal of geoengineering is to mitigate, or even reverse, the effects of GCC by creating large-scale changes in existing environmental systems. These proposals are not a new phenomenon, and they have been assessed on a number of occasions in the past.⁷¹ Digressing too far into the literature would be inappropriate, but it is worth pointing out that my compensation-based approach to GCC creates a strong argument that we ought to fund geoengineering research (and perhaps substantially).

Let me reiterate two important claims that underlie my approach. First, regardless of what we do to mitigate and adapt to GCC, there are large numbers of people being wrongfully harmed by it at this moment, and there will also be large numbers of people who will be wrongfully harmed by it in the future. Second, our compensatory duties are in part determined by how much we adapt and mitigate: the more mitigation and adaptation we pursue, the more our compensatory duties will decrease. Now recall that so far we our attempts to reach a global agreement regarding mitigation and adaptation have failed. If that continues, then our

⁷¹ For some examples, see Boyd (2008), Shepherd et al. (2009), and Gardiner (2011a, pp. 339-396; 2011b).

compensatory duties may become overwhelmingly large. If geoengineering proves effective, it could potentially solve some of the problems caused by GCC, thereby serving as a form of compensation to future people: it would give them a way to reduce, contain, or even reverse some of the effects of GCC. However, given the lack of substantial geoengineering research and the speculative nature of most analyses, we have only limited information about what proposals are the most reasonable, cost-effective, and safe. One form of epistemic compensation we could provide would be substantive, large-scale research into geoengineering. We would not be the ones to deploy it: given our lack of information about its safety and effectiveness, we are not positioned to make a reasonable judgment about whether it should be used. Moreover, unless one is very pessimistic about the projections regarding GCC, there is still time to implement adaptation and mitigation schemes that combat GCC effectively without need for geoengineering. Our goal, therefore, would be to put future people in a position where they could assess whether to use geoengineering technology: it will be up to them whether to push that button or refrain from doing so, but we must first ensure that there is a button that they could press. Effectively, this could function as a backup plan for future generations – a desperate measure to be undertaken in 2100 if they are staring at a 5-degree Celsius increase in global temperature that cannot otherwise be avoided.

There are at least two major objections to geoengineering, but I think both of them can be rebutted.⁷² The first is that geoengineering schemes should not be implemented because all of them carry serious environmental risks to both human and nonhuman life. As it stands, I think

⁷² To clarify, I do not regard my remarks in this subsection as being an insurmountable case in favor of pursuing geoengineering research. (There are other objections, after all.) I am simply sketching the central argument in favor of geoengineering research that emerges from my approach. A fuller examination of the argument and potential objections to it will have to wait for another time.

this objection is sufficient reason not to implement geoengineering anytime soon, but that is not what I am proposing. My suggestion is that we intensify research and development pertinent to geoengineering *now* in the hope that future people will have it available if they need it *in the distant future*.

The second objection is more substantive. According to this objection, we should not pursue geoengineering – even just *research* into geoengineering – because it creates a *moral hazard*: it may make us less likely to engage in collective efforts of mitigation or adaptation. Even if these measures are pursued, we may not pursue them with the same commitment that we otherwise would because a geoengineering alternative creates the appearance of a safety net. Even if we do not properly mitigate our GHG emissions or adapt appropriately, we can always undo the damages later by manipulating the climate system. Obviously, many of these damages (e.g., species extinctions, people who die) cannot in fact be undone, even by a genuinely effective geoengineering scheme, but the point is that we will be tempted to adopt this sort of outlook and thereby rationalize our failure to reduce GHG emissions and adapt to GCC properly.⁷³

The first response to the moral hazard argument would be to point out that we are not currently pursuing any mitigation or adaptation efforts at the international level. Attempts to reach agreements about them have failed so far, and geoengineering research has been primarily limited to computer modeling. Field tests, particularly on large scales, are almost nonexistent. Thus, it is hard to see how pursuing more extensive geoengineering research could make us less

⁷³ It is worth noting that the precise structure and content of this *moral hazard* argument is difficult to clarify. See Hale (2012). For our purposes, however, this sketch is sufficiently accurate.

effective in our mitigation and adaptation efforts: at present, we appear to already be near maximal inefficacy!

Perhaps the thought behind the moral hazard argument is that geoengineering research will make us *even less likely* to reach an agreement and pursue a global mitigation and adaptation scheme. Perhaps this is true, but it is an empirical claim about human psychology that is difficult to evaluate. Moreover, given the political inertia surrounding GCC, one may be skeptical about any agreement reached – regardless of whether geoengineering is under consideration – being adequate to address the problem. Whatever policies are eventually implemented may be too little too late, and the worst-case scenario would be a failure to mitigate and adapt compounded by a failure to pursue geoengineering to any degree. In such a scenario, we would leave future people to inherit a devastated world with no feasible means of escaping their fate.

I must reiterate that I am not advocating that we implement geoengineering *now*. My proposal is only to bolster the research and development with regard to geoengineering so that future people will have it available as an option. This epistemic compensation functions essentially as a preventative measure against the worst-case scenario outline above. Future generations might still elect not to manipulate the climate system, even if the worst-case scenario is looming before them, but without our aid in getting the geoengineering research in motion, they will have no choice to make at all. Given our inability to respond adequately to GCC so far, we cannot rule out the worst-case scenario, and if geoengineering could prevent its actualization, then pursuing it seems obligatory. Matters would be much different if we implemented policies

of mitigation and adaptation, but until that happens, geoengineering research seems to be an appropriate form of epistemic compensation for GCC.⁷⁴

Educational Reform

One further means of improving the transfer of epistemic goods across generations would be to ensure that future people have greater access to the information we preserve. We have already made some strides in this regard with advancements to communications technologies. Further improving these technologies and rendering their use more sustainable in the long term would be one means of providing epistemic compensation, but a more productive way to accomplish this aim would be to improve individuals' ability to get an education. There are limits to this proposal, however. The United Nations (1948) *Universal Declaration on Human Rights* explicitly identifies a human right to a free education, "at least in the elementary and fundamental stages" (Article 26). If this is indeed a human right, then we cannot offer this kind of educational access as a form of compensation for GCC because we owe it to future people (and present people) on the basis of another moral duty. Similarly, there are strong reasons to think that inequalities in educational opportunity are unjust independent of anything related to GCC, which means that rectifying inequalities in educational opportunity would also not be suitable forms of compensation for GCC.

Nevertheless, there may be some methods of educational reform that are consistent with compensation for GCC. For instance, if affirmative action for historically disadvantaged minority groups is justified, then it seems that affirmative action programs for victims of GCC would also be justified.

⁷⁴ I am indebted to Alex Feldt for valuable discussion of the issues addressed in this subsection.

The Double-Burden Problem

One who is skeptical about the merits of my proposals might raise a concern about burdening future people with our compensation policies. Future people will already be burdened by the effects of GCC, but since our compensation policies can only be *initiated* by us, we will need future people to continue them. They will have to continue them even if they take serious action to mitigate GCC, to adapt to its impacts, or to reverse its effects (perhaps through geoengineering). They could thereby be tasked to carry on our compensation projects even though they will not owe compensation for the wrongful harms of GCC, and they will have to carry on these projects even though *they* are the ones being wrongfully harmed by GCC. In effect, our compensation policies risk imposing two different burdens on future people: one burden will be dealing with the impacts of GCC; the other will be continuing our compensatory projects to benefit future people who are wrongfully harmed by GCC. Call this the *double-burden problem*.

The double-burden problem could refer to either of two worries. The first is a concern about future people's motivations to continue our compensatory projects. The second is a concern about whether future people can really have any obligation to carry on these compensatory projects. Notably, the double-burden problem is not unique to epistemic compensation for GCC: it will apply to any long-term compensatory scheme with regard to GCC and to any long-term adaptation scheme regarding GCC. Any efforts at compensation or adaptation that take multiple generations to implement will require contributions from future people who may not bear any meaningful responsibility for GCC. Given the scale and scope of GCC, I cannot fathom a genuinely effective response involving adaptation or mitigation that will not span multiple generations. Theoretically, a monetary compensation scheme could avoid this problem if we could somehow estimate how much money we would need to set aside for victims

of GCC and leave this amount of money untouched for future people, but it is difficult to see how such a feat could be achieved in practice.

Future people would have self-interested reasons to continue some of our compensatory projects. For example, if we concentrate research into alternative forms of energy and geoengineering, future people will want to continue those projects because their continuation may help solve the problems caused by GCC. This reasoning will not apply to all forms of epistemic compensation, however, and so I take the double burden problem to point inescapably to the superiority of mitigation over adaptation or compensation in response to GCC. Since future people will have to bear the double burden of both being harmed by GCC and having to sacrifice resources to adapt to GCC or compensate its victims, the only morally satisfactory solution to GCC is to mitigate sufficiently so that the problem never affects future people. But as I have stressed throughout this project, we have passed the point where mitigation alone will constitute a sufficient response to GCC. We cannot prevent future people from being harmed. Thus, the double-burden problem is an unfortunate but virtually unavoidable aspect of any long-term method of compensating the victims of GCC.

SECTION 7: GLOBAL IMPLEMENTATION OF COMPENSATION-BASED DUTIES

Having considered some substantive policy changes that could facilitate epistemic compensation for GCC, we can now consider how these compensatory duties should be distributed at the global level, an issue that arose back in Section 2. At its core, this question concerns who bears responsibility for compensating the present and future victims of GCC. No individual could have such a responsibility (largely because no solitary individual is responsible for GCC), but we can make more substantive statements regarding the relative responsibilities of nations. My discussion must be fairly brief because developing a full, working global policy regarding GCC would be a book-length project in itself, but I can nevertheless sketch the contours of how compensatory duties should be distributed.

So what is the just distribution of compensatory responsibilities at the global level? Speaking broadly, the compensatory duties should be fulfilled primarily by the richer, more developed nations, such as the United States, Canada, Australia, and developed nations in Western Europe. The view that these nations bear the primary responsibility for responding to GCC has been substantively defended elsewhere (e.g., Shue 1993, 1999; Singer 2004, ch. 2), and if this view is correct, then duties to compensate the victims for GCC – like duties of mitigation and adaptation – will fall primarily on these developed nations. There are four different moral considerations that lead almost inescapably to the conclusion that developed nations should assume the primary responsibility for responding to GCC.

First, there is what might be called the *Polluter Pays Principle*. According to this principle, the polluters bear the responsibility for remedying any problems caused by their pollution. When the polluters' contributions to the problems differ (e.g., because their degrees of pollution vary), their responsibility varies in proportion to their respective contribution. Thus, if

there were 50 total polluters but 10 of them contributed a total of 90% of the overall pollution, it follows that these 10 would bear a much greater responsibility for cleaning up the pollution and addressing any other problems it caused than the other 40. The Polluter Pays Principle accords with the basic thought that one's responsibility for rectifying a moral problem is related proportionally to one's respective role in causing the problem. Thus, as Peter Singer (2004) puts the point:

“...as far as the atmosphere is concerned, the developed nations broke it. If we believe that people should contribute to fixing something in proportion to their responsibility for breaking it, then the developed nations owe it to the rest of the world to fix the problem with the atmosphere” (2004).

The figures concerning the exact quantity of GHGs each country currently emits and has emitted in its history vary (likely due to different methods of measuring emissions), but they all demonstrate conclusively that developed nations have emitted far more GHGs per capita than those in developing nations.⁷⁵ Thus, it is their duty to make the biggest sacrifices in responding to GCC.

One might object to this sentiment by claiming that the majority of historic emissions were a result of ignorance of GCC. Since we often excuse people for the immoral things they do when they do them unknowingly and unintentionally, the developed nations should be excused from their historic responsibility for GCC.

A number of replies can be offered to this objection. First, there was some speculation about GCC as early as the late 19th century (Arrhenius 1896), so perhaps previous generations cannot claim to have been completely ignorant of GCC. Second, ignorance is not always a

⁷⁵ This data could come from an enormous number of sources, but for a couple examples, see United Nations Statistics Division (2013) and United States Environmental Protection Agency (2013). China now has the highest quantity of annual GHG emissions, but China's enormous population renders their per capita emissions much lower than many other countries.

plausible excuse for moral wrongdoing. In this case, given that we were not certain about the environmental effects of burning fossil fuels, one could argue we should have been more mindful of the unforeseeable outcomes of our actions and more cautious in our approach to polluting the environment. Third, ignorance does not always eliminate a duty to provide compensation. Tragic accidents often require that victims be compensated. Fourth, even assuming that people were genuinely ignorant of GCC until the late 1980s, this would still not excuse the emissions between 1990 and now, and the quantities of GHGs emitted during this time is enormous (and annually increasing). The argument from ignorance would be much stronger if serious mitigation and adaptation efforts had been undertaken when GCC first became a pressing issue, but we have not taken these steps, even after knowing conclusively about the problem for more than 20 years. Thus, the appeal to ignorance appears to be more of a rationalization for past emissions rather than substantive justification of them.

A second consideration that suggests the developed nations bear the primary responsibility for responding to GCC rests on an appeal to equality. The atmosphere is a common resource, one which all people share and need for their survival. Assuming that all people deserve equal access (or at least roughly equal access) to common resources necessary for their survival, it follows that all individuals have a claim to emitting some designated quantity of GHGs – whatever quantity it would be that would not adversely impact the climate system even if everyone emitted that amount. We could calculate the amount of permissible GHG emissions per country by multiplying the amount of permissible individual GHG emissions (or in other words, the permissible GHG emissions per capita) by the population of the country. Doubtlessly there would be disagreement about the premise amount of permissible GHG emissions per capita, and we would have to make some exceptions to the general rule. People in Sweden, for

instance, have a reasonable need to emit more GHGs to heat their homes than people living in Brazil. Nevertheless, on any remotely plausible version of this calculation, we will see that the developed nations, whose GHG emissions are 10-50 times the amounts of many developing nations, have radically exceeded (and continue to radically exceed) the threshold of permissible emissions. Thus, the developed nations are the ones that bear moral responsibility for reducing their emissions below the acceptable threshold or helping the developing nations cope with GCC.

Third, the developed nations have more resources than developing nations. As a result, they can respond to GCC more effectively than developing nations can and will still be much better off than those developing nations afterward. The developing nations, despite having contributed very little to GCC, are the ones that (in general) are most likely to be affected by GCC's worst effects (e.g., droughts, severe storms, sea level rise) and the ones least able to adapt to it. Given these two related facts, other things being equal, it falls to the developed nations to shoulder the greater burden of responding to GCC. (And I should stress that all things are not equal: the previous two considerations indicate there are *already* substantial reasons to think the developed nations bear the greater burden in responding to GCC.)

Forth, a substantial portion of the emissions by citizens of developed countries are luxury emissions. This point rests on a crucial distinction made by Henry Shue (1993): the distinction between *subsistence* emissions and *luxury* emissions. GHG emissions in most developing nations are primarily subsistence emissions – emissions that are necessary for the populations to survive. Most developed nations, in contrast, emits GHGs for rather frivolous reasons, such as joyriding, cooling a home to a constant 68 degrees Fahrenheit in the summer, and drying clothes in a machine rather than hanging them on a clothesline. These are luxury emissions – those that are done for mere convenience and enjoyment rather than survival. Subsistence emissions, even if

they ultimately violate others human rights, may be justified because they are necessary for the parties involved to secure their own human rights. But there is no comparable moral justification to be made for luxury emissions: they are simply superfluous. Since luxury emissions occur disproportionately in developed nations, this is yet another reason to think developed nations bear more moral responsibility for responding to GCC than developing nations.

These four considerations, though they are not beyond being challenged, create a virtually overwhelming *prima facie* case that any global response to GCC is primarily the responsibility of developed nations.⁷⁶ Developing nations whose emissions are steadily increasing (e.g. China, India) will incur some responsibilities to respond to GCC once they pass the permissible amount of GHG emissions per capita; if they have already passed that threshold, then they will have *some* responsibilities with regard to GCC but not as much as their developed counterparts. Nonetheless, it does not follow from these remarks that any particular developed nation will have responsibilities of compensation with regard to GCC. Mitigation, adaptation, and compensation are all appropriate responses to GCC, and nations may elect to pursue different ones depending their particular circumstances. Some may favor radically lowering their GHG emissions, some may favor investing their resources in adaptive measures, and some may favor starting research programs aimed at epistemic compensation. Again, these would all constitute appropriate responses to GCC; however, I do not mean to suggest by this language that all three approaches are equally viable. In fact, I gave a reason in Section 6 (i.e., the double-burden problem) for thinking that mitigation was ultimately the best solution. Rather, by

⁷⁶ One could object by appealing to the thought that developed nations have brought about many good things in the world through their economic and technological growth and that the developing nations have indirectly benefited from this growth. This objection is a slight variation on the compensatory benefits objection: the central claim is that the benefits bestowed to developing nations serve as sufficient compensation for the harms the developed nations cause them through GCC. I addressed this objection in Section 4, and I can see no reason that the criticisms mentioned there would not be equally fatal to this version of the argument.

“appropriate,” I only mean that each approach to GCC will have some role to play in the general global response to GCC.

Although we can assert that developed nations must accept the primary responsibility for responding to GCC, the particular allocations of duties from country to country could vary considerably. Given the complications that will emerge when we consider the particular circumstances of each nation and the concerns regarding political feasibility, speculating over any specific distribution of responsibilities regarding the global response to GCC would be a foolish endeavor without a much more comprehensive assessment of the relative merits of adaptation, mitigation, and compensation, as well as further inquiry into how particular policy changes might make more sense for certain nations than others. Though worth pursuing, such a grand and daunting project must wait for another occasion.

SECTION 8: CONCLUSION

We are now in position to appraise what I have shown in this thesis. I have sought to defend the following five claims:

1. We have duties to compensate future people for the harms caused by GCC.
2. The transmission of knowledge from the current generation to future generations is a suitable means of compensating future people for the rights violations caused by GCC.
3. We cannot provide sufficient compensation to nullify the harms caused by GCC.
4. Contrary to initial appearances, striving to meet compensatory duties through intergenerational transfer of knowledge would carry great practical significance.
5. Duties of compensation should be undertaken primarily by the richer, developed nations that have historically contributed the most to GCC.

It will be up to the reader to judge whether my defenses of these claims have been satisfactory, but let us suppose – if only for the sake of argument – that I have adequately defended them.

What follows from my conclusions?

The truth is that much of what follows from my arguments is uncertain. Two important points are worth repeating. First, the extent of our compensatory duties regarding GCC hinge substantially on how much harm is caused by continuing emissions. Robust attempts at mitigating GHG emissions and adapting vulnerable populations will reduce the amount of compensation required. Second, there are many forms compensation can take, and what form of compensation is most appropriate will vary considerably depending on the circumstances of both those harmed and those providing aid. When taken together, these points reveal that it is possible – even after all this discussion – to respond adequately to GCC without engaging in any

epistemic compensation: even though some compensation will be owed, it is somewhat open-ended what form that compensation will take. Given the arguments I have put forward, however, I am skeptical that a global response lacking *any* epistemic compensation would be the best solution we could offer to GCC, and I am even more skeptical we will pursue adaptation and mitigation sufficiently to render this hypothetical response a realistic possibility. We will probably have an enormous number of compensatory duties by the time we implement a genuine global response to GCC.

Nevertheless, rather than establishing beyond doubt that epistemic compensation should be pursued, I take this thesis to establish something more modest – that epistemic compensation as a response to GCC deserves the same level of discussion and consideration as the other, more established forms of response (e.g., mitigation, adaptation, geoengineering, monetary compensation). GCC may be the most formidable environmental problem collective humanity has ever confronted, and given its scope and significance, we need as many policy options as possible so that we can reach a morally satisfactory and politically feasible solution. Otherwise, post-apocalyptic settings may no longer seem so far removed from reality. In fact, some philosophers and environmentalists have even started to write about what the future will look like for those in the warmer world and how they will perceive us.

One example is Tim Mulgan's (2011) *Ethics for a Broken World*. Its opening chapter sets the stage for a series of fictitious history of philosophy lectures by contrasting our current world, which existed during the "Age of Affluence," with a futuristic broken world – a world "where resources are insufficient to meet everyone's basic needs, where a chaotic climate makes life

precarious and where each generation is worse off than the last” (p. xi).⁷⁷ Mulgan’s main aim in the book is to showcase how our moral and political ideals are much more contingent on social and historical context than we often realize, but his creative approach also exposes a more somber reality: the broken world he describes may not be a mere fantasy. Although Mulgan readily acknowledges that the broken world is only one of many possible futures (p. x), his text serves as a sobering reminder that unchecked climate change could undo much of our technological and social progress within only a few centuries.

There is, however, another thought generated by the text that is equally troubling. In the imaginary course’s introductory lecture, the professor remarks:

“Affluent philosophy produced a vast literature of texts, articles and commentaries. Virtually none of this survives today. Pre-affluent writers preserved their thoughts using durable media such as stone, wood, papyrus or paper. Affluent people, confident in their own technological superiority, dispensed with all these and transferred everything to electronic media. During the internet collapse that heralded the end of the affluent age, almost all the accumulated wisdom of humanity thus disappeared forever” (Mulgan 2011, p. 13).

I mentioned in Section 6 the need to create knowledge preserves to avoid this kind of outcome, but there is a graver message here: the affluent were in position to help future people – to prevent the catastrophes of GCC or at least safeguard against its worst outcomes – and flagrantly failed to do so. Moreover, they failed in part because they were unable to use their accumulated knowledge to reach a solution to GCC and then allowed this knowledge to be destroyed, such that future people can no longer access it. We cannot allow Mulgan’s futuristic vision to be prophetic. We must advance our knowledge and preserve it for those future generations who will

⁷⁷ For another approach to GCC from the fictional perspective of a scholar in the distant dystopian future, see Oreskes and Conway (2013).

continue the battle against GCC; it is not one that they started, but it will be up to them to finish it.

Responding properly to GCC will not be easy. Even limiting our scope to compensatory duties, the moral mountain we must scale will be quite steep. When we consider the other harms we are causing posterity (e.g., depleting natural resources, overpopulating, reducing biodiversity), and consider whether compensation for these actions might also be owed, we may agree with Clifford (1877) that it is “[a]n awful privilege, and an awful responsibility, that we should help to create the world in which posterity will live” (292).

Nonetheless, despite the heavy moral burden we carry, it is not too late for us or for our successors. Mulgan’s broken world can still be avoided; we can still prevent the gravest climate catastrophes from coming true. But merely preventing the gravest catastrophes will not be a morally adequate response, for many will be (and have been) wrongfully harmed while we try to reach a solution. Part of our solution must be to compensate these victims (insofar as it is possible), and knowledge transmission and preservation can partially fill this role. After all, there are many things that future people would like to know.

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