UNIVERSITY OF CALIFORNIA, SAN DIEGO

Critical Political Ecology and Environmental Crisis: Rhetoric, Technology, and Decentralization in the US and Mexico

A dissertation submitted in partial
satisfaction of the requirements for the degree of
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in

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by

Kyle Haines

Committee in charge:

Professor Harvey Goldman, Co-Chair
Professor Tracy Strong, Co-Chair
Professor Fonna Forman
Professor Marcel Henaff
Professor Gerry Mackie
Professor Keith Pezzoli

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The Dissertation of Kyle Haines is approved, and it is acceptable in quality and form for publication on microfilm and electronically:

Co-Chair

Co-Chair

University of California, San Diego

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DEDICATION

To my Dad—for showing me that being an intellectual doesn't have to mean being arrogant, bringing my sister and I up with a deep respect for nature, and providing an example of the satisfaction and impact of dedicating your life to public service.

EPIGRAPHS

‘There are no frontiers between the disciplines that man sets himself for understanding and loving. They interlock, and the same anxiety merges them.’

Albert Camus

‘It’s not easy to see things in the middle, rather than looking down on them from above or up at them from below, or from left to right or right to left: try it, you’ll see that everything changes. It’s not easy to see the grass in things and in words (similarly, Nietzsche said that an aphorism had to be ‘ruminated’); never is a plateau separable from the cows that populate it, which are also the clouds in the sky.’

Gilles Deleuze and Felix Guattari

‘Oh, God, what a noble profession this is. How well do I know the reader? How much can I tell him without unnecessarily embarrassing either of us? I can tell him this: A place has been prepared for each of us in his own mind.’

JD Salinger

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LIST OF ABBREVIATIONS

BECC	Border Environmental Cooperation Commission (NAFTA)
CEC	Council for Environmental Cooperation (NAFTA)
COLEF	El Colegio de la Frontera Norte
CONAPO	Consejo Nacional de Población
CONEVAL	Consejo Nacional de Evaluación de la Política de Desarrollo Social
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
EPA	Environmental Protection Agency
EPPM	Extended Parallel Process Model
EPT	Environmental Political Theory
EVT	Expectancy-Valency Theory
GNEB	Good Neighbor Environmental Board (US)
MAS	Movimiento al Socialismo (Bolivia)
NADB	North American Development Bank
NAFTA	North American Free Trade Agreement
NEPA	National Environmental Policy Act (1969)
PCH	Post-colonial history
PE	Political Ecology
PMT	Protection Motivation Theory
SEDESOL	Mexican Federal Social Development Ministry
SEMARNAT	Mexican Federal Natural Resources and Environment Ministry
SES	Social-ecological systems
SRM	Solar Radiation Management
TEIA	Transboundary Environmental Impact Assessment
TEK	Traditional Ecological Knowledge
UNEP	United Nations Environmental Program
UNFCCC	United Nations Framework Convention on Climate Change
USFS	US Forest Service
USFWS	US Fish and Wildlife Service
Usos	Usos y costumbres, recognized indigenous municipalities in Oaxaca

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VITA

2006	Bachelor of Arts, University of California, Santa Cruz
2007-2008	Substitute Teacher, Santa Ynez Valley Union High and El Cerrito High School
2009-2011	Earl Warren Fellow, UCSD Political Science
2011-2015	Teaching Assistant and Graduate Lecturer, UCSD Political Science and UCSD Urban Studies and Planning
2013-2017	Graduate Fellow, UCSD Center on Global Justice
2013-2017	Director, Binational Interdisciplinary Forum for Environmental Research, UCSD Center for the Humanities, Scripps Institution of Oceanography, and El Colegio de la Frontera Norte.
2014-2017	Graduate Field Coordinator, UCSD Cross-Border Initiative
2016-2017	Visiting Fellow, UCSD Center for US-Mexican Studies
2017	Doctor of Philosophy, University of California, San Diego

PUBLICATIONS

2015	'Resilient Development and Environmental Justice in Divided Context: Political Ecology in the San Diego-Tijuana Bioregion.' *Glocalism*, Global Cities Special Edition, February 2015.

FIELDS OF STUDY

Major Field: Political Science (First Concentration: Political Theory, Second Concentration: Comparative Politics)

Specializations: Modern Political Theory, Environmental Political Theory, Latin American Studies, Social-Ecological Systems Theory

ABSTRACT OF THE DISSERTATION

Critical Political Ecology and Environmental Crisis:
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by

Kyle Haines

Doctor of Philosophy in Political Science

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Professor Harvey Goldman, Co-Chair
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Global scale ecological crises are often interpreted as a fundamentally 'new' problematic. This perceived novelty has important effects on how we politically interpret the urgency these crises produce and the kind of solutions, whether cultural, institutional,

or technological, that we consider appropriate or ethically defensible. This project, as a whole, responds to this perceived novelty by insisting two basic things. First, any critical theory of ecological politics in this new era must see past the seeming novelty of the Anthropocene and understand that there have been eras of history in which the actors also perceived themselves as new. In particular I will draw parallels between debates over nuclear weapons and population, both global in nature and containing green premises, and show how some of the lessons embedded there regarding humility, irreversibility, agency, and universality can benefit critical theories of 'new' eras like the Anthropocene.

Second, any political theorist seriously approaching global ecological politics must begin by expanding the existing debate beyond the technologically-advanced industrial nations, which are both the principal causes of environmental degradation and the chief, and at times only, voices in the global narrative. The second half of this project follows intuitions about simultaneity and subsidiarity to assess the practical politics of localization and cultural decolonization in the context of institutional decentralization. I look at specific examples, including local theories of ecological governance, environmental justice in the divided region of Tijuana and San Diego, and finally forest governance and municipal autonomy in Oaxaca, Mexico. In sum, I seek to expand the historical and geographical perspectives in political debates over ecological change. In the end, I want to suggest that such an expansion of perspective and institutional logics can help theorists of this new era reflect critically on many of the most problematic narratives now flowering in the urgent atmosphere provided by ecological crisis.

01 Introduction: Critical Political Ecology and Environmental Crisis

> Void of Counsel, having no Understanding in them; and that, under all the Cultivations of Heaven, brought forth bitter and poisonous Fruit. – Deuteronomy 32:28

> This essay is also out of touch with the times because here I am trying for once to see as a contemporary disgrace, infirmity, and defect something of which our age is justifiably proud, its historical culture. For I believe, in fact, that we are all suffering from a consumptive historical fever and at the very least should recognize that we are afflicted with it. – Friedrich Nietzsche

I. Overview of the Project

Deleuze once wrote 'we always start in the middle.' This project is, if unintentionally at times, my homage to that insight. In this introduction I try to trace a path across the interdisciplinary and wide-ranging material that I have assembled throughout my time in graduate school and lay out as coherently as I can in a short space here the many paths my original question has taken me down. This original question was deceptively simple: 'Why do we, the most technologically-advanced, 'modern,' and 'developed' societies in history, do nothing about major planetary ecological change?'

As a student of the history of political thought and more specifically Critical Theory and Nietzsche, I originally found this question to be highly cultural. From my experience living in California over the last thirty years I had seen how many areas with good science and dedicated activists were still falling short of the more fundamental changes in energy, global production, and transportation needed to avoid the kinds of catastrophic conditions that these changes seemed to imply, given the best available scientific evidence. My home for the last decade, San Diego, in particular, seemed to be living this paradox, dependent for 80% of its water on distant sources yet refusing water recycling as 'toilet to tap' in the 1990s.

My original studies that make up the early parts of this dissertation looked for historical precedents for the supposedly 'new' era of global planetary influence. Encountering the Anthropocene as an academic I thought it was likely a buzzword that would fade, but over time I found myself more directly engaging with it, especially following my introduction to Dipesh Chakrabarty's interesting work from a critical historical perspective. I followed Chakrabarty and saw that the sense of history which used to inform the environmental movement was being lost, that the 'newness' of the global climate problematic was reshaping the landscape of green theory in new ways that were still organized around old divisions, chief amongst them the relationship of technology and economic development to human flourishing.

The first chapters, then, are a kind of critical genealogy of some important themes in debate in the 2000s, primarily in the US, but also in Europe and international institutions. To deepen these insights historically I look at the debate over nuclear weapons, population crisis debates in the 1970s, and try to think about the history of American apocalypticism and how it can both inform and caution current debates. The arc of the beginning of this project thus followed my route through mid-20th century thought into the present. As I approached the present, however, I began to feel overwhelmed.

Like many people who research global environmental politics, I had a resigned sense of inevitability that was incredibly hard to shake. I contemplated joining the likes of James Lovelock and other would-be disaster prophets, renaming my work 'New Survivalism,' and confronting the world with the truth, tragically knowing it would do nothing to prevent the coming change. The practical application of such a feeling is

preparing for the worst mentally without changing the comforts of everyday life. Indeed, if such habits were to come to an end soon, there is a perverse incentive to enjoy them before they disappear, the essence of Hardin's 'Tragedy of the Commons.'

This idea made me think about what the politics of such an inevitably-changed world would look like, how the disruption of international trade, changes in energy supply, and unavoidable rising seas would change perspectives on collective action. Many already preach that such a transformation is inevitable, preparing now for the worst, urgently recommending strengthening the capacities of local levels which may again become the centers of political life in a world of reduced connection. These kinds of narratives are flexible—the strength of the appeal from global disaster can blend into all sorts of different kinds of political and rhetorical hybrids and fusions. It seemed clear to me that these kinds of post-apocalyptic forced-decentralization narratives drew equally on the hopeful idealism of bioregionalists seeking everyday conversions and on the dour survivalist inevitability that melded millennial rhetoric with scientific authoritarianism. Each had deep roots in the traditional rhetorical tropes of American movements, from back to the land and self sufficiency to centralized efficiency and apocalyptic endings.

Chief among the big problems identified by looking at these American historical roots in detail, from exploring other historical eras that thought of themselves as initiating new global eras, was the seemingly un-affectable scale of the global problematic. Global measures like the 2C climate threshold, average global sea level rise, and ocean acidification hide regional variations, many of them potentially ending the way of life of entire nations, as in the bleaching coral and disappearing islands of the tropical Pacific. Gunther Anders, confronting the novelty of the extinction threatened by nuclear weapons,

identified this unimaginability of the global problematic as the 'Promethean Gap,' or inability to ethically render decisions involving great numbers and distances. The first active task confronting this gap, I argue in this section, is to reseat 'new' eras in their historical context in order to translate the effects of global trends into a meaningful language that can be historically-informed and enable more reflexive forms of preparedness and adaptation.

During my time teaching at UCSD I had the opportunity to be a teaching assistant and create syllabi for several urban studies classes, including ones focused on sustainability and the politics of San Diego and Tijuana. My broad, theoretical question which had begged for cultural answers became more practical throughout this period, and I began looking harder at San Diego itself. I taught my own classes in environmental policy and environmental thought, as well as working as a field instructor for work-study programs and organizer of interdisciplinary environmental meetings. In each of these venues, thinking locally provided an interesting way to blend the many different kinds of influences which I was both teaching together as 'political theory' and also curate them together into relevant meetings and lesson-plans for graduate and undergraduate students.

Where I had originally imagined a short chapter on decentralization in Mexico and Bolivia as possible answers to the kinds of suggestions for overcoming the stasis diagnosed in the earlier chapters, this section grew and matured as I began to learn several new literatures, including Political Ecology, Ecological Economics, Fiscal Federalism, and gained training in mapping and remote sensing techniques. During this period I conducted field research in Oaxaca, Mexico, coordinated over 50 binational, interdisciplinary environmental discussion and lecture meetings, ran several summer-long

student internships with NGOs and faculty from the UCSD Cross-Border Initiative, and helped deliver education surveys throughout the binational region with students and the Center for US-Mexican Studies at UCSD.

I do not consider this a turn from 'theoretical to practical' work. I think there is a secret complementarity to such a broad approach. It is not pure activism and it is not pure scholarship, but the interaction of the two that, I hope, has produced new and more provocative questions with, undoubtedly, more subtle and complicated answers, many of which I can only hint at given the time and effort to explore it in detail. In the final chapters I explore the diverse insights of Environmental Political Theory, Environmental Justice theory, Comparative Institutions, Fiscal Federalism, and Adaptive Governance theory developed by the interdisciplinary cooperative the Resilience Alliance. I consider in depth the contributions of Political Ecology, Post-Colonial History, and resource economics to the adaptation of traditionally Western or Northern themes to more specific and geographically dispersed locations. In particular, I think about Mexico, both at the border with the United States in the site of the bulk of my field work, the San Diego-Tijuana bioregion, and at the southern and indigenous edge, in the forests of Oaxaca.

These two examples are, by the terms of several strands of scholarship assessing decentralization success, near polar opposites—rapidly growing Tijuana sits at the edge of the United States with a young, migrant population and few long term ties to the land itself; rural and indigenous Oaxaca has recognized, local control and a history of inhabitance and spiritual connection (whether still existing or not) with the land, as well as established parallel common pool resource institutions like *ejidos*, ruled by a mixture of municipal institutions and customary indigenous norms. That the environmental

outcomes are highly different across these different examples is obvious, as even the basic ecological contexts of each region are very different. What is interesting is how their different experiences can help inform Environmental Political Theory and create a more pluralistic debate about the concepts of lifestyle, development, and local autonomy.

Thus, originally animated by a broad theoretical question about the reasons why the 'developed' world seems to do nothing has become a project about the politics of specific places and what their experience can tell us when we put aside our dichotomies like 'Developed' and 'Developing' and their resonance with the old colonial 'Mature' and 'Young' societies or the Cold War ideological ranking of 'First,' 'Second,' and 'Third' worlds. As the nod to Deleuze at the beginning suggests, this project, as it grew, sprouted more horizontal branches rather than a thick arborescent trunk, expanding rhizomatically to resemble complex theories of social-ecological systems and critical theories of technology on which I increasingly drew for new evidence where the rather shallow literature within Environmental Political Theory seemed at complete impasse.

My work thus changed with the 'interdisciplinary' expansion that I pragmatically encountered in both my field work and relationships built with students and faculty across campus and different kinds of programs. By the time I entered my final year I was a fellow at the Center for US-Mexican Studies, officially a student of comparative politics using advanced mapping software to investigate fiscal federalism debates over proper scales of governance for public goods. This was not inevitable and also not easy. I began to think of my work as 'Undisciplined,' an idea that I took on proudly at first, and as the first results of the job market became apparent, began to recognize as a particular challenge in itself.

The resulting project contained in the 700 pages or so that follow is a sprawling and wonderful mess from my point of view. I have certainly tried to do too much, and suffer from being 'inside' too many diverse literatures to be reliably read by any one person besides myself. This challenge is everywhere in this project. I have tried at times to limit my scope in the chapters, to edit down to paper length to enhance the punch of my argument, as I do in the sections on survivalism, fear appeals, and tragedy. At other times I have let myself follow tangential thoughts through several different literatures, arriving at a set of conclusions that may not be as easily digestible.

This is especially pronounced because of the humility that I feel approaching other disciplines of thought. I spent a vast amount of time and effort to try and understand my resources as debates and dialogues rather than pluck single efforts from different disciplines in a way that would seem arbitrary and unlicensed. Instead, at times the density of those sections grows, and it is out of respect for the depth of those debates that I try to leave as much coverage of the different aspects within it to make out a more complicated version of the authors I treat.

This project thus began as a critical and theoretical hatchet aimed at the sense of resignation and stasis I felt living in the US in times of seemingly inevitable Earth System change, and ended with a kind of investigation of different seeds to plant in the space opened up by rejecting technological messianism and hierarchies of development. bioregional theorist Jim Dodge and others claimed that such a dual task, the hatchet and the seed, was incumbent on any environmental theory, both critical and experimental tasks. Although originally separated into critical and positive sections, over the years this project has incorporated both elements throughout, and it is this at times messy, even

‘undisciplined’ mixture, which I present to you as the culmination of my practical and theoretical work.

II. Critical Political Ecology and the New Era

Global scale ecological crises are often interpreted as a fundamentally 'new' problematic. This perceived novelty has important effects on how we politically interpret the urgency these crises produce and the solutions, whether cultural, institutional, or technological, that we consider appropriate or ethically defensible. This project responds to this perceived novelty by insisting on two basic things: First, any critical theory of ecological politics in this new era must see past the seeming novelty of the Anthropocene and understand that there have been eras of history in which the actors also perceived themselves as new. In particular I will draw parallels between debates over nuclear weapons and population, both global in nature and containing green premises, and show how some of the lessons embedded there regarding humility, irreversibility, agency, and universality can benefit critical theories of 'new' eras like the Anthropocene today.

Second, any political theorist seriously approaching global ecological politics must begin by expanding the existing debate beyond the technologically advanced industrial nations, which are both the principal causes of environmental degradation and the chief, and at times only, voices in the global narrative. The second half of this project follows intuitions produced in the first about simultaneity and subsidiarity to assess the practical politics of localization and cultural decolonization in the context of institutional decentralization. I look at specific examples, including local theories of ecological

governance, environmental justice in the divided region of Tijuana and San Diego, and finally forest governance and municipal autonomy in Oaxaca, Mexico.

Together, these two research tracks seek to expand, respectively, the historical and geographical sources of theoretical and practical insight of ecological political theory and other hybrid disciplines seriously considering climate change and other global ecological problems. In the end, I want to suggest that such an expansion of perspective and institutional logics can help theorists of this new era reflect critically on many of the most problematic narratives now flowering in the urgent atmosphere provided by ecological crisis. I'll argue here that this can be seen both in the assumption of technological panaceas that will revalidate degrading lifestyles, and also in the patronizing assumption that 'developing' parts of the world must 'develop' in the Western style before becoming effective environmentalists. Both of these ideas hide the sources of the crisis itself and produce only a one-dimensional and impoverished set of political options, uninformed by history or the experience of other places in the world.

This is increasingly important today, as it appears that the scientific questions surrounding mounting social-ecological crises have grown less murky, but the willingness to ignore the decline of natural systems in both the so-called 'developed' and 'developing' worlds has kept pace with this growing scientific consensus. This project is intended as a response to this seeming paradox—to the contradictory acceptance of deteriorating ecological trends and pervasive feeling of powerlessness and inevitability rooting itself in societies which must act urgently or face catastrophic consequences. Throughout what follows, in different ways, I will argue that confronting cynical and indifferent perspectives can no longer be a debate about the veracity of the scientific

evidence, but rather needs to become an active project based on the urgent need to spur active social learning. This calls for more than an eye for translating science into policy or adjusting theories to the threat of ecological catastrophe—it requires searching our own history and the marginalized experiences of the contemporary world for lessons to begin building collective capacity.

This means we, as critical theorists of warmer times, have to return in earnest to questions of collective agency and cultural transformation which have been conspicuously absent in contemporary debates integrated around the catastrophic pull of global social-ecological crises. If the task of critical history is the defense of vitality and the response to unreflective, one-dimensional cultural logics, the increasingly dire reports of international scientific societies throughout the world prove that there have been few times where critical theory is needed more urgently. Beginning to dismantle the old ladders of cultures sitting behind both 'developed'-nation calls for lifeboat politics and 'developing'-nation demands for material comfort in exchange for not destroying vital remaining ecosystems (now dubbed 'Payment for Ecosystem Services' and a central component of the Paris 2015 climate deal) requires a dedicated attempt to overcome the over-generality of global discourses and pursue solutions at many geographic and temporal scales that may have been disqualified by their inconsistency with problematic, naturalized assumptions.

The feeling of powerlessness revealed by ecological crisis is produced by a lack of critical attention to history and an unreflective belief in technological progress that have created both great comfort and great political and natural isolation in the 'developed' world. This 'remoteness' helps to explain why, while humans now have the

capabilities to interpret and address many aspects of environmental degradation, those in the positions most capable of acting effectively to solve these problems also retain powerful institutional and psychological incentives to maintain the status quo and their relatively privileged lifestyles.

Looking beyond the assumptions of what constitutes a 'developed' or 'modern' life in the industrialized world will require critical historical work and attention to effective rhetoric. My contribution is to provide a set of debates and rhetorical strategies as foundations for critical analysis of the fragmentary contemporary discourses pulled together by ecological crisis and its potential for universal appeal. Providing these sources of insights can productively inform contemporary debates over the use and abuse of catastrophic rhetoric, the need for active responses to global-scale problems, and the more far-reaching cultural consequences of values like humility in the face of calls for sweeping management of ecological and political systems.

The rest of this project is organized as follows (this introduction is chapter 1):

2. In the first research chapter I begin from the insight that the perceived inevitability of catastrophic Earth System change has caused many to break with long-standing green taboos on nuclear energy and the large-scale technological manipulation of the climate. This change in perspective is justified by the entrance into novel conditions, foregrounding engineering solutions to inevitable change and obfuscating debate over both the politics and ethics of their deployment.

I argue that those interested in the politics of navigating such a new era which seems to invalidate old moral norms constraining political action should engage the

population and nuclear debates, both to learn the lessons of the first generation of social-ecological apocalypse prophets, and to reevaluate our own technocratic impulses. These contemporary themes can be seen as 'survivalist' where they: 1) Universalize threats to the global or species level, 2) Rely on secular, scientific crisis narratives, 3) Propose the revaluation of old moral limits to fit qualitatively new conditions, and 4) Depoliticize environmental crisis to technocratic problem-solving. Noting the historical reliance on nuclear weapons in past survivalist narratives, I show how the critical ambivalence nuclear technology represented is conspicuously lacking in the cases made for climate geoengineering.

3. In the third chapter I refocus on the idea of the new era, noting that many living at the advent of nuclear weapons felt they had also entered a new era, perhaps none as acutely as German theorist Günther Anders. Using the central concern of the activist Anders with the problem of creating effects one cannot imagine, I reconnect valuable technology debates following the advent of nuclear weapons to debates over global-scale social-ecological crises.

Anders used catastrophic rhetoric to combat the possibility of indifference, but also insisted on the active nature of the response to be generated to avoid passive resignation. Rather than a source of despair, Anders' anti-apocalyptic method should draw attention to the urgent need to expand our imaginations of political solutions to match our ability to manipulate planetary systems, whether intentionally or unintentionally. He seeks a special kind of fear that awakens the imaginations of average people to the magnitude of effects which humans could create, and also calls for a non-

traditional challenge outside of academy and government. His ideas of apocalyptic blindness and guiltless guilt are valuable on their own for critical theories of technology, but applied to environmental political theory it provides a coherent rejection of modernist-romantic and survivalist-promethean dichotomies and their replacement with a third category of the anti-apocalyptic, one who neither shies from the true scale of the challenge confronted, as hopeful technological narratives often do, but which also does not surrender to despair and resignation as many survivalist apocalypse narratives did.

4. In the fourth chapter I draw on an overlap between the concept of tragedy in the work of Garrett Hardin and Reinhold Niebuhr. In *The Irony of American History*, Niebuhr asserts that the deep irony of post-war America was that Americans had sought isolation and entered world politics through the discovery of the atomic bomb. Today in discussions over global climate change like those anchored in the scientific narrative of the Anthropocene, or age of human dominance of natural systems, Americans are again awakening to such ironic responsibility. Recent discussions about political adaptation to advancing social-ecological crises have begun to represent the necessary change as a short-term need to adjust to emergency conditions. Solar Radiation Management and other geoengineering techniques are the vanguard of such emergency preparedness logic.

I argue through reference to Niebuhr that advocates for these technologies mistake conditions as tragic rather than ironic. Working through Niebuhr's Christian vocabulary, I suggest an alternate ironic framing for climate change discussions which stresses humility, responsibility, and politics rather than denial or confirmation of climate doomsday. This ironic frame, I argue, better engages with the US public, presenting

climate change as a choice between good and evil rather than an engineering problem to be solved. This perspective acknowledges the audience of such appeals and begins translating abstract global trends into the moral vocabulary of the democratic public which will debate things like Solar Radiation Management in the future.

5. In the fifth chapter I work through historical tropes in US history to try and understand the relationship between scientific outreach and religious belief, in particular to consider the composition of appeals utilizing vivid or catastrophic rhetoric as a preliminary attempt at a more pluralistic climate politics that can draw on culturally meaningful guideposts for navigating our 'new' era. This chapter traces catastrophic rhetoric from deep sources in the experience of the Great Awakening, the Millerites, and 1970s Millennialism, and examines their translation into 'secular apocalypses' which emerged in American culture with the possibility of nuclear holocaust.

As a preliminary effort and demonstration of the rich cultural sources from which critics in the US might draw, I develop three examples: I compare Rachel Carson's rhetorical strategy to John Edwards, note the transformation of the Millerites to a slow apocalypse, and explore the links between human ecologist Paul Ehrlich and millennial preacher Hal Lindsey. The lessons gained from these examples are that catastrophic rhetorical strategies must balance apocalyptic visions with the insistence that there is still time to act, that there is both power and peril in naming specific dates for the arrival of catastrophic conditions, and that it is dangerous to ignore the links between secular and religious apocalyptic tropes when the audience of such appeals is religious.

6. In the sixth chapter I attempt to make a contribution to popular debates over the composition of public appeals related to social-ecological crises. Focused on rhetoric, this chapter explores arguments for and against utilizing catastrophic imagery in the United States, particularly in the social psychology and public health outreach literatures. I argue that viewing fear appeals as either activating or depoliticizing is based on a bad understanding of how people respond to fear-inspiring messages, a reductionism which is obvious in the health literatures but assumed incorrectly throughout the 'pragmatic' reform platforms attempting to revalue the ideological goals of the green movement. I revisit some of the studies used by prominent objectors and link them to parallel studies done in public health and advertising measuring the effectiveness of fear appeals.

Diagnosing a simplistic assumption about linear fear and activation relationships, I suggest in this chapter the application of a two-stage model from public health, using the Extended Parallel Process Model developed by Witte and others. The social-ecological application of this model is complicated by the kind of agency required, which requires a greater attention to politics rather than simply individual responses. I argue that the challenge for theorists of social-ecological systems in crisis is not to frame crisis as an unmitigated opportunity, but rather to present the alarming scale of the problem confronted while also providing active ways for the anxiety produced to be channeled into effective action.

7. In the seventh chapter I return to the idea of the Anthropocene and proposal of climate geoengineering techniques and work through the role of critical theory in times defined by emergency and planetary crisis. This is important because the universalized

sense of urgency which ecological crisis represents is deployed today by actors with radically different interpretations of how to adapt to novel conditions. This diversity exposes rival tendencies within the broad umbrella of agreement that we have entered the Anthropocene, or geologic epoch where humans threaten to overwhelm natural systems.

My argument is that any critical social theory accepting the Anthropocene as a challenge must avoid the temptation to focus only on the present and future, as there are key lessons still waiting in the past for debates like those around climate geoengineering. Looking at a more specific and targeted appeal, I recap the argument from previous chapters that nuclear themes embedded in survivalism of past eras can help us act more effectively in the context of accelerating ecological damage. This is important to critique the managerial response of scientific policy-making which makes the argument that contemporary times are without precedent and old moral and political taboos are no longer tenable.

This chapter looks in depth at the case for geoengineering made in recent publications across disciplines and attempts to add an element of critical history. In particular, I explore the relevance of a parallel challenge of scientific public education surrounding the concept of nuclear winter in the 1980s, a debate which included many of the same voices from both nuclear debates past and climate debates in our contemporary times. Surviving our era, I argue, implies a public debate over climate geoengineering should not wait for the perfection of the technology, but rather needs to have its tradeoffs weighed against slower forms of cultural change whose failure insurance-framed emergency arguments often begin by assuming.

8. In the eighth chapter, I work through the idea of 'exterminism' and the critical responses which it inspired. EP Thompson wrote in 1980 that the ingrained bipolar logic of the Cold War arms race represented the final stage of civilization, what he called 'exterminism.' This stage was characterized by the absorption of political agency into the threat of extinction represented by nuclear holocaust. Embroiled in the nuclear debate in Europe, given fuel by the positioning of American missiles throughout Western Europe and a new rhetorical strategy stressing the 'tactical' nature of nuclear weapons and generating, in response, detailed handbooks of how to survive after a nuclear attack. Thompson, at his bleakest extreme, claimed that the structure of the Cold War itself had been altered by the advent of transcontinental nuclear weapons, that now *the bombs themselves* had an agency which humans only adapted to, that they had created a deterrence model that *required* each side to be willing to end the world.

I follow Mike Davis' critique of exterminism as ahistorical and over-general. Davis, reacting to the European sense of despair over being the site of a nuclear exchange between remote powers that sat at the bottom of Thompson's anxiety, pointed to areas around the world where the Cold War was actually producing real conflicts, encouraging Thompson and other European theorists to begin looking to the rest of the world for answers rather than being resigned to the centrality of the Iron Curtain and the sense of resignation that the Cold War inspired in the once mighty colonial powers. I then interpret the potential importance of these lessons for contemporary climate catastrophe rhetoric through the lens of historians and social scientists such as resource geographer Jesse Ribot critiquing the emerging Anthropocene literature.

The argument at the end of this chapter informs what comes after it, as the exterminism chapter is the final in the first wave of research that I did for this project. Presaging the turn to more specific examples in the developing world, this chapter insists that if contemporary times provide a parallel exterminism, now largely related to the slow, seemingly inevitable progression of anthropogenic climate change, these lessons are critical for understanding the problem faced and acting effectively to confront it. Chief amongst the first tasks of any such theory, then, would follow Davis' advice, and rather than becoming resigned to the inevitability of the problem, see the crisis as an opportunity to expand the perspectives considered within the debate and a chance to place the 'developed' lifestyle into critical and eventually ethical terms.

9. In the ninth chapter I follow Davis' suggestion and expand my analysis with post-colonial history and political ecology. This chapter, in a sense, was the first chapter I planned to write and ended up being the last that I finished. It begins from the now uncontroversial assertion that global-scale social-ecological crises are redefining traditional appeals for global governance. Writing about this transition, post-colonial historian Dipesh Chakrabarty warns against placing the future beyond the grasp of historical analysis because it risks hiding specific forms of domination and responsibility. Drawing on debates over development in Environmental Political Theory, Political Ecology, and Post-Colonial History, I suggest that a simultaneous image of human agency suggests the return to earnest debate about the content and rhythms of the 'modern' lifestyle and not the removal of global-scale crises from the realm of politics suggested by treating the problem as a technical problem to be solved.

In this chapter, then, I explore how perspectives on globalization and the Anthropocene from the 'developing' world are important challenges to traditional ideas of 'sustainable development' and other theories claiming economic wealth is key to environmental protection. Such theories, I suggest here, must first overcome biases towards liberal market-based development theories and begin moving, perhaps in culturally distinct, towards a global rejection of the everyday habits and perverse national growth politics that drive global degradation. I analyze two regionally distinct ways that this is being theorized today, degrowth in Europe and *buen vivir* in South America, and conclude by reflecting on how the idea of simultaneity can help us move past enduring conflicts within the green platform over development, modernity, and growth.

10. In the tenth chapter I turn to a more institutional framing for my analysis, reflecting on rival discourses on the ecological potential of decentralization of meaningful fiscal and political power through several different currents of scholarship. Beginning with a theory of 'remoteness' from environmental political theory, I consider the contributions of institutional political science, public economics, common pool resource theory, and, in particular, the tradition of fiscal federalism and its broadening into unitary settings as 'multilevel governance.'

In this part of the project I look in particular at the arguments for decentralization made across literatures, and try to tease together the diverse insights which the very different methods offer. The chief contribution here is to disentangle neoliberal economic from bioregional green rationales for decentralization, as well as to point to a more complicated, multi-level framing which rejects simplistic, universal institutional

arguments and pursues, instead, an evaluation of more practical research objectives like evaluating normative concepts like subsidiarity and incorporating insights from the practical experiences of decentralizing societies in both 'developed' and 'developing' contexts. Doing so relies on the rejection of developmental hierarchies which several of the preceding chapters, treating extremely diverse source material, stress as necessary.

11. In the eleventh chapter I take on a more empirical kind of method, although still informed by environmental political theory. Written at the end of my tenure at UCSD, it reflects the more practical and specific focus of my final years of study, as well as the interaction of my field work maturing with my theoretical arguments. In the chapter, I seek to augment the traditional emphasis of green political theory on local political power, which often remains overly simplified and light on empirical evidence. I attempt to do this by analyzing the relationship between recognized systems of local indigenous political authority and forest loss in Oaxaca, Mexico.

Oaxaca is an ideal testing ground for these common intuitions, with almost 25 years of recognized indigenous municipal governance across a diverse range of indigenous groups and globally-significant ecosystems in terms of biodiversity, carbon capture, and natural resource extraction. Focusing on the idea of 'remoteness,' I look to institutional and economic arguments for decentralization from the perspectives of fiscal federalism and natural resource management. I then generate three basic tests on an original data set incorporating remote sensing, social census, driving times, and ecological regions to try and understand more rigorously the relationship between local indigenous sovereignty and forest loss in a truly mixed social and ecological context.

These tests demonstrate: 1) that indigenous governance has a significant and meaningful impact on forest loss across the state of Oaxaca; 2) that within the cohort of locally-governed communities the distance from cities, presence of federal roads, and various measures of social marginality have little demonstrable relationship to forest loss; and 3) that local governance has a varied effect and significance across ecological regions, sampled here as four major watersheds, and different implications for global debates based on the types of vegetation regimes reporting loss. The sum of these tests indicates that local governance has a positive relationship with forest conservation and that such systems function better in particular regions, results which will be interrogated in further research.

12. In the penultimate research chapter of the project, I attempt to apply concepts of environmental justice to the divided context of the Tijuana-San Diego border. Most clearly influenced by my ongoing field work over the past five years or so in the coastal canyons of Tijuana and National Estuarine Research Reserve at the Tijuana River Estuary in the US, this and the final chapter follow my own reevaluation of many key assumptions of 'developed' environmental politics and community-oriented research. This work provided me with an active outlet for my anxiety regarding ecological change and power politics, and became a catalyst to a maturing as a researcher and a teacher that would have been impossible without having to be on the ground somewhere trying hard to make things work better.

Tijuana and San Diego are a perfect place for such academically-informed community work, and serves as a kind of crucible on which I tests several of the most

vexing debates in ecological politics. Simultaneously a complex local region and a locus point of global economic and migration flows, San Diego and Tijuana present both unique and general challenges to traditional environmental politics. Drawing on field research and engagement with the binational community on both sides of the border, I outline four particular challenges of operationalizing the concept of environmental justice in the border region, related to problems of 1) information, 2) identification of partners, 3) shared collective agency, and 4) mental and material forms of displacement.

13. In the final research chapter of this project I continue to reflecting on the binational border community through my binational research sites in the Tijuana National Estuary in the US and Los Laureles Canyon in Mexico. In this final effort, I analyze the potential of concepts of resilience and adaptive governance in such divided and specific context. Such research, I suggest here, will benefit from cross-fertilization with themes from political ecology and bioregionalism, which complementarily suggest focus on larger scale political economy and a strengthening on local identity. In conclusion, I offer some examples from the Tijuana-San Diego region and re-evaluate the idea that 'developing' societies must become rich before stewarding their environment.

14. In the end, these examples show the political and academic relevance of applying abstract ideas like justice and scientific governance in particular places, and in particular the importance of binational regions like San Diego-Tijuana for understanding development debates in local terms. I conclude finally with an attempt to weave together the many themes approached throughout the rest of the project and some final thoughts on the insights which the long process and tangents of this research have presented.

III. Final Introductory Thoughts

In sum, if such a summary can really be made of such diverse material, I hope to both expand the information drawn upon by theorists of ecological crisis politics, and also to say something particular about some of the kinds of options that such a pluralistic and inclusive perspective opens up. Chief amongst these are focusing on re-evaluating everyday habits rather than saving 'developed' ways of life with technological redemption, reducing political power to scales where citizens feel meaningfully involved and make decisions about their own natural environments, and finally understanding how cultural and institutional efforts must proceed in step, rather than the simple zero-sum prescriptions of most environmental political theories and their opposition.

In the course of the studies which led to this dissertation project I have tried to connect the study of political theory to comparative politics and the interdisciplinary world of sustainability politics in both 'developed' and 'developing' contexts. In this process, I have tried to focus on both understanding environmental crisis politics in the United States and on perspectives from our closest neighbor, Mexico. This was not a coincidence. I grew up in Southern California and learned broken Spanish working in restaurants and playing soccer. I was researching theories of decentralization and looking for evidence in other literatures on fiscal federalism, regional governance, adaptive co-management, and many sustainability-focused social science disciplines, and this small window into Mexican society provided an interesting set of potential examples.

Thus, my method is path dependent, mixed, and uncomfortably interdisciplinary due to the frequent opacity of different disciplinary vocabularies. Doing such research is thus necessarily tangential—it is lazy to pick and choose without context, and it exposes

the cross-disciplinary project to criticism in the disciplines which it shallowly samples, requiring longer commitments to understanding the language, debate, and specific sites in which the sampled research exists. Working in this multi-disciplinary register is impossible without a community of likeminded scholars to guide and critique projects straying into contentious vocabulary or concepts. Focusing on ecological issues bridges much of the motivational gap between academics, but also contends with more rigid disciplinary expectations for research format, required teaching work within the discipline, and lack of a specific audience for publication.

In this project I have been aided by the connections to sociology, anthropology, history, philosophy, and literature by Harvey Goldman, Tracy Strong, and Marcel Henaff respectively. Out of Marcel's class emerged the initial group of students who gained funding for collaboration between UCSD Humanities and the Center for Marine Biodiversity at Scripps to put environmentally-focused research from across campus divisions and disciplines in regular conversation about their research. In the same year, I began a relationship with a masters program at El Colegio de la Frontera Norte (COLEF) in Tijuana where they sent their students to meetings in La Jolla, and once a quarter I would take a group of UCSD students and professors to COLEF's campus for a talk and a dinner later in Tijuana.

This forum continues now into its fifth year, and has received seed funding from a major campus initiative. I was even lucky to receive a nice (temporary) plaque for outstanding student leadership from UC President Janet Napolitano. What it has done for the community at UCSD, Scripps, and COLEF in the long term, I don't know. In the meantime, it has enabled my field research in Tijuana to take on a new level of

complexity and sophistication, both driving me to improve my Spanish and introducing me to a huge network of academics, activists, and city officials on both sides of the border. In this dissertation project, Tijuana thus serves an explicit and tacit mediating role, it is both a specific place and a call for dramatic transition in the US to consider the rest of the world seriously and in an empirical way. Tijuana and San Diego sit in common ecosystems, share ocean currents, migrating birds, airsheds, and more. In an era of free movement of goods and currency globally, funneled through the tariff loopholes in NAFTA agreements, Tijuana and San Diego remain divided by both mental and physical barriers. They also will encounter a changing world together, but on highly unequal terms of wealth, comfort, and vulnerability.

I have come to understand Tijuana and San Diego as thus representing a microcosm of many of the themes pursued in the other parts of my dissertation. The region gathers together a diverse population of people, both wildly affluent and desperately poor, from a variety of cultures. Beginning from the Tijuana Estuary, I tried to use my field work over the past six years to trace the outlines of what transborder governance and civil society exist today and point to possibilities for increasing adaptive governance capacities and understanding a binational application for environmental justice theories moving forward. Building a bioregional vision in a region characterized by economic and social inequality, massive recent immigration, and a militarized border means, at its most basic, understanding the shared ecological context of life. Much of this outreach can be augmented by the softening of national boundaries and militarization at the border, and by a recognition of the different levels of political decision-making which must interact to understand the effects of change at different scales.

The long time horizons necessary for successful policy experimentation at the local level are equally absent in San Diego and Tijuana, but perhaps most frustratingly and unjustly so in Mexico, where environmental protection lags behind economic growth and social welfare in popularity with politicians. Decentralizing meaningful political power to the regions and cities of California and Baja California could fashion new kinds of regional alliances for managing resources and protecting the environment, that in turn may prove to be crucial in avoiding the worst possibilities foretold in apocalyptic narratives of social-ecological change *on each side of the border wall*. Returning to the local, both partners may find that the allies they sought were just across a razor-wire tipped wall splitting the 'developed' from the 'developing.'

This 'return to the local,' however, is profoundly complicated by the need for higher levels of authority where externalities arise and problems occur at greater aggregate scale than can be effectively addressed locally, powerfully exposed by the recent gutting of environmental institutions in the US by the Trump administration. I argue here that approaching a global trend like climate change politically requires local, national, and international action, all ongoing at different speeds—essentially a kind of simultaneous and nested action. At the moment, however, the most vulnerable scale is the one at which people live their everyday lives, the local, which is also the most affected by the gap between the understanding of global processes and the local collective action necessary to avoid them, which means critical and accepting localist theories need to be stripped of problematic assumptions and assessed clearly.

In the context of the special vulnerability of local systems to global trends, understanding problems like climate change as ushering in realization of a new era, I

argue in the earlier sections, can be profoundly pacifying, both by making the crisis appear beyond human control and by severing ties with historical experiences which could provide useful lessons for public outreach and adaptive political institutions. This challenge requires strengthening local democratic action and changing national development patterns, goals and processes far outside the ostensibly 'special interest' green political lobby. The actual implementation of such an agenda in real places like Tijuana-San Diego which harbor deep divisions and also unarticulated potential is even more important really than the nuance produced by the theory when the result of inaction is widespread suffering and the assumption of new scales of technological risk.

The sum of this work, I hope, is more than its parts and I conclude with reflections on the path which critical theory, real-world engagement in different developmental contexts, and empirically-driven analysis has taken through the project and the kinds of lessons on offer from their mixture. Overall, I hope to offer insights for many separate conversations that need to be better integrated and aware of their connections to each other, and consider this a preliminary effort in showing the potential for such kinds of 'undisciplined' approaches, if not their final perfection. I understand the challenges work like this presents to many audiences beyond the narrow fields mixed unevenly into different sections, but I also see this kind of scholarship and broader networks of scholars emerging to greater prominence. This is not an excuse, per se, for the schizophrenic method presented by my project. It is a recognition that these kinds of efforts are bound together in different and at times less-obvious ways, around problems that are both global in theory and local in consequences, and bound to affect political institutions of all kinds and in all contexts with new and uncomfortable challenges.

02 Navigating New Survivalist Eras: Is the Anthropocene the New Club of Rome?

I. The New Survivalist Geology of Mankind?

In a high profile research program, Nobel Prize-winning atmospheric chemist Paul Crutzen has renamed our present geologic epoch 'the Anthropocene,' or age of human influence at a geologic scale.[1] Used first as a term by biologist Eugene Stoermer in the 1980s, Crutzen and coauthors have written that the entrance to the Anthropocene means that 'human activities have become so pervasive and profound that they rival the great forces of Nature and are pushing the Earth into planetary *terra incognita*,' or new, unknown epoch where the credentials for survival will be tested.[2] For many, including Crutzen himself, this universalized threat, revealed by studies of planetary-scale systems, demands the development of technology to stabilize the climate system.[3]

In contrast to the disorienting sense of novelty that drives the shift from the recognition of the Anthropocene to the need for planetary-scale technological intervention, I will argue here we must historically situate the complex political and ethical questions entailed in these debates in context of other eras which perceived themselves as qualitatively new. In particular, I will show how the 'survivalist' literature on population and linked debates over nuclear weapons are resources for critically assessing controversies at the heart of politics of the Anthropocene. 'Survivalism,' a term retrospectively ascribed to a group writing in the 1970s, claimed the species had

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[1] Paul Crutzen, 2002. 'Geology of Mankind.' *Nature*, Vol. 415, Jan 31.; Paul J. Crutzen and Christian Schwägerl, 2015. 'Living in the Anthropocene: Toward a New Global Ethos.' *Yale Environment 360*, Online.

[2] Will Steffen, Paul Crutzen, and JR. McNeill, 2007, 'The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature?',*Ambio*, Vol. 36, No. 3, pp 614-62; p. 614.

[3] Paul Crutzen, 2006. 'Albedo Enhancement by Stratospheric Sulfur Injections: A Contribution to Resolve a Policy Dilemma?' *Climatic Change*, Vol. 77, pp. 211-219.

entered a new era of ecological vulnerability, what they called 'ecological scarcity.' Like those embracing the Anthropocene today, self-styled 'human ecologists' like Garrett Hardin and Paul Ehrlich applied their scientific training to global society. Given widespread public attention following the energy crisis in 1973, these studies were adopted by social scientists as evidence of an imminent catastrophic threat, such as in the works of economic historian Robert Heilbroner and political theorist William Ophuls.[4]

The idea that we have entered a new survivalist era is meant as a challenge to unreflective narratives building cases for change on the foundations of ecological apocalypse. Today, the idea that contemporary conditions represent a new era has been refracted across popular and academic space, evidenced by the explosion of publications on the Anthropocene.[5] As the world begins to contemplate such heady themes as controlling the climate and historical responsibility for carbon emissions, the sense of novelty animating the most morally-complicated prescriptions needs to be put in critical context. Establishing the presence of survivalist themes in the Anthropocene narrative, I will then highlight the role of nuclear technology in survivalist population discourse, both to tease out differences in treatments of technology, and also to understand how catastrophic narratives built on the foundation of the Anthropocene may also lead to resigned endorsement of technocratic, authoritarian government, shown today through the recommendation of emergency climate geoengineering schemes.

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[4] Donnella Meadows, Dennis Meadows, Jorgen Randers, William W. Behrens III, 1972. *The Limits to Growth*. Universe Books, New York; Robert L. Heilbroner, 1974. *An Inquiry into the Human Prospect*, WW Norton and Company, Inc, New York; William Ophuls, 1977. *Ecology and the Politics of Scarcity: Prologue to a Political Theory of the Steady State*, WH Freeman and Company, San Francisco.

[5] If only as a summary tag for some of the most cynical, i.e. adding 'in the Anthropocene' to the end of a title. A summary here would be meaningless by the time of reading. A Google Scholar search of 'Anthropocene' returns over 31,000 results in .3 seconds. Jan 3, 2017.

Considered as a whole, this huge and growing body of work shows that the idea of the Anthropocene could be the catalyst to meaningful democratic change or it can the heart of a new survivalist era which will fundamentally change core ethical and material relationships between natural and political systems, assume unprecedented risk in terms of both human suffering and ecological destruction, and limit the participation of the most vulnerable global majority in the process. The difference is predicated on, I'm arguing here, the rejection of the sense of novelty presented by the universal appeal of the Anthropocene and return to history for meaningful guideposts for critical debate and collective decision-making.

II. Interpreting the Signs of Survivalist Times

Contemporary popular and academic publications marking the arrival of the Anthropocene present a dour, mixed set of messages about inevitable collapse and urgent but perhaps useless sacrifice. Many hope for technological salvation, others, perversely, for the catastrophe to begin in earnest in order to jar loose the collective agency necessary to change.[6] Both are reactions to acceptance of the dire need for transformation represented by the rise in scale of global ecological problems, but each orientation largely envisions a different future as the result of that transformation.

The Anthropocene, I'm arguing here, is potentially 'survivalist' for four reasons: 1) It utilizes a universal threat, 2) It relies on scientifically-revealed crisis, 3) It insists the new era requires reevaluation of traditional moral checks, and 4) An apparent lack of political concern hides technocratic leanings. Each of these issues proved problematic

[6] Contained in summary form in the two common refrains of Americans regarding climate change: 'we've always figured something out before' and 'it's going to take a disaster to wake people up.'

for the first generation of survivalist authors, and understanding why is important. After exploring each, I will propose a fifth survivalist characteristic which, crucially, is not shared today. This is a 5) Critical attitude toward the potential of technology, provoked by the reliance on nuclear weapons to underline crisis in the 1970s.

This analysis adds to current discussions by asking three basic questions: First, is the Anthropocene a survivalist epoch? Second, is the explosion of Anthropocene narratives a positive or negative trend from the perspective of democratic ecological politics? And finally, how can we recognize, critique, and move past managerial impulses that depoliticize ecological crises? The answers to these questions, I'll argue here, point to a deeper question for those trading on the rhetorical power of the Anthropocene today: Given that the designation of the new epoch is accepted, what will the political legacy of the Anthropocene realization be?

1. The Universalized Threat

Despite the claims to novelty inherent in the effort to rename the geologic epoch, the idea that the deterioration of world ecosystems represents a threat global natural and social systems is not new. Neither is the universalizing global context of the catastrophic imagery underlying the urgency of the plea. In the late 1960s and early 1970s this link was made by the 'survivalist' literature surrounding the infamous Club of Rome Report, released in 1972. The *Limits to Growth* insisted that catastrophic social and ecological crisis was imminent within a generation.[7] A secretive international college of scientists, world leaders, and international businessmen, the Club of Rome commissioned the report

[7] The 7th Agreed Point at the end of the report. Meadows *et al* 1972; p. 192.

using early computers at MIT, and its authors included both systems scientists and military men.[8] Funded primarily by Volkswagen, the report tracked key resources for human life and plotted their known reserves against their current consumption rates.

Their rudimentary results, which they acknowledged did not account for technological change or change in consumption habits, predicted dramatic consequences of continuing contemporary trends in consumption of natural resources. They warned starkly that 'the growth-stopping pressures from negative feedback loops are already being felt in many parts of human society,' and that this entrance into times of scarcity meant, obliquely, that 'either the birth rate must be brought down to equal the new, lower death rate, or the death rate must rise again.'[9] The concept of limits has been ornamented by increased computing capacity and better understandings of social-ecological interconnection, but the framework of the appeal remains identical in concepts like Planetary Boundaries—current patterns are unsustainable and will lead to catastrophic consequences in the near but unpredictable future unless urgent action is taken.[10]

A key part of this strategy is to appear 'beyond politics,' i.e. above messy political or cultural bias, the chief charge of deniers stoking anti-government paranoia to stall transformations in energy and trade.[11] The authors of the Club of Rome report recognized this and sought to preserve their scientific neutrality to move beyond ideology

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[8] William W. Behrens, III was the son of William W. Behrens, Jr, the influential Naval officer who helped set up the National Oceanographic and Atmospheric Administration, himself the son of a navy admiral.
[9] Meadows *et al*, 1972; p. 159.
[10] See: Will Steffen, K Richardson, J Rockström, S.E. Cornell, I Fetzer, EM Bennett, R Biggs, SR Carpenter, W de Vries, C.A. de Wit, and C Folke, 2015. 'Planetary boundaries: Guiding human development on a changing planet. *Science*, Vol. 347, No. 6223, p.1259855.
[11] See Erik Conway and Naomi Oreskes, 2011. *Merchants of Doubt: How a handful of scientists obscured the truth on issues from tobacco smoke to global warming.* Bloomsbury, New York.

and potentially reach audiences on both sides of the Cold War. The global scale, and its seeming universality, was key to this move. They claimed:

> The essential significance of the project lies in its global concept, for it is through knowledge of wholes that we gain understanding of components, and not vice versa. The report presents in straight-forward form the alternatives confronting not one nation or people but all nations and all peoples, thereby compelling a reader to raise his sights to the dimensions of the world problematique.[12]

The authors recognized the difficulty of such a jump in scale to the global imagination. In the section following the passage above they wrote: 'A drawback of this approach is of course that—given the heterogeneity of world society, national political structures, and levels of development—*the conclusions of the study, although valid for our planet as a whole, do not apply in detail to any particular country or region*.'[13] In this sense, it is both global and not specific to any one place, stripping potential sources of cultural and political mediation in the attempt to threaten all people.

Considered from this perspective, while the Anthropocene concept potentially serves as a powerful critical tool, in most incarnations it remains problematically general despite the radically different historical responsibilities of areas and nations of the world.[14] Like the survivalists, the Anthropocene call is addressed to humans-in-general, and, as in prior survivalist eras, the undifferentiated call to the species to take responsibility lacks a clear agent of change tasked with the project. This survivalist trait has been a source of sustained warnings throughout the critical social sciences responding

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[12] Meadows *et al* 1972; p. 188.
[13] Meadows *et al* 1972; p. 188. My emphasis.
[14] Jesse Ribot, 2014. 'Cause and response: vulnerability and climate in the Anthropocene.' *Journal of Peasant Studies*, Vol. 41, No. 5, pp 667-705; Gisli Palsson, B Szerszysnki, S Sorlin, J Marks, B Avril, C Crumley, H Hackmann, P Holm, J Ingram, A Kirman, M Pardo Buendia, R Weehuizen, 2013. 'Reconceptualizing the 'Anthropos' in the Anthropocene: Integrating the social sciences and humanities in global environmental change research.' *Environmental Science and Policy*, Vol. 28, pp. 3-13.

to the Anthropocene literature, a fear that cultural and political terms of the Anthropocene transformation have been obscured by the relative dominance of global scientific themes characterizing the verification debates.[15]

2. The Scientific Crisis Narrative

Garrett Hardin and Paul Ehrlich, biologists by training, theorized that humans were subject to natural population dynamics. The argument they put forward was built around the transference of population biology concepts to politics, such as 'carrying capacity,' or the numbers of individuals of a species relative to the resources needed to sustain them.[16] Perceiving the limitation of human births as outside the capacity of any existing authority, both predicted humans would exceed the total carrying capacity of the Earth, triggering 'natural' checks. They assumed that this would happen first in the places which were reproducing the fastest, primarily the developing world.

Bolstered by the reports of 'neutral' scientific experts like the Club of Rome, the political elaborations of the worst case produced by Hardin and Ehrlich were adopted by social scientists and humanities scholars, such as in the work of economic historian Robert Heilbroner and political theorist William Ophuls.[17] Both Heilbroner and Ophuls foretold the impoverishment of rich areas as a result of the egalitarian pressures of a troubled world, elaborating on the scarcity foreseen by their scientific colleagues.

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[15] Palsson *et al*, 2013; Eva Lövbrand, S Beck, J Chilvers, T Forsyth, J Hedrén, M Hulme, R Lidskog, and E Vasileiadou, 2015. 'Who speaks for the future of the Earth? How critical social science can extend the conversation in the Anthropocene.' *Global Environmental Change*, Vol. 32, pp. 211-218; Jeremy Baskin, 2015. 'Paradigm Dressed as Epoch: The Ideology of the Anthropocene.' *Environmental Values*, Vol. 24, pp. 9-29; Dipesh Chakrabarty, 2012. 'Postcolonial Studies and the Challenge of Climate Change.' *New Literary History*, Vol. 43 No. 1 Winter 2012 pp. 1-18.

[16] Paul Ehrlich, 1968. *The Population Bomb*, Sierra Club, NY.; Garrett Hardin, 1968. 'The Tragedy of the Commons.' *Science*, Vol. 162, No. 3859, December, pp. 1243-1248.

[17] Meadows *et al*, 1972; Heilbroner, 1974, Ophuls, 1977.

Explicitly framing their problems 'tragically,' these survivalist political narratives drawing on Hardin's 'Tragedy of the Commons' metaphor anticipated a terrible choice based on the species-scale vulnerability revealed by population studies, the selection of normatively undesirable political solutions for the sake of the species as a whole.

This political elaboration of the global trends described by the *Limits to Growth* was desperately needed, if vulgar in execution. The Club of Rome report, analyzing the potential for social upheaval, had noted cautiously:

> The real meaning of such a collapse is difficult to imagine because it might take so many different forms. It might occur at different times in different parts of the world, or it might be worldwide. It could be sudden or gradual.[18]

The disaster predicted, here, appears vague and in the uncertain future, more of a general state of anxiety than a prediction of specific events that could dramatically confirm or disconfirm their clairvoyance. What that transition would mean to everyday political life in specific places is left intentionally vague, and creates the vacuum which survivalist politics fills.

Interpreting scientific scenarios also, however, opens social critics to special criticism, since understandings of science change and are even, at times, subject to radical reevaluation. In the case of the population crash predicted by Hardin and Ehrlich (to be charitable) the catastrophe prophesied has not yet come the better part of fifty years later. The choices it justified as extra-ethical now appear in their original ethical complexity, stripped of their protective emergency. This was a conscious gamble on the part of many, including ostensibly neutral scientists. The *Limits to Growth* claimed:

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[18] Meadows *et al* 1972; p. 169.

> We are convinced that realization of the quantitative restraints of the world environment and of the tragic consequences of an overshoot is essential to the initiation of new forms of thinking that will lead to a fundamental revision of human behavior and, by implication, of the entire fabric of present-day society.[19]

The question of species survival posed by quantitative limits, they believed, would animate universal solidarity and individual sacrifice. Short of this level of universal threat, they worried, actions taken by individuals and even individual nations would fall short of the problems identified in the 'global problematique.'

Advanced by a Nobel Prize-winning chemist, the Anthropocene has today become, in many circles of academic and even popular thought, a shorthand for recognition of the scale of the Earth System changes identified by global scientific organizations—it is the latest scientific buzz word organizing social approaches to environmental issues, one which both sounds ominous and is promulgated by high profile scientific actors, not unlike the 'Tragedy of the Commons' and 'Population Bomb' made famous by Hardin and Ehrlich respectively. The universal scale of the threat it implicitly offers attracts attention across disciplinary boundaries, both providing a potentially productive field of common interest and also closing the field of political action by strengthening the rhetorical appeal of seemingly apolitical, scientific responses.

3. Moral Re-evaluation

In response to novel conditions of scarcity, the scientist turned political prophet Ehrlich saw starvation and forced sterilization as ethical options. He predicted millions

[19] Meadows *et al* 1972; p. 190.

dead in the next decade and connected ecological scarcity to nuclear war.[20] Hardin recommended ending immigration and foreign aid to insulate parts of the world with low birth rates from the inevitable conflicts that would result from scarcity, what he called in 1974 'Lifeboat Politics.'[21] This drastic political reaction was justified in this framework of assumptions by the certainty of the arrival of scarcity.

Robert Heilbroner, an economic historian known primarily for his biographies of famous economists, was a democratic socialist most of his professional life, with a stated ideal country closest to Sweden. His biographies stressed the communitarian nature of the assumptions of many great economists.[22] His 'Survivalist Principle' is, thus, a paradoxically clear statement, of what the precedence of survival over all other values meant for society at large. He reasons:

> We sacrifice some portion of life-to-come in order that life itself may be preserved. This essential commitment to life's continuance gives us the moral authority to take measures, perhaps very harsh measures, whose justification cannot be found in the precepts of rationality, but must be sought in the unbearable anguish we feel if we imagine ourselves as the executioners of mankind.[23]

Reluctantly endorsing authoritarian government, Heilbroner conceded, 'if the issue for mankind is survival, such governments may be unavoidable, even necessary.'[24]

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[20] Paul Ehrlich, 1968. *The Population Bomb.* Sierra Club, NY; Paul and Anne Ehrlich, 1974. *The End of Affluence: A Blueprint for Your Future.* Ballantine Books, New York.

[21] That this is a dark echo of Spaceship Earth and other more hopeful technological stewardship calls is clear. Compare: Garrett Hardin, 1974. 'Commentary: Living on a Lifeboat.' *Bioscience*, Vol. 24, No. 10, October, pp. 561-568; Kenneth Boulding, 1966. 'The economics of the coming spaceship earth: Environmental Quality Issues in a Growing Economy.' In *Radical Political Economy: Explorations in Alternative Economic Analysis.* Routledge, NY.

[22] Robert L. Heilbroner, 1953 (2011). *The Worldly Philosophers: The lives, times, and ideas of the great economic thinkers.* Simon and Schuster, NY.

[23] Heilbroner, 1974; p. 174.

[24] Heilbroner, 1974; p. 110.

The urgency of imminent transition is important. Political theorist William Ophuls clearly noted that on a longer time horizon he would advocate for decentralized, local-scale communities, but his final political prescriptions, like Heilbroner's, do not follow from his own personal political commitments. This 'pragmatic' turn was because, as Ophuls insisted, 'the wars, plagues, and famines that have toppled previous civilization are overshadowed by horrible checks Malthus never dreamt of, like large-scale ecological ruin or global radiation poisoning, for these checks are threats to the very existence of the species.'[25] The new era meant that old moral qualms would need to be sidelined until the survival of the species was guaranteed.

The revaluation of old moral checks is increasingly obvious in emerging debates over climate geoengineering, the intentional manipulation of natural systems to increase albedo and lower incoming solar radiation. In a now infamous special edition of *Climatic Change* in 2006, Paul Crutzen suggested that scientific taboos on climate manipulation should be broken because efforts to end carbon emissions are frustratingly behind pace. Understanding climate change affects global systems unevenly, Crutzen claims: 'If sizeable reductions in greenhouse gas emissions will not happen and temperatures rise rapidly, then climatic engineering, such as presented here, is the only option available to rapidly reduce temperature rises and counteract other climatic effects.'[26] Since many of the least responsible places of the world are also the most vulnerable, advocates insist that research should be encouraged into technological insurance plans meant to mitigate short term crises which could cause extreme suffering. To not do so, by their terms,

[25] Ophuls, 1977; p. 137.
[26] Crutzen, 2006; p. 216.

would be unjust, especially where those suffering were negligibly responsible for historical emissions.

The most controversial policy prescriptions of the survivalist 1970s—from forced sterilization, to ending foreign aid, to technocratic authoritarian government—were all pursued in the resigned sense that the catastrophe they predicted was inevitable. The urgency they felt was so strong that normal political circumstances no longer seemed valid, which they interpreted as a case for emergency measures that contradicted their own stated political beliefs. This is an object lesson for debates like the Anthropocene trading on a scientifically-revealed ecological crisis. The seeming inevitability of scarcity prompted an urgent call for action and emergency endorsement of authoritarian technocracy able to stave off the possibility of extinction.

4. Technocratic Impulse

John Dryzek calls William Ophuls' work 'the most comprehensive and sophisticated analysis of the political ramifications of ecological crisis to appear in the 1970s.'[27] This is in part because taking the survival of the species as the basic good generates a critical question for Ophuls about how well institutions accustomed to conditions of abundance would fare in a new era of scarcity. As a graduate student at Yale, Ophuls penned an infamous chapter in Herman Daly's otherwise highly optimistic *Steady State Economics*. Although agreeing with Daly on the need for a transition to 'steady-state' or zero-growth economics, in this chapter, Ophuls drew Hobbes and

[27] John Dryzek, 1997. *The Politics of the Earth: Environmental Discourses*. Oxford Univ. Press, Oxford; p. 32.

Malthus together to predict a dour choice of authoritarian technocracy or human extinction in the face of resource collapse—the tragic choice of 'Leviathan or Oblivion?'

Although perhaps the most thorough and closest to his contemporaries' understandings of ecology and world systems, Ophuls' academic work had the least popular influence of the survivalist authors considered here.[28] Rhetorically targeting elite decision-makers and bureaucrats, Ophuls cast his work as a 'fundamentally empirical and scientific or agnostic approach,' rhetorically detaching his value judgments from his specific analysis in order to speak directly to those with political and technocratic expertise.[29] His prescription, drawn from analysis of Plato, Hobbes, and Mancur Olson, was a team of 'ecological mandarins,' a technocratic cadre of experts with sweeping power on an immense timeline.

Today, this same technocratic logic of lesser evils extends to active technological climate modification and other global-scale geoengineering techniques. Whether in the sanitized language of scientific confidence intervals or the popular imagery of climate apocalypse, these apolitical technological narratives show that our new survivalism is again leaning to the power of centralized governments. As a survivalist era, it insists on urgent response but does not ask the audience to consider if the source of the problem confronted is rooted in their own habits, not because they should or should not, ethically, but because they assume they will not change regardless. It is a cultural malaise, not a technological shortcoming.

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[28] Heilbroner and Ehrlich had best-sellers at some point. Hardin remains one of the most cited authors in several fields of study.
[29] Ophuls, 1977; p. 12.

The chief danger of this mindset, interpreting global trends as novel and inevitable, is that it may produce only short-term preparedness planning, intended to solve problems in a technical, engineering frame, rather than alter the habits of everyday life which create these problems. Geared to natural hazards planning and aimed at bureaucrats and elite decision-makers, such approaches appear technical and politically neutral, presenting themselves as a tool box for restoring conditions to as close to normal in the smallest amount of time. Techniques like climate geoengineering appear as the extreme of this logic, a kind of uncertain but perhaps tragically necessary tool for alleviating acute human suffering.

The unspoken authoritarian and technocratic political machinery necessary to take on such new global managerial roles sits tacitly behind the curtain of such Promethean hopes. Perceiving the crisis as imminent and unavoidable enhances the appeal of such engineering resilience, technological fixes intended to return a disturbed system back to its normal parameters.[30] I will not suggest here that such an approach is wrong on its own terms. Instead, I want to suggest that changing the frame for understanding the crisis *driving* the urgent search for technological control of the planet may change our opinions about such research, its cost, possible consequences, and its moral and political justifications. Lacking such a conversation, technological fantasies like emergency geoengineering sit dangerously outside political control.

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[30] Gunderson is at pains to separate Holling's concept of 'ecological resilience' from forms of 'engineering resilience' which do not consider state shift or transformation, but rather presume the goal is simply bounce-back to pre-existing conditions. See Lance Gunderson, 2000. 'Ecological Resilience—In Theory and Application.' *Annual Review of Ecological Systems*, Vol. 31, pp. 425-39. See also: Carl Folke, Thomas Hahn, Per Olsson, and Jon Norbert, 2005. 'Adaptive Governance of Social-Ecological Systems.' *Annual Review of Environmental Resources*, Vol. 30, pp. 441-73.

III. Technology in Survivalist Times

Much of the pessimistic attitude and shock value of the survivalist appeal in the 1970s was drawn from a debate which is conspicuously absent in contemporary discussions of our 'new' era. The term 'prisoner's dilemma' popularized by Hardin (and subsequent responses from Nobel Prize-winning economist Elinor Ostrom and others) originated as description of global nuclear strategy, popularized by Albert Tucker and initially formulated by RAND strategists Merrill Flood and Melvin Dresher.[31] This is no coincidence, the nuclear example serves as a reminder of the ambivalence of technological advance.

In the first paragraph of 'Tragedy of the Commons,' Hardin cites an article by Wiesner and York on the future of nuclear war which claims that the nuclear issue is one which is beyond technical solution.[32] Hardin maintains his connection to the nuclear debate into his much later work. In *Living Within Limits* he retraces the utopian claims from people like physicist Edward Teller regarding 'unlimited' potential for ending scarcity, the possibility of 'energy too cheap to meter,' as well as revisiting President Eisenhower's 1953 'Atoms for Peace' speech, where he inaugurated the biblically-titled 'Project Plowshare,' a functional use for nuclear explosions to dig massive-scale infrastructure projects, including proposals for a new harbor at Point Barrow, Alaska.[33] Teller had gone as far as to call for a new sea-level Panama Canal and even reclosing the

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[31] Albert William Tucker, 1959. *Contributions to the Theory of Games*. Vol. 4. Princeton University Press, NJ.; Merrill Flood, 1958. 'Some Experimental Games.' *Management Science*, Vol. 5, No. 1, pp. 5-26.
[32] Jerome Wiesner and Herbert York, 1964. 'National Security and the Nuclear Test Ban.' *Scientific American*, Vol. 211, pp 27-35.
[33] Garrett Hardin, 1993. *Living Within Limits: Ecology, Economics, and Population Taboos*. Oxford University Press, New York.

Mediterranean at Gibraltar to 'freshen' the it and water the Sahara.[34] Hardin remarks in 1993, twenty five years removed from the publication of 'The Tragedy of the Commons,' that 'looking backward at the mid-century proposals of nuclear enthusiasts, it is clear that their principal deficiency was a lack of ecological insight.' Famously, for Hardin, this insight was that 'We can never do merely one thing.'[35]

As the threat of global scale crises like climate change become increasingly apparent and useful for motivating political action, it is important to reflect on this ambiguous perspective on technology and inevitable human progress in the debates surrounding the atom bomb. The translation of these themes to ecological politics in survivalist tracts from the 1970s is seldom reproduced today, perhaps because our imaginations have grown to see hurricanes like Katrina, record droughts, fires of the century, and other disasters, or perhaps because of the dominance of modernist narratives where the promise of technology disguises the need for fundamental change.

This modernist logic insists, nobly, that humans must act at the fullest of their technological capacities in the interest of the species and planet. In many cases, they maintain, the development of such technology, controversial or not, is *inevitable* and best embraced by responsible scientists under institutionalized norms rather than in the heat of a climate emergency. At their caricatured extreme, such modernist narratives embracing the Anthropocene concept may go further even than Crutzen's call for stewardship and advocate the transcendence of the Earth itself and total detachment.[36] Such science

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[34] Edward Teller, Wilson K. Talley, Gary H. Higgins, and Gerald W. Johnson, 1968. *The Constructive Uses of Nuclear Weapons*.' McGraw-Hill, NY.
[35] Hardin, 1993; p. 149.
[36] For a caricature of this viewpoint see: Rasmus Karlsson, 2013. 'Ambivalence, irony, and democracy in the Anthropocene.' *Futures*, Vol. 46, pp. 1-9.

fiction narratives[37] are often more interesting than the extended conversation about the beginning of the Anthropocene under which much of the implicit debate over worldviews is conducted.[38] Unlike Crutzen, many of the hyper-modern narratives spawned from the Anthropocene's integrating pull retain the strict separation between nature and society, and thus can imagine and even dream of detaching entirely or 'decoupling' from nature, moving beyond need and even beyond the planet itself.

Crutzen cannot do this—he understands natural and social systems are inseparable. But he also still assumes that the human forms the conscious and rational element of this new entangled planetary whole.[39] This is intuitive in a sense, since Crutzen hopes to maintain a global, species-wide form of responsibility for ecological degradation, but at the same time, like the Club of Rome over fifty years ago, he refers to the global without reference to the local, it is both everywhere and nowhere. Such a gap between local and understanding, the survivalists past showed, can lead to resignation or denial, both of which remain politically passive and prone to technological fantasy.

By problematizing benign technological advance *by tacit example*, the atomic debate reflexively asked if engineering problem-solving itself presented a grave and dangerous risk. This is important because the space race metaphor continues to anchor

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[37] For an interesting recent contribution see: Heather Swanson, Nils Bubandt, and Anna Tsing, 2015. 'Less than one but more than many: Anthropocene as science fiction and scholarship-in-the-making.' *Environment and Society: Advances in Research*, Vol. 6, pp. 149-166.

[38] The emphasis in stratigraphy on a 'golden spike,' or date for the beginning of the new epoch, in some ways enables this at times fruitless debate. Clearly, I think the nuclear thesis is most useful, versus industrial revolution and early Anthropocene narratives (Crutzen and Ruddiman). For a short summary of a very large literature from the perspective of archaeology, see: Michael Balter, 2013. 'Archaeologists say the Anthropocene is here—but it began long ago.' *Science*, Vol. 340, April.

[39] In this way he similar to James Lovelock.

many centralized investment, green capital, and eco-modernist programs.[40] Without the presence of the nuclear foil it is unsurprising that the same authors prefer gradual, incentives-based strategies, including, in what would have been nearly unthinkable to earlier green movement and academic literatures, the adoption of nuclear energy as a 'bridging fuel' or 'powered landing,' expansion of natural gas production through hydraulic fracturing, and the investigation of 'emergency' climate geoengineering.

The dilemma for the survivalists, however, was never the potency or potential of technology, but rather the production of a meaningful collective agency capable of addressing the problems urgently and at appropriate scale, a task which they believed was impossible given the global political systems of the time. Their absorption of nuclear imagery emphasized the sudden nature of the shift they predicted, an age of scarcity which was already arriving, and by tacit example invalidated technological and political optimism. The political consequences, for them, were clear: the production of economic strife caused by population growth would serve as a powerful destabilizing force to ways of life built on the promise of continued growth. This, in turn, would drive a steady centralization of power as conditions grew more extreme, with the possibility of world war between haves and have nots. The certainty of this future, the survivalists felt, left only hope for a horrible but effective solution to avoid a more terrible one.

The Sword of Damocles

[40] Ted Nordhaus and Michael Shellenberger, 2011, 'The Long Death of Environmentalism,' Delivered at Yale School of Forestry, available at http://thebreakthrough.org/blog/2011/02/the_long_death_of_environmenta.shtml.

Using the scale of nuclear catastrophe as a foundation for understanding the gravity of environmental crisis, the survivalists capitalized on fears of proliferation to imagine a nuclear-armed distributive struggle between classes of people and nations. This was, crucially, not a rejection of technology itself in abstract. The problem was social and political. As Ophuls claimed, 'it seems absolutely clear that the rich have not the slightest intention of alleviating the plight of the poor if it entails the sacrifice of their own living standards,' which meant that, 'ecological scarcity thus greatly increases the probability of naked confrontation between rich and poor.'[41]

This inevitability of conflict was the key to the survivalist resignation, and punctuated by nuclear annihilation. Ophuls says:

> Ever since Hiroshima the world has lived in a state of highly armed peace with a nuclear Sword of Damocles hanging over its head. We have all learned to live with the bomb, and the hair suspending the nuclear Sword has indeed held, although for how much longer no one can say.[42]

The image of the sword dangling by a hair was used by John F. Kennedy to describe the precariousness of holding atomic weapons.[43] Ophuls' key addition was to add the environmental crisis as an *equally imposing* sword hanging *even more precariously* above our heads:

> Now the world must live under the blade of another Sword of Damocles, slower to fall but equally deadly. Unfortunately, the hair holding this environmental Sword has come loose; pollution and other environmental problems will not obligingly postpone their impact while diplomats

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[41] Ophuls, 1977; p. 211.
[42] Ophuls, 1973; p. 228.
[43] John F. Kennedy said in his September 25th, 1961 address to the UN General Assembly: 'Today, every inhabitant of this planet must contemplate the day when this planet may no longer be habitable. Every man, woman and child lives under a nuclear sword of Damocles, hanging by the slenderest of threads, capable of being cut at any moment by accident or miscalculation or by madness. The weapons of war must be abolished before they abolish us.'

> haggle, so the Sword is already slicing down toward our unprotected heads.[44]

In literal and rhetorical ways Ophuls folds the nuclear threat, and with it the imagery of global-scale catastrophe, into the political and ecological problem posed by entrance into the new conditions of scarcity, and by doing this he implicitly includes a deep suspicion of technological advance.

In their article recommending removing taboos against climate geoengineering, Jennifer Burney, Charles Kennel, and David Victor assert that 'the trick for climate scientists of the warming generation—just as it was for the atomic scientists of the bomb generation—is to marry good science with smart politics.'[45] This invocation of the debate over atomic weapons is fleeting in their analysis, given that the publication is in the *Bulletin of Atomic Scientists,* but also profoundly under-theorized throughout the literature on geoengineering given the shared concerns with the challenges of governing potentially disruptive technology.[46]

There are, of course, exceptions. In one such uncommon paper in *Climatic Change* in 2009, Max Planck Institute for Meteorology professor Victor Brovkin and co-authors draw different conclusions, too rare in the considerations of such 'pragmatic' solutions. They pay attention to the possibility of technological failure presented by injections of sulfur particles into the stratosphere.[47] Noting the potential for 'termination

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[44] Ophuls, 1973; p. 228

[45] Jennifer Burney, Charles Kennel, and David Victor, 2013. 'Getting serious about the new realities of global climate change.' *Bulletin of the Atomic Scientists*, Vol. 69, No. 4, pp. 49-57.

[46] Despite the fact that early geoengineering was promoted by Edward Teller and early proposals were phrased as 'Manhattan Projects..

[47] Victor Brovkin, Vladimir Petoukhov, Martin Claussen, Eva Bauer, David Archer, and Carlo Jaeger, 2009. 'Geoengineering climate by stratospheric sulfur injections: Earth system vulnerability to technological failure.' *Climatic Change*, Vol. 92, pp. 243-259.

effect,'[48] where ceasing injections causes a rapid return to higher temperatures, Brovkin and colleagues present the possibility of tipping points and rapid change as an unintended result of technological intervention, sounding a particularly tragic note:

> The amplification of global warming through emissions of methane released from thawed permafrost regions and, later, from methane hydrates stored on the continental slopes in the ocean, would seem to be unavoidable. Coming generations would have to live with the danger of this 'Sword of Damocles' scenario, the abruptness of which has no precedent in the geologic history of climate.[49]

The reference to the Sword of Damocles myth is not accidental. The ambivalence of the atomic example, even indirectly referenced, balances the sense of urgency created by the tragic frame. Brovkin and coauthors conclude that the long-term nature of the risks of climate engineering disqualify sulphate injections from serious consideration as a solution to climate change. They fear, instead, that focus on developing short-term remedies will distract from more necessary research into energy and transportation solutions which can affect the source of the problem itself.

Reincorporating respect for technology's potential ambivalence, the survivalists believed, meant recognizing the political task as primary. Today, however, in the absence of a critical analysis of technology, key debates about the ways to politically avoid the projected crises are consistently hamstrung by a passive belief in a general idea of human ingenuity and resigned acceptance of lesser evils. From the perspective of the developing world this is an understandably unconvincing and incoherent message,

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[48] See: Andy Jones, J. Haywood, K. Alterskjaer, O. Boucher, J. Cole, C. Curry, P. Irvine, D. Ji, B. Kravitz, JE Kristjansson, JC moore, U. Niemeier, A. Robock, H. Schmidt, B. Sing, S. Tilmes, S. Watanabe, adnd JH Yoon, 2013. 'The impact of abrupt suspension of solar radiation management (termination effect) in experiment G2 of the Geoengineering Model inter-comparison Project (GEOMIP).' *Journal of Geophysical Research: Atmospheres*, Vol. 118, pp. 9743-9752.

[49] Brovkin et al, 2009; p. 255.

underlined by hypocritical lack of domestic action in the 'developed' world. If the public in the richest nations most responsible for global environmental crises are both conscious of deteriorating trends like climate change and yet continue to give it such low priority, what case can be made to China, India, or Brazil that they must find new ways to achieve material comfort for their citizens?

For the vast majority of the world entering the predicted slow apocalypse alongside those most historically (if inadvertently) responsible, the simple return to pre-existing conditions prioritized by managerial technologies is not a good enough option. Lacking transformative content, such global preparedness doctrines, both scientific and military, do not address the political challenge of uneven vulnerability which underlined survivalist pessimism, nor can they begin to debate the justice of contemporary 'developed' lifestyles in a wide geographic and multi-generational context. Instead, they plan for unpredictable natural disasters and hope for technological panaceas to re-legitimate the rhythms and habits of comfortable 'developed' cultures.

For the survivalists, recognizing the parallel Sword of Damocles and the distributive implications behind the calls for the industrialized world to urgently prepare was only the first step what was to be a long, perhaps fractious process of political and social adaptation. This process today is also potentially painful, and may involve what are perceived to be great sacrifices, especially where the disintegrating force of climate change adaptation targets long-held or naturalized cultural habits, such as reliance on automobiles in the United States.[50] Challenging such an unspoken consensus is the key

[50] Cheryl Hall, 2013. 'What Will it Mean to be Green? Envisioning Positive Possibilities Without Dismissing Loss,' *Ethics, Policy and Environment*, Vol. 16, No. 2, pp. 125-141; Michael Maniates and John Meyer, 2010. *The Environmental Politics of Sacrifice*. MIT Press, Cambridge, MA.

task for climate change outreach, but to create the change it seeks it needs to think collectively, i.e. about the political at many scales.

The Platonic captain of the ship of state which Ophuls and Heilbroner prescribed is presented as an unspoken afterthought in the accounts of the boldest advocates of climate geoengineering, probably because it is assumed that the leader would be the US or a 'consortium' of technologically advanced nations, not a world body. The privilege is to a scientifically-informed nation state, a call which they believe the US must answer at the risk of ceding the technology to China or Russia.[51] Ehrlich, in 1971, also prioritized drastic action in the United States. In a section playing on the Greek roots of ecology called 'Getting Our House in Order,' he claims:

> The key to the whole business, in my opinion, is held by the US. We are the most influential superpower; we are the richest nation in the world. At the same time we are also just one country on an ever-shrinking planet. It is obvious that we cannot exist unaffected by the fate of our fellows on the other end of the good ship Earth. If their end of the ship sinks, we shall at the very least have to put up with the spectacle of their drowning and listen to their screams.[52]

This outreach makes sense since the US is both largely responsible for warming and has the economic and scientific power to do something about it. Like the insurance arguments for geoengineering, however, Ehrlich's scientific diagnosis is laced with concerns for justice, but his political prescriptions are not.

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[51] See: Kingsley Edney and Jonathan Symons, 2014. 'China and the blunt temptations of geoengineering: the role ofsolar radiation management in China's strategic response to climate change.' *The Pacific Review,* Vol. 27, No. 3, pp. 307-332.

[52] Ehrlich, 1968; p. 128.

IV. The Anthropocene and the Club of Rome

The history of environmental thought, including survivalist population and atomic debates, are largely left in the darkness of history by both sides discussing the entrance to the new era of social-ecological crisis. Deprived of any ambivalence toward technology, eco-pragmatist arguments in particular interpret acceptance of the Anthropocene as a chance to rethink old limits, in contrast to critics focused on preventing the overshoot of such limits. Crutzen and Schwagerl are emblematic of this eco-modernist spin, claiming:

> Rather than representing yet another sign of human hubris, this name change [to the Anthropocene] would stress the enormity of humanity's responsibility as stewards of the Earth. It would highlight the immense power of our intellect and our creativity, and the opportunities they offer for shaping the future.[53]

They can claim this because they have erased the memory of the nuclear ambiguity from the Promethean history of technological advance. Their so-called 'eco-optimism' depends on this forgetting. What this optimism is designed to sustain, however, is left out of the discussion. Who would participate, govern, and enforce such a system of tools is left to bottom-up, self-enforcement of scientific norms still in development.

This is important for democratic politics in the age of the Anthropocene, if there is to be such a thing, since the politics of buying time requires governments to coordinate, manage, and coerce. While the Promethean enemies of survivalism ostensibly sided with libertarians and Reagan-era free market economists in the 1980s, the most dangerous Promethean critics today admit that climate change is not a hoax.[54] Instead, they turn to Space Race-style investment programs, and ultimately decide that nuclear power,

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[53] Crutzen and Schwägerl, 2015; p. 2.
[54] For the 1980s standard Promethean argument see: Julian L. Simon, 1980. 'Resources, Population, Environment: An Oversupply of Bad News,' *Science*, New Series, Vol. 208 No. 4451, pp. 1431-1437.

hydraulic fracturing, and global-scale climate geoengineering are necessary lesser evils given the possibility of catastrophic ecological change. This is a deceptively easy decision, since nuclear energy and tropospheric cooling regimes are not simply tools for alleviating suffering, but have the potential to cement technocratic structures into democratic governments, and, in the event of an emergency, threaten the choice which Ophuls' work begins with—the tragic decision between 'Leviathan or Oblivion?'

Crutzen's call for geoengineering is archetypical in this sense. His response is not inevitable, but more common to those with advanced scientific training. This is because, in the sciences, ecological crisis is often interpreted an urgent need for stewardship without discussion of who or what that steward would be beyond the over-general and oft-capitalized Man. Steffen *et al*'s highly-cited piece on the Anthropocene from 2011 displays this logic in a clear form, spreading responsibility across a generation of humans, like the Club of Rome—they claim: 'we are the first generation with the knowledge of how our activities influence the Earth System, and thus the first generation with the power and the responsibility to change our relationship with the planet.'[55] Like the *Limits to Growth,* what this change means for everyday life remains obscure.

In this sense, it is no surprise that techniques like climate geoengineering have gained widespread interest in the scientific world, and, far from the catastrophic threat it is often tied to in critical social sciences, are largely seen as a brand of high technology 'eco-optimism.' Established scientists like Jeff Kiehl and Victor Brovkin have argued against the basic ideas put forth by David Keith, Ken Caldeira, and Crutzen, as have

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[55] Will Steffen, Jacques Grinevald, Paul Crutzen, and JR McNeill, 2011. 'The Anthropocene: Conceptual and Historical Perspectives.' *Philosophical Transactions of the Royal Society A,* Vol. 369, pp. 842-867; p. 749.

social critics like Robock,[56] Barrett,[57] Gardiner,[58] and more from a variety of disciplinary backgrounds. This attention has spurred a series of recent reviews by major national science academies, notably the UK Royal Society and US National Academy of Sciences.

Both of these reports, to greater or lesser degrees, point to the need for international norms and beginnings of effective governance regimes, although the Royal Society report, heavily influenced by Ken Caldeira from Stanford, a prominent geoengineering researcher and holder of several major patents related to Solar Radiation Management, echoes calls from others like David Victor to maintain a general 'bottom-up' approach to regulating geoengineering research and testing.[59] This is tricky, since scientific consensus, as shown by many in the same issue of *Climatic Change* as Crutzen's controversial article in 2006, is conservative and has long placed taboos on Earth system modification.[60]

Advocates are betting, academically and economically in some cases, that the urgency driving the crisis will invalidate these norms.[61] Scott Barrett has been a conspicuous voice in the pushback against such urgency, and political and technological concerns are at the heart of his concern. One target is the economics of climate

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[56] Alan Robock, 2008. '20 reasons why geoengineering may be a bad idea.' *Bulletin of the Atomic Scientists*, Vol. 64, No. 2, pp. 14-18, May/June.
[57] Scott Barrett, 2008. ' The incredible economics of Geoengineering.' *Environmental Resource Economics*. Vol. 39, pp. 45-54; p. 51.
[58] Stephen Gardiner, 2009. 'Is 'Arming the Future' with geoengineering really the lesser evil? Some doubts about the Ethics of Intentionally Manipulating the Climate System.' *Climate Ethics*, Gardiner, Caney, Jamieson, and Shue, eds. Oxford University Press. Oxford.
[59] David Victor, 2008. 'On the regulation of Geoengineering.' Oxford Review of Economic Policy, Volume 24, Number 2, 2008, pp. 322–336.
[60] Kiehl's response in that issue is perhaps the clearest expression of this hesitancy. Jeff Kiehl, 2006. 'Geoengineering Climate Change: Treating the Symptom over the Cause?' *Climatic Change*, Vol. 77, pp. 227-228.
[61] Jonas Anshelm and Anders Hansson, 2014. 'Battling Promethean dreams and Trojan Horses; Revealing the Critical discourses of geoengineering. *Energy Research and Social Science*, Vol. 2, pp. 135-144

geoengineering regimes, which was supposedly small enough to encourage unilateral use, a claim which he contests on its own terms. Beyond this economic argument, Barrett insists on the need for attention to governance, and, unsurprisingly, ties his potential examples to nuclear technology, specifically test bans.

Considering the nuclear example modulates his optimism, introducing the possibility of Daniel Bodansky called 'the specter of technology gone awry.' This follows on work Barrett coauthored with Ehrlich, of all people, where the authors claim:

> The many problems with geoengineering — its inability to address every climate emergency, the risks associated with its use, the geopolitical problems that would be triggered by its use, and the prospect of its use becoming addictive — suggest that contemplation of geoengineering does little to diminish the need to address the root causes of climate change. If anything, the prospect of geoengineering should strengthen resolve to tackle climate change by limiting atmospheric concentrations of GHGs.[62]

Like the survivalists, Barrett does not question technology's potential but rather the ability of human societies to govern its use and compensate its unintended harms in a just and ethical way. Technology in abstract is not rejected, as many vulgar modernist critics allege, it is just not seen as a potential silver bullet in the same way. Barrett's analysis asks if insurance logics based on risk are really hiding a desperate gambling metaphor.

Not unlike Paul Ehrlich's famous lost bet to Julian Simon, Bodansky asks: 'How much are we willing to bet that countries will succeed in preventing dangerous climate change by cutting their emissions of carbon dioxide and other greenhouse gases?'[63] His gambling logic concludes that romantic qualms about technology are both important and

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[62] Scott Barrett, TM Lenton, A. Millner, A. Tavoni, S. Carpenter, JM Anderies, FS Chapin III, A. Crépin, G. Daily, P. Ehrlich, C. Folke, V. Galaz, T. Hughes, N. Kautsky, EF Lambin, R. Naylor, K. Nyborg, S. Polasky, M. Scheffer, J. Wilen, A. Xepapadeas, and A. de Zeeuw, 2014. 'Climate Engineering Reconsidered.' *Nature Climate Change,* Vol. 4, July 2014, pp. 527-530; p. 529.

[63] Daniel Bodansky, 2013. 'The who, what, and wherefore of geoengineering governance.' *Climatic Change,* Vol. 121, pp. 539-551.

potentially debilitating, that they expose threats of unilateral use and premature rejection, each of which would be inappropriate given the possible trends to more than 5-9c warming and revelations about nonlinear change and 'climate surprises.' He claims:

> Geoengineering raises understandable fears about technological hubris. Virtually everyone who studies geoengineering hopes that it will not prove necessary. But with global emissions continuing to rise, and little prospect of reversing that trend anytime soon, we are not living in a world where we can assume the best. We are living in a world where we must prepare for the worst.[64]

Here, the survivalist fear of political stagnancy again inhibits both social adaptation and, he worries, the technological tools to prevent great suffering. The gamble is not whether technology will advance fast enough to potentially save human civilizations, but whether human societies will be able to develop, use, and govern the deployment of these technologies in an equal, timely, and just manner.

Doubting this political component was possible, reluctant advocates admit that insurance must be developed—like the survivalists of old, this logic reads that we should not bet on developed societies to change in time. This sense is everywhere in the accounts of geoengineering advocates. As Victor *et al* note: 'The worlds slow progress in cutting carbon dioxide emissions and the looming danger that the climate could take a sudden turn for the worse require policymakers to take a closer look at emergency strategies for curbing the effects of global warming.'[65]

Even given agreement at an international level, however, such schemes would inevitably affect different places very differently, which draws a more specific question about what exactly justice for geoengineering will mean. The Royal Society report on

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[64] Bodansky, 2013; p. 549.
[65] See: David Victor, Granger Morgan, Jay Apt, John Steinbruner, and Katharine Ricke, 2009. 'The geoengineering option: a last resort against global warming?' *Foreign Affairs*, Vol. 88, No. 2, pp. 64-76.

geoengineering, in particular, is highly vague. They write that: 'Technical, legal, ethical, economic and other concerns need to be balanced carefully in a policy and governance framework which is international in scope and remains flexible in light of fresh evidence.'[66] In their analysis, consonant with the popular Oxford Principles, geoengineering is framed as an apolitical method of spreading catastrophic risk and therefore a global public good.[67]

Such theories utilize a universal threat to an abstract subject without meaningful agency, rely on scientifically-revealed crises for authority, justify breaking old moral taboos, and, I'm arguing here, contain many of the same technocratic instincts as past survivalist eras. They have few answers to hard political questions, and respond to calls for regulation with platitudes about freedom of inquiry. Beyond the abstract values of scientific liberty, more specific and interesting questions remain, such as the question of damage and compensation. Even if found liable by some enforceable law, how will countries or the international community pay for damage done? Will a 'consortium' of advanced nations consider equally the effects on traditional cultures, remote areas, and economically unimportant species?

Some have proposed a 'general climate compensation fund' that would include climate change redistribution as well.[68] Even the most optimistic observer would be forgiven for feeling momentary survivalist resignation given these institutional answers

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[66] John Shepherd, K Caldeira, J Haigh, D Keith, B Launder, G Mace, G MacKerron, J Pyle, S Rayner and C Redgwell, 2009. *Geoengineering the Climate–Science, Governance and Uncertainty*. Royal Society, London; p. 37.

[67] Philosopher Stephen Gardiner has been the most forceful in his rejection of the public good framing. See: Stephen Gardiner, 2013. 'Why geoengineering is not a 'global public good', and why it is ethically misleading to frame it as one.' *Climatic Change*, Vol. 121, pp. 513-525.

[68] Pak-Hang Wong, Tom Douglas, Julian Savulescu, 2014. 'Compensation for Geoengineering Harms and No-Fault Climate Change Compensation.' *Climate Geoengineering Working Paper Series*, 008. Oxford.

and the lack of success of similar ones throughout recent history which has helped to create the plausibility of the lesser evils argument. These ideas seem distant hopes considering the battles over adaptation funds and technology transfer. It is not encouraging, from this perspective, to hear even proponents of such a fund faces 'no more difficulties than designing and implementing a compensation scheme for the negative effects from anthropogenic climate change,' a task which is by all accounts still far from settled or realized.[69]

History and New Eras

In the *Limits to Growth*, systems scientist Donella Meadows and her coauthors wrote that 'we hope that this book will serve to interest other people, in many fields of study and in many countries of the world, to raise the space and time horizons of their concerns and join us in understanding and preparing for a period of great transition—the transition from growth to global equilibrium.'[70] By their own terms, this has not happened. Fixated on gaining attention and urgency, survivalists of the 1970s like the Club of Rome overplayed their apocalyptic rhetoric, gaining short-term exposure without long-term acceptance. That we find ourselves in survivalist times again is testament to this failure.[71] Many now assume that all must adapt to the most urgent problems and

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[69] Wong *et al*, 2014; p. 19.
[70] Cited in Andrew Dobson, 1991. *The Green Reader*. André Deutsch Limited, London,.
[71] In a piece coauthored by prominent scholars of environmental politics across different social science disciplines, the authors warn of 'tornado politics,' 'where crisis rhetoric ('we need to act now!') serves to suspend robust societal debate about future pathways. It leads researchers to focus only on the 'best' means necessary to reach given environmental goals in light of existing arrangements — thus leaving these arrangements relatively immune to questioning.' See: Noel Castree, W. Adams, J. Barry, D. Brockington, B. Boscher, E. Corbera, D. Demeritt, R. Duffy, U. Felt, K. Neves, P. Newell, L. Pellizzoni, K. Rigby, P. Robbins, L. Robin, D. Bird Rose, A. Ross, D. Schlosberg, S. Sorlin, P. West, M. Whitehead, and B. Wynne, 2014. 'Changing the Intellectual Climate.' *Nature Climate Change*, August 27, Vol. 4, pp. 763-770; p. 765.

make hard choices given the unwillingness of consumers in the industrialized nations to alter their ways of life. This is problematic because, for those accepting the Anthropocene as an organizing framework, it clear that continuing to develop in the traditional model of the Western, 'developed' nations will not be a feasible goal barring revolutionary technological change.

Crutzen, despite agreeing on the inevitable change already here, believes that technology can present both a chance to mitigate the harshest effects and to inspire people with a positive vision of change. His political narrative is built on this promise, and expunges all traces of ambivalence. This allows him to claim confidently, in the same universal register:

> If one looks at how technology and cultures have changed since 1911, it seems that almost anything is possible by the year 2111. We are confident that the young generation of today holds the key to transforming our energy and production systems from wasteful to renewable and to valuing life in its diverse forms. The awareness of living in the Age of Men could inject some desperately needed eco-optimism into our societies.[72]

Despite writing about the dangers of super-sonic air travel, nuclear winter, and the ozone hole throughout his long and decorated career, Crutzen puts on a bold and positive public face here. The logic reads: if the Anthropocene is inevitable, the Good Anthropocene must be constructed to avoid catastrophic change.

Reopening of specific context and history is an important addition to these debates which accept generic human responsibility as license of advancing mastery of natural systems. Despairing for such agency delivers even well-intentioned theorists to the cusp of either system justifying indifference or overwhelmed resignation. Lacking

[72] Crutzen and Schwagerl, 2015; p. 2.

the connection to past debates which stressed humility due to the dual-edged nature of human technology to create and destroy, the best such passive reactions can hope for is to become master of the weather and other large-scale technological hopes, the consequences of which are unknown and unevenly distributed.

Although despairing for the possibility of democratic or socialist governments solving social-ecological problems like global population, Ophuls was also aware of the kind of negative effect that could result from the catastrophic rhetoric employed. He is clear that 'feelings of despair and impotence are not appropriate responses to the crisis of ecological scarcity,'[73] acknowledging the scale of the problems and their inaccessibility to individual actors. The simple operationalization of human influence as population numbers, of course, was misleading in many ways, since it did not vary responsibility by historical contribution and was largely blind to the variation in intensity produced by relative differences in lifestyle. Over-general, a similar lack of historical sense haunts efforts for climate geoengineering. Beyond the questions about the safety and ethics of such technological manipulation, deeper questions about who should decide on their use and for what goals remain unanswered.

Instead, some now propose humans as a species enter into a kind of arms race with the natural world to assume away harder changes in the fabric of everyday life. Making the climate an engineering problem and not a challenge to the rhythms of everyday life encourages denialism and resignation, the opposite of their intended effect. Far from time-consuming critique or hopeless idealism, the political questions here can actually be thought of as very pragmatic in the survivalist context. To create research

[73] Ophuls, 1977; p. 243.

programs and eventually systems for sustained interventions requires major funding and commitments to continuity uncommon in democratic politics since the space and arms races. Managing transition fuels and nuclear energy require massive infrastructures, research facilities, and personnel, and the compromise of their funding or agencies responsible for ensuring their safety introduces serious questions about the costs of a 'powered landing,' even in the absence of disastrous events like Fukushima or Porter Ranch. In response to the messiness of democratic politics, the idea that politics must be managed by a scientifically-trained elite national cadre of managers thus sits dangerously unspoken in many debates.

V. Conclusion

In the 1991 follow up report to the Club of Rome, the authors clearly make the link between these original population narratives and climate change, claiming that 'in searching for a new enemy to unite us, we came up with the idea that pollution, the threat of global warming [etc] fit the bill.'[74] William Ophuls has also interpreted contemporary social-ecological crises as proof that his long-discredited premises were merely untimely, that contemporary conditions represented the culmination of survivalist narratives.[75] His flurry of activity at the turn of the century extends his original analysis: his most recent publications (often self-published) are titled *Requiem for Modern*, *Plato's Revenge*, and *Immoderate Greatness: Why Civilizations Fail*.[76]

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[74] Alexander King and Bertrand Schneider, 1991. *The First Global Revolution: A report by the council of the Club of Rome*. Simon and Schuster, NY.
[75] He's not totally unjustified. The Club of Rome initially had warned of 2050 as an upper limit.
[76] See: William Ophuls… 1998. *Requiem for Modern Politics: The Tragedy of the Enlightenment and the Challenge of the New Millennium.'* Westview Press, Boulder; 2011. *Plato's Revenge: Politics in the Age of*

The danger of dismissing such theories out of hand is that the prospect of such an emergency authoritarian government should not be taken lightly. In the 20th century many horrible things were justified by the arrival of exceptional circumstances. The threat behind Ophuls' and Heilbroner's social elaborations of ecological crisis is repeated today in many academic and official circles: ecological ruin is the beginning of war and social chaos, and will require hard choices between greater and lesser evils. The survivalists believed that even with their warning the best case scenario was a hard government capable of acting efficiently to change lifestyles in uncomfortable, even unthinkable ways, including the right to breed.

I argued here that the Anthropocene, in some interpretations, bears the characteristics of this 'survivalist' discourse, namely that it wields a universal threat, relies on scientific authority, revalues old moral taboos, and leans toward technocratic authoritarianism. Unlike prior survivalists, however, many today lack the same ambivalence toward technology typical of Cold War politics. In the absence of ambiguity toward technology, our contemporary survivalists adopting the Anthropocene as license for global stewardship at once assume away political agency and insist on urgent action, leaving aside messy questions of political and ethical deliberation. This suggests that, like survivalists of old, the modernist strain of the Anthropocene realization, typified by the advocates of climate geoengineering, also, if less honestly, assumes the need for technocratic and centralized forms of 'stewardship' that can only be managed by national or even global authoritarian government.

Ecology. MIT Press, Cambridge; 2012. *Immoderate Greatness: Why Civilizations Fail*. CreateSpace Independent Publishing Platform. Online.

I argued here that understanding the historical terms of the debate which made emergency authoritarianism appear inevitable in survivalist times provides a valuable set of lessons for critiques aimed at confronting the possibility of passive resignation on the part of those most responsible for historical degradation. This is not spurred by belief or disbelief in technology, but belief that politics will inevitably fail and the need to prepare for the worst case, a resignation only answered by fantasies of technocratic governance. Uncritical acceptance of the Anthropocene narrative may result in exactly this resignation, depoliticizing catastrophic conditions because of the assumed inability of political institutions to change in time. This attitude interprets the experience of consumers in the 'developed' world as a universal human malaise that is impossible to overcome through traditional forms of human agency.

Returning to the population theories and the Club of Rome report is not an affirmation of their dour view on human nature, their uncomfortable institutional prescriptions, or their hyperbolic predictions. This survivalist tradition is valuable because it illustrates the perils of public appeals based on global catastrophe, and because it draws on debates over technology that are conspicuously and dangerously absent today. Their 'failure' belies the serious popularity of such beliefs during a 1970s, and their lack of attention to politics may provide valuable guide posts for emerging research programs built on the possibility of a catastrophic future.

Today, at the beginnings of the serious debate over geoengineering the same survivalist logic is apparent: anything is better than the end of civilization. The assumed character of such a future civilization, however, continues to remain frustratingly opaque. I argued that the survivalist premise is thus not as far-fetched as it seems, that

contemporary ecological crisis prophets suffer from a similar pretension to novelty and a fatally over-general idea of human agency, that they rely heavily on worst-case scientific accounts for authority, and that they secretly lean towards technocratic authoritarian government. Crucially, however, they do not share the critical ambivalence towards technology with these past generations of survivalists, a difference which should modulate their lesson and give a fresh perspective on contemporary debates.

03 Prometheus and Anti-Apocalyptics: Gunther Anders and Ecological Crisis

I. The Promethean Challenge: Technology and New Eras

This chapter argues that 20th century German theorist, journalist, and philosopher Gunther Anders is important to consider today as a critical voice to balance pervasive technological optimism contained in many contemporary political debates, chief amongst them those surrounding global ecological change and the ethics of technological intervention.

Prometheus is the central character Anders' major work *The Obsolescence of Man,* which exists only in translated fragments for consumption in English.[77] This is an interesting bridge between global environmental issues and nuclear debates, emphasizing the search for urgent and effective action. The centrality of the nuclear bomb means that human ingenuity, for Anders, is an ambiguous advance rather than an inevitable source of progress. Anders believed that the speeding up of the technological advancement of human societies had come too soon, that it had created a discrepancy between the things humans could do as a species and the ability of individuals to imagine the scale of the effects produced. This 'Promethean Gap,' for Anders threatened humanity at a global level with extinction, not just from the earth but also the 'double-death' of all generations who came before who would never be remembered.[78]

Today, the integrating force of global-scale social-ecological problems has brought together a powerful and talented group of scientists, politicians, and academics of all disciplinary and professional stripes. At the same time, the dramatic mismatch in the

[77] Gunther Anders, 1956. *Die Antiquiertheit des Menschen*, Vol. 1, *Über die Seele im Zeitalter der zweiten industriellen Revolution*. Verlag CH Beck, Munich.
[78] Gunther Anders, 1956a. 'Reflections on the H-Bomb.' *Dissent*, Vol. 3, No. 2, Spring, pp. 146-155.

scale of human action compared to changing conditions provides a fundamental challenge to the imaginations of decision-makers and citizens used to making decisions at the scale of nations or individual choice. The literature on the politics of ecological crisis, confronting this problem of imagination, is profoundly at odds over how to react. Some claim that outreach must become more catastrophic to wrench attention away from short-term incentives and day to day life to the global scale. Others argue that outreach should avoid appearing alarmist by presenting crisis as an opportunity, dismissing catastrophic rhetoric as alienating.

The positive strategy, in fear of causing resignation, underplays the crisis and cuts against its own urgency. While importantly focused on revaluing the incentives in everyday life, the sense of crisis fades they are often reprioritized and coopted, leaving those they sought to 'pragmatically' reach indifferent. The other, its apocalyptic twin, seeks to break through indifference by elaborating worst-case scenarios. Where it does so in a global register, as in most climate-related crisis narratives, it may create the resigned sense of acting at too small a scale. Each strategy at its extreme, produces a kind of passive depoliticization, whether by making the crisis appear as a low priority or by making its resolution appear impossible.

In many ways, then, each extreme requires the other—the reformist needs the threat of the radical to appear moderate and still underline, if only indirectly, the urgency of the crisis predicted. The radical needs the reformist to create the basic policy platform to debate and critique, and to establish the legitimacy to engage in practical negotiations with and within government. This mutual dependency is potentially confusing, and remains a divisive element across ecologically-focused social and humanistic inquiry.

Thus, although it has become common in these academic literatures to refer to our time as a 'new' era of global connection and potential catastrophic failure, I am arguing in this chapter that attention to the lessons of similar eras which perceived themselves as fundamentally 'new' reveals that those using catastrophic rhetoric to generate urgency and concern for solving social-ecological problems must come to terms with two disappointing possibilities. First, the message may prove ineffective and the audience may remain indifferent, whether because it becomes washed out by other, seemingly more important issues, or because it makes predictions which do not turn out to be true. Second, the message may be too effective, allowing for a kind of surrendering resignation which preserves comfortable habits at any cost.

This chapter begins to map some of the potential contributions of Anders' critical theory of the atomic bomb to these modern debates over global ecological crises. I begin with the failure of both catastrophic and reformist outreach to generate effective action, and attempt to utilize the tools presented by Anders to understand and move beyond the corrosive passivity which has come to characterize contemporary climate debates. Anders' concept of the 'Promethean gap' was based on the intuition that the new age had stripped individual imaginations of their power to comprehend the effects humans could now create. I explore Anders' critique of technology and consider how the main sources of introduction to Anders in English have interpreted his relevance, then analyze the concepts of 'apocalyptic blindness,' 'guiltless guilt,' and the 'Promethean gap,' and consider their relevance to environmental politics. Finally, I outline Anders' contributions to debates over the use of fear, focusing on his 'special kind of fear.'

At an abstract level, considering Anders can help understand how globally-framed analyses, in the case of both climate and nuclear problematics, create a paradoxical set of problems—the danger of historical disconnection presented by outreach claiming a 'new era' and phrasing its claims in a global vocabulary, and the need to understand the political and ethical conditions of a what *may indeed be* a qualitatively new era. At a more specific level, revisiting Anders can help us understand the promise and danger of catastrophic rhetoric, a strategy which he both criticized in its most pacifying forms and utilized against reformist arguments claiming the era of nuclear weapons was *not really all that different*. Anders' more complicated understanding gives critical purchase on this deabte, which has grown polemical in environmental circles and usually contains a tacit argument about the shape of any non-apocalyptic future to be worked towards.

The rest of this chapter begins from the insight that while the era of climate catastrophe may be new, it is not the first era which has considered itself so. Using this link between nuclear and climate problematics, I show how Anders can help us understand the 'apocalyptic blindness' of narratives based on proclaiming such new eras, now lurching into planetary geoengineering schemes and nuclear 'powered landings,' and how the unimaginable can become real in the desperate search for an active response to a crisis inevitably arriving. The sum of these arguments suggests both that Anders has been overlooked as a source of critical technological themes and that many of his ideas provide interesting insights into debates over the promise of technology. Such sources of technological ambiguity are important to remember as we enter the Anthropocene and consider drastic political actions in response.

II. Cold War Technology Critique in Warmer Times

Looking back from the better part of 50 years, it is perhaps impossible for someone like myself, born in the 1980s, to reproduce the feeling the first generation after WWII felt when humans landed on the moon or the earth-rise pictures were first published. Using these still-ubiquitous images, green literature from the dawn of the space age has attempted to tap into a feeling of smallness and fragility which seeing the earth from space inspired. The unspoken parallel to this image, I am arguing here, has largely been forgotten—the destructive potential of the Cold War driving the Space Race.

Landing on the moon, to optimists, showed that humans had forged a common identity and that our imagination was catching up to our ability to manipulate the world. But as Michel Foucault noted, the specter of atomic war on a global scale also meant that the we had crossed the 'threshold of modernity,' that humans now wagered the survival of the species on politics.[79] In the introduction *The Human Condition*, Hannah Arendt reacted to the launching of Sputnik by noting the earth seen from space for the first time gave both a new sense of fragility and, at the same time, a sense of de-territorializing relief that humans had escaped the earth. Analyzing this dark sense of relief, she asks:

> Should the emancipation and secularization of the modern age, which began with a turning-away, not necessarily from God, but from a god who was the Father of men in heaven, end with an even more fateful repudiation of an Earth who was the Mother of all living creatures under the sky?[80]

Arendt saw the beginning of the Space Age as a threat to the relationship between humans as a species and the Earth. Her fear was that 'it could be that we, who are earth-

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[79] Michel Foucault, 1980. *The History of Sexuality, Vol. 1: An Introduction*, Vintage, New York.
[80] Hannah Arendt, 1958. *The Human Condition.* University of Chicago Press, Chicago; p. 2.

bound creatures and have begun to act as though we were dwellers of the universe, will forever be unable to understand, that is, to think and speak about the things which nevertheless we are able to do.'[81]

This fear is, I think, expressed most powerfully by Arendt's first husband, Günther Anders, a student of Edmund Husserl, Martin Heidegger, and Max Scheler before the Second World War. Distant cousin of the influential literary theorist Walter Benjamin, Anders has rarely been referenced in the US beyond footnotes of these relationships.[82] His work is less studied in English than that of Arendt, Heidegger, or Benjamin in part because his major work *The Obsolescence of Man* remains untranslated in complete form, and in part because he abandoned his academic career for a life of journalism and activism.[83] Instead of seeking a teaching position at a major university he helped found the anti-nuclear movement in Europe and dedicated his life to challenging the idea that technology could be ethically or politically neutral.

Anders, I will show here, is interesting to return to as a resource for understanding the catastrophic urgency produced by global-scale social-ecological crises because he too confronted a seemingly 'new' global-scale disaster. Son of child psychologists, Gunther Stern was the product of comfortable German-Jewish circumstances that faded into two world wars. He studied at Hamburg with Cassirer, with artists in Munich, psychologists in Berlin, and eventually with Edmund Husserl, Max Scheler, and Martin Heidegger in

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[81] Arendt 1958; p. 2. This passage has been cited by environmentally focused theorists from across disciplinary boundaries to point to the relevance of Arendt to environmental politics. While Arendt stressed the loss of control of technology, however, Anders saw a more basic problem related to imagining the effects themselves, a prerequisite for moral or political choices that entail responsibility for some party.

[82] See: Richard Wolin, 2001. *Heidegger's Children: Hannah Arendt, Karl Lowith, Hans Jonas, and Herbert Marcuse*. Princeton University Press, Princeton; Martin Woessner, 2011. *Heidegger in America*. Cambridge University Press, New York.

[83] Clearly these two reasons are linked. Parts of *Obsolescence* have appeared in English translations, as well as a full translation in Spanish and French. It is alternatively translated as *Antiquatedness*.

Marburg and Freiburg during the Weimar Republic.[84] Adopting the name Anders (German for 'different), he blended phenomenology, Heideggerian ontology, and philosophical anthropology into a uniquely active pursuit of an 'engaged' intellectual. This same pursuit of engagement eventually limited his career opportunities, despite his distinguished academic pedigree.[85]

For Anders, the rise of Nazism inspired a dystopian novel (*The Molussian Catacombs*) and active attempts to organize leftists in Germany.[86] He fled to Paris in 1933, and eventually to the US in 1936, where he stayed until 1950, in close contact with the exiled Frankfurt School and even briefly working in a costume shop in Southern California, an experience on which he reflected later in life. He returned to Europe and eventually settled in Vienna, where he wrote a book on Kafka, and what is considered his most important book, *Die Antiquiertheit des Menschen*, or the Obsolescence or Antiquatedness of Mankind, which was intended to be in two volumes.[87] The first was released in 1956 in German, the second not until 1980.[88]

Anders recognized that the technology which had exponentially improved human welfare, mobility, and health had also delivered the species to the brink of unthinkable scales of disruption and, at its extreme, the possibility of extinction. This was because,

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[84] Biographical details from: Jason Dawsey, 2004. 'History After Hiroshima: Gunther Anders and the 20th Century.' *Unpublished dissertation proposal*. UCSB; Paul van Dijk, 2000. *Anthropology in the Age of Technology: The Philosophical Contributions of Gunther Anders*. Rodopi, Atlanta. A recent collaborative effort is also interesting: Gunter Bischof, Jason Dawsey, and Bernhard Fetz, 2014. *The Life and Work of Gunther Anders: Émigré, Iconoclast, Philosopher, Man of Letters*. StudienVerlag, Austria.

[85] He famously publically turned down a university appointment to visit Hiroshima.

[86] Anders even tries to commit the son of Adolf Eichmann to the anti-nuclear cause in his first letter. The Molussian Catacombs was published as: *Die molussische Katakombe: Roman.* Verlag C.H. Beck, Munich.

[87] Gunther Anders, 1951. *Kafka-Pro und Contra: Die Prozessunterlagen*. Verlag C.H. Beck, Munich.

[88] The 1980 edition includes a new preface which is very interesting to consider alongside his second letter to Klaus Eichmann, written around the same time. 1956. *Die Antiquiertheit des Menschen*, Vol. 1, *Über die Seele im Zeitalter der zweiten industriellen Revolution* and: 1980. Vol. 2, *Über die Zerstörung des Lebens im Zeitalter der dritten industriellen Revolution*. Both Verlag C.H. Beck, Munich.

for Anders, being itself was being 'technified'—work was being automated, entertainment was more pervasive, and nuclear weapons, at the very extreme of this trend, had made the extinction of the human species possible. The nuclear issue would consume the rest of his productive life, even resulting in an infamous rejection of non-violence in response to Chernobyl in 1986.[89] He died in 1992 at the end of the Cold War that defined his work.

The concepts of 'guiltless guilt,' 'Promethean discrepancy,' and 'apocalyptic blindness' have found their way into the American philosophical canon chiefly through the translations of other European theorists.[90] Despite a flurry of attention in German in the early 1990s, the full translation of Anders' major work has never been made to English, although it is, interestingly, translated to Spanish. I utilize several other Spanish translations, especially his amazing letters to Klaus Eichmann, in this analysis. Save for a few English resources, such as UC Santa Barbara history professor Harold Marcuse's wonderful archive and tribute, there are remarkably few resources for understanding his work in English, despite the disorienting mass of scholarship on Heidegger, Husserl, Arendt, and, if to a lesser extent, Hans Jonas.

Lack of critical attention to Anders in the United States is, I think, also in part due to a difference between nuclear debates in Europe and the United States. The nuclear bomb, in the US, remains more ambiguous morally, since it had ended the war with Japan, the US was one of the prime actors in the nuclear standoff, and the development of nuclear weaponry itself reinforced nationalist accounts of American superiority. In

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[89] Gunther Anders, 1987. 'Violence-yes or no?' *Gewalt-ja oder nein: Eine notwendige Diskussion*, ed. Manfred Bissinger, Knaur, Munich.

[90] Here I will treat the work of Zygmund Baumann, Ulrich Beck, and Pascal Bruckner. Babette Babich is a recent example of American scholarship beginning to pay attention to Anders.

Europe after Soviet parity this sense of agency and national pride was profoundly absent, a sentiment which drove campaigns for nuclear disarmament across the continent and also instilled a deep sense of powerless resignation to many of the debates, epitomized by EP Thompson's incomparably bleak *Notes on Exterminism* in 1980.[91]

This resignation is reproduced in debates over the politics of ecological crisis. The global scale of the crises often appears out of scale with the kinds of actions and goals that individuals or local governments can realistically accomplish. Instead, even those convinced of the reality of climate change harbor dark thoughts about the ability of contemporary societies to adapt in time to avoid great suffering, a kind of resignation which, unlike its denialist cousin that relies on markets and technology, inspires passivity in those it convinces. Knowing the power of the sentiments invoked by the tenuous political atmosphere of the Cold War, and himself trying to balance his audience's continued indifference against the possibility of resigned acceptance, Anders' final words in his 'Theses for the Atomic Age' are useful because they insist on both raising the level of fear and the level of activity—confronting the possibility of fatalism provoked by the dire future he predicted, Anders says 'Our despair is none of our business.'

The Reception of Anders in the US

While there are few references to Anders available to English speakers, there are several prominent treatments by European theorists like Ulrich Beck, Zygmund Baumann, and Pascal Bruckner, as well as, more recently, some limited attention from

[91] Dawsey notes the connection to Thompson's 'exterminism' arguments in his unpublished prospectus. See also: EP Thompson, 1982. 'Foreword.' In: *Notes on Exterminism, the Last Stage of Civilization.* New Left Publishing, London.

theorists like Babette Babich, Ernest Schraube, and Christopher Muller, as well as biographical accounts by Jason Dawsey and Paul van Dijk.

Although outside of academia in his later life, Anders remained an active and serious thinker. Mentioned in a long footnote by Adorno in a section of *Negative Dialectics* critiquing Heidegger,[92] Anders was in conversation with Herbert Marcuse throughout the late 20th century, as Harold Marcuse's archive of original scanned letters shows.[93] Woessner's *Heidegger in America*, unlike Wolin's *Heidegger's Children*, spends some time on Anders, noting how he reacted to counter-revolutionary tendencies in Heidegger's philosophy. Anders, who never forgave his teacher's Nazism, called him provincial for not considering industrialization, democracy, or workers' movements, and naïve for being ahistorical and unable to consider beginnings.[94] Instead, for Heidegger, famously, Dasein was always *thrown* into existence, a condition which Anders thought was fleeing the world to a hollow Catholic shell of pseudo-concrete nihilism.[95]

Van Dijk notes that 'no other philosopher is referred to as often by Anders, and generally in a critical sense, as Martin Heidegger.'[96] Van Dijk's biography makes it clear that Anders' rejection was not generally related to Heidegger's later work on technology, but rather at his anthropology presented in *Being and Time*.[97] This was principally related to his rejection, with another former teacher Scheler, of attempts to define the

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[92] Theodor Adorno, 1966 (2007). *Negative Dialectics*. Continuum, NY.
[93] Marcuse's archive is available online here: http://www.history.ucsb.edu/faculty/marcuse/anders.htm.
[94] Wolin's book, now in a new edition, instead treats Hans Jonas, Hannah Arendt, Herbert Marcuse, and Karl Lowith. The critique of beginnings was also central to Arendt's response to Heidegger's 'Being toward death' through the concept of natality.
[95] Gunther Anders, 1948. 'On the Pseudo-Concreteness of Heidegger's Philosophy. *Philosophy and Phenomenological Research*, Vol. 8, No. 3, March, pp. 337-371.
[96] van Dijk 2000; p. 97.
[97] Anders' comments in his second letter to Klaus Eichmann could likely also be read as indirect commentary on Heidegger, especially the sections on indifference as they relate to Heidegger's comments regarding human material caught up in progress.

essence of human beings in an abstract way, a technique which they felt necessarily commits violence to the plurality of individual experience, as well as elevates the human to an undeserved position as 'Shepherd of Being.' Anders called such attempts 'pseudo-concreteness' because they lacked history, and attempted to resituate the ahistorical, thrown *Dasein* at the base of Heidegger's ontology into a material context that recognizes the pull and agency of things on human experience. This difference, for Anders, was powerfully revealed by the way machines and technology were remaking everyday life, a process which was accelerated by the kinds of historically disconnected narratives that Heidegger wrote in his cabin in the woods.

Outside of the secondary connections made in literature concerned primarily with Arendt or Heidegger there are also several interesting translated fragments of continental thought concerning Anders. I consider these treatments fragments not because their translations are incomplete but because they only treat a sliver of Anders' thought in the English treatment. Adorno's long footnote in *Negative Dialectics* is only the most summary of these nods to Anders, itself placed in a section explicitly criticizing Heidegger. Zygmund Baumann and Ulrich Beck are probably the most notable names approaching Anders' work for related reasons which I address below, but French philosopher and romance novelist Pascal Bruckner is particularly relevant considering the environmental application to which I would like to apply Anders' insights here.

Bruckner, author of the best-selling *Paradox of Love* along with a diverse portfolio of marriage handbooks, conservative cultural critiques, and even a romantic thriller featuring a love triangle with a priest, is a self-nominated guardian of European culture and opponent of multi-culturalism and romantic precaution. He invokes Anders

in a conversation about ecological politics, contending that his absolute opposition made him a 'progressive against progress,' and that efforts to humble Enlightenment thought, which Bruckner proudly calls 'Promethean,' set the world in the apocalyptic countdown where even unconnected events were drawn into a catastrophic semantic framework. This was problematic, for Bruckner, because it projected human agency into even the most random acts, that where people 'in the twentieth century still saw tidal waves and earthquakes as random events, we now see them as effects of our own actions.'[98]

Ecologists, for him, use these natural disasters as proof of their own guilt and seek to spread their perceived need for self-flagellation universally across the species in a kind of sick penitence to an imagined natural harmony that never really existed. Bruckner, like many in the developed world, bristles at the idea of historical responsibility for ecological degradation, a concept which, if carried out in policy globally, would entail substantial consequences for the comfort in former colonial powers like France. This sense of the unfairness of a 'guiltless guilt,' or a collective guilt which inspires resentment in individuals who cannot or will not expunge it, is for Anders the chief characteristic of the new era of nuclear modernity. I'm arguing that it is also paralleled in debates over historical responsibility for ecological degradation or more radical concepts like an 'ecological debt' which developed countries might owe to the developed world.

Bruckner sees any attempt to 'humble' Western thought as an affront, and refers to 'science' in abstract as a product only of European history. 'Ecologism,' Bruckner's over-generalized and explicitly gendered term for environmental thought with romantic

[98] Pascal Bruckner, 2013. *The Fanaticism of the Apocalypse: Save the Earth, Punish Human Beings.* Polity, NY; p. 77.

or critical influences, represents the culmination of the anti-Enlightenment project, a 'philosophy of twilight, of the pale and wan.' It does this, for him, because it preaches sobriety and limits, rather than *their transgression*. The chief proof that ecologism was really a scientifically-disguised cultural critique opposed to Western ways of life rather than an extrapolation of political consequences of earth system change, for Bruckner, was that those predicting the apocalypse still opposed developing large-scale technological management like climate geoengineering and nuclear power. If these things could both maintain everyday life and solve the problem, such critics' true opponent, for Bruckner, was not environmental crisis but Western culture itself.

Bruckner only shallowly references Anders, usually drawing from his *Menace Nucleare* essay published in France in the 1960s as proof of the self-hating idealism of critical Western theorists.[99] Anders thus serves as a brief model, alongside many other celebrated theorists at whom he is taking aim, of the self-defeating and misanthropic tenets of critics of Western culture. He is right, at least in one regard, that 'catastrophists hope that we will touch bottom in order to wake us up.'[100] Interpreting a similar trend in recent ecological politics, he interprets environmental politics as a misguided stunting of the very technological progress which may finally solve the underlying distributive issue underlying the predicted ecological apocalypse—he claims: 'it could be that ecology, as a discourse, seeks not so much to save us from the end of the world as to precipitate it. It is both the agent and the vehicle of our death wish.'[101]

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[99] Likely this is following the republication in France in 2006, the same year as Al Gore's *An Inconvenient Truth*. See: Gunther Anders, 2006. *La menace nucléaire: considérations radicales sur l'âge atomique*. Serpent à Plumes, Paris.
[100] Bruckner 2013; p. 61.
[101] Bruckner 2013; p. 62.

Bruckner is convinced that ecologism, following from Anders' attack on the Promethean technological legacy, reinforces political passivity in comfortable places of the world by being against everything that makes life more comfortable in the rest of the world. He claims ecologists are adamant that 'we have to put Prometheus in a straitjacket!'[102] because 'the true desire of this movement is not to safeguard nature but to punish human beings.'[103] I think this is both a bad reading of Anders and a really poor attempt to blur and erase the critical content of the ecological political critique as it relates to the lifestyles of developed societies.

Bruckner's resentment towards what he defensively perceives as a challenge to abstract concepts of Science and Progress, which he believes are part of the European Enlightenment legacy, drives him to frame all those with concerns for the maintenance of earth systems vital to human and non-human life alike as nihilists and idiots. Anders, in his reading, is emblematic of this naiveté now presented in ecological politics, a kind of misguided attack on the only sources of alleviation possible in new conditions and a fanaticism which ironically subjects those most vulnerable to inevitable suffering. This case is reproduced almost word for word in debates over climate geoengineering, nuclear power, and natural gas.[104]

Bruckner's attack is thus both shallow and interesting, in the sense that he makes some of the connections I am looking to make here between nuclear and climate problematics, and that he does so from a completely oppositional perspective to

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[102] Bruckner 2013; p. 57.
[103] Bruckner 2013; p. 129.
[104] Which explains why Anders receives a limited notice in academic pieces thinking about violence and climate, such as Bruckner. See also Harold Welzer and Patrick Camiller, 2012. *Climate Wars: What People Will Be Killed for in the 21st Century*. Polity, Malden.

environmental politics and technological critique. Recent work by Ernest Schraube, Christopher Muller, and Babette Babich have been much more open to Anders' premises, if less focused on their application to environmental crisis politics. This reflects their more critical positions with reference to the Enlightenment tradition, despite their common seating with Bruckner in the broader European philosophic tradition. In the following sections I want to quickly address some of these main points in the continental literature, before turning to possible contributions of specific concepts for ecological crisis politics.

The Promethean Gap and Guiltless Guilt

Despite these few scholarly articles and Bruckner's shallow reference there has been very little sustained attention to Anders outside of the German academy and some translations in French and Spanish. In that sense, it may be surprising to find that there are environmental references in almost all of them, if little sustained attention to environmental politics in any empirical sense.[105] This is because the globality of nuclear war has now been matched by a slower and more inevitable global ecological crisis narrative which is both equally universal, in that it affects all people on the planet, and overwhelmingly abstract in most renditions, typified by the challenge of climate change.

Unlike the nuclear problematic at the heart of Anders' productive life, these newer ecological crisis narratives often advocate for radical technological advance and planetary management. Things like climate geoengineering, or the intentional modification of stratospheric albedo through calculated injections of reflective particles,

[105] Treating Anders with environmental crisis, Beck and Bruckner are politically polar opposite exceptions.

carry Anders' idea of 'technification' to an absurd extreme, attempting to remake the atmosphere itself into a more efficient and manageable machine.[106] What the breakdown of such a machine would mean in terms of new risks, or what political machinery will be necessary to ensure its operation, is 'pragmatically' ignored by advocates persuaded by the existential urgency of the problem. This blindspot is what Anders' called the 'Promethean Gap,' the mismatch between human imagination and powers of fabrication that enabled 'the monstrous' and 'apocalyptic blindness' which are the focus of much of the German scholarship which has been translated into English.

In *Collateral Damage,* Zygmund Baumann points to the gap (also, literally, the 'discrepancy,' and translated by others in a more temporal fashion as the 'hiatus'), that 'we are technologically all-powerful because of and thanks to, the powerlessness of our imagination.'[107] This impotence was reflected in the relative lack of meaningfulness or effort which the 'action' commencing nuclear war would require, the pushing of a button annihilating millions of people, 'the negligibility of the effort and thought needed to set off a cataclysm—any cataclysm, including globocide.' Anders' moral commitment to overcoming this discrepancy, by imagining and outlawing nuclear weapons, led him to carry out several high profile letter campaigns, including an open letter to the son of Adolph Eichmann following his execution in Israel which I return to below, and, in which, he pleads for Klaus Eichmann to reject his father's legacy and publically support nuclear disarmament.

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[106] Under the assumption the technology will be used benevolently for the public good of all.
[107] Zygmund Baumann, 2011. *Collateral Damage: Social Inequalities in a Global Age*. Polity, Malden; p. 147.

In another of these correspondences, if in part perhaps as a vehicle to get his 'Commandments for the Atomic Age' translated and printed in English, Anders engaged the pilot of the Enola Gay scout mission, Claude Eatherly. In the letters that constitute *The Pilot of Hiroshima*, Eatherly's experience is deeply resonant with the kind of despair felt by those who feel implicated in something they cannot morally imagine, the ebb and flow of activity and passivity so prominent in the climate change debate. Eatherly expressed a deep, existential guilt for his part in the Hiroshima bombing and was in and out of jail and mental health facilities throughout the rest of his life. The difference between the ability to create effects and to understand the consequences of this action haunted him. Seeing everyday life as increasingly 'technified,' Anders wrote sympathetically to Eatherly in the first message of their long correspondence:

> The fact that to-day it is possible that unknowingly and indirectly, like screws in a machine, we can be used in actions, the effects of which are beyond the horizon of our eyes and imagination, and of which, could we imagine them, we could not approve—this fact has the very foundations of our moral existence.[108]

For Anders this change in moral foundations meant 'we can become 'guiltlessly guilty,' a condition which had not existed in the technically less advanced times of our fathers.'[109]

Becoming 'guiltlessly guilty,' for Anders, meant that individuals could no longer imagine the scale of their own actions, and therefore traditional checks on human behavior were no longer adequate. Anders insisted that while it might have been possible to mourn the loss of a single life, reconciling the scale of new actions made possible by the progress of technology was a yet to be accomplished task; he says to Eatherly: 'you

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[108] Gunther Anders, 1961. *Burning Conscience: The Pilot of Hiroshima*. Monthly Review Press, NY; p. 1.
[109] Anders 1961; p. 1.

happen to have left 200,000 dead behind you. And how should one be able to mobilize a pain which embraces 200,000?'[110] The inadequacy of individual moral reasoning to comprehend and ethically process this new level of destruction and fragmentation of responsibility represented, for Anders, an existential threat to the continuance of humans as a species. The nuclear situation, for him, exposed this discrepancy in its most extreme form: the inability of the human species to reflect on the possibility of its own extinction.

My argument is that today a similar problem imagining responsibility for global ecological degradation inhibits our ability to act politically to adapt to climate change. Bruckner's rejection of Anders' idealism rejects the challenge, and on Anders' terms, reveals him to be guiltlessly guilty, unable to comprehend or imagine his own responsibility. Addressing Eatherly in his first letter, Anders describes 'guiltless guilt' as the product of a new age:

> The frustration of your efforts is not your fault, Eatherly. It is a consequence of what I previously had described as the decisive newness of our situation. That we can produce more than we can mentally reproduce; that we are not made for the effects which we can make by means of our man-made machines; that the effects are too big for our imagination and the emotional forces at our disposal.[111]

Anders explains to Eatherly that his doctors, judges, and family saw his problem as one like any other, his guilt as something normal or banal: 'your doctors maintain: 'Hiroshima in itself is not enough to explain your behavior'—which, in a less indirect language, means nothing else than 'Hiroshima wasn't really as bad as all that.''[112]

Baumann draws on Anders' formulation of 'the Promethean Complex,' or three 'discoveries' made by humans that have come to define the modern age. The first was a

[110] Anders 1961; p. 3.
[111] Anders 1961; 3.
[112] Anders 1961; 2.

kind of pride at inventing machines capable of doing great things; the second was the challenge these machines now set in terms of defining *human* perfection; and the third was a deep shame understanding humans can never measure up entirely to their creations. Baumann repeats much of this argument in his Simon Wiesenthal Lecture, called 'A Natural History of Evil.'[113] Here he focuses on the idea of the 'over-liminal' or 'excess,' those things that, for Anders, were lost in the Promethean Gap. Baumann claims such over-liminal phenomena, by outgrowing human conceptual nets, became sublimated. The proof, for Anders, was what he called 'Nagasaki syndrome,' or the idea that what can be done once, no matter how horrific, can be done with less deliberation or moral outrage each time it is repeated.

Anders, for Baumann like the others considered here, is important because he insists that Nazism and atomic stalemate were not the tragic failures of the Enlightenment, momentary lapses in or even vital threats to human progress, but rather a still present possible outcome of that process itself. In the Wiesenthal Lecture Baumann claims that:

> The bombs thrown on Hiroshima and Nagasaki prove, that the anti-Enlightenment sentiments are not the necessary conditions of technological massacre. The two atomic bombs as much as the Nazi camps were elements of the 'civilizing process,' manifestations of one of its potentials, one of its faces and one of its possible ramifications.[114]

Like the Frankfurt School, who had claimed that technology meant to subjugate natural necessity had been turned back on the lower classes, Anders made a claim about the radical change in humans produced by technologies of annihilation. Baumann sees this

[113] 'A Natural History of Evil' appears in The Wiesenthal Lecture Reader in 2012 as a revised chapter from *Collateral Damage*.
[114] Baumann 2012; p. 9.

as a much more metaphysical version, influenced by Heidegger, but one which was still placed into a historical context, a philosophical anthropology modeled on Scheler which diagnosed the beginning of the nuclear age.

This produces an interesting synthesis—while the Gap, what Baumann translates as 'hiatus' in a very temporal interpretation of the German *Diskrepanz*—is metaphysical in nature and universally applied to the species, Anders also still looks for those *who take advantage of the gap*, who use the increasingly stunted moral reasoning produced by the complexity of the division of modern labor to *indifferently* eliminate humans as simple material. This is the subject of his incredible second letter to Klaus Eichmann, where he carves out the special evil of Adolph Eichmann, who took advantage of the gap and was indifferent to who he annihilated.[115] Although he pleaded with Klaus that 'we are all today sons of Eichmann' in the sense that modern humans suffer from the consequences of the Promethean gap together, guiltlessly guilty and blind to the apocalypse, but that his father, using this to his advantage, had become 'monstruous'—he had become indifferent to human life, entirely technified, carrying out orders which committed genocide on Anders' people as if simply pushing a button.

Heidegger's *techne*, for Anders, had far outstripped human capacities, and unlike Arendt's diagnosed lack of control, Anders thought that it was a more primary and fundamental lack of imagination underlying the intransigency of the political and ethical questions posed by the nuclear, post-Holocaust era. Like much of the Frankfurt School, Anders' is an abstract psychological theory in many ways. The Promethean Complex

[115] Here accessed through the Spanish translation. See: Gunther Anders, 2001. *Nosotros, Los Hijos de Eichmann: Carta Abierta a Klaus Eichmann*. 2nd Edition, Paidos, Barcelona.

which Baumann pulls out of the *Obsolescence of Man* is really a philosophical anthropology about how people came to be 'guiltlessly guilty,' i.e. how life itself had become so technified that, amazed by our technology, we are also challenged by it, and in turn, judge ourselves inferior to it. As Baumann explains:

> The outcome of indignity brought upon us in the last account by our failure to self-reify – to become *like* the machines: indomitable, irresistible, unstoppable, un-submissive, and indeed ungovernable as are the machines 'at their best.' To mitigate that infamy, we need to demonstrate our own ability to accomplish, by our own natural means and bodily effort and without help of machines, things which the machines so easily, matter-of-factly perform: by turning themselves, in other words, into means for the means, tools for the tools.[116]

Baumann clearly does not consider Anders a panic monger or idealist, as Bruckner accuses, and points to the fact that Anders, when called an alarmist told journalists that 'panic monger' should be a distinction worn with pride. This was because, he believed, people needed to know their fears were real and that modern humans, altogether as a species, had become guiltlessly guilty.

The concept of guiltless guilt is especially interesting given the intensity of the contemporary debate over historical responsibility for climate change, and the clear implications for global development created by shifts in energy and development paths. Many contemporary citizens in 'developed' areas of the world still perceive themselves as struggling, having naturalized their relative comfort, and perceive such limitations as Bruckner clearly did above—as attempts to dismantle the Western way of life. Anders' concept of guiltless guilt follows his plea to Klaus Eichmann—he distributes responsibility evenly on everyone, but judges individuals based on what they does when

[116] Baumann 2012; p. 10.

they understand their responsibility. Do they take advantage of it, as the monstrous Adolph Eichmann had? Or do they hide, refusing to refuse their inheritance, as Klaus Eichmann and so many other Sons of Eichmann had? Would they instead, Anders hoped, seek redemption in the survival of the species, as the troubled Pilot of Hiroshima did?

III. Apocalyptic Blindness and the Flattening of Time

Baumann, also exiled from his home country (Poland) during the Holocaust, was focused on defining evil in contemporary times, and his sense of the discrepancy/gap as a 'hiatus' is interesting. Rare in the Anglophone academy, Babette Babich has also recently written about Anders' conception of temporality, noting the spatial sense of time which Anders presents in contrast to Heidegger and Jacob Taubes. She, like Baumann, senses that Anders' contribution to the present day is important, claiming that 'violence in good conscience characterizes the postwar, cold war era and the present day with its mushrooming effects of neo-fascism under the titles of national security and anti-terrorism.'[117] She sees Anders' suspicion of technological determinism as a sign of political blindness in philosophy of science, which has 'ignored the political as well as the ethical in their eagerness to avoid suspicion of technophobia.'[118]

For Babich, Anders' indispensability is related to his concept of 'apocalyptic blindness,' revealed by considering 'the *further consequences* in every case.'[119] This extension to the furthest case is obvious is Anders' treatment of atomic weapons, the dangerous extreme of the trend of 'technification of being' which he diagnosed in the

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[117] Babette Babich, 2013. 'Angels, the Space of Time, and Apocalyptic Blindness: On Günther Anders' *Endzeit-Endtime*.' *Ethics and Politics*, Vol. 15 No. 2, pp 144-174; p. 144.
[118] Babich 2013; p. 144.
[119] Babich 2013; p. 147.

Obsolescence of Man. He does not debate policy or strategy on the normalized terms of deterrence theory, but rather pushes to imagine the extreme point of global atomic war in order to illustrate to absurdity of the entire enterprise. Babich thinks he can do this because he provides a spatial sense of time, one where 'the future has already ended,' focusing on producing an image of those final moments to inform the present debate and flattening the distance between the end and now.[120] This is important because the worst case, if it arrived, would be experienced directly, not as a figure of future decision or ethical deliberation.

For Anders, the nuclear threat, in its universality, was not only a warning sign of the final generation of humans, but rather a complete geographic and temporal vanishing of human presence and history. In 'Commandments for the Atomic Age,' the manifesto included in his published letters to Eatherly, Anders outlines the scale of the threat:

> We, as *mankind*, are 'killable.' And 'mankind' doesn't mean only today's mankind, not only mankind spread over the provinces of our globe; but also mankind spread over the provinces of time. For if the mankind of today is killed, then that which *has* been, dies with it; and the mankind to come too.[121]

This was because the end of the human race meant also the end of the history which preserved the memory of all those who had come before, both a physical and temporal ending. Full of millennial affect, bursting with his 'burning conscience,' Anders believed that this realization of the power of human actions to extinguish all remnants of human striving and existence meant that all had entered into a new era characterized by 'the apocalyptic temporality.'

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[120] That this resembles modern natural disaster scenario planning is not surprising, since most of these 'preparedness' strategies were developed in response to the threat of nuclear war.
[121] Anders 1961; p. 11.

Producing such catastrophic sense of time, one which required reflection, fear, and humility before the possibilities of technology, for Babich is Anders' chief contribution, a kind of modern retelling of Goethe's 'Sorcerer's Apprentice.' She sees modernity as both spaceless, or lacking a sense of the world, and timeless, or lacking a sense of history, both constituting and constituted by our technology. Her contention is laced with bitterness for Anders' relative disregard in the English-speaking academy, lamenting that such a general dismissal would only ironically make him that much more available for 'the next set of scholars seeking the next generation of the new thing,' who would then use him to leverage 'a university appointment of one's own, which the younger scholars are already planning to set aside in their good time in favor of once, again, the next new thing, something with the word digital, or even better prefixed with a non- or an anti-.'[122] Her plea for reflection at the end of her piece is ironic as well considering her academic position, in this sense, given Anders' insistence on action and refusal of university positions.

In another English publication, Christopher Muller's 'Desert Ethics' looks at Anders in relation to Jacques Derrida, emphasizing, like Babich and others, the way that Anders insists on imagining the apocalypse as present.[123] Focused on responsibility, Muller looks for the ways in which realizing the presence and reality of the ruined future could inspire a different kind of perspective on present choices. The loss of a sense of ownership was because the apocalypse was not the fault of a single decision, but the last link in a long chain of decisions. This loss of individual responsibility is, for Anders, the

[122] Babich 2013; p. 173.
[123] Christopher Muller, 2015. 'Desert Ethics: Technology and the Question of Evil in Gunther Anders and Jacques Derrida.' *Parallax*, Vol. 21, No. 1, pp. 42-57.

'Promethean shame,' the realization that the individual is in fact obsolete. Muller emphasizes that for Anders the Bomb, like the Holocaust, was not a blip of regress on an otherwise progressive narrative, but rather the culmination of the Western experience. This was important—it meant that fascism, the camps, and nuclear war were not emergencies to be guarded against, but always already operating tendencies within Western cultures.

Understanding how to make such tendencies appear for critical reflection in societies where individuals understandably no longer understand themselves as responsible was the labor of Anders' life. Muller notes that the need for such 'desert ethics'[124] or ethics which imagine the unimaginable, opposes the kind of arguments presented at Nuremburg and made famous by his ex-wife Hannah Arendt in the case of Adolf Eichmann's trial in Jerusalem. Anders both recognized that individuals could not understand the full consequences of their actions in the context of new technology, which could inspire pity, as it did in the case of his letters with scout pilot Eatherly, or condemnation, as in his open letter to Klaus Eichmann written on the day of his father's execution. Muller points out that the evil Anders confronts is an impersonal one, it is the abstraction produced by the great gears of human society. His letter to Klaus Eichmann shows, as well, that it is aimed at people who take on traits of the machine's indifference, people like Adolph Eichmann who were indifferent toward the material of human life.

Muller believes such 'desert thinking' draws attention to the blind faith in 'tele-technological machines' of modern life. Ernest Schraube, on the other hand, is more

[124] Itself a reference to a phrase from Derrida about 'a desert within a desert.'

closely focused on the technology critique which founds Muller's search.[125] Schraube considers Anders' approach too narrow and, ironically for its premises and the famous critique on Heidegger's concreteness, too abstract. He contrasts Anders' view of technology as a coherent, separate entity with Latour's actor-network theory and other post-modern approaches which have attempted to blend the dichotomy between humans and technology. Schraube understands that the distinction is key for Anders because it brackets technological efficacy to expose a universally-human failure at the source of expanding catastrophic risk.

Like Heidegger's later work, Anders is not blaming technology itself, in some abstract form. His fear, instead, is that humans have not yet measured up to their abilities, as a species, a position which Schraube finds unsatisfyingly over-general. Nevertheless, Schraube admires that 'at last, someone was trying not to play down or avoid issues, but rather to face problems head on, to think them through and to expose their implications,' and admiration for intellectual honesty and activist commitment are the common thread throughout the small literature which addresses him.[126]

The Confusion of Centuries in Atomic and Climate Debates

Babich reflects briefly on natural gas fracking and other environmental conditions, but uses them as only as further proof of the blindness of contemporary society to deteriorating conditions and rising risks. She notes the difference of Anders' position from object-oriented ontologies, that it was not that things received agency, but rather that they had come to order people, that instead of the shepherds of being, humans

[125] Ernst Schraube, 2005. 'Torturing Things Until They Confess': Günther Anders' Critique of Technology.' *Science as Culture*, Vol. 14, No. 1, March, pp. 77–85.
[126] Schraube 2005; p. 78.

were also 'claimed by objects.'[127] She is concerned primarily with Anders' possible contributions to the philosophy of science, but it is in the literal annihilation of the species and the banal evil of our shared guilt as sons of Eichmann where the most potential for environmental political theory resides.

One author who does clearly address the resources in Anders' work for environmental critique is sociologist Ulrich Beck, principally by extending his concept of 'organized irresponsibility' to the climate.[128] Beck understands Anders' concept of 'the confusion of centuries' as at the heart of the need to shift from organized irresponsibility, or self-torturing passivity, to reflexive forms of modernity. The confusion of centuries, for Anders, was the application of 19th century ideas of inevitable technological and social progress in a world now defined by the atomic threat, the common criticism of both Enlightenment and Enframing in Critical Theory and Heidegger respectively after the war. Beck is applying the same logic to the 'new' epoch of climate change, seeking, like Anders, both a realistic assessment and active political response.[129] He asks:

> We have to attack head-on the key question: Why is there no storming of the Bastille because of the environmental destruction threatening mankind, why no Red October of ecology? Why have the most pressing issues of our time—climate change and ecological crisis—not been met with the same enthusiasm, energy, optimism, ideals and forward-looking democratic spirit as the past tragedies of poverty, tyranny and war?[130]

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[127] Babich 2013; p. 154. This interconnection is also the central tenet of green political theory and other hybrid social-ecological disciplines.
[128] Ulrich Beck, 2010. 'Climate for Change, or How to Create a Green Modernity,' *Theory, Culture and Society*, Sage, Vol. 27, No. 2-3, pp. 254-266.
[129] The source of his argument in the 2010 piece is Weber, whose concept of maturity is a clear influence on this formulation.
[130] Beck 2010; p. 254.

Beck's answer to non-response to global ecological issues is 'organized irresponsibility,' an essentially passive mode of thought induced by the great scale of global problems. The resonance with Anders' Promethean gap is clear.

Beck's analysis is clearly influenced by the nuclear debate, and explicitly by Anders. His concept of 'the boomerang effect,' or tendency for technology to cause unintended effects which must be reflexively assessed and adjusted to, emphasized the magnification of risk entailed by industrial scale production. In *Risk Society* he claims:

> Contained within the globalization and yet clearly differentiated from it is a distribution pattern of risks which contains a considerable amount of political explosive. Sooner or later the risks also catch up with those who produce or profit from them. Risks display a social *boomerang effect* in their diffusion: even the rich and powerful are not safe from them. The formerly 'latent side effects' strike back even at the centers of their production. The agents of modernization themselves are emphatically caught in the maelstrom of hazards that they unleash and profit from.[131]

He gives examples of how fertilizer overuse has exhausted soils, habitat destruction for economic development has destroyed species and ecosystems that once provided sustenance for the most vulnerable, and intensive farming has raised lead levels in babies in the developing world. Like Anders, his idea of technology is thoroughly ambivalent.

This perspective is not incidental—Beck too is radically conditioned by the atom bomb and what it represents. Referring to atomic war he says: 'here it becomes clear that the Earth has become an ejector seat that no longer recognizes any distinctions between rich and poor, black and white, north and south or east and west,' and follows, with a line where he cites Anders, by claiming that 'the effect only exists when it occurs, and when it

[131] Ulrich Beck, 1992. *Risk Society: Towards a New Modernity*. Sage, Thousand Oaks; p. 37.

occurs, it no longer exists, because nothing exists anymore.'[132] Anders called this the 'double-death' of living humans and history itself. Beck claims that the ecological crisis is different in that it is not instant and continues to undermine vital systems like agriculture even in the absence of a flash-point catastrophe. Thus he, like Babich, is pointing to the spacelessness and timelessness of modernity.

Beck, explicitly and purposefully framing his approach as 'positive', does not seek to overturn modernity, but make it reflexive. To do so, it must first overcome the Promethean gap. His point, utilizing Anders, is important here. Noting Anders' concept of the 'travesty of measurement,' or the inability to fully weigh the consequences of something as total as a nuclear threat, Beck claims that nuclear physics and technology have 'fallen from grace,' that the fact that it was 'Hiroshima everywhere,' as Anders claimed, was patent proof that the engineering mindset had been exposed.[133]

In *World at Risk* Beck explains why he thinks the atomic bomb should serve as such an obvious refutation of the engineering mindset. In a section called *The Atom Bomb* he meditates on Hiroshima and what the word has come to represent—both a profound success of natural science and an object of 'universal horror.'[134] This success, much heralded in abstract, for Beck initiated a new, more powerful challenge to survival, that: 'Only the inconceivable, unimaginable scale of the destruction showed what lay hidden in the everyday normality of science, research and theory.' This realization was politically important. He says: 'The triumph of modernity had given birth to a demonic weapon which left the fate of humanity in the hands of those who controlled—or

[132] Beck 1992; p. 38.
[133] Beck 1992; p. 60.
[134] Ulrich Beck, 2007. *World at Risk.* Polity, Malden; p. 224.

managed to get their hands on—the levers of power.'[135] It made old logics of war and peace meaningless by making them blur together in nuclear war.

Beck draws on the Sword of Damocles imagery used by Kennedy just before the Cuban Missile Crisis to draw out the ways that Anders' concept of 'the antiquatedness/ obsolescence of humanity' as proof of the new constellations of power produced by the global destruction made possible by nuclear weapons. For Beck, this meant challenging modernity itself—he claims:

> Global risk means that the basic principles of modernity are open to challenge and that the power of modernity can be used to decide against the basic principles of modernity. The atomic bomb does not merely potentially destroy modernity; the anticipation of self-annihilation also immediately destroys the self-confidence and the basic concepts and theories of modernity.[136]

Beck, like Anders, places the future into the present, showing how usual ways of dealing with such threats, like insurance and security preparedness planning, were no longer feasible options given the rise in the scale of catastrophic consequences. He sees this excessive success of modernity as salvageable through a dedicated form of critical reflexivity. Drawing on Weber, he posits 'reflexive modernity' as a positive vision of the future, based first on a sober and 'mature' assessment of the reality of global risk. The chief threat to this reflexive move, as in environmental political theory, was passivity. 'Organized Irresponsibility' is thus Beck's theory of non-response, a plausible explanation for his initial question in his paper on climate change (why is there no storming of the Bastille for the environment?).

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[135] Beck 2007; p. 224.
[136] Beck 2007; p. 225.

The irreversibility of the climate problematic, for Beck, accentuates the threat first perceived with the dropping of the bomb, that old logics confusing the nuclear era with the 19th century narratives of inevitable progress risked normalizing what were in fact much more terrible possibilities. Echoing Anders, Beck claims:

> Incommensurables are compared and calculation turns into obfuscation, resulting in a kind of ' organized irresponsibility.' It rests on a 'confusion of centuries' (Gunther Anders). The challenges of the beginning of the twenty-first century are being negotiated in terms of concepts and recipes drawn from the early industrial society of the nineteenth and early twentieth centuries.[137]

Considering a wider set of technological themes, Beck claims that the old insurance-based risk assessment at the heart of modern national bureaucracies tasked with tackling challenges like climate change is being undermined, chiefly by the possibility of catastrophic consequences due to growing global risks.

Here gene technology, information flows, financial instability, terrorism, and environmental destruction are all explicitly tied together as symptoms of an unreflexive modernity which has not yet fully appreciated the global risks introduced by the new era of global vulnerability. He claims:

> Nuclear power stations, in all their dazzling glory, have canceled the insurance principle, not only in the economic sense, but also in the social, medical, psychological, cultural and religious senses. *The ' residual risk society' has become an insuranceless society in which insurance protection paradoxically diminishes with the size of the threat*. For no institution, no real or presumably any conceivable institution could be prepared for the ' MCA,' the ' maximum credible accident', and there is no social order that could guarantee its social and political integrity in such a situation.[138]

[137] Beck 2010; p. 27.
[138] Beck 2010; p. 27.

Typified by nuclear technology and eventually climate change, Beck makes the case that global risk has made the need for reflexivity more urgent. This is because, following Anders' concepts of the Promethean Gap, Hiroshima everywhere, and the travesty of measurement, industrialized societies were unable to yet appreciate in full the magnitude of the shift underway, whether in terms of the kinds of risks created by nuclear power or by burning coal for electricity.

In this exploration of the major interpreters of Gunther Anders' work in English translation I have tried to tease out some of the main concepts and themes which these authors have drawn out, including 'apocalyptic blindness,' the 'Promethean gap,' the concept of guiltless guilt, and his temporal ideas of spatial time and the 'confusion of centuries.' Although these have been applied by Beck and Bruckner (with varying degrees of fidelity to Anders himself) to ecological themes, this has always happened as part of a suite of problems associated with modernity itself.

As I will show below, however, Anders' potential contribution to environmental political theory and other hybrid disciplines approaching the politics of ecological change goes much further. First I show how the common enemy of 'Promethean' arguments may reveal some interesting clues for environmental politics. Then, I work through the practical lessons of Anders' outreach over nuclear weapons for contemporary debates over earth system stewardship and technological manipulation of the climate, focusing on how his arguments sought to inspire both fear and activity, and suggesting the importance of his concept of 'anti-Apocalyptics' for avoiding despair and indifference.

IV. Dueling Titans: Prometheus and Atlas

In his best-selling survivalist tract *An Inquiry into the Human Prospect*, the economic historian Heilbroner directly identified the source of entwined social and ecological crises in the industrial spirit of both major industrial blocs, naming it the 'Promethean spirit.'[139] He claimed there that 'the driving energy of modern man has come from his Promethean spirit, his nervous will, his intellectual daring.'[140] Prometheus, who appears in Hesiod's, Homer's, Pindar's, Aeschylus', and Pythagoras' myths, is celebrated as the avatar of technological advancement, a trickster god leftover from an older canon. The insistence of both Anders and the survivalists wass that many people forget a sobering part of the Prometheus story.

In Hesiod *Theogony* version of the Prometheus myth, contrary to the simpler hero portrayed in Aeschylus' *Prometheus Bound*, Prometheus tricks Zeus by offering him a choice of which sacrifice he would prefer, beef stuffed in ox stomach or bones wrapped in fat. Zeus accepts the bones because they appear richer, but realizes that he was deceived and takes fire from humans in response. Prometheus, the trickster god, steals fire back for humans, for which he is still today celebrated as the symbol of technological progress. But many forget that for this act Zeus binds him to a rock, where each day a giant eagle would come to eat his liver—a particularly gruesome sentence since the Greeks believed the liver was the source of the emotions and because Prometheus, the

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[139] Robert L. Heilbroner, 1974. *An Inquiry into the Human Prospect.* WW Norton & Company, NY; p. 142.

[140] Dryzek notes: 'There does exist a discourse which has engaged survivalism more directly, and on ground where arguments can be made, as opposed to dogma asserted. This opponent is Promethean, and its defining feature is the denial of limits.' John Dryzek, 1997. *Politics of the Earth: Environmental Discourses*. Oxford University Press, Oxford; p. 43.

son of immortal Titans in Hesiod's version, re-grew his liver each night only to have it eaten again the next day.[141]

It is this other part of the story which is often left conspicuously out of many contemporary uses of the Prometheus myth, such as the golden bearer of fire adorning Rockefeller Center in New York. The Hesiodic version of the Greek Prometheus myth celebrates ingenuity, but also stresses the moral ambiguity of technological advances. Unlike in Aeschylus, the story ends with the endurance of Zeus' power and the hard work of humans to make a living. It is more of a theodicy than a story of progress, and portrays both the potential for innovation and the consequences of hubris. The one-sided, Aeschylean understanding of technological advancement identified by both the survivalists and Anders came to prominence in the US in the 1980s.

Prometheus, the god of foresight, has assumed many different roles throughout history, and this chapter is not a story about all of them. It is curious, however, that the central character in Anders' Promethean Complex is also the chief symbol of the market and technological arguments against ecological regulation and climate science in particular. I will focus briefly here on how two rival interpretations of the Prometheus myth are visible in contemporary green politics, and then focus in on how Anders' concepts can help critical political ecologists to better understand the assumptions behind attacks by Prometheans today. Finally, I suggest that the perspective on technology often drives the major divisions in green theory, but that Anders' analysis pushes us to consider instead responsibility and activity as the central organizing forces.

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[141] See: Jean-Pierre Vernant, 1981. 'The Myth of Prometheus in Hesiod,' in *Myth and Society in Ancient Greece*; pp. 183-201; EF Beall, 1991. 'Hesiod's Prometheus and development in myth.' *Journal of the History of Ideas*, Vol. 52, No. 3, pp. 355-371.

University of Exiter philosopher Trijsie Franssen notes how the figure of Prometheus has transformed through the ages, from a Titan trickster to an avatar of human futurity.[142] Franssen shows how in the older myths derived from Hesiod Prometheus was a trickster set against the implacable and wise Zeus, and how Aeschylus and others transformed him into a romantic rebel with a love of humans, and eventually into a symbol for the possibility of progress. Plato refers to Prometheus briefly in *The Gorgias* as a Titan directed by Zeus to deprive humans of foresight of their own death, which allowed Zeus to establish justice based on their fear. Prometheus was thus a positive force for many great rationalists, raising the fear of punishment and need to understand the future. For Plato, as for many Prometheans today, this positive story is unmarred by the tragic premises of the early Greeks. In *The Protagoras*, Plato puts Prometheus in conversation with his brother Epimetheus (after-thought) about the vulnerability of humans, in response to which he steals them fire, without mention of Pandora or punishment by Zeus.

There were no temples to Prometheus in Greece—he was not worshipped the way he was later by other arch-rationalists like Bacon. Hobbes initially sees him as a symbol of human invention and a challenge to Olympian authority which he rejects as 'gratuitous, infantile, and self-destructive.' Franssen notes that by the time of Leviathan in 1651 Hobbes changes his view: Prometheus becomes prudent man, in an anxious and unstable condition before institutions. This later Prometheus is not rebellious, but more practical. The Frontispiece of Rousseau's *Discourse on the Arts* has a more destructive

[142] Trijsje Franssen, 2014. 'Prometheus through the Ages: From Ancient Trickster to Future Human.' Unpublished Doctoral Dissertation, University of Exiter, Department of Philosophy.

version of Prometheus, emphasizing the consequences of the fires he brought, a sentiment which continues to track with Romantic environmental philosophies as well as the clear reference in Mary Shelley's *Frankenstein: A New Prometheus*.

In the contrary rationalist tradition, the most famous Enlightenment philosopher, Kant calls Ben Franklin a 'modern Prometheus', and emphasizes the benefits of his rationality and creativity. Marx, equally a product of the Enlightenment, sees Prometheus as the ultimate rebel, bound to the rock of capitalism. In another register, Nietzsche's *Birth of Tragedy*'s frontispiece features Prometheus, who later in the *Gay Science* is a peddler of illusions and proof that humans delude themselves. Camus, like Marx, figured him as the ultimate rebel, as the human attempt to replace God, and eventually as a prisoner in the underworld with history as his new rock. He is still an inspiring figure for Camus, who sees him suffering from absurdity but keeping faith in beauty and happiness, a position is different from the purely positive versions.

Anders' rendition of Prometheus is much less positive, but, crucially, *is not negative* as Bruckner and other defensive modernists have interpreted it. He focuses on the things that technology reveals, on the way human fabrications had outgrown us, how we refuse to owe anything to others, and how humans in general suffer from a Promethean pride which elevates our role as humans in the greater world. Refusing to treat technology 'in essence' as Heidegger would do after WWII, Anders targets the seeming indifference of Heidegger's refusal to directly apologize for his Nazism or oblique comments figuring death camps as churning 'material' rather than human lives. He rejects both the Enlightenment doctrine of perpetual progress and his former teacher Heidegger's 'pseudo-concrete' romanticism. Anders believed the explosion of the atom

bomb forever invalidated the 19th century hopefulness of Bacon and Kant and their images of Prometheus, that entering the atomic era meant all measures of progress had to be reevaluated for implicit hubris. This makes its connection to Beck's reflexive modernity concept clear, as Beck is not damning modernity itself, but challenging it to become critical and improve itself.

Anders' discussion of Prometheus thus ends with a discussion of ambiguity, not the inherent evil of technological advance, but the profound ambivalence of human knowledge itself. This insight, more complicated than simple endorsements or rejections of technology in abstract, casts new light on potential allies and supporters as well as traditional foes. Franssen notes how this can expose similar Promethean pretensions in seemingly opposed forces:

> One camp accepts the insecurities and risked associated with gaining knowledge that is vastly superior to that which we currently have, and decides to defy the dangers. The other camp rejects these, although they do value and encourage the pursuit of vastly superior knowledge in particular areas, such as the human soul. The different debaters do then not recognize the ambivalence of knowledge in the sense that they accept it, but rather wish to provide that its nature is either *unproblematically* or *seemingly* ambivalent.[143]

This is especially interesting in a general form to environmental political theory, often divided into modernist and romantic camps following the same general pattern: modernists see knowledge as unambiguously good while romantics seek a different kind of knowledge related to the soul and individual habits. Anders is, importantly, outside such distinctions, as noted by Franssen above, because he emphasizes the ambiguity across both kinds of knowledge.

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[143] Franssen 2014; p. 232.

This is interesting today because it exposes the secret interrelation of many seemingly-opposed forces—their underlying belief that technology and human ingenuity make any concept of limits untenable. Besides the largely right-wing theory of technological salvation mixed with market libertarianism pioneered by Simon and others in the 1980s, today there is increasingly another, more left-wing version of technological salvation. These 'Left Prometheans' contest that contemporary social-ecological crisis represent an urgent call to encourage rapid technological innovation through a massive government research program modeled on the Space Race-era investment targeting the moon landing. This perspective suggests that investigating the roots of the crisis are unimportant, whether because they believe people will, in the end, not alter their lifestyles, or because they believe that such a transition is a long-term process which cannot be accomplished on the timeline dictated by social-ecological crisis.

Positioning themselves as moderates in the environmental debate, these 'pragmatic' reform narratives are often centered on embracing new business opportunities and energy transitions to nuclear power which maintain 'modern' lifestyles in the industrialized world as intact as possible. The urgency provided by crisis is interpreted by such left Prometheans as a spur to double-down on Cold War era funding for science and technology in the short term, and often complimented by a consolation that traditional enemies of green movements like nuclear power and hydraulic fracturing may be necessary stopgaps to mitigate immediate consequences of changing ecological

systems like the climate. Some have even begun to suggest that it would be unjust to the rest of the world not to choose such a 'powered landing.'[144]

While ostensibly 'green' narratives in that they accept the reality of environmental degradation and the urgent need for change, these modernist narratives inspire real controversy in the green literature. This is not because the underlying debate between romantic and modernist perspectives on technology is unbridgeable, but rather because they overlay Promethean technological themes on a background of political urgency created by growing acknowledgement of environmental change. This presents a critical paradox: lacking attention to root causes, however slow and politically fractious it might be, requires paradoxically more urgency as crises produced by those causes grow and the short-term fixes grow into planetary risks.

Anders analysis sees both the market libertarian approach, often openly hostile to scientific research, and the reformist 'moon shot' investment schemes, which accept scientific evidence while minimizing extreme possibilities, as fatally damaged by the underlying faith in technological progress which guides their different strategies. This is important: by identifying both as Promethean, Anders' analysis rejects a false choice between free markets and government investment. Anders sees the problem as one of imagination, leaving him unconvinced of the inevitability of progress or annihilation.

Atlas and the Promethean Response to Climate Change

The profusion of scientific and popular literature projecting catastrophic change in social-ecological systems today can be interpreted as an era of transitional rhetoric, and

[144] This phrase is from James Lovelock, although the idea it refers to is now common in the 'pragmatic' green literature embracing technological solutions as stopgaps for necessary but so far lacking social adaptation.

signals to many green theorists the possibility of a return to the politics of survival. Calling Robert Heilbroner's *Inquiry into the Human Condition* a 'land-mark' publication, Robyn Eckersley explains that survivalists demanded the 'Promethean spirit must give way to the example of Atlas—the spirit of fortitude, resolutely bearing whatever burdens were necessary to sustain life.'[145] Atlas, for Heilbroner, represented the opposite of the absolute belief in human creativity represented by Prometheus. Also a Titan, rather than Prometheus' infinite inventiveness, Atlas was fated with a crushing burden.

In response to the Promethean gap in moral imagination, Anders' imagery is similarly bleak and catastrophic. He claims in 'Theses for the Atomic Age' that now 'it is our capacity to fear which is too small and which does not correspond to the magnitude of today's danger.'[146] He seeks to raise the scale of the human capacity to fear, which requires conveying just what is at stake in its full alarming detail. The new age, for Anders, was already here. The bombs were dropped on Japan, and all now lived in the post-nuclear era. All that came before was pre-history. This newness expresses a qualitative difference, emphasizing the gap between traditional individual-to-individual morals and the scale of destruction represented by nuclear attacks. He says:

> Although we are unchanged anatomically, our completely changed relation to the cosmos and to ourselves has transformed us into a new species—beings that differed from the previous type of man no less than Nietzsche's superman differed from man. In other words—and this is not meant as a mere metaphor—we are Titans, at least as long as we are omnipotent without making *definitive* use of this omnipotence of ours.[147]

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[145] Robyn Eckersley, 1992. *Environmentalism and Political Theory: Toward an Ecocentric Approach*. SUNY Press, Albany; p. 13.
[146] Gunther Anders, 1962. 'Theses for the Atomic Age.' *The Massachusetts Review*, Vol. 3 No. 3, Spring, pp. 493-505; p. 496.
[147] Anders 1956; p. 146.

For the survivalist Heilbroner, like Anders, the product of this new age of technological prowess is ironically a reversion of sorts, to being a Titan, a god predating the Olympian canon, to Prometheus the trickster and Atlas with his crushing burden.

Julian L. Simon and right wing Prometheans, elevated through relationships with the RAND institute and the Reagan administration in the 1980s, picked apart the catastrophic urgency of warnings of ecological collapse prominent in the 1970s, such as Stanford biologist Paul Ehrlich's infamous *Population Bomb* or the MIT computer scenarios of resource shortage and civilizational decline contained in the Club of Rome Report. Simon contested that the population problem, emblematic of this era of crisis literature, was not a problem at all, that the increase in human individuals on earth was a good thing because it statistically increased the chances of great innovators and geniuses.[148] He was 'Promethean' in the one-sided sense because he believed that human ingenuity, if allowed to flourish, could solve any problem.

Simon's connection to the Reagan regime's free market policies, which oversaw the dismantling of federal environmental agencies, was clear: he believed that when a problem grew great enough the price, if allowed through free markets, would rise, incentivizing great geniuses to solve it. Government regulation, in this perspective, only created barriers for innovation, and thus inhibited the rapid development of technologies necessary to confront and overcome problems of resource scarcity. Where the survivalist world was defined by limits on ecosystems and human cleverness, Simon regarded nature as a source of materials and energy to be rearranged, therefore inexhaustible since human

[148] See: Julian L. Simon, 1980. 'Resources, Population, Environment: An Oversupply of Bad News,' *Science,* Vol. 208 No. 4451, June, pp. 1431-1437.

ingenuity was unlimited. He saw substitution and the price mechanism as unsurpassable in their efficiency (and therefore morality), and proclaimed in a book coauthored by RAND nuclear strategist Herman Kahn that despite the apocalyptic scenarios peddled by survivalists, human civilization would last until the sun burned out.[149]

This reaction gathered strength throughout the 1980s, with proponents arguing that 'humans are characterized by unlimited ingenuity, symbolized in Greek mythology by the progress made possible by the theft of fire from the gods by Prometheus.'[150] Where the survivalist reference to Atlas stressed limits and the undertaking of great sacrifice, including authoritarian government, the Promethean reaction was based on the denial of these limits, both through the denial of scientific evidence and an unwavering faith in the powers of human inventiveness.

Green political theorist Andrew Dobson, writing at the end of the Cold War, believed that the technological faith which such Promethean responses relied on throughout their dominance in the 1980s had been proven fragile by the high profile technological disasters at Bhopal, India, where a chemical explosion killed hundreds, the nuclear meltdown at Chernobyl, and the explosion of the Challenger space shuttle. Dobson's certainty, given the time that has passed and the development of the internet and advances in transportation and medicine, seems shaky. His reminder that Prometheus is caught by Zeus and eaten alive by an eagle for 30 years stands in stark contrast to the golden statue of Prometheus at Rockefeller Center and the exalted place of technology in modern society.

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[149] Julian L. Simon and Herman Kahn, 1984. *The Resourceful Earth: A Response to Global 2000*. Blackwell, NY.
[150] Dryzek 1997; p. 21.

Dobson, after explaining the 'folly of our Promethean aspirations' exposed by the 'normal disasters' prominent in the 1980s, sounds a similar note with his critical hammer—he claims 'we have tramped all over the planet, and the geographical exhaustion of space seems to parallel the exhaustion of our political imagination.'[151] His analysis mirrors Anders' because he sees the basic problem as a lack of political ingenuity to match the dubious potential of technology. Neither convinced of an abstract flaw or promise of technology in essence, Anders wants to both come to grips with the horrifying possibilities it unlocks and continue to act as if despair was not an option.

Resignation, Anti-Apocalyptics, and Special Kinds of Fear

Anders, like many now writing about climate change, sought to appeal to every individual, across ideological, religious, and linguistic lines. He believed this universal appeal was evident because Mutually Assured Destruction hypothetically affected everyone on the planet. This meant that traditional separations of race, class, and nation would no longer be relevant, that 'every end will be destroyed together with the entire world in which 'ends and means' had existed.'[152]

Describing the kinds of people that he had spoken with regarding their correspondence, Anders reports to Eatherly that the broadness of his appeal is a methodological choice to speak out against atomic weapons 'before everybody, for our problem concerns everybody and the danger does not discriminate between young or old, military or civilian, black or white, Christians, Jews, or Mohammedans.'[153] Seeing the impending catastrophe of nuclear war approaching with no apparently adequate way of

[151] Andrew Dobson, 1991. 'Introduction.' *The Green Reader*, André Deutsch Limited, London; p. 7.
[152] Anders 1962; p. 16.
[153] Anders 1961; p. 9.

imagining its effects in an effective moral way, Anders *still insists on activity*, on an active confrontation with the forces of apocalyptic blindness. He pleads:

> We must do everything in our power to make The End Time endless. Since we believe in the possibility of the The End of Time, we are Apocalyptics, but since we fight against this man-made Apocalypse, we are—and this has never existed before—'Anti-Apocalyptics.[154]

For Anders, these Anti-Apocalyptics were compelled by their realization of the scale and power of human actions to raise the awareness of these effects and actively confront the forces of extermination. The preoccupation with the survival of the species demanded it.

The Promethean argument that things were getting better and that human ingenuity could solve all problems was the chief opponent of Anders. His insistence on the unprecedented newness of his age is clearly an effort to combat the passivity inspired by the technological optimism which he associated with 'the confusion of centuries,' or the use of progressive narratives from the 19th century to explain radically different circumstances in the nuclear age. The invention of weapons which could potentially affect humans at the scale of the species, for Anders, gave lie to these narratives—it meant that technology could now accomplish the unimaginable, in the sense that it was not something which individual decision-makers and citizens could morally consider.

The scale of the disaster represented by nuclear holocaust, to Anders, meant that a profound gap had been opened between the things which humans, now constituted as a species by the negative universal of apocalyptic nuclear war, could do and that which they could imagine. Anders argued that in response, rather than resigning oneself to fatalistic passivity or continuing to live indifferently as if one never knew the problem,

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[154] Anders 1962; p. 494.

each individual must seek to raise the level of fear to match the scale of the problem, sabotage conversations relying on technical authority, and actively attempt to confront the problems identified.

For the first generation of survivalists the entrance into the new era of scarcity meant that social-ecological crises were inevitable because governments and ideologies resting on Promethean tenets of expanding growth and the benevolent force of technology were bound to be fatally slow in their response to global-scale crises. For them, confronting elites capable of authoritarian enforcement with the severity of the growing crisis was imperative, and necessitated the persistent use of catastrophic imagery stressing universal urgency.

Today, climate change and other global-scale ecological threats have again modulated the speed and urgency of the catastrophes faced, introducing new 'pragmatic' logics which embrace great risks for temporary stabilization. These managerial, technological solutions appear to be the only option to those resigned to the inevitable arrival of crisis conditions, a symptom clear in the advocacy literature, much of it highly scientific, surrounding climate geoengineering and nuclear power.

Reading Anders alongside the survivalists here is instructive. While diagnosing the inability of individuals to imagine the scale of human agency implied by Intercontinental Ballistic Missiles and the prospect of Mutually Assured Destruction, Anders spends the rest of his life actively trying to create such an imagination, to scale up the fear provoked by the possibilities of modern technology. Anders agrees that humans have passed a threshold where continued indifference would be catastrophic, but he interprets this transition as a kind of calling, as an activating force compelling the

construction of exactly the kind of imagination lacking. The survivalists, despite their personal inclinations toward more palatable solutions, remain stuck in the Promethean Gap, unable to envision the kind of collective scale efficacy necessary outside the return to a primitive era or the intervention of elites to regulate the species at any cost.

Many have interpreted the possibility of creating resignation as a broadly applicable condemnation of catastrophic rhetoric in any form. Anders provides another model for examining this tightrope between indifference and resignation, reflecting on the potential of maladaptive responses to its visceral nature. In 'Reflections on the H Bomb,' he writes that:

> What stuns or panics us at such moments is the realization not of the danger threatening us, but of the futility of our attempts to produce an adequate response to it. Having experienced this failure we usually relax and return shamefaced, irritated, or perhaps even relieved, to the human dimensions of our psychic life commensurable with our everyday surroundings. Such a return, however pleasant it may be subjectively, is of course sheer suicide from the objective point of view.[155]

Anders realized that the appeal he made to the universality and urgency of the atomic debate to create an active fear could also result in a passive version; he admits, 'of course, as long as you are granted the grace to continue living, you can lay your hands in your lap, give up hope and try to resign yourself to your schizophrenia.'[156]

This resignation, though, is pathological. Anders pleads 'you have to make the daring attempt to make yourself as big as you actually are, to catch up with yourself,' or:

> In other words: you have to violently widen the narrow capacity of your imagination (and the even narrower one of your feelings) until imagination and feeling become capable to grasp and to realize the enormity of your

[155] Anders 1962; p. 152.
[156] Anders 1961; p. 12.

> doing; until you are capable to seize and conceive, to accept or reject it—in short: your task is: *to widen your moral fantasy*.[157]

He makes a similar plea in the final letter to Klaus Eichmann in a section titled 'Against Indifference.' The ultimate crime Klaus' father had committed, to Anders, was not that he had utilized the Promethean Gap to commit genocide, but that he had been so indifferent in his design of the exterminating apparatus to who or what it processed, that for him *it might as well have been for anyone*.

He continues to plead with Klaus in the much later second letter to reject his lineage, to speak up for all those who experienced his generalized condition and galvanize them against the technification of the world that now escaped their imaginations and threatened a final, perfect nuclear solution to complete the promise of the Nazi apocalyptic project. This lesson, the special responsibility of those indirectly responsible for evil to reject their lineage and cease being 'one Eichmann more' and instead become 'one human being more,' applies equally well in the ecological case.

In this context, the final, pleading words of 'Theses for the Atomic Age' are haunting, but also instructive for those confronting social-ecological crises:

> I have published these words in order to prevent them from becoming true. If we do not stubbornly keep in mind the strong probability of the disaster, and if we do not act accordingly, we will be unable to find a way out. There is nothing more frightful than to be right. And if some, paralyzed by the gloomy likelihood of the catastrophe, have already lost courage, they still have a chance to prove their love of man by heeding the cynical maxim: 'Let's go on working as though we had the right to hope. Our despair is none of our business.'[158]

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[157] Anders 1961; p. 12.
[158] Anders 1962; p. 503.

This complexity marks Anders' thought as far removed from most voices in contemporary debates over technology and catastrophic rhetoric, many of which seem to place the two in simplified linear relationships. The challenge Anders' thought represents, instead, is more complicated: it is a call to both acknowledge the severity of the crisis confronted and still continue to act.

It should be instructive for those interested in an anti-apocalyptic environmental politics that is neither tragically fated to become bare life politics of survival nor prophetically destined to overcome all limits through Promethean technological ingenuity that after realizing all modern humans were 'sons of Eichmann,' or denizens of a common apocalyptic age, Anders asks even Klaus Eichmann, the 'chief inheritor of evil,' to take a chance on redemption and realize the opportunity presented to him by his horrible inheritance. For Anders, Klaus, and by proxy the other modern 'sons of Eichmann,' could do this by acknowledging the responsibility an inheritance entails, not because one was the sole guilty party, but precisely because *no one* was traditionally guilty. He asks Klaus Eichmann, will you raise a third generation of Eichmann's, or will you be 'an Eichmann for peace,' and in this way 'one Eichmann less' and 'one human being more.'

Modern day survivalists can also learn from Anders about the *kind* of fear that needs to be generated. The fear Anders sought was a special kind, calibrated in order to avoid both indifference and resignation. First, he believed it must be a 'fearless' fear which keeps its resolve in the face of criticism; second, a 'stirring' fear which cultivates urgency and channels it into action; and third, a 'loving' fear which expands the temporal scale and considers its actions in a multi-generational context. The fear Anders sought

was thus one which maintained resolve in the face of criticism, which encouraged urgent action, and which worked on long time horizons. While many survivalists created urgency, and appeared to keep resolve in the face of (widespread) criticism, it is less obvious how this fear was seated in a multi-generational context or how the urgency generated comes to be channeled towards effective action.

To oppose apocalyptic resignation is the singular challenge of contemporary debates over global-scale ecological governance. Confronting the emerging realization of the global effect of human societies on natural systems can provoke passivity. For Anders, however, the recognition of the mismatch in scales between imagination and crisis was an urgent call to activity, to spread the awareness of the problem faced, and to imagine the way that individuals are responsible to their communities and increasingly degraded natural systems. Revisiting Anders allows for critical reflection on some of the unintended effects of seeking universal appeal and active political response through catastrophic rhetoric, including the possibility of creating resignation where specific forms of collective agency are not present. What Anders' assertion of 'the right kind of fear' means, in this context, is preserving an active attitude in the face of apparent catastrophic crisis, seeking out a sustainable place between indifference and resignation.

V. Conclusion

Contemporary political discourse that hints at catastrophe in oblique scientific language or even increasingly boldly advertises it can learn from other self-identified 'new eras.' This is particularly true with reference to the need to expand moral imagination from describing and understanding natural systems to imagining the political

agency necessary to actively confront the problems identified. If effective climate change regulation remains almost unthinkable 25 years after the UNFCCC was formed and a year after the historic Paris Accords, it is because the Promethean gap still prevents knowledge of world system degradation from creating the kinds of political agency necessary to avoid the unthinkable.

The focus on passive technological optimism is central to both Anders' critique of atomic weapons and the catastrophic political ecology of Heilbroner and the survivalist school. What it suggests is that many contemporary debates over 'pragmatic' adaptation responses to climate change, including harsh immigration policies or more desperate options such as global-scale climate engineering, should remember the darker half of the Prometheus myth, the radical ambiguity of technology and potential for mismatch in scales between the crises confronted and the sense of moral responsibility of individuals.

It is good to be clear here: the enemy of Anders *was not* technology or creativity per se, but the kind of passive attitude which they believed that deifying these abilities in the abstract created. This Promethean attitude is evidence of largely unconscious and taken-for-granted premises underlying Western culture and institutions. While Prometheanism as a structured doctrine may have been unconscious the strategy of the Prometheans, archetypically represented in the by Simon, was deliberate and powerful. A similar oppositional logic attacked Anders as a panic monger, insisting that the nuclear era was subject to the same 'laws' of diplomacy and politics as others before it, that the challenge faced was *not* existential, but instead would be overcome in good time with the slow application of human ingenuity.

Anders, most vehemently in his second letter to Klaus Eichmann, sent in 1980, opposed bitterly the idea that World War II had just been 'another war' and that the Holocaust was 'another genocide.' Accepting the new era, for Anders, did not invalidate old moral checks, but required a critical pause to consider the furthest consequences in order to structure the present politically to lead to an ethically acceptable future. Like Adorno, Agamben, and others, Anders took the techniques of annihilation revealed by the Holocaust and dropping of atomic bombs as the culmination of the Western tradition and secret arbiters of liberal and socialist modernity at the point where lack of imagination enabled an indifferent liquidation of people. While diagnosing the inability of individuals to imagine the scale of human agency implied by Intercontinental Ballistic Missiles and the prospect of Mutually Assured Destruction, Anders spends the rest of his life actively trying to create such an imagination, to scale up the fear provoked by the possibilities of modern technology.

Modern survivalist narratives largely consider themselves as operating in a new era which implies either great sacrifice or the possibility of civilizational decline. This is perhaps Anders' greatest contribution to our 'modern' discourses and strategies. The key lesson from Anders is not that institutions are fatally flawed, but rather that people needed to work urgently to expand their moral imagination to begin envisioning, and eventually assuming responsibility for, what once had appeared unthinkable. In the face of such a challenge, Anders is not content to simply display the true reality as he saw it, but also to inspire activity. It is this activity, he believed, that was necessary to become an 'anti-apocalyptic,' one who worked against the forces of extinction and against fatalism which passively returns agency to non-human forces.

For Anders, the loss of individual moral responsibility for political events deprived statesmen and bureaucrats of their traditional moral checks, resulting in nuclear submarines, hydrogen bombs, and long-range missiles, some of them named after the Titan Atlas and his crushing burden rather than the dark side of Promethean technological passivity it represented. The problem was the disconnect between the scale of the problem and the moral imagination of those who must decide. Seeing the continued passivity created by making individual agency radically out of scale with the collective agency necessary, Anders insisted on public debate and active confrontation. Recognizing the potential for resignation, he sought to harness the moral urgency of extinction to rapidly expand the sense of agency and responsibility necessary to confront it. His argument both questions the unambiguous technological salvation themes reproduced in both right and left Promethean narratives, and at the same time does not surrender to the inevitability of the catastrophe the way survivalist narratives from the 1970s often did.

Instead, he insists on remembering, through his letters with 'The Pilot of Hiroshima' and Klaus Eichmann, his rejection of 'pseudo-concreteness,' and his lifelong practical advocacy that the nuclear age was not something oncoming but rather the new condition of life. The challenge, articulated by Anders, is to find the line between alarmist and alarming, to generate the 'right kind of fear' which seeks out active engagement by toeing the line between indifference and resignation, remembering that to be anti-apocalyptics means 'our despair is none of our business.'

04 Irony of the Commons: Geoengineering, Christian Realism, and Humility

I. Tragedy, Irony, and Climate Geoengineering

Since Garrett Hardin coined the infamous 'Tragedy of the Commons,' the concept of tragedy has been used as a master frame for analyzing crises in global social-ecological systems.[159] The more intimidating and global the crisis relative to the possibility of collective change, the more 'tragic' the mismatch in problem and solution is commonly assumed to be. Hardin and other 'survivalists' of the 1970s insisted that the ecological predicament could not be avoided in time by existing institutions, requiring the tragic choice of a lesser evil, often a drastic authoritarian solution.[160]

This 'logic of survival,' I will argue here, is not unique to Hardin and the survivalists, who take their name from the imperative to survive at all costs. Today, this logic is increasingly mobilized in the debates surrounding political responses to climate change, powerfully represented at its seeming logical extreme by global-scale climate geoengineering. Like the planetary-scale changes it confronts, climate geoengineering is often discussed in abstract as a global insurance technology or under the aegis of scientific freedom of inquiry, focusing on *whether it will work* rather than *whether we should use it*. This paper attempts to move these discussions over the technical feasibility of large-scale climate interventions common in both the pro and critical literatures into a vocabulary capable of translating global debates into meaningful political deliberation in

[159] Garrett Hardin, 1968. 'The Tragedy of the Commons,' *Science*, Vol. 162, No. 3859, December, pp. 1243-1248.

[160] Hardin (p. 1248) famously says: 'The most important aspect of necessity that we must now recognize, is the necessity of abandoning the commons in breeding. No technical solution can rescue us from the misery of overpopulation. Freedom to breed will bring ruin to all'.

the US. I'll argue here that Reinhold Niebuhr represents a key figure in interpreting moral and political choices over greater and lesser evils entailed in the tragic framing.

Applied to contemporary debates around climate geoengineering and other messianic technological hopes, the critical humility identified by Niebuhr suggests understranding 'prudential' intervention as a political decision with potential, even unintentional, ethical and natural consequences rather than simply the pragmatic choice of a lesser evil. The difference between what I will call here, following Niebuhr, ironic and tragic logics involves the form of agency produced when the crisis is realized. Instead of understanding history as coming to a tragic, ordained end, Niebuhr refocuses on responsibility, an emphasis which requires free will and the potential for meaningful action.[161] His faith, contrary to the dystopic scientific prophecies now dominating debates over climate change, preserves the potential for agency as a fundamental aspect of human action and a primary condition for judgment. This does not mean that tragic decisions are not possible, but rather that the decision itself is meaningful, that it exposes one's judgment to moral and political conflict.

Using Niebuhr's typology, one could alternately interpret climate change as the ultimate ironic condition, an unforeseen aftereffect of development which undergirds the comfort of our way of life, and one which, despite this unintended nature of the consequences, summons the responsibility of the most historically responsible. If climate narratives are often criticized for being distant or unintelligible at the scale of a particular culture, Niebuhr's stark Christian framing is closer to the traditional understandings of the United States audience than most scientific appeals. Most importantly, his analysis

[161] Reinhold Niebuhr, 1951 (2008). *The Irony of American History*. University of Chicago Press, Chicago.

ends with a moral imperative rather than inevitable tragedy: the final choice, upon revelation of ironic responsibility, was between good and evil.

Such a moral choice is suspended by emergency arguments framed as tragic choices. This is important because today, blossoming in the frustration of political effort, a new research program based on unprecedented intervention in global-scale systems, or 'geoengineering,' has evolved. Geoengineering, as a generic term, is misleading, since it covers a vast array of interventions to modify Earth systems. In many ways, its ambiguity has served to help spread it throughout the literatures on global change. Schemes like iron fertilization in the ocean, mirrors placed at LeGrange points in space, massive reforestation, and surface albedo enhancement in cities have all been proposed under the name geoengineering, and some are seemingly workable with limited moral danger.[162]

The debates considered here concern 'climate geoengineering,' but even this seemingly more descriptive category contains several schemes for affecting the climate at global scale. The most controversial one is Solar Radiation Management, proposed by Paul Crutzen in his 2006 article following David Keith and Ken Caldeira's early work. I begin by exploring in greater detail the emergence of the geoengineering debate through Niebuhr's ironic lens, first questioning the traditional interpretations of ecological crisis as tragic, then investigating the critical potential of some of Niebuhr's Christian Realist interpretations of key terms like humility, prudence, and responsibility.

Throughout, I will argue that this transition to considering controlling the weather is only intelligible through a tragic framing of contemporary crises, and will try to point

[162] See the assessments in Royal Society, 2009 and National Academy of Sciences 2015 for more detail.

to the potential for an ironic perspective that retains a Christian vocabulary of moral choice. I conclude with a discussion of the role of humility in post-ironic political debate over whether to control the climate.

II. Christian Realism and the Irony of Climate Change

Geoengineering the climate through management of incoming solar radiation has been proposed before, but rarely taken seriously in the scientific literature. Proposals for 'planetary sunscreen' in the late 1990s were put forward by people like Edward Teller, the father of the hydrogen bomb then in residence at Lawrence Livermore Labs.[163] David Keith from the Kennedy School at Harvard has made the case for serious research and consideration of situational deployment in a series of papers and books from 1992.[164] Climate modelers from Stanford, Govindasamy Bala and Ken Caldeira also initiated early research programs from 2000 and an influential paper in 2003.[165]

These authors and their students and colleagues are still active and have been dubbed by skeptical critics the 'geoclique.'[166] What they share in common is the sense that climate negotiations are currently not working fast enough, and that somewhere in this century the devastating effects of the slow violence of climate change will become

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[163] Edward Teller, L. Wood, and R. Hyde, 1997. 'Global warming and ice ages: Prospects for Physics-Based Modulation of Global Change.' 22nd International Seminar on Planetary Emergencies, Erice, Italy, August 20-23.

[164] David Keith and Hadi Dowlatabadi, 1992. 'A serious look at Geoengineering.' *Eos*, Vol. 73, No. 27, July, pp. 289-293. Also: David Keith, 2000. 'Geoengineering the climate: history and prospect.' *Annual Review of Energy Environment*. Vol. 25, 245-284. More recently: David Keith and Douglas MacMartin, 2015. 'A temporary, moderate and responsive scenario for solar geoengineering.' *Nature Climate Change*, Vol. 5, March, pp. 201-206.

[165] B. Govindasamy, K. Caldeira, P.B. Duffy, 2003. 'Geoengineering Earth's radiation balance to mitigate climate change from a quadrupling of CO2. *Global and Planetary Change*, Vol. 37, pp. 157-168.

[166] Eli Kintisch, 2010. *Hack the planet: science's best hope-or worst nightmare-for averting climate catastrophe.* John Wiley & Sons, Hoboken, NJ. For a critical discussion: Jonas Anshelm and Anders Hansson, 2014. 'Battling Promethean dreams and Trojan Horses; Revealing the Critical discourses of geoengineering. *Energy Research and Social Science*, Vol. 2, pp. 135-144; p. 137.

rapid and cause undue suffering. To arrive at such a state without researching technological tools capable of stalling suffering, they claim, shirks the responsibility for climate change of those rich countries which can afford the research and are paradoxically most insulated from dangerous change.[167]

Solar Radiation Management approaches 'unwelcome change' through the eyes of an engineer. SRM through sulfate injections in the upper atmosphere, as proposed by Crutzen, Caldeira, and Keith, would mimic observed cooling after the 1991 eruption of Mount Pinatubo in the Philippines. It is no coincidence that this is the same year as Keith's first paper on climate geoengineering—this natural metaphor is still relied upon in most positively-framed discussions as implicit proof of the safety and naturalness of SRM, despite the many uncertainties recognized in the Pinatubo data.[168] By injecting modified sulfates into the upper atmosphere, these authors claim that a calibrated amount of sunlight could be reflected into space before becoming trapped in increasing greenhouse gas concentrations, effectively cooling global temperatures and moderating the worst extremes.[169]

SRM is highly controversial. Even advocates usually only argue for expanded research, understanding both the uncertain nature of intervening in complex systems like the climate and the general uneasiness of the public approaching a technology which is

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[167] John Virgoe, 2009. 'International governance of a possible geoengineering intervention to combat climate change.' *Climatic Change*, Vol. 95, pp 103-119.
[168] Adam Corner and Nick Pidgeon, 2015. 'Like artificial trees? The effect of framing by natural analogy on public perceptions of geoengineering.' Climatic Change, Vol. 130, pp. 425-438.
[169] Ken Caldeira, Govindasamy Bala, and Long Cao, 2013. 'The Science of Geoengineering.' Annual Review of Earth and Planetary Sciences, Vol 41, pp. 231-256.

not well comprehended.[170] Recently, however, there has been increasing attention to loosening taboos on limited field tests in order to build real-world knowledge. This recommendation is intelligible, despite the recognized dangers of SRM deployment, because it emerges from the tragic frame common to Hardin's era of resource anxiety and our own transition to the slow violence of the Anthropocene.[171]

While proposed insurance-based 'portfolio' or risk-management techniques often include other controversial technologies, such as nuclear power, hydraulic fracturing, and genetic engineering, SRM stands out in the package, both for the temporary nature of its deployment and the scale of the uncertainties it would introduce into planetary ecosystems. It makes sense *only* as a response to the tragic framing, as a form of preparedness for an uncertain future where political action cannot be guaranteed and continued inaction ensures generations of humans to come will inhabit a very different world, potentially one where SRM will no longer be considered morally questionable but rather, in some instances, represent the difference between life and death.

Although SRM research advocates Burney *et al* note that 'such measures are fraught with the danger of unintended consequences' they quickly reassert the tragic frame by claiming that 'unchecked catastrophic changes in climate could be even worse.' In the end, their logic presents the catastrophic future as potentially unavoidable given current political and economic institutions, which requires the cultivation of emergency preparedness techniques to mitigate acute suffering. As they claim: 'The odds of truly

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[170] Paul Crutzen, 2006. 'Albedo Enhancement by Stratospheric Sulfur Injections: A Contribution to Resolve a Policy Dilemma?' *Climatic Change*, Vol. 77, pp. 211-219; David Keith, 2001. 'Geoengineering.' *Nature,* Vol. 409, January, pp. 420-420.

[171] Rob Nixon, 2012. *Slow Violence and the Environmentalism of the Poor.* Harvard University Press, Cambridge*;* Will Steffen, Paul J. Crutzen, and John R. McNeill, 2007, 'The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature?', *Ambio,* Vol. 36 No. 3, pp 614-621.

catastrophic changes in climate are rising, and the world needs insurance against truly horrible outcomes.'[172] Of course, they are not advocating for a climate strategy of *only* SRM, but rather for the 'portfolio approach,' the principal part of which, it is maintained, has to be dealing with carbon emissions.

The insurance portion of this portfolio of responses is SRM, and it corresponds directly with the need to account for climate tipping points. Juan Moreno-Cruz argues in a working paper for the National Bureau of Economic research that such an insurance logic demands gradual introduction as preventive emergency management:

> Solar geoengineering is part of the optimal policy portfolio for two reasons. First, it provides a means to control temperature at (potentially) a lower cost than mitigation. Second, it can be used as insurance against the risk of reaching a climate tipping point..[173]

What this effectively means is that because of the uncertainties associated with SRM and other geoengineering techniques, many feel that waiting for an inevitable climate emergency to begin testing them would be asking for great risks and even catastrophic failure. Much of this uncertainty, reason research advocates, could be removed with further research and 'sub-scale' tests, the data from which could inform responses prompted by emergencies in the future. Moreno-Cruz goes as far to argue that, economically speaking, waiting for tipping points to be reached would not be 'a welfare-maximizing policy.'

Philosopher Stephen Gardiner, author of the popular *A Perfect Moral Storm: The Ethical Tragedy of Climate Change*, has criticized this approach for several years.

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[172] Burney *et al* 2013; p. 55.
[173] Garth Heutel, Juan Moreno Cruz, Soheil Shayegh, 2015. 'Climate Tipping Points and Solar Geoengineering.' National Bureau of Economic Research, Working Paper 21589, http://www.nber.org/papers/w21589.

Examining the portfolio response, he asks why there is such a desperate search for justification for geoengineering, wondering 'whether this is a policy in search of a rationale?'[174] Gardiner is worried that geoengineering is presented as the only possible lesser evil to confront climate catastrophe, a point which he feels ignores the interests of future generations and potentially sidelines concerns about justice, ethics, and equity.[175]

Instead, he argues that such approaches 'pass the buck' to future generations and fail to specify the conditions for deployment, circumstances which require agreement on the ranking of lesser and greater evils. In a later paper, Gardiner argues that:

> There is every reason to expect a buck-passing generation to be tempted by interventions that do not constitute real solutions to the genuine global, intergenerational and ecological problem of the perfect moral storm, but rather "shadow solutions" that address their own distinct concerns, but may be disguised as the real thing. [...] Such temptations are easily hidden behind appeals to moral emergency; yet they are threats that any serious ethics of geoengineering must take seriously.[176]

Gardiner's opposition to treating geoengineering as a solution to tragic circumstances comes down to three central concerns: 1) the political question of who deploys the intervention, 2) the problem of identifying the long term goals of such interventions, and 3)the insurance framing of the debate for public consumption. He claims that the 'desperation argument' in the tragic narrative fails because it underestimates the plight of the desperate in general, understates what is morally at stake for the desperate potential user, and understates the moral stakes for those offering geoengineering assistance.

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[174] Stephen Gardiner, 2011. *A Perfect Moral Storm: The Ethical Tragedy of Climate Change*. Oxford University Press, NY; p. 396.
[175] Gardiner 2011; p. 369.
[176] Stephen Gardiner, 2013. 'The Desperation Argument for Geoengineering.' *PS: Political Science and Politics*; Vol. 46, No. 1, pp: 28-33; p. 33.

While Gardiner rejects the tragic framing of geoengineering as a lesser evil and dismisses the relevance of the commons example to Hardin's concept of tragedy, he retains the language of tragedy in a modified form. In a paper from 2002, Gardiner picks apart Hardin's claim that world population represented a tragedy of the commons and that this required coercion or suffering. Despite finding Hardin's claims 'deeply flawed,' however, he agrees that some problems associated with population did have tragic structures.[177] This is because things like climate change have an added 'intergenerational aspect' which may eventually necessitate extreme responses 'to avert environmental catastrophe.'[178] As others have shown, repeated interaction (iteration) is a key to solving prisoner's dilemmas like Hardin's imagined commons scenario. Gardiner sees this as damning for intergenerational problems like climate change, where there are no repeated interactions between parties to work out a solution.

This admission from Gardiner means that Hardin was partly right that coercion, in Gardiner's case phrased as 'regulation,' would be necessary to protect global commons like the atmosphere, and also that any transition would likely be painful. Gardiner only concedes Hardin is partly right however, spinning the survivalist focus on the developing world and focusing on transition in the developed world. He says: 'Hardin is not correct about who the primary subjects of coercion should be. For it is the people in the rich countries who presently cause most of the pollution I have been concerned with, not those in the poor countries.'[179] Reversing the focus, for Gardiner, means rethinking developed ways of life before risking intergenerational technological consequences,

[177] Stephen Gardiner, 2002. 'The Real Tragedy of the Commons.' *Philosophy and Public Affairs*, Vol. 30, No. 4, pp. 387-417; p. 387.
[178] Gardiner 2002; p. 388.
[179] Gardiner 2002; p. 416.

because ‘this locates the problem not in the deep nature of human beings and their germlines, but rather in ways of life which all of us could, and should, give up.’ A good ethicist, like Niebuhr he ends with a moral imperative.

Beyond Tragedy

My argument here is that seeing geoengineering as a tragic choice in the sense that Hardin considered global population crisis would be as misleading as the over-general moniker geoengineering. Instead, I will suggest that geoengineering could be framed through an ironic perspective which acknowledges that those in the developed world did not know they were causing climate change, but also that they must accept responsibility anyway, a line of thought which, like the most recognizable scientific codification of norms, the Oxford Principles, could likely condemn or support climate geoengineering depending on moral and political opinions about deployment of large-scale technologies.

It is to the benefit of those seeking further research before public regulation that the term geoengineering remains an umbrella term for several types of intentional large-scale manipulation. Following the investing metaphor used by many, it is a way of spreading the risk throughout the proposed portfolio of options for technological enhancement of carbon transitions and mitigation of acute crises. These means are considered necessary due to the novelty of the scale of global change, the acceptance of the Anthropocene. Like many others, Niebuhr saw the atomic bomb as fundamental to a new world era brought on by the possibility of mutual annihilation. The nuclear age was already here, and it required imagining new scales of responsibility. This sentiment is

never more evident in his work than in *The Irony of American History*, published in 1951, just after the entrance of the Soviet Union into the nuclear arms race and the spread of communism to China.

Delivered first as lectures in 1949 and 1951, Niebuhr explains in his introduction that *Irony* deals with 'the position of our nation in the present world situation, as interpreted from the standpoint of the Christian faith.'[180] The rest of this chapter attempts to evaluate some of the possible contributions of this perspective from the vantage point of current discussions over climate geoengineering and the political mobilization of the concept of tragedy. I start by outlining Niebuhr's tripartite definition of tragedy, pathos, and irony, and compare it to the treatment of the potential of irony for environmental thought, particularly in the work of Bronislaw Szerszynski. I then explore the critical potential of concepts of 'humility' and 'responsibility' for engaging new traditions of thought traditionally ignored by secular academic environmental thought. I conclude the paper by examining proposed schemes for governance of climate geoengineering regimes and the problematic loss of Niebuhrian tension between prudence and humility that often accompanies the accounts of advocates who see global-scale ecological crisis through the interpretive lens of unavoidable tragedy and technological lesser evils.

Irony, Tragedy, and Pathos

In a paper recommending the removal of taboos on climate geoengineering research, Nobel Prize-winning atmospheric chemist (and popularizer of the Anthropocene concept) Paul Crutzen uses the idea of a pious wish as a sign of futility, claiming 'I

[180] Niebuhr 1951; p. xi.

repeat: the very best would be if emissions of the greenhouse gases could be reduced so much that the stratospheric sulfur release experiment would not need to take place. Currently, this looks like a pious wish.'[181] This modernist, secular tinge to the geoengineering debate he helped reinvigorate in 2006 is obvious and not surprising given the scientific occupation of many of its main participants. It also neglects the fact that many of those in the target audience they seek to reach in the US are religious.

Niebuhr, speaking from a different context, also addressed the possibility of global catastrophe—in his case, the atomic bomb and the nature of American authority in the Cold War. Niebuhr, who Time Magazine dubbed upon his death in 1971 'the greatest American Protestant theologian since Jonathan Edwards,' may have begun his career as a idealist and pacifist but his experience of the 1930s and 1940s led him to 'Christian realism,' a vision of world politics anchored in a religious interpretation of human nature as inherently limited. He criticized the expansionist impulse of frontier fantasies and rejected Whig histories of inevitable progress because, for Niebuhr, history like God was essentially indecipherable, which makes his perspective essentially critical of rationalistic progress narratives. Applied to the study of history it entails a 'historical pragmatism,' which recognizes the limits of historical understanding and attempts to make moral choices based on the situation (hence the 'realist' in Christian Realist).

The atomic bomb, for Niebuhr, was thus not a triumphant story of technological mastery, but a sad reality which accentuated the difference between the isolationist nostalgia of American myths and superpower status which the atomic bomb had inaugurated. He insists that 'no one can be sure that a war won by the use of the modern

[181] Crutzen 2006; p. 217.

means of mass destruction would leave enough physical and social substance to rebuild a civilization among either victors or vanquished,' articulating a deep anxiety which the prospect of nuclear war created.[182] Despite this heavy rhetoric, he also attacks those who sought a unilateral ban on nuclear weapons—his vision of the inevitability of human error and sin led him to adopt a much more pragmatic stance. Pretending the weapons did not exist would not make them disappear, Niebuhr surmised, therefore we must plan for a world where they exist with all options on the table.

Niebuhr contrasts tragedy, or choice of lesser evil in the face of inevitable loss, with pathos, where things simply happen and no one is responsible (asteroids or earthquakes), and with the ironic, where intentional actions lead to unforeseen consequences for which one is still responsible. For him, the pathetic elicits pity, but not admiration since it is built on confusion and coincidence and does not imply guilt. The benefit of the pathetic frame is that, like the tragic, no one is particularly responsible, a trait which makes it ripe for debates like those surrounding global climate change which are characterized by a fundamental disagreement about historical responsibility.

Many catastrophic climate narratives today rely on such a pathetic rhetoric, emphasizing natural disasters and social unrest without any sense of responsibility for their production or consequences. James Lovelock's famous externalization of Gaia is only the most obvious of such projections of agency. Such responses which plan for unpredictable events are increasingly common today, especially in response to natural disaster, and characterized by scenario planning and vulnerability mapping. Understanding the crisis as inevitable but its timing as unpredictable drives such security,

[182] Niebuhr 1951; p. 2.

risk-based analyses to diversify the set of available tools for policy-makers confronting catastrophic events.

As global climate change is increasingly accepted by the security, military, and other bureaucratic apparatuses such 'portfolio' approaches become more appealing. As the scale of the change predicted increases, the moral and political calculus for acceptable and legitimate counter-techniques increases. The tragic framing begins with the greater tragedy, the perceived impossibility of coordinated global action to reduce emissions, and interprets this inertia as a sign of inevitability. Despite the conditional language of most international scientific bodies, exemplified by the Intergovernmental Panel on Climate Change, the growing understanding of nonlinear change and feedback effects in the climate system has created a more present and rapid form of change, emphasizing discontinuity, state shift, and interrelationship. Such non-linear change anchors the most vivid rhetoric of scientific advocates, a vague global amalgamation of geographically and temporally specific processes and systems.

Niebuhr's realism is tempered in comparison to classics from Hans Morgenthau because while he acknowledged tragedy as salient framework for understanding world politics, he did not insist that it was the only or even most enduring trait of international politics.[183] This is because of a deep-seated commitment to social justice and Christian doctrine. A practicing minister and then a professor at the Union Theological Seminary, Niebuhr is also known for authoring the Serenity Prayer, famously adopted by Alcoholics

[183] Alison McQueen explores Morgenthau's shift from the purely tragic in response to nuclear standoff in the 1960s, but Niebuhr is disagreeing with his influential early work. Alison McQueen, 2016. 'The Wages of Fear and the Promise of Hope: How should We Feel When We Talk About Climate Change?' Unpublished draft.

Anonymous. The prayer is useful in our case, since it gives a hint at what exactly he means by tragedy. It goes:

> God, grant me the serenity to accept the things I cannot change,
> The courage to change the things I can,
> And the wisdom to know the difference.

For Niebuhr, the reality of nuclear weapons was something which could not be changed, requiring a tragic choice, continuing to hold and threaten to use the weapons which could potentially end life on Earth. He asks: 'could there be a clearer tragic dilemma than that which faces our civilization? Though confident of its virtue, it must yet hold atomic bombs ready for use so as to prevent a possible world conflagration.'[184] Surrendering the bomb while the USSR still held it, Niebuhr believed, was suicide.

In contrast, irony, for Niebuhr, was the condition where unconscious actions or chaotic events have unintended but ordered results. Until coming to the ironic realization such a situation bears the signature of pathetic, it appears unordered and chaotic. The ironic thus implies an observer, and disappears with the awareness of the actor involved. In this sense, it elicits laughter rather than pity, realizing the 'apparently fortuitous incongruities in life which are discovered, upon closer examination, to be not merely fortuitous.'[185] What makes this particularly interesting is the indirect nature of the responsibility inspired by irony—while not consciously chosen, the subject of such an ironic situation is nevertheless responsible for the outcomes of their inadvertent actions. Niebuhr believes that to accept irony as a call to make hard decisions would be a sign of

[184] Niebuhr 1951; p. 1.
[185] Niebuhr 1951; p. xxiv.

maturity.[186] At heart, this is because, although significant, 'tragic elements in present history are not as significant as the ironic ones.'[187]

Table. 1: Niebuhr's pathos, tragedy, and irony.

	Agency	Arrival of crisis	Responsibility	Elicits…	Examples
Pathos	External	Unavoidable	Absent	Pity	Asteroid, earth quake, volcano
Tragedy	Internal	Inevitable	Choose lesser evil, face facts maturely	Admiration	Oedipus, SRM, nuclear deterrence
Irony	Internal (un-observed)	Unintentional	Revealed after	Laughter	Climate change, ocean acidification

On its face, asserting the need for irony in the face of serious global-scale social-ecological crises appears frustratingly naïve regarding the pace of global change. I'll argue here that this is a shallow interpretation. Following Szerszynski, I will show how philosophical irony can 'a general philosophical stance'[188] which can be applied the most urgent social-ecological issues now under debate. Drawing on Niebuhr, I suggest this philosophical irony should also embrace the religious themes implied in the extended reference to Kierkegaard. This is because, in his Christian terms, the realization of ironic agency was a call to responsibility to choose between good and evil. The starkness of this call and its seating in a religious vocabulary could be useful tools for ecological outreach pursuing democratic change in religious countries like the US.

[186] Here it is clear why Ulrich Beck, pitching his concept of collective irresponsibility, implores climate theorists to return to Weber. Ulrich Beck, 2010. 'Climate for Change, or How to Create a Green Modernity,' *Theory, Culture and Society*, Vol. 27, No. 2-3; pp. 254-266.
[187] Niebuhr 1951; p. 2.
[188] Bronislaw Szerszynski, 2007. 'The post-ecologist condition: Irony as symptom and cure.' *Environmental Politics*, Vol. 16, No. 2, pp. 337-355.

On Philosophical Ironies

Niebuhr's central doctrine of original sin is not based on evil intentions, but rather on the limited perspective through which we perceive the world. This limit forms the basis of his call for a kind of rational humility before God. Being limited, humans, for Niebuhr, are never aware of the full consequences of their actions, placing them in a continuing state of irony or unconscious tension between their intentions and the results of their actions. Garrett Hardin claimed that tragedy was produced by the limited perspectives of individuals depleting common resources, requiring private property or government control. His 'ecological insight' of interconnection, the oft-paraphrased 'you can never do merely one thing,' for him inspired a kind of humility before technological innovation, but his understanding of political possibilities led him to a vicious form of this humility, a 'pragmatic' dismissal of politics tempered by the arrival of tragedy.

This chapter is arguing, instead, that Hardin and the advocates for climate geoengineering are wrong, that modern crises constituent of the Anthropocene or whatever the moniker for the 'new era' of ecological risk are more effectively and accurately seen through an ironic lens. Such a position has been suggested in other places. Drawing on Kierkegaard, Bronislaw Szerszynski has recently argued that common forms of irony are insufficient for the demands of environmental crisis, that instead what was required was 'a generalized ironic stance towards the world and oneself.'[189] He differentiates this form of irony from what he calls 'post-modern' irony, or a negation of all things. He thinks this passive, manipulative irony, and the accompanying sense of resignation, are the chief challenges for environmental outreach.

[189] Szerszynski 2007; p. 337.

Analyzing Kierkegaard's dissertation on irony, Szerszynski claims that such 'post-modern' irony does not fully realize the critical potential of the ironic perspective. In this, he follows Kierkegaard, who opposes 'irony-as-world-relation' to 'the simple negation of immediacy.' Instead, Szerszyski insists: 'the ironist does not abandon, but *returns* to his finite, worldly existence, and takes *responsibility* for it.' He suggests that such an ironic perspective makes an 'authentic' response possible, i.e. it makes it possible to avoid dissimulation and disengagement. He suggests that understanding environmental politics as ironic could generate new solutions and understandings of different perspectives to avoid dissimulation and disengagement.

Such a 'thoroughgoingly ironic environmentalism,' for him, would entail critical reflection and the understanding of limits on human understanding. In this sense it also requires responsibility. His paper attempts to go beyond the pejoratively-framed 'postmodern' irony, characterized by despair and denial, to 'generalized philosophical irony' based on contrition. He does so, however, without the use of Niebuhr's or Kierkegaard's moral vocabularies, and thus may falter before the chief aim of this paper: to initiate a debate on global problems in meaningful local terms and explicitly recognize non-secular audiences.

What is interesting considering Szerszynski's account is that although he clearly insists on the ironic return to responsibility, it is not clear why the decider should take such a painful path away from numbing dissimulation, which is comfortable, barring Kierkegaard's leap of faith, or, following Niebuhr, the emergence of an unavoidable moral decision. In the largely secular discourse emerging from both scientific outreach and radical criticism this transition from information to motivation remains a particularly

confusing leap in logic, especially where the crises predicted are global, slow, and varied throughout the many places where people live their day to day lives. Many of these debates today are dominated by scientific experts explicitly disavowing moral or political concerns to project objectivity even as they predict the end of civilization as it exists today. That such attempts struggle to create meaningful moral or political engagement should not be surprising.

In *Irony of American History* Niebuhr suggests that avoiding the return to passive, purely-negating irony was a chief benefit of his Christian worldview:

> A religious sense of an ultimate judgment upon our individual and collective actions should create an awareness of our own pretensions of wisdom, virtue or power which have helped to fashion the ironic incongruity, the irony would tend to dissolve into the experience of contrition and to an abatement of the pretensions which caused the irony.[190]

The alternative between abatement (through acknowledgment and contrition, the targets of Szerszynski's 'cultural modernism') and denial of responsibility (whether through fury or despair), Niebuhr claims, 'is, in fact, the primary spiritual alternative of human existence,' and one which has much to offer ostensibly secular narratives concerning technological responses to climate change. Drawing on Kierkegaard with a secular lens despite the contradictions, for Szerszynski, is a strategic accentuation of the secular worldview he proposes. Although he spends a lot of time differentiating his 'cultural modernism' from post-modern detachment, the source of the attachment which differentiates them, however, is less clear.

[190] Niebuhr 1951; p. 169.

III. Humility and Stewardship

Considering the prospect of Earth systems stewardship, Stuart Chapin and coauthors note the need for such values 'given the checkered history of past efforts to shape ecosystems.' They claim that because of this 'Earth Stewardship requires humility about the state of human knowledge, acknowledging the uncertainty of potential outcomes,[191] meaning it requires a cautious but also proactive effort. The critical content of this humility, though, is unmoored from the perspective of rhetoric, a point which both obscures the rival tendencies to active technological intervention and more sweeping forms of lifestyle change, both pursued under the aegis of humility.

This distinction is important in the US, where activists have developed a policy platform on the basis of secular, scientific trend data in a democracy where a large portion of the country is religious. Considering the prospects of climate intervention, in particular, advocates have been loath to expose research or testing to public debate, likely in large part to avoid this religious audience. It is critical, in this sense, for critical theorists and activists to engage this part of the American spectrum of political life where common ground over manipulating Earth systems may exist.

The first step is understanding what it *will mean* when we ask people to be humble considering the deterioration of natural systems and potential technological remedies. Niebuhr's analysis outlines the kind of humility necessary when dealing with irreversible consequences, in his case atomic weapons. In a more general sense, it is curious that the atomic example does not occur more in debates over climate

[191] F. Stuart Chapin, Mary E. Power, Steward T. A. Pickett, Amy Freitag, Julie A. Reynolds, Robert B. Jackson, David M. Lodge, Clifford Duke, Scott L. Collins, Alison G. Power, and Ann Bartuska, 2011. 'Earth Stewardship: science for action to sustain the human-earth system.' *Ecosphere*, Vol. 2, No. 8, pp. 1-20; p. 4.

geoengineering and other large-scale technological solutions to ecological crisis. Avoiding the atomic example may maintain the specificity of the climate debate, especially where it disentangles the timelines of climate and nuclear problematics. But its omission is potentially disruptive to these same discussions, since atomic technology long stood as a clear example of the moral and political ambiguity of technological progress. Instead, debates over geoengineering lack such a terrible form of humility. This is important because the paradoxical senses of urgency and inevitability, the hallmarks of the tragic framing of global ecological crises, have again become common.

This change in the level of urgency modulates the ethical dimensions of the debate in a way which confounds historical reasoning. Ultimately, the great evil of runaway climate change begins to validate the pursuit of technological means which would once have been considered pure hubris, powerfully represented by the efforts to manage the global climate. Crutzen's infamous paper is representative of this change in pace and scale. In it he goes as far as speculating about creating a 'minor' nuclear winter effect with soot to decrease temperatures, alongside mention of mirrors and sulfur injections, for which he cites both Teller[192] and Keith.[193]

There is some irony to found here: novel social-ecological crises drove Crutzen to seek an emergency fix so urgently that he considers a cognate for nuclear winter, despite his sustained work on the tragic prospects of 'darkness at noon' following a nuclear war.[194] Ironically, he eventually advocates for research, despite its potential effect on the

[192] Edward Teller, L. Wood, R. Hyde, 1997. *Global Warming and Ice Ages: I. Prospects for Physics Based Modulation of Global Change*. Lawrence Livermore National Laboratory, Livermore.
[193] Crutzen, 2006; p. 214
[194] Paul Crutzen, 1984. 'Darkness after a Nuclear War.' *Ambio*, Vol. 13, No. 1, pp. 52-54.

atmospheric ozone levels for which he earned his Nobel Prize studying.[195] This unobserved irony shows that today the greatest threat presented by the absence of nuclear themes in dominant narratives considering the technological stewardship of world systems is the loss of the clear object lesson on the ambiguity of human ingenuity represented by the atom bomb.

Crutzen began his career by studying the effects of supersonic air travel, and the difference between his tone then and now is striking. In a passage summing up the recommendations from his dissertation published in 1972, Crutzen wrote:

> Although it is not possible to assess at this stage the real environmental consequences of future supersonic air transport, present knowledge indicates that there exists a real possibility of serious decreases in the atmospheric ozone shield due to the catalytic action of oxides of nitrogen, emitted in the exhaust of supersonic aircraft. The minimum requirement is therefore that extensive supersonic air traffic **should not take place** in the stratosphere before reliable predictions can be made of the possible environmental consequences of such operations. This may still take many years.[196]

This summary did little to ingratiate him with the Concorde project, nor did it convince those like Edward Teller and later Lennart Bengtsson that natural systems were fragile. They continued to believe, with many, that human actions had little effect on Earth systems. That Teller and Crutzen's prescriptions of climate engineering have converged despite this difference in worldviews is telling—it testifies to the force of the argument from catastrophe and the tragic frame.

Niebuhr's focus on the nuclear problematic and his framing of the need for humility are layered into his larger religious understanding of the ironic and unintended

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[195] Paul Crutzen, 1996. 'My life with O3, NOx, and other YZOx compounds (Nobel lecture)." *Angewandte Chemie International Edition in English* Vol. 35, No. 16, pp. 1758-1777.
[196] Paul Crutzen, 1972. 'SST's: A Threat to the Earth's Ozone Shield.' *Ambio*, Vol. 1, No. 2, pp. 41-51; p. 49. My emphasis.

historical contradictions that come to define human progress, exemplified by isolationism giving way to superpower in America. He claims 'the irony of America's quest for happiness lies in the fact that she succeeded more obviously than any other nation in making life 'comfortable,' only finally to run into larger incongruities of human destiny by the same achievements by which it escaped the smaller ones.'[197] For him, the irony of US commitment to world politics and negative responsibility for ensuring the species as well as its way of life, was a call to acknowledge that similar, unconscious responsibilities may be adding up. Humility, in his typically religious language, meant acknowledging possible unintended consequences, but also acting anyway.

Technologies of Humility?

The argument here is not simply about stretching one field's set of concepts to another over the bridge of atomic weapons. Niebuhr is also directly speaking about industrialization. He says directly: 'It is industrial technique that weakens beliefs that have justified and upheld the age-long order of human societies; that uproots the urban masses and makes them dissatisfied with their humble lot; that makes poverty, long accepted as a decree of God or nature, a sort of scandal.[198] Like Hardin and the survivalists, this indictment of industrialization does not make an a priori distinction between communist and capitalist. He claims:

> The price which American culture has paid for this amelioration of social tensions through constantly expanding production has been considerable. It has created moral illusions about the ease with which the adjustment of interests to interests can be made in human society. These have imparted a quality of sentimentality to both our religious and our secular, social and political theories. It has also created a culture which makes 'living

[197] Niebuhr 1951; p. 63.
[198] Niebuhr 1951; p. 164.

> standards' the final norm of the good life and which regards the perfection of techniques as the guarantor of every cultural as well as of every social-moral value.[199]

He insists that this faith in unlimited growth and historical purpose was extremely dangerous, that: 'the progress of American culture toward hegemony in the world community as well as toward the ultimate in standards of living has brought us everywhere to limits where our ideals and norms are brought under ironic indictment.'[200]

From isolation, through the development of a new powerful destruction, the US had suddenly awakened at the crux of world politics. Through the weapon it invented and used, Niebuhr believed, the US was no longer able to retreat to national politics alone, but rather had become lodged in the new structuring of the bipolar world system. In a similarly Christian tone, Pope Francis claimed in the 2015 *Laudato Si* Encyclical that mastery of technology has brought great comfort but not parallel development of responsibility, values, or conscience.[201] Seeing the climate-changed world as one which is profoundly unjust to the poor and most vulnerable, most of whom have had little responsibility historically for the changing climate, Francis claims that 'Although the post-industrial period may well be remembered as one of the most irresponsible in history.'

Pope Francis claims that: 'Doomsday predictions can no longer be met with irony or disdain.' But what about irony and action? This paper has tried to ask if it was possible that such an ironic framing may be necessary to emphasize the responsibility that he hopes for. Importantly, it may be important to avoid the narrow technocratic

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[199] Niebuhr 1951; p. 57.
[200] Niebuhr 1951; p. 57.
[201] Pope Francis, 2015. *Laudato Si: Encyclical Letter of the Holy Father Francis On Care for our Common Home.* Vatican; #161, p. 119.

leanings of the tragic framing of emergency SRM as climate crises become increasingly likely. Adding to Szerszynski, then, Christian values, and in particular the Christian Realism of Niebuhr, are important for interpreting the debate over global change and climate intervention through the prism of the historical and cultural experience of the United States.

The struggle to communicate climate trends to the public at large could likely benefit from reconsidering such historical tropes for their effectiveness at conveying a particular message in understandable terms to the audience. As Pidgeon *et al* note, 'non-experts bring a variety of considerations to bear including value-based concerns often deemed unimportant or trivial by scientists and other expert commentators, but which are likely to prove significant for laypeople.'[202] These values are important to consider, especially when the scale of analysis is much greater than the individual or regional levels at which most people act. In a way, this is a form of humility, recognizing the limits of a certain strategy and adapting to them.

This need for humility has been sounded from many corners of academia and popular culture recently. One example is the work of Sheila Jasanoff. She asserts:

> There is a growing need, I shall argue, for what we may call the '**technologies of humility**.' […] Acknowledging the limits of prediction and control, technologies of humility confront 'head-on' the normative implications of our lack of perfect foresight. […] They require not only the formal mechanisms of participation but also an intellectual environment in which citizens are encouraged to bring their knowledge and skills to bear on the resolution of common problems. [203]

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[202] Adam Corner and Nick Pidgeon, 2015. 'Like artificial trees? The effect of framing by natural analogy on public perceptions of geoengineering.' *Climatic Change*, Vol. 130, pp. 425-438; 426

[203] Sheila Jasanoff, 2003. 'Technologies of Humility: Citizen Participation in Governing Science,' *Minerva*, Vol. 41, pp. 223-244; p. 227. My emphasis

A couple of things are especially notable here. One is that she separates institutional and cultural problematics. The other is that she recognizes internal limits on human cognition which require a new kind of capacity, and one which crucially must be public. These technologies of humility are strictly opposed to 'technologies of hubris', or technologies of risk assessment to facilitate management and control claiming objectivity and normative perks of the scientific method.

Although these methods appeared to be scientific, Jasanoff wants to expose their limitations, of which she sees three major. First, they are blind to uncertainty and the non-quantifiable: 'well-defined, short-term risks command more attention than indeterminate, long-term ones, especially in cultures given to technological optimism.' This means, essentially, that Promethean cultures will be prone to overstating the known at expense of the ambiguous, then overplaying the certainty produced by these blinders. Second, she feels like scientific productions of risk analysis pre-empt political discussion. Requiring expert credentials to enter policy creates high entry barriers, and in situations where common and expert knowledges are rarefied, can use objectivity as a smokescreen to continue an agenda or 'politics of demarcation' created by experts and not accountable to review of goals.

Third, Jasanoff claims that usual methods like risk analysis and precaution are unable to internalize unforeseen challenges. She claims that these forms of analysis can't see synergistic effects, long-term problems, or where issues are multiple; where the model breaks down there is little chance of adaptation to changing conditions (physical and epistemological). This is essentially the critique that Niebuhr's Christian vocabulary of responsibility commands. Humble before the possibility of far-reaching unintended

effects, Niebuhr does not seek nuclear disarmament, as his individual morals, he acknowledged himself, demanded. He was not, however, thus convinced that the world or the species were inevitably tragic, as were Hardin and other 'realists' like Morgenthau. Neither convinced of the perfectability of humans nor of their fatal corruption, Niebuhr's Christian Realism insists on humility before tragic decisions that recognizes the potential for unintended consequences and, crucially, which recognizes such decisions as inherently moral. His pragmatism came from the fact that nuclear weapons were already a reality, that Soviet parity meant the possibility of life on Earth based on ideology, miscalculation, or even mistake.

Still in development, climate geoengineering strategies are not yet a reality to pragmatically strategize around, a fact which would disqualify the clear, and I think vulgar, counter-argument that Niebuhr's support of atomic weapons, in whatever qualified form, transfers to SRM and other global-scale geoengineering techniques. In the rest of what follows I will try to explore what some alternative conclusions of these insights from Niebuhr mean for governing climate geoengineering.

Climate Geoengineering in Focus

Advocates of climate geoengineering research and testing rely on the threat of nonlinear change, that 'after decades of inaction, the planet is nearing the cusp of what may be major tipping points in the climate system.'[204] These 'tipping points' identify

[204] Burney *et al* 2013; p. 54.

hard to quantify feedbacks between different factors, such as the relationship between albedo from arctic ice and darker water or the release of trapped methane clathrates.[205]

This threat, for advocates following Crutzen, means taboos against geoengineering are outdated and potentially could result in great suffering, that 'in an emergency, the ability to quickly respond to climate change with crude offsetting measures—for example, injecting reflective particles into the upper atmosphere to cool the planet, as volcanoes do periodically—could be useful.' Solar Radiation Management injections would last for only a span of one to two years, which is both a selling point for advocates, since it appears reversible in the short-term, and a problem on a longer timeline. It is a problem because SRM does not act to lower the amount of carbon in the atmosphere and, upon cessation, temperatures would quickly return to their pre-injection state.[206] This 'termination effect'[207] incentivizes the continuing injection of particles to avoid the uncertain and geographically uneven effects of this rapid rise in global temperatures, creating the fear of technological 'lock-in.'[208]

The short-term nature of potential climate geoengineering interventions also mean longer-wave phenomena like sea level rise will lag far behind. SRM could

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[205] As ice melts, less sunlight is reflected into space and more is absorbed by the darker water surface, causing a rise in temperature, which in turn melts more ice, which in turn heats the water, etc.
[206] Oliver Boucher, JA Lowe, CD Jones, 2009. 'Implications of delayed actions in addressing carbon dioxide emission reduction the context of geoengineering'. *Climatic Change*, Vol. 92, pp. 261-273.
[207] Andy Jones, Jim Haywood, Kari Alterskjaer, Olivier Boucher, Jason Cole, Charles Curry, Peter Irvine, Duoying Ji, Ben Kravitz, Jon Egill Kristjansson, John Moore, Ulrike Niemeier, Alan Robock, Hauke Schmidt, Balwinder Singh, Simone Tilmes, Shingo Watanabe, and Jin-Ho Yoon, 2013. 'The impact of abrupt suspension of solar radiation management (termination effect) in experiment G2 of the Geoengineering Model intercomparison Project (GEOMIP).' *Journal of Geophysical Research: Atmospheres*, Vol. 118, pp 9743-9752.
[208] Scott Barrett, 2014. 'Solar geoengineering's brave new world: thoughts on the governance of an unprecedented technology.' *Review of Environmental Economics and Policy*, Vol. 8, Issue 2, pp. 249-269.

affect regional precipitation in complex ways by altering the energy available for evaporation, and may have other unintended consequences unforeseen in current, highly simplified computer models.[209] Finally, the injection of sulfur in the upper atmosphere could change the color of the sky. As proponent David Keith obliquely wonders: 'How much is a blue sky worth?'[210] The criticism created in the past few years as the geoengineering literature has flourished was largely contained in the initial issue of *Climatic Change* in the responses of fellow experts. Some expressed their fear of hubris, like Jeff Kiehl from the National Center for Atmospheric Research in Boulder, who asks in his response: 'When will we know a model is 'good enough' to go out and perform a real experiment?'[211]

This is in contrast to the more reserved comments made by then President of the National Academy of Science, Ralph Cicerone, in the same issue urging that 'research on geoengineering be considered separately from actual implementation.'[212] Kiehl worries that developing such research without properly addressing carbon emissions may be morally wrong, and insists that it sends a problematic message to the global public; he claims: 'On the issue of ethics, I feel we would be taking on the ultimate state of hubris to believe we can control Earth. We (the industrially developed world) would essentially be

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[209] Gabriele Hegerl and Susan Soloman, 2009. 'Risks of Climate Engineering.' *Science Express: Perspective*. August 6.
[210] Keith, 2000.
[211] Jeff Kiehl, 2006. 'Geoengineering Climate Change: Treating the symptom over the cause?' *Climatic Change*, Vol. 77; p. 227.
[212] Ralph Cicerone, 2006. 'Geoengineering: Encouraging research and overseeing implementation.' *Climatic Change,* Vol. 77, pp. 221-226; p. 221.

telling the (rest of the) world not to worry about our insatiable use of energy. In essence we are treating the symptom, not the cause.'[213]

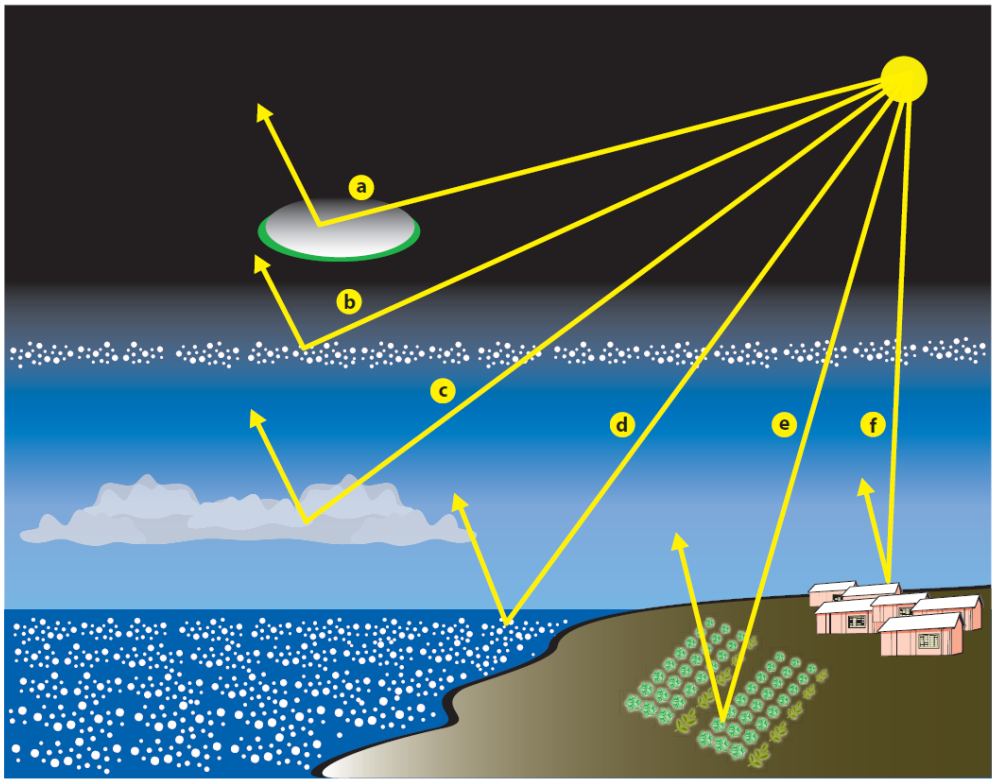

Figure 2

Solar geoengineering/solar radiation management approaches work by reflecting to space sunlight that would otherwise have been absorbed. Illustrated methods are (*a*) using satellites in space, (*b*) injecting aerosols into the stratosphere, (*c*) brightening marine clouds, (*d*) making the ocean surface more reflective, (*e*) growing more reflective plants, and (*f*) whitening roofs and other built structures.

Figure 1: Solar geoengineering schemes. Source: Caldeira, Bala, and Cao (2013)

The usual response to this criticism is that SRM follows the risk management logic advanced by Burney, Kennel, and Victor—they argue SRM would work as part of a larger security portfolio, one which must include actions to reduce emissions and capture carbon.[214] What makes SRM appealing as a part of such a portfolio is its *initial* cost.

[213] Kiehl 2006; 228.
[214] Olivier Bahn, M. Chesney, J. Gheyssens, R. Knutti, A.C. Pana, 2015. ' Is there room for geoengineering in the optimal climate policy mix?' *Environmental Science and Policy*. Vol. 48, pp. 67-760; Also Boucher, J.A. Lowe, C.D. Jones, 2009. 'Implications of delayed actions in addressing carbon dioxide emission reduction the context of geoengineering'. *Climatic Change*, Vol. 92, pp. 261-273.

Relative to the cost of changing the global economy, the cost of geoengineering is said to be 'shockingly small.'[215] Typically, the author claiming this is talking about a single deployment in the case of an acute emergency. Adding in the temptation to manage the weather from then on this number grows quickly, and some have noted that the cost of the eventual cessation may far exceed conventional 'slow' forms of carbon sequestration and lifestyle change.[216]

This is important—SRM's perceived cheapness, advocates claim, both encourages unilateral use and proportionally incentivizes democratic activists to push for global cooperation and governance as a public good.[217] Most proponents of serious research, however, are wary of initiating a global conversation on oversight of research or regulation of testing, fearing a ban due to poor understanding, unreflective moral opposition, or the caution of countries which do not have the technical means to join in the eventual technological control of the weather. Instead, they often propose an elite group of national research programs[218] and the 'bottom-up' establishment of norms to govern research and testing. The most influential of these bottom-up efforts, the 'Oxford Principles' put forward by Steve Rayner and colleagues, goes further to insist that states and international organizations begin regulating geoengineering as a public good and debates be opened to public participation to ensure legitimacy and address equity and

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[215] David Victor, 2008. 'On the regulation of Geoengineering.' *Oxford Review of Economic Policy*, Vol. 24, No. 2, 2008, pp.322–336, p. 326.
[216] Adam Abelkop and Jonathan Carlson, 2013. 'Reining in Phaëthon's Chariot: Principles for the Governance of Geoengineering.' *Transnational Law and Contemporary Problems*, Vol. 21, pp. 763-808.
[217] Jonas Anshelm and Anders Hansson, 2014. 'The Last Chance to Save the Planet? An analysis of the geoengineering advocacy discourse in the public debate.' Environmental Humanities, Vol. 5, pp. 101-123.
[218] See: Victor, 2008.

justice concerns.[219] The position consistently taken by David Victor and others is that such debate will be premature since the science is still young and only feasible in a few major technological powers.

Despite also stressing the need for continuing research, Rayner, a central author on the influential 2009 Royal Society report, and his colleagues from the Oxford Geoengineering Program place more stress on the need for adequate governance, including public debate. They agree with Victor and others that 'a legal regime regulating computer simulations of stratospheric sulphate particle injection would be regulatory overkill,' but argue that at the same time that 'voluntary regulation of large scale field testing seems to be inadequate.'[220] According to the Oxford Principles, this is a reality which demands multi-scalar and multi-level governance architecture which can enable effective participation, fund diverse forms of measurement, and work to rationalize the objectives of nested scales of political authority.

Addressing geoengineering as a whole, and responding in particular to the controversial plans to test aerosol cooling in Britain,[221] the Oxford Principles are purposefully vague in a way that likely can be argued to support or condemn SRM in particular based on the kinds of concerns the author values most and the sense of urgency and inevitability surrounding the arrival of emergency conditions. Their version of the 'bottom-up' ethos is broader than the scientific community and research bureaucracies of major technological nations invoked as major players in other discussions, and is imagined as an ongoing part of adaptation plans with meaningful local effects. The

[219] Steve Rayner, Clare Heyward, Tim Kruger, Nick Pidgeon, Catherine Redgwell and Julian Savulescu, 2013. 'The Oxford Principles.' *Climatic Change*, Vol. 121, pp. 499-512.
[220] Rayner *et al* 2013; p. 508.
[221] The so-called 'SPICE' program was eventually canceled.

Oxford Principles call for flexibility, intentionally ambiguous to normative substance or specific local consequences of particular geoengineering schemes, but its relative focus on governance and public debate *during the research phase*, including both voluntary scientific norms and multi-level political institutions, is potentially more radical than many proponents would prefer.

For instance, Victor agrees with the need for full disclosure of research and open publication of the results and the need for governance before the transition from research to deployment to assure accountability. The fear of Victor and others is that such a call for opening up public debate will result in more failures like the SPICE program, that, essentially, more research is necessary before the case can coherently be made to the public.[222] The problem is that attaining the kind of certainty sought, by their own admission, will require small-scale tests,[223] introducing a Catch 22, the 'technology-control problem,' where attempts to regulate technology in advance to protect safety are inherently inadequate because they cannot predict the full consequences of its eventual implementation.[224]

Others have since questioned the cost and efficacy of climate engineering, but it is interesting that in the same issue of *Climatic Change* many of these criticisms appear in proto-form. One example is the response of then-Director of the Max Planck Institute for Meteorology, Lennart Bengtsson. Like many meteorologists, Bengtsson suspects the

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[222] SPICE is an acronym for the 'Stratospheric Particle Injection for Climate Engineering,' a set of SRM field trials proposed and later canceled by the UK Research Council. For a discussion see: Nick Pidgeon, Karen Parkhill, Adam Corner, and Naomi Vaughan, 2013. 'Deliberating stratospheric aerosols for climate geoengineering and the SPICE project.' *Nature Climate Change*, Vol. 3, May, pp. 451-458.
[223] Douglas MacMynowski, David Keith, Ken Caldeira. and HoJeong Shin, 2011. 'Can we Test Geoengineering?' *Energy & Environmental Science*. Vol. 4, pp. 5044–5052.
[224] David Collingridge, 1980. *The Social Control of Technology*. Frances Pinter, London.

accuracy of long-term climate modeling, and briefly became a member of the climate denial group the Global Warming Policy Foundation before dropping out due to threats and professional ostracism. Deeply skeptical of computer modeling, Bengtsson is clearly not persuaded by emergency arguments and does not see the development of SRM as a 'tragic' choice of a lesser evil. One of the key concerns Bengtsson highlights which is echoed throughout critical accounts of geoengineering is the threat of moral hazard. Conceiving climate geoengineering as an insurance policy, some authors claim, will incentivize people to act more dangerously and may hamstring the huge effort which must be made to make necessary drastic cuts in emissions.

This threat is largely treated as irrelevant by scientists, who, in their written and live responses, quickly switch to arguments about freedom of inquiry and preparedness for catastrophic scenarios rather than meditate on ethics. They see themselves as readying tools which society will decide how to use in the event that they are necessary. Cicerone's measured language is indicative of this line of argument, separating the abstract research from real world intervention:

> While some people fear that research will lead to direct experimentation and to geoengineering interventions, I believe that we should encourage research, and separate research from actual interventions. Research is needed to reduce ignorance, and it is likely that gaining an acceptable amount of knowledge before intervention will take many years. Freedom of inquiry itself has moral value.[225]

The moral value of such freedom of inquiry is questioned by many in the debate, especially from the perspective of the social sciences and humanities.[226] Cicerone's own

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[225] Cicerone 2006; p. 224.
[226] Clive Hamilton, 2013. *Earthmasters: The Dawn of the Age of Climate Engineering*. Yale University Press; Mike Hulme, 2008. 'The conquering of climate: discourses of fear and their dissolution.' *The Geographical Journal*, Vol. 174 No. 1, March, pp. 5-16.

reservations about real-world tests drive him to call for a moratorium on actual interventions 'until acceptable agreements were in hand,'[227] but he leaves open how these agreements would come about and at what scale. The recent National Academy of the Sciences report on geoengineering, while clear that SRM should not be deployed at this time due to 'unfamiliar and unquantifiable risks and governance issues,' makes a kind of compromise and recommends research into types of governance.[228]

Such a technical discussion of governance is the target of many scholars of technology and society, including Jasanoff. In her paper from 2003 she diagnoses the problematic removal of normative terms from public debate over climate change, noting that: 'participation in the absence of normative discussion can lead to intractable conflicts.'[229] For Jasanoff, this means that critical theorists of technology need to focus on rival framings, including 'technologies of humility.' These technologies of humility, for Jasanoff consist of framing, vulnerability, distribution, and learning, and draw attention to political questions of 'what is the purpose, who will be hurt, who benefits, and how can we know?'[230] Key for Jasanoff in this process is the participation of a wider public than currently engaged in scientifically-framed climate change debates. Noting a lack of deep analysis of reflection, she insists that outreach which pursues the four points will avoid polarization or post-modern ennui and move to deliberation 'on the substance of decision-making.' She is intent to avoid both total ossification of ideological framings and the total disintegration of the debate into indifference and resignation.

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[227] Cicerone 2006; p 224.
[228] Recommendation 6 in NRC 2015; p. 10.
[229] Jasanoff 2003; p. 243.
[230] Jasanoff 2003; p. 240.

The most qualified and sophisticated advocates for Solar Radiation Management shy from exactly this public engagement, fearing lack of understanding and unwarranted fears will prevent emergency measures that can save lives. The emergency framing, trading on the increased certainty of disaster, prevents such a move for engineers seeking effective implementation and efficient research progress. Spurred to urgency by the knowledge that initial injections would be affordable for many national governments, the time for critical reflection, social learning, and public decision-making demanded by the 'technologies of humility' is strikingly absent from even the moderate public stances taken by advocates.

IV. The Tension Between Prudence and Humility

As Jasanoff and others have warned, global catastrophe scenarios have disconnected contemporary debates from historical comparison in a way which is dangerous for democratic politics. With techniques like SRM emerging as potential emergency responses to novel conditions, the insights from past debates and the lessons of their unintended consequences remain absent. Niebuhr's Christian Realism is an important addition, in this sense, considering the global consequences of nuclear war and need for action which acknowledged human limits. Humility, in this context, is the negation of prudence where it is revealed as hubris, as it is also a spur to continue acting.

In abstract, this can likely be seen as endorsing or rejecting SRM. One could even, perversely I think, argue that such technological hopes were humble in the sense that they recognized limits on the political process. This means that humility can lead to either response depending on whether the tragic framework of inevitability and illusion of

predictability of the future are accepted. In the ironic worldview Niebuhr interpreted, humility implies 'historical pragmatism,' or the recognition of unintended effects and reality of poor implementation of even good ideas.

The most profound criticisms of SRM follow from this critical perspective on unintended consequences and basic feasibility. The first major argument is about this limited perspective of climate scientists *qua* engineers identified by Jasanoff. Understanding the problem as global temperature, many researchers have narrowly focused on deflecting sunlight to lower temperature, privileging a certain kind of expertise: namely, the atmospheric scientist. This is why Crutzen's contribution was important for opening up the debate on geoengineering—the *gravitas* of his Nobel Prize-winning work on the ozone hole gives the call new authority and legitimacy.

At the same time, the summary dismissal of continued ocean acidification, unintended climate modification, and other major effects of high carbon concentrations in the atmosphere, and the messy political and ethical feasibility of SRM deployment itself, do not appear in the accounts of such scientifically-framed, narrowly climate-focused assessments, despite their longer-term and more radical effects on the functioning of the planetary biosphere. Seen as indirect consequences, themselves *caused* by emissions rather than climate engineering, things like ocean acidification are put outside the purview of such studies, and do not feature in optimistic cost assessments despite their potential to disrupt world food chains. Likewise, political concerns are duly noted and either bracketed as inappropriate for scientific speculation or assumed away. Thus the ethical and moral dimensions, let alone the economic costs, are never presented as objects for public discussion.

Such a change in framing to consider ethics or public deliberation is rejected by climate engineering advocates on the grounds of tragic circumstances. In the first sentence of their 2008 paper on arctic climate engineering, Ken Caldeira and Lowell Wood set the tragic tone immediately—they claim: 'we are now, or soon will be, confronting issues of whether, when and how to engineer a climate that is more to our liking.'[231] They present the effects of ocean acidification and temperature rise in contrast to the failure of emissions reductions, which they agree would be the best choice. Unfortunately, it is a choice which is not being made, forcing them to accept a tragic interpretation of political inevitability which pushes their idea of prudence towards engineering solutions and away from time-consuming public debate. They claim:

> Regardless of what we might consider to be **prudent or imprudent** with respect to CO2 emissions into the atmosphere, these emissions continue to increase and as a result atmospheric CO2 concentrations also continue to increase. […] If we were faced with an imminent climate catastrophe where further warming would push us over some critical 'tipping point', and we chose to address this situation via CO2 emissions reductions, a near-complete cessation of CO2 emissions would be required to prevent further warming, one whose abruptness might make the likelihood of its attainability appear remote.[232]

By contrast, this sense of tragic prudence is a long way from the more ironic prudence in the National Academy of Science's 2015 report. But although noting the complications and possible side-effects of such techniques, again the tragic urgency modulates the moral opposition. In the Preface, chair Martha McNutt claims:

> Although there are ongoing efforts at climate adaptation in many communities, both humans and ecosystems face substantial challenges in adapting to the varied impacts of climate change over the coming century. For that reason, it may be prudent to examine additional options for

[231] Ken Caldeira and Lowell Wood, 2008. 'Global and Arctic climate engineering: numerical model studies.' *Philosophical Transactions of the Royal Society A*. Vol. 366, pp. 4039-4056; p. 4039.
[232] Caldeira and Wood, 2008; p. 4053.

> limiting the risks from climate change (namely CDR and albedo modification), which could contribute to a broader portfolio of responses, even as mitigation and adaptation remain the primary emphasis.[233]

One could be forgiven for confusing the sense of ethos at play here. She claims simultaneously that research is necessary and some forms of geoengineering are 'prudent,' but that Solar Radiation Management and other schemes which present novel, even global, risks are disqualified, *for now*. This means that their attempts to reinstall taboos against SRM are confusingly set in the urgent need to act, that because 'progress in the understanding of the complicated earth climate system is generally slow' they recommend 'to intensify research in order to challenge the climate modification idea here presented, starting with model investigations and, dependent on their outcome, followed step by step by small scale atmospheric tests.'[234]

The second problem, identified by Bengtsson in his original paper in 2006, is the dramatic mismatch between the temporal duration of sulfate injections (1-2 years) and the long-term consequences of increasing carbon emissions, which, for Bengtsson and others, encourages a form of moral hazard. Crutzen emphasizes the speed SRM would make available, that 'in contrast to the slowly developing effects of greenhouse warming associated with anthropogenic CO2 emissions, the climatic response of the albedo enhancement experiment would start taking effect within about half a year.' He insists that such a tactic was cheaper than it seemed, noting that 'in comparison, current annual global military expenditures approach US$1000 billion, almost half in the U.S.A.'[235] Most of those seeking expansion of SRM research make a similar argument. Caldeira

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[233] National Academy of Science, 2015. 'Climate Intervention.' *Report of the Committee on Geoengineering the Climate*. National Academies Press, DC.
[234] Preface to Vol. 2 on active intervention. NAS 2015; p. 215.
[235] Crutzen 2006; p. 213.

and coauthors, with an indirectness characteristic of climate scientists, claim that while estimates are strictly provisional given the state of current research, 'it is not clear that either deployment or sustained operations of such systems would cost as much as billions of dollars per year, i.e. they might be several orders of magnitude less expensive than the authoritatively estimated costs of global carbon rationing a few decades hence (Stern 2006) and even of net negative direct cost when offsetting direct economic savings of avoided UV-B photodamage are considered.'[236]

The incredible numbers produced by the Stern report for the scale of global change necessary here add to the sense of tragic inevitability implicitly justifying SRM. Crutzen goes further and makes an added value pitch, citing ability to reduce other aerosols which influence human health beneath the shield of sulfate particles in the troposphere. Many of these aerosol pollutants have actually cooled the earth, which means addressing their health concerns by removal also has the side-effect of adding to short-term warming. Pushing several of these responses together, Crutzen writes:

> Climatic engineering, such as presented here, is the only option available to rapidly reduce temperature rises and counteract other climatic effects. Such a modification could also be stopped on short notice, if undesirable and unforeseen side effects become apparent, which would allow the atmosphere to return to its prior state within a few years. There is, therefore, a strong need to estimate negative, as well as positive, side effects of the proposed stratospheric modification schemes. If positive effects are greater than the negative effects, serious consideration should be given to the albedo modification scheme.[237]

He makes several assumptions here which are not supported even by many of his scientific colleagues pursuing geoengineering research. He assumes that the atmosphere

[236] Caldeira and Wood, 2008; p. 4052.
[237] Crutzen 2006; p. 216.

would return to 'its prior state' within a few years, when this 'prior state,' in the absence of carbon emissions reduction, would no longer exist. Essentially, he ignores the termination effect produced by rapid return to warming. He also assumes that interventions could be short-term and stopped quickly if negative effects were observed, ignoring political incentives for lock-in.

A textbook example of an engineering response giving policy instructions, Crutzen obliquely asserts a rational political calculus of positive and negative effects of use without any consideration of who would make the assessment or what kinds of costs would be counted as relevant. Such an optimistic view has been criticized strongly in the literature. With colleagues Marlos Goes claims that 'Published economic studies typically neglect the risks of aerosol geoengineering due to (i) the potential for a failure to sustain the aerosol forcing and (ii) the negative impacts associated with the aerosol forcing.'[238] They note that SRM transfers responsibility to future generations and that there was a large uncertainty pertaining to assessing of damages when used in a portfolio.[239] Their biggest concern is that the taboos against premature trials will break down, noting that the National Academies of Science had conditioned their early endorsement of such research on 'broad understanding of the direct effects and the potential side effects, the ethical issues, and the risks.'[240] They conclude, glumly that this 'broad understanding' is still lacking in contemporary scientific discussions about SRM.

It is not surprising that such a critique would come from someone with an ocean sciences background, given the precariousness of the condition of the world's oceans in a

[238] Marlos Goes, Nancy Tuana, and Klaus Keller, 2011. 'The economics (or lack thereof) of aerosol geoengineering.' *Climatic Change*, vol. 109: pp. 719-744.
[239] Goes *et al* 2011; p. 720.
[240] Cited in: Goes *et al* 2011; p. 740.

climate-changed world. SRM would have large effects on the ocean, since increasing carbon concentrations are in large part taken up in the oceans, changing their chemistry and threatening the survival of calcifying species, including coral, terapods, and many zooplankton, fundamentally altering ocean ecosystems. Given a significant portion of the world's population gets their primary protein from sea food, this represents a slow but still urgent threat to both ecosystems and human health, and one which is ignored in the SRM literature beyond casual mentions of ocean liming to decrease acidity in particularly important areas. The threat of moral hazard leading to passivity is especially strong when seen through this perspective, since lack of action on carbon threatens the health of oceans worldwide regardless of whether or not SRM can lower global temperatures.

Bengtsson, in his initial response to Crutzen, links the problem of moral hazard to a temporal mismatch, noting that 'a temporary solution may weaken the incentive to reduce the CO2 emission and therefore increase the atmospheric concentration further.'[241] This is a tricky critique for geoengineers. At once, they do not want to emphasize the potential for continued use, for fear of stoking fears of irreversibility, but at the same time asserting that such interventions would be ' buying time'[242] for portfolio responses or used to lessen acute crises exposes the fact that it does nothing to directly affect the core problem, and may in fact discourage costly action by appearing to be a technological fix capable of maintaining contemporary habits.

David Keith and Douglas MacMartin take both of these critiques seriously, and in a recent paper have calibrated a response which separates SRM from its unintended

[241] Lennart Bengtsson, 2006, 'Geoengineering to confine climate change: is it at all feasible?' *Climatic Change*, Vol. 77, pp. 229-234; p. 231.
[242] T.M.L Wigley, 2006. 'A combined mitigation/geoengineering approach to climate stabilization.' *Science*. Vol. 314, pp. 452–454.

consequences. They assert: 'claims that SRM will reduce precipitation, increase ocean acidification or deplete stratospheric ozone, or that it must be continued forever once started, are not inherent features of SRM; rather, they are features of common scenarios for its implementation.'[243] Instead, they insist that 'humanity is not committed forever once SRM begins; rather, there is an implied commitment to a measured wind down rather than an abrupt termination.'[244] It is not clear, however, where this is implied, if ever coherently expressed in the political terms of actually following such a 'measured wind down' strategy once started.

Such an 'implied commitment' also makes no comment on changes in global precipitation, which in places already stressed by population and drought for water resources could result in unintended consequences carrying suffering as great as that which the technique was intended to counter. This lack of political nuance is stated plainly in Keith and MacMartin's paper: 'The central planner framing we have adopted here ignores the institutional factors that create strong lock-in.'[245] Despite this caveat, their opinion remains strongly in favor of development of the techniques, even gradual introduction and experimentation in the near future:

> Our view is that if SRM is seriously contemplated (developed, governed and incorporated into climate policy) as an emergency measure, then it arguably makes more sense to begin some gradual and moderate SRM as a precursor.[246]

The prudent response to emergency, here, overwhelms the humble assessment of unintended consequences.

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[243] David Keith and Douglas MacMartin, 2015. 'A temporary, moderate and responsive scenario for solar geoengineering.' *Nature Climate Change*, Vol. 5, March 2015, pp. 201-206.
[244] Keith and MacMartin, 2015; p. 205
[245] Keith and MacMartin, 2015; p. 206
[246] Keith and MacMartin, 2015; p. 205

Critics of geoengineering should borrow from the nuclear debate as commonly as scientific advocacy specifically avoids it. In a way, the erasure of the nuclear and population examples of new global eras consistently obscures this reference, a move encouraged by the abstract and global nature of the problem faced and the feeling of local insecurity which it inspires. Reinterpreting SRM through this lens problematizes its reality as a 'lesser evil' to be chosen tragically, drawing attention to the wildly uncertain outcomes possible from its initial development and eventual use. This includes political and ethical feasibility. While some have claimed that the process itself may not work,[247] others emphasize the unworkability of the political arrangements that would be necessary to safely utilize SRM.[248]

Christian Virtue and Responsibility

Niebuhr argues that Americans must make a choice to risk total annihilation for the sake of stopping evil, in the form of confident totalitarian atheism, from spreading through the world. This choice is central—he wonders if it can be asked in a way that acknowledges the responsibility to act and also the uncertainty of the future. He insists that it must do so without ironically committing the same errors of ideological certainty and power projection which it opposes in the USSR. Niebuhr's is both an urgent call to action and also a desperate plea for humility and precaution. He insists that all recognize that there are certain limits within which human nature operates and that 'whenever

[247] See: David Keller, Ellias Feng, Andreas Oschlies, 2014. 'Potential climate engineering effectiveness and side effects during a high carbon dioxide-emission scenario.' *Nature Communication*, Feb 25.
[248] Scott Barrett, Timothy M. Lenton, Antony Millner, Alessandro Tavoni, Stephen Carpenter, John M. Anderies, F. Stuart Chapin III, Anee-Sophie Crépin, Gretchen Daily, Paul Ehrlich, Carl Folke, Victor Galaz, Terry Hughes, Nils Kautsky, Eric F. Lambin, Rosamond Naylor, Karine Nyborg, Stephen Polasky, Marten Scheffer, James Wilen, Anastasios Xepapadeas, and Aart de Zeeuw, 2014. 'Climate Engineering Reconsidered.' *Nature Climate Change*, Vol. 4, July 2014, pp. 527-530.

judgment defines the limits of human striving it creates the possibility of a humble acceptance of those limits. Within that humility mercy and peace find a lodging place.'[249]

Much of the humility traditionally cultivated in the environmental movement and green academic literatures, things like Leopold's 'Land Ethic,' Thoreau and Muir's 'wilderness,' and the philosophical rejection of human centered perspectives and ontologies, has clearly been lost from this discussion. Survivalists like Hardin in the 1970s cultivated a form of this humility, but it was one conditioned by accepting tragedy, by realizing there was no good option and picking the lesser evil, making a tragic choice to preserve something in whatever reduced form, rather than face the prospect of extinction. This tragic choice was political because they refused to rely on technological progress, seeing it as pacifying and its progress as uncertain due to its connection with the growth ideologies of both the US and USSR.

Modern scientific outreach remains focused on verification and ostensibly politically neutral. Phrased in a global vocabulary, such an emphasis on describing and predicting the disaster to come can be profoundly depoliticizing, detaching local actions and national development policies from globally-constructed facts. In a paper from 2010 in *Global Environmental Change*, Mark Charlesworth and Chukwumerije Okereke explore this moral gap, claiming that typical policy responses to climate change rely on an idea of prudence which is remarkably shallow and utilitarian.[250] To pursue such debates without acknowledging the ethical commitments of their audience is potentially

[249] Niebuhr 1951; p. 64.
[250] Mark Charlesworth and Chukwumerije Okereke, 2010. 'Policy responses to rapid climate change: An epistemological critique of dominant approaches.' *Global Environmental Change*. Vol. 20, pp. 121-129.

short-sighted—lacking engagement at the level of meaningful cultural dialogue such a debate remains doomed to stalling and denialism, delivering the tragic conditions it glumly predicts. Charlesworth and Okereke suggest prudence and hope are rival values to draw on. They suggest that a 'virtue prudence' based on Aquinas, emphasizing weighing evidence and appropriate caution without trying to predict all future utility and welfare. In the end, they suggest: 'virtue ethics and epistemology with emphasis on moderation, prudence (wisdom) and hope,' qualifying prudence to retain the deeper, more measured meaning implied by Aquinas.

What they do not suggest, however, alongside hope and moderation, is humility. Understanding climate debates as Niebuhr saw the atomic debate, means seeing prudence and humility in uncomfortable balance, and changes the moral vocabulary of the debate. In a situation where dire consequences seem unavoidable, what counts as 'prudential' logic depends on the framing of the problem—is it something that can be fixed by increasing technical mastery of Earth systems or is it incumbent on humans to radically change their ways of life? This essentially describes the major fault-line among environmental thinkers, the vision of the future as technological progress or as romantic return. Humility, mobilized by different forces, could also drive a form of passivity that geoengineers are explicitly acting to counter. The question remains—how to be humble and active? How to act urgently and reflectively?

This language is already used, even by scientists. In the controversial 2006 issue of *Climatic Change*, Kiehl from Boulder's NCAR questions the ethics of testing geoengineering, claiming that:

> On the issue of ethics, I feel we would be taking on the ultimate state of hubris to believe we can control Earth. We (the industrially developed world) would essentially be telling the (rest of the) world not to worry about our insatiable use of energy. In essence we are treating the symptom, not the cause.[251]

Instead, he is concerned with the problem research represents—that such research will come to a point where nothing more can be gained from hypotheticals and computer models. He claims it will be difficult, especially under emergency conditions, to evaluate the risks of such an experiment, many of which may be unintended and revealed only through field testing. Others might not emerge until the intervention was performed at scale. This leads Kiehl to conclude humbly, if uncharacteristically one with his professional training and position, that: 'It seems that we need to address the fundamental issue of value, before tinkering with a system that we do not completely understand.'[252]

Some have suggested instead that geoengineering could be a positive recognition of mastery already destructively attained. Geographer Erle Ellis calls, like Jasanoff, for 'humble science,' but his conclusions are radically different. Seeing the world as already changed by human influence, Ellis believes stewardship requires Anthropocene man to apply the greatest resources to solving catastrophic problems. He insists that acting humbly means communicating the uncertainty of scientific predictions, describing specific risks rather than abstract concepts, and advising for the benefit of humanity. This final part of his 'Oath for Earth Scientists' sits awkwardly alongside the others, primarily because he insists that doing so requires removing all personal bias and

[251] Kiehl 2006; p. 227.
[252] Kiehl 2006; p. 228.

considering the species as a whole.[253] Like the Anthropocene which authorizes his change in moral intuitions, his analysis remains abstract despite his call for specificity.

Niebuhr's analysis focuses us on the need to act, on the already changed nature of major systems that require attention and the application of human ingenuity *in the service of* the species, and one might add to Ellis' modernist take, the planet itself. He claims, in a long passage which I think is worth a moment of reflection:

> Our moral perils are not those of conscious malice or the explicit lust for power. They are the perils which can be understood only if we realize the ironic tendency of virtues to turn into vices when too complacently relied upon […] The ironic elements in American history can be overcome, in short, only if American idealism comes to terms with the limits of all human striving, the fragmentariness of all human wisdom, the precariousness of all historic configurations of power, and the mixture of good and evil in all human virtue. […] That idealism is too oblivious of the ironic perils to which human virtue, wisdom and power are subject. It is too certain that there is a straight path toward the goal of human happiness; too confident of the wisdom and idealism which prompt men and nations toward that goal; and too blind to the curious compounds of good and evil in which the actions of the best men and nations abound.[254]

If we today are 'too confident' and 'too blind,' this 'ironic tendency of virtues to turn into vices' could equally describe the critique of unreflective climate engineering schemes. It is this humility, I think, which Jasanoff sought, here in its 'Christian Realist' form. For him, humility is a key political virtue in dire times, a counter to the failure of risk calculation and temptation to let prudence run wild in the face of seemingly inevitable change. It is exposed as crucial by the ironic realization—the moment where the agent realizes their unconscious responsibility for the unintended consequences of an intended action aimed at seemingly unconnected goals.

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[253] Erle Ellis, 2009. 'Earth science in the Anthropocene: New epoch, new paradigm, new responsibilities.' *Eos*, Vol. 90, No. 49, December 8th, pp. 473-474; p. 474.
[254] Niebuhr 1951; p. 133.

Where tragedy may inspire 'prudent' strategies built on lesser evils, undertaken in the certainty of degrading political and natural conditions, irony reinforces the emphasis on agency and responsibility. It is not simple—as Niebuhr shows, it can still result in a tragic decision, liking holding atomic weapons. SRM and other geoengineering techniques in vogue in climate science mostly lack the sense of humility and continue to castigate critics as naïve (because the new era is here) or anti-science. It may indeed be true that we have entered such a new era, but to design 'emergency' techniques with global implications without *any governance framework in place* is pure hubris and potentially catastrophic naïveté.

Lacking humility regarding the progress of technology and dual-edged nature of technological advance which both solves great problems and also creates centralized vulnerability and risk, modern debates pushing geoengineering as a form of insurance or prudence lack the conceptual resources to address the debate over controlling the weather as more than a question of technical feasibility. Surveying the atomic debate so curiously disconnected from those surrounding geoengineering, he believed that upon realization, when the irony is finally revealed to the responsible party, there was no going back to ignorance of responsibility. Instead, a decision was necessary.

Seeing issues through the ironic framing proposed by Niebuhr emphasizes both the unintended nature of the crisis confronted and, crucially, the resulting responsibility generated by the ironic realization of one's own complicity. An ironic frame, in contrast to the popular tragic one increasingly marshaled in global climate response debates, does not stop at the need for more information or education, but rather presents a serious choice with moral consequences as the culmination of this educational process.

Critically, unlike the tragic version, an ironic frame does not rely on the perceived inevitability of the crisis for legitimation, but rather draws attention back to the moment of realization and the choice between good and evil.

The question here is not about rejecting technology or accepting it fully in all forms, but rather about how we will actively deal with creating, managing, and distributing such technologies whose employment represents a compromise for the sake of the emergency. It is about understanding the choice of using such technology, of the uncertainty and potential disruption of controlling the weather (along with the uneven spread of its consequences, good and bad), when is undertaken in order to avoid the worst effects of the catastrophic degradation of global systems. In this way the geoengineering debate accepts the tragic frame for arriving emergency conditions without the humility towards technological progress produced by the atomic precarity of the Cold War order—it acknowledges the tragedy and begins cultivating the lesser evil.

Such a choice, Niebuhr reminds us, is both moral and political, whether phrased in neutral language or not. This moral element requires precaution. He claims that:

> Escape from our ironic situation obviously demands that we moderate our conceptions of the ability of men and of nations to discern the future; and of the power of even great nations to bring a tortuous historical process to, what seems to them, a logical and proper conclusion'[255]

The goal of this strategy is not persisting in an ironic stance of negation, but rather the cessation of that irony, the end of the unintended responsibility and the choice of whether to continue after acknowledgment and risk judgment in moral terms of good and evil. This makes shallow, surface-level versions of irony like Paul Wapner and John

[255] Niebuhr 1951; p. 140.

Willoughby's 2005 'Irony of Environmentalism,' which highlights urgent need for transformation and its ecological futility, appear as what they are, simple negations and plays on tensions within concepts, not significant contributions.[256]

Niebuhr's irony is different because it places religious judgment into moral decision-making. Scientific narratives lack this imperative, which may explain why climate issues continue to be denied by segments of the population, especially evangelical Christians. His strategy is not to live ironically but rather to cultivate the self-reflection and humility necessary to constrain irony, to place limits on the risks and unintended consequences which tragic narratives tend to ignore. Unlike Szerszynski's generalized stance, then, it is the potential for this dissolution of the irony which makes the ironic frame so powerful. The lack of inevitability in the ironic frame disrupts the survivalist emphasis on the emergency and turns attention to how we got here rather than simply what we can do to survive. From a Christian theorist focused on responsibility in modern conditions, such an emphasis on tragedy distorts the ironic fact that we *can* act.

V. Beyond Tragedy: the Irony of the Commons

Given the various drawbacks associated with SRM, it is surprising to see it considered as seriously as it has been.[257] That many today are seriously discussing such large-scale techniques for managing Earth systems like the climate shows the return to the tragic framing of social and ecological crisis. This tragic frame configures the choice to manage the climate as a kind of lesser evil, a last-ditch insurance plan against a

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[256] Paul Wapner and John Willoughby, 2005. 'The irony of environmentalism: the ecological futility but political necessity of lifestyle change.' *Ethics and International Affairs*, Vol. 19, No. 3, pp. 77-89.
[257] A popular summary of these complaints can be found in: Alan Robock, May/June 2008. '20 Reasons Why Geoengineering May be a Bad Idea.' *Bulletin of the Atomic Scientists*, Vol. 64, No. 2, pp. 14-18.

catastrophic future. This framing is attractive given the slow progress on carbon governance at the global scale and the perception that it may already be too late to prevent major change.[258]

Niebuhr considered it tragic prudence to maintain the atomic bomb, a prudence conditioned by his certainty that the USSR would threaten democracy and religion worldwide. Without this certainty, the argument from tragedy dissolves. This is important for thinking about the 'tragedy' of climate geoengineering: it is only pragmatic to make the lesser evil argument if one knows the possible consequences. In contrast, in conditions of uncertainty like those which even the most ardent climate change activist admits, the ironic frame demands action. The threat of all of this is ironic too—efforts to address problems through traditional institutions and strategies has even more resolutely brought about the conditions they initially sought to avoid. This futility of action is not tragic, as Hardin claimed, because it was largely unconscious for the responsible party, violating the need to understand the consequences that anchors the tragic choice.

Irony, in Niebuhr's sense, still entails responsibility—just because the US had always sought isolation does not mean it can abandon it responsibility to check the advances of totalitarian atheism. Similarly, the industrialized nations are now confronted with a decision about their unrealized historical responsibility, which in terms of human suffering is between good and evil. Niebuhr's insistence on humility is political, not passive, it insists on critical revaluation without surrendering a pragmatic realist approach. His concept of tragedy, punctuated by the grace and sin of human life, is not

[258] Burney *et al* 2013 (p. 49) note how two decades of perceived failure have violated the trust in institutions necessary to create meaningful change, that 'while diplomacy hasn't been in short supply, it hasn't had much practical impact on the rate of emissions.'

Greek, but Christian, he sees the cycles and rhythms of tragic thought in the logic of nations, not individuals, who could be saved and choose good when confronted with a clear choice. The danger of living in ironic times was that such a choice was never as clear as it seemed, that often what was seemingly tragic was really too uncertain to make a choice of lesser evils.

For example, the great irony of Hardin's campaign against aid and immigration was the finding that education for women dramatically lowers birthrates. Hardin's emergency had demanded leaving the Third World behind based on its rapid population growth, when in the end, this transition would have benefitted from a moral renewal of US purpose to bring aid and education to the rest of the world. Although prudent in the face of the challenges presented by rapidly accelerating global ecological degradation, our contemporary survivalists, unlike Hardin's generation, lack humility about the promise of concentrated technological efforts, whether delivered by efficient markets or concentrated space-race-style central government investment. The survivalist central problem of imagining effective institutions remains, but is superseded by the possibility that human ingenuity will salvage the contemporary consumer lifestyle of 'advanced' nations with input substitution and incentivized technological breakthrough.

Although the militant atheism of the USSR, in Niebuhr's eyes, was more dangerous to the world (since it held its sins so securely and collectively without dissent), the general expansionist framework of both US and USSR were implicated by their confidence in the rational order to be progressively discovered. His fear was that liberal democracy would become as assured of its historical narrative, as communists had

become, and that the humility that comes from knowing one's finitude was in danger in an age increasingly defined by secular political goals. He says:

> Perhaps the real difficulty in both the communist and the liberal dreams of a 'rationally ordered' historic process is that the modern man lacks the humility to accept the fact that the whole drama of history is enacted in a frame of meaning too large for human comprehension or management. It is a drama in which fragmentary meanings can be discerned within a penumbra of mystery; and in which specific duties and responsibilities can be undertaken within a vast web of relations which are beyond our powers.[259]

The possibility of mystery is front and center in even the most strident accounts pushing for geoengineering. While the tragic framing seeks to emphasize the increasing certainty of such events to motivate action, an ironic frame appears less urgent and more damning.

This is accentuated by the secular nature of the scientific calls for action, which, like the communist science of history, predict the end of history as an objective fact. Niebuhr, humbled by world war and atomic destruction, replies:

> A sane life requires that we have some clues to the mystery so that the realm of meaning is not simply reduced to the comprehensible processes of nature. But these clues are ascertained by faith, which modern man has lost. So he hovers ambivalently between subjection to the 'reason' which he can find in nature and the 'reason' which he can impose upon nature. But neither form of reason is adequate for the comprehension of the illogical and contradictory patterns of the historic drama, and for anticipating the emergence of unpredictable virtues and vices. In either case, man as the spectator and manager of history imagines himself to be freer of the drama he beholds than he really is; and man as the creature of history is too simply reduced to the status of a creature of nature, and all of his contracts to the ultimate are destroyed.[260]

For Niebuhr, both great ideological systems were implicated because industrial organization was linked to the decline of religious values which once anchored

[259] Niebuhr 1951; p. 88.
[260] Niebuhr 1951; p. 88.

communities in a shared moral imaginary, and to the production of great levels of poverty, which he viewed as a scandal. Ignoring such a radical uncertainty (for him related to original sin) meant that the lesser evil always risks overtaking the greater. Applied to history, Niebuhr believed any purely rational interpretation was thus absurd, and that its adoption created the possibility of suffering so great that it legitimized holding atomic weapons.

The sum of these arguments is more qualified that it may first appear. Niebuhr's realization that the atomic tragedy was laid into an overarching ironic historical arch balances the prudent maintenance of deterrence with a real sense of the evil which doing so represented. Frustrated with idealist naivete, he attempted to treat the world as it had revealed itself, as potentially catastrophic and bent by human ambition to universal power. Doing so, however, Niebuhr did not return to survivalist, Hobbesian power politics, but rather seated his Christian moral vocabulary in the challenges of living in times where the confluence of original sin (partiality of human experience) and novel technological destruction meant a practical engagement with a lesser evil than that revealed by Nazi Germany and Stalinist communism.

The 'evil' of geoengineering is not yet revealed, however. Atomic weapons were used and hydrogen bombs tested, missiles were developed that could spread catastrophe to planetary proportions. Geoengineering remains 'in the box' so to speak, untested and uncertain. Prudence demands that techniques be investigated and governance constructed due to the potential for unilateral use and localized climate catastrophes. But its field testing and eventual entrance into public debate as a real mitigation measure remain highly problematic. It seems impossible to prevent the research and stifling to assert a

preemptive moratorium on computer modeling, but there are also serious questions about the potential moral hazard of phrasing the eventual use of these technologies as insurance for emergency.

Such a rhetoric, on its own terms, is certainly logical. But these terms lack specificity about how to deal with lock-in incentives, termination effects, the sticky ethical concerns with intervening in natural systems at a global level (and perhaps 'passing the buck' to future generations), and the decidedly political questions about liability, social justice, legal terms of legitimate use, and feasibility of the long-term continuity in interventions necessary to prevent catastrophic warming once started. Understanding the complexity of Niebuhr's Christian Realism places these at times abstract-seeming global debates into a specific and historically-grounded moral vocabulary which Americans, by far most historically responsible for climate change and still rich enough to act, can understand and debate.

This signals a shift in tactics from the science wars strategies of fighting denial with greater certainty (couched always in conditional scientific language) are misguided, as even if successful they emphasize the oncoming catastrophe, reinforcing catastrophic tropes and obscuring non-technical debate about ethics and politics. The uncertainty involved in the deployment of SRM requires such an unavoidable and terrible future—a framing which requires drawing attention away from the moral and political needs for reducing emissions. It may create a self-fulfilling prophecy. This sense is strong with Crutzen and Caldeira, who owns several patents on SRM technology, a tragic prudence mirrored in Niebuhr's eventual choice to keep weapons of mass destruction.

What Crutzen and Caldeira lack however is the balancing sense of humility and profound ambivalence for technology which Niebuhr assumed. Lacking the certainty and abruptness of the entrance into the nuclear age, contemporary debates drawn from recognition of entrance into human-dominated world systems and the slow violence that results also lack the certainty of the catastrophic future necessary to weigh greater and lesser evils. Instead, such seemingly tragic choices risk vast unintended consequences in the assumption that it will be for the sake of survival, creating an urgency which mobilizes the prudent technological management of systems in crisis without the reflexive humility to see that it was in no small part these management schemes at lower levels which have delivered the crisis they predict.

I have tried to show the usefulness of Niebuhr's Christian Realist perspective for understanding the change in norms now underway in the most dire and 'pragmatic' corridors of academia and government. This analysis responds to the specific platform of geoengineering as well as the need to translate global and abstract concepts and trends into meaningful terms for political and ethical debate. In the US this cannot be done democratically without embracing a Christian audience, a task which Niebuhr's vocabulary may help us guide toward the kinds of political outcomes we seek rather than increased technological mastery in the guise of hollowed-out versions of tragedy, prudence, and humility. Embracing an ironic view does not mean critiquing until nothing remains, but generating a choice with moral consequences. Climate geoengineering, at its worst, prevents such a choice, and its advocates actively resist public debate.

05 A New Great Awakening: Surviving American Rhetorical History

I. Awakening to Survivalism

> God may indeed be dead in the minds of many, but there is no shortage of surrogates eager to do the work He once reluctantly did. – John H. Schaar

Contemporary post-apocalyptic fantasy is its own industry now in the United States, and this trend is not limited to popular culture. Many writing today from academic perspectives have accepted the scientific concern over global ecosystems as a sign of disastrous change and have begun utilizing vivid depictions of post-apocalyptic futures to animate urgent political action. Crucially, however, political agreement created by the possibility of a catastrophic future often ends well before consensus on the core problems to be addressed most urgently. This disagreement is more than continuing battles over scientific verification and focus on effective communication. The contest goes deeper, to core assumptions about the shape of the new future to work towards and the kinds of politics necessary to get there.

In an increasingly polarized political environment in the United States the temptation is often to demonize or belittle principled opponents, many of whom might agree with the underlying concerns of the other if they could be expressed in meaningful terms. The bifurcation of the media environment in the contemporary United States makes this task both exceptionally hard and increasingly necessary for those interested in democratic environmental politics. In response to cynical denialism it has become too common on the secular left to patronize religious audiences as anti-science or ignorant, even while, unconsciously at times, wielding the tools of religious apocalyptic imagery.

This paper is a considered effort to begin generating a more inclusive democratic politics for the age of environmental crisis, one which makes a considered case to religious audiences in the US for transformative environmental politics. This is important for two main reasons. First, the perceived smugness of secular academics has inhibited the initiation of a serious climate debate across the political spectrum. Continuing to ignore or antagonize religious audiences only compounds this problem. Second, and perhaps most importantly, religious people make up a significant portion of the US voting demographic, including important concentrations in specific states.

In the face of a desperate need for active and transformative change, abandoning such a large section of American society essentially cedes that such change will take place in the secular coastal states or by the hand of an empowered central government. Traditional information campaigns predicated on neutral scientific analysis have not been able to adequately address this fundamentally political problem. In response, many traditionally reserved scientists have been challenged to move past information to motivation, to begin demonstrating the personal relevance of global change in meaningful local terms.

In this process, many commentators appear surprised, and at times worried, that debates have taken on tropes of religious apocalypse. This is important because all sides of this 'secular' debate accuse the others of zealotry, whether ascetic Romanticism, technological determinism, or creationist denial. The analysis here begins from the assumption that, rather than examining this debate through the lens of fidelity to scientific facts, it is more useful to see it as a contest of faiths. This perspective, I argue here, will be important in order to draw critical attention back to the audience such rhetoric targets

and the reasons such tropes are powerful and dangerous in the American context and to begin sincerely approaching religious audiences with climate outreach. Considering the audience in the US, it is clear that there is a powerful historical tradition of apocalyptic rhetoric which continues to resonate in contemporary times with both religious and secular audiences.

I will show in what follows how this historical inheritance can help us better understand catastrophic ecological crisis rhetoric increasing in volume today. To do this, I offer three historical examples that show how 'secular' ecological catastrophe narratives also draw heavily on religious themes, and work to draw out potential insights from their comparison. First, I revisit a master trope of American political appeal, the fire and brimstone of John Edwards and the Great Awakening. Noting the continued relevance of an 'Awakening' rhetoric to the environmental movement, I highlight how many prior campaigns like that of Rachel Carson observed a clear move in the Great Awakening strategy—they presented the possible future balanced with a pause and assertion that the time is not too late to act.

Contemporary apocalyptic environmental campaigns threaten more than Edwards' individual damnation, and extend the fire and brimstone to the global level. This type of appeal is also not new to American history—a second relevant example comes from the transformation of the apocalyptic 19th century sect, the Millerites. The Millerites gained great urgency and commitment by naming the year of the apocalypse, and their disconfirmation began the transition to a slower, more indeterminate apocalypse as 7th Day Adventists. I explore how this slow apocalypse is similar to secular

contemporary narratives like Rob Nixon's 'slow violence' of climate change and the longer, even geologic timescale of climate predictions and Anthropocene activism.[261]

Finally, I treat the catastrophic imagery of Christian political eschatologist Hal Lindsey alongside that of ostensibly secular population ecologist Paul Ehrlich, both of whom gain great popularity and influence in the 1970s. Like many in the contemporary climate debate, Ehrlich is profoundly modernist—he preserves his appeal as secular, objective, and global. At the same time, he often writes in catastrophic tropes borrowed from the religious imaginary and clearly neglects the lessons of religious experiences. With reference to the dispensational pre-millennial strategies of Hal Lindsey and their critical discussion by anthropologist Susan Harding, I tease out how Ehrlich's use of specific dates and lack of attention to the scale of agency of his audience produced both long-lasting suspicion of ecological politics and failed to affect the central problem in his analysis, global population.

The sum of these parts is two-fold. First, it shows that perceptions of climate change as a 'secular' apocalypse are shallow as many activists and academics regularly borrow from a shared set of apocalyptic tropes and address an audience in the US which is steeped in an amalgamation of religious, nuclear, and environmental apocalypses. Second, it shows the rich potential of American historical debates to understanding the prevalence of catastrophic imagery connected to ecological politics and guide its future

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[261] See: Rob Nixon, 2012. *Slow Violence and the Environmentalism of the Poor.* Harvard University Press, Cambridge; Paul Crutzen and Christian Schwägerl, 2015. 'Living in the Anthropocene: Toward a New Global Ethos.' Yale Environment 360, Online. http://e360.yale.edu/feature/living_in_the_anthropocene_toward_a_new_global_ethos/2363/; Will Steffen, Paul Crutzen, and JR. McNeill, 2007. 'The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature?' *Ambio,* Vol. 36 No. 3, pp 614-621.

use. Reaching across traditional secular/sacred, left/right divides will be important if there is to be a truly plural democratic politics of the Anthropocene.

II. The Power and Danger of the Apocalyptic Method

> If the patterns of argument typical of religious prophecy are also observable in any public discourse that anticipates or predicts catastrophe, then we should be skeptical of the public's ability to reasonably evaluate any appeal to urgency in the face of disaster. At the same time, we also run the risk of dismissing valid threats because they are couched in the form, if not the language, of traditional prophetic warnings. –Stephen O'Leary

Threatened chiefly by passivity and political inaction, academics and activists addressing ecological crisis have increasingly turned to the tools of apocalyptic rhetoric in ways which seem to confound the traditional separation of secular and religious apocalypse narratives. This is because their ideal audiences are not as clearly segregated as many imagine, evident both in the persistence of religious interpretive frames in Christian areas in the US and in the perverse hope for apocalyptic change creeping into more traditionally secular, leftist, and scientific accounts of ecological politics.

In his study of apocalyptic rhetorical strategies Frank Borchardt notes that apocalyptic rhetoric is intended to persuade audiences to 'undertake some action to resolve the crisis in its favor or to persuade an audience of the insignificance of the crisis in the grand scheme of things.'[262] This attention to rhetoric is important. Rhetoric is the crafting of speech to persuade an audience through careful attention to the expectations and history of that audience as well as the mechanics and allusions of the speech itself, an effort which requires deep contextual knowledge of the culture targeted. As Michael

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[262] Frank Borchardt, 1990. *Doomsday Speculation as a Strategy of Persuasion: A Study of Apocalypticism as Rhetoric*. E. Mellen Press; p 2.

Halloran notes, 'the master of rhetoric was the man who had interiorized all that was best in his culture and applied this knowledge in public forums, influencing his fellow citizens to think and act in accord with their common cultural heritage.'[263]

This presents a clear challenge to the conveying of information about global problems, perhaps nowhere more in evidence than efforts to create outreach that leads to effective climate governance at international, national, and local levels. The need for meaningful translation is at the heart of the critique emanating from scholars of technology like Sheila Jasanoff and Bryan Wynne. Jasanoff, in her 2010 paper 'A New Climate for Society,' insists that:

> Much work has to be done to make the representations look as if they are the right ways of characterizing the world. That work tends to erase specificity and remove traces of the human mind and hand[…] Inevitably, the process of making things impersonal eliminates not only subjectivity but also meaning: scientific facts arise out of detached observation whereas meaning emerges from embedded experience.[264]

Such 'neutral' trappings of scientific facts, as enshrined in the environmental movement and green scholarship, Jasanoff contends here, disengage their subjects from their audience. Instead, for Jasanoff, 'living creatively with climate change will require re-linking larger scales of scientific representation with smaller scales of social meaning.'[265]

For sociologist Brian Wynne this realization generates uncomfortable questions. In an article from the same year he asks whether the push for scientific authority also

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[263] Michael Halloran, 1975. 'On the End of Rhetoric, Classical and Modern.' *College English,* Vol. 36, No. 6, pp. 621–631; p. 621.
[264] Sheila Jasanoff, 2010. 'A New Climate for Society,' *Theory, Culture and Society*, Vol. 27, No. 2-3, pp. 233-253; p. 234.
[265] Jasanoff 2010; p. 238.

perversely prevents ownership of those issues[266] For him, the fact that scientific outreach *depends* on broader frames of meaning means that 'more poetic ways of understanding this knowledge […] could render its public lives, public uptakes, and public engagements more resilient, and practically more rewarding,'[267] or that, essentially, in the gap exposed between scientific facts and taking action, new political and cultural mediation is necessary. This gap, for both authors, requires analysis from the social sciences and humanities which have largely been sidelined by the dominant rhetorical strategies of secular scientific fact and its mirror in reactionary (often religious) denialism.

Jasanoff notes the opportunity for the humanities and social science, noting that 'climate change, through the discordances it produces in established ways of understanding the human condition, offers unique opportunities for disciplines that mainly concern themselves with the interpretive, sense-making capacities of human societies.'[268] Palsson *et al* also claim that accepting the new era of ecological crisis creates a distinct task for social science research, that: 'The larger conceptual task remains to reframe Anthropos for the modern context.'[269] In a recent paper, Lovbrand and coauthors have argued that the character of narratives of global change is problematic because 'the concept has its home in the environmental sciences and is dominated by a persuasive science narrative of escalating human induced environmental change.' Instead of focusing on the certainty of global change, they insist that 'a more pressing

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[266] Brian Wynne, 2010. 'Strange Weather, Again: Climate Science as Political Art,' *Theory, Culture and Society,* Vol. 27, No. 2-3, pp. 289-305; p. 291.
[267] Wynne 2010; p. 301.
[268] Jasanoff 2010; p. 249.
[269] Gisli Palsson, B. Szerszynski, S. Sorlin, J. Marks, B. Avril, C. Crumley, H. Hackmann, P. Holm, J. Ingram, A. Kirman, M. Pardo Buendía, and R. Weehuizen, 2013. 'Reconceptualizing the Anthropos in Anthropocene: Integrating the social sciences and humanities in global environmental change research.' *Environmental Science and Policy,* Vol. 28, pp. 3-13; p. 4.

analytical task lies in exposing and challenging the underlying cultural and social assumptions that inform how we collectively makes sense of and respond to a changing environment.'[270]

This is particularly important to consider in the context of escalating ecological crisis narratives, many of which pursue active and critical perspectives through the ever-greater certainty of catastrophic change. These apocalyptic visions are seen by many as grossly unproductive for pursuing environmental goals—modernist critics claim that a suite of positive, seductive visions must be constructed to entice rather than shame people into individual and collective change. These reformist authors claim 'scaring people' cannot succeed in the long term, criticizing any attempt at public outreach which draws on controversial or unscientific tropes. Concerned with overwhelming their audience, such reformist critics of green apocalypticism have charged even moderate environmentalists as alarmists and advanced a centrist and incremental platform based on large-scale government investment and increasing technological management.

This line of thought is contrary to the insights of scholars of apocalyptic rhetoric like Borchardt, who notes, by contrast, 'to threaten or predict disaster works rhetorically—in defiance of reason, experience, and good sense; to predict routine does not.'[271] For him, 'working' means catching and holding attention in a crowded information environment full of rival appeals. He maintains that predicting a future like what has come to be seen as 'normal,' as the critics of apocalyptic rhetoric contend, is an invitation to allow the audience to return to unconscious habits. Predicting the end of

[270] Eva Lövbrand, S. Beck, J. Chilvers, T. Forsyth, J. Hedrén, M. Hulme, R. Lidskog, and E. Vasileiadou, 2015. 'Who speaks for the future of the Earth? How critical social science can extend the conversation in the Anthropocene.' *Global Environmental Change*, Vol. 32, pp. 211-218; p. 212.
[271] Borchardt 1990; p. 4.

routine and habits not often exposed to critical reflection is jarring and creates anxiety. Borchardt believes that the shift from individual to higher scales generates a higher, more powerful form of this anxiety linked to the speculation about the end of all things. Playing 'fast and loose' with this scalar mismatch, he claims, is a powerful rhetorical tool of persuasion which can be wielded strategically.

Communications scholar Stephen O'Leary agrees that apocalyptic themes can be useful if used under certain conditions:

> The discourse 'works' with its audiences to the extent that it can successfully account for events that disrupt the tenuous order humans impose on their existence, whether such events are understood to signify the indifference of chaotic and inexorable natural processes (such as death, floods, and earthquakes) or the existence of malevolent forces in the universe.[272]

Like Borchardt, O'Leary notes the paradoxical comfort produced by the apocalyptic timeline, the sense that things which appear chaotic and uncontrollable are part of the divinely ordered plan. This tactic, for O'Leary, is especially powerful in unsettled times where a return to the past no longer seems feasible, presenting individual conversion as a path to avoid the worst possibilities.[273]

Christina Foust and William Murphy argue that this emphasis on conversion is useful to contemporary debates because apocalyptic rhetoric 'represents a mediating frame in global warming discourse,'[274] or, essentially, a way of organizing the overwhelming amount of drastic scenarios and sense of despair in the face of disaster into something which cultivates agency and moral reflection. Uncomfortable as it may be for

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[272] Stephen O'Leary, 1997. 'Apocalyptic Argument and the Anticipation of Catastrophe: The Prediction of Risk and the Risks of Prediction,' *Argumentation*, Vol. 11, pp. 293-313; p. 294.
[273] O'Leary 1997; p. 309.
[274] Christina Foust and William Murphy, 2009. 'Revealing and reframing Apocalyptic Tragedy in Global Warming Discourse,' *Environmental Communication*, Vol. 3 No. 2, pp. 151-167; p. 153.

secular activists and scholars, this is exactly the kind of creative mediating frame called for by Wynne and Jasanoff.

Beyond the strategic usefulness of addressing the religious community, I am arguing here that the fact that global-scale social-ecological crises defining our times continue to be presented as purely secular catastrophes is puzzling given the imagery used to construct it. It is also confusing for debates over the strategies for creating urgent outreach through public fear campaigns in the US. Because of the rich history of catastrophic appeals in the US, using such tropes to activate an American audience is paradoxically effective and dangerous. Seeking a new Great Awakening of political agency necessary to maintain the possibility of adaptation to global ecological crisis, the wielders of apocalyptic narratives may be tempted to unbalance old 'Awakening' formula with global, and seemingly inescapable, crises.

The self-perceived hyper-rationality and secular nature of ecological crisis literature, emblematized by theorists like Paul Ehrlich popular in the 1970s, precluded the links to religious tropes even as it was swept to fame bundled with energy crisis, millennial fervor surrounding the Arab-Israeli War, and the profound insecurity of atomic stalemate. His experience, set alongside the more politically successful rhetoric of millennial preachers of his own era, shows how escalation to the global level without attention to politics may legitimize interpretations that create new, unprecedented technological risks or encourage responsible people to resign themselves to authoritarian government to manage decline. Both are in line with the rhetorical history of the US, and understanding their resonance is important for calibrating 'creative mediation,' i.e. demonstrating the personal relevance of global change and beginning an active and

inclusive political process that does more than wait for the arrival of apocalyptic conditions.

The Secular Apocalypse?

Political scientist Michael Barkun began writing about apocalyptic politics in the 1970s with his book *Disaster and the Millennia* and continues to work on themes of religion, conspiracy, and security up to our contemporary times.[275] Looking back through US history, Barkun separated traditional Great Awakening and Millennial religious apocalypses from a category he called 'secular apocalypses.' Here I will argue that while this demarcation is intuitive in ideal in form, it is not useful for specific rhetorical outreach.

In a paper from 1983 titled 'Divided Apocalypse,' Barkun lays out exactly what the category of 'secular apocalypse' would contain, namely four major factors: 1) nuclear war, 2) spiritual and ideological exhaustion, 3) environmental degradation, and 4) overpopulation and resource fear.[276] Two of these subdivisions are distinctly ecological, if led in gravity by the nuclear example. Barkun insists that each models itself consciously on the framework of religious apocalypse. He claims:

> However uninformed or unsympathetic these secular prophets may be concerning their religious counterparts, they clearly recognize the presence in their own work of religious motifs. Their predictions of 'last things' generate the feelings of awe that have always surrounded

[275] Michael Barkun, 1974. *Disaster and the Millennia.* Yale University Press, New Haven; 1996. *Millenialism and Violence*, F. Cass, Portland; 2003. *Culture of Conspiracy: Apocalyptic Visions in Contemporary America*, University of California, Berkeley; 2011. *Chasing Phantoms: Reality, Imagination, and Homeland Security Since 9/11*, University of North Carolina Press.
[276] Michael Barkun, 1983. 'Divided Apocalypse: Thinking About the End in Contemporary America,' *Soundings: An Interdisciplinary Journal*, Vol. 66, No. 3, pp. 257-280; p. 263.

> eschatology, even if in this case the predictions often grow out of computer modeling rather than Biblical proof-texts.[277]

His point in this paper is that while the imagery of such rhetorical strategies may be similar, their underlying cultural logics and framework of assumptions are radically different. He claims that: 'a common intuition of impending catastrophe has seized upon two dissimilar populations, one rooted in Southern and Midwestern Christian fundamentalism, the other in academic, usually social scientific, modes of empirical analysis.'[278] Barkun's insistence on the demarcation between secular and religious apocalypses is intended to preserve the acknowledgment of the agency of humans in the crises confronted, in his opinion unlike religious narratives which placed ultimate agency in Nature or God.

For Barkun, the possibility of a discourse producing a synthesis of religious and secular strategies was impossible given the basic assumptions underlying the target audience of each—essentially, the world view that created legitimacy and authority in each was too disparate. The great threat, he thought, was rather that these parallel but separate discourses would somehow agree on their signs, creating the potential for a global-scale self-fulfilling catastrophic prediction.[279] O'Leary also notes the connection between ecological debates and apocalyptic rhetoric, but does not divide secular and

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[277] Barkun 1983; p. 265.
[278] Barkun 1983; p. 265.
[279] Barkun 1983; p. 278. Later Barkun notes that more hybridized forms developed in the 1980s, but still retained these categories for the production of those hybrids. I do the earlier work in more detail here because it serves as the touchstone of several different disciplines approaching catastrophic environmental rhetoric in the 1990s which I will refer to later.

religious apocalypse as neatly as Barkun does.[280] Far from operating in parallel, O'Leary sees the two discourses in constant interaction. He claims:

> If, when confronted with conflicting arguments and scenarios from technical experts, the public resorts to standards of argument evaluation more appropriate to religious discourse than an age of science, argumentation scholars should be neither surprised nor scornful. Rather, we should pay closer attention to the social functions as well as the argumentative forms of predictive argument.[281]

For O'Leary, the differences are important to consider, but they do not mean that religious and secular discourses are functionally separate. This is in part due to the fact that, from the perspective of rhetoric, such a designation ignores the audience in the United States.

Many other authors have made the connection between religious and ecological themes. James Chall pointed out the theological aspects of such 'secular' discourses as early as 1976. Eric Zencey's work on radical environmentalism draws in comparisons to the Millerites and points out the decidedly religious flavor of early environmental movements and their apocalyptic inheritors in the 1970s.[282] Today, Giner and Tábara, Killingsworth and Palmer, Stewart and Harding , and McQueen, amongst others, have contended that such a separation ignores the interdependence of catastrophic narratives, reflecting a turn to considering in detail the target audience approached in the US and the history of interpenetration between discourses.

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[280] In his piece from 1999 Barkun shows that these are ideal types, identifying a mixed use of many different apocalyptic strategies as characteristic of contemporary 'hyperstatic' disaster scenarios. Cited in Kathleen Stewart and Susan Harding, 1999. 'Bad Endings: American Apocalypsis.' *Annual Review of Anthropology*. Vol. 28, pp 285-310.

[281] O'Leary 1997; p. 310.

[282] Eric Zencey, 1988, 'Apocalypse and Ecology.' *The North American Review*, Vol. 273, No. 2, pp. 54-57. I return to Zencey in the section on the Millerites.

In perhaps the most forceful of the efforts to complicate Barkun's taxonomy, Killingsworth and Palmer insist that secular and religious apocalyptic discourses are intimately interrelated, showing the peak of 'Millennial ecology' in the early environmental movement and new resurgence under the aegis of global warming.[283] They name this tendency the ugly neologism 'ecoreligion,' and chide Barkun for assuming that environmental catastrophe was a species of nuclear, secular, anthropogenic apocalypse. Regarding environmental themes as a subset of nuclear problematics, they think, is a category mistake tied to the assumption that nuclear war has subsided from public consciousness, a recognition that old ecological millennialism predicated on reference to atomic war may not resonate as strongly as it once did in a new information environment which is not as permeated with apocalyptic nuclear themes.[284]

Some, however, are worried, like Barkun, that the inescapability of the apocalyptic mode may posit global warming as something outside the powers of human agency, as something 'extra-human' or fated, a move which disables accountability. This is enhanced by the sense that 'climate change is happening so quickly and intensely that we cannot keep pace with understanding it; nor can our current form of politics give guidance or promote action to halt or slow it.'[285] These critics fear that, lacking human agency, such narratives drawing on religious imagery will deliver the self-fulfilling prophecy—that the temporal misunderstanding of global warming (as akin to floods or

[283] Jimmie Killingsworth and Jacqueline Palmer, 1996. 'Millennial ecology: The apocalyptic narrative from Silent Spring to global warming.' *Green culture: Environmental rhetoric in contemporary America*. pp. 21-45.
[284] Robin Globus Veldman, 2008. 'Planet in Peril': The End of the World in Environmental Discourse.' Unpublished masters thesis.
[285] Foust and Murphy 2009; p. 156/

droughts that happen overnight or in a season) will risk creating despair and accusations of alarmism which will ironically prevent efforts to confront the trends diagnosed.

Philippa Spoel and coauthors summarize scholarship linking religious and ecological narratives, hoping to illustrate how 'to bridge the discursive-epistemic gap between lay and expert understandings of the world.'[286] They are concerned, as I am here, with getting beyond the 'educative function' and moving on to 'motivational' factors, getting beyond communication to action. Citing Killingsworth and Palmer, they observe that ecological crisis literature often draws on apocalyptic themes to expand its base and incorporate new perspectives, and in this way 'millennial rhetoric bears a dialectical relation to public support for the environmental movement.'[287] Spoel *et al* insist that communicating something like climate change requires a 'rich and dynamic communicative process, a process that integrates the proofs of ethos, logos, and pathos in meaningful and memorable ways.'

They are particular concerned with reaching religious audiences—they claim that apocalyptic rhetoric serves as 'a key resource deployed by these works to communicate climate change science in terms of a cultural rationality that includes, but goes beyond, technical rationality.'[288] They focus on religious audiences because they are concerned with translating typically dry scientific data into compelling evidence of the need for active political transformation. The concern with 'situationally meaningful engagement

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[286] Philippa Spoel, David Goforth, Hoi Cheu, David Pearson, 2009. 'Public Communication of Climate Change Science: Engaging Citizens through Apocalyptic Narrative Explanation,' *Technical Communication Quarterly*, Vol. 18 No. 1, pp. 49-81; p. 52.
[287] Killingsworth and Palmer 1996; p. 22.
[288] Spoel *et al* 2009; p. 74.

in this process'[289] is reflected in Robin Globus Veldman's 2012 piece from *Ethics and the Environment*. In it, she refutes claims by reformist and denialist authors that reflecting on apocalyptic futures inspires fatalism, noting instead that 'empirical evidence shows that environmental apocalypticism is frequently associated with activism.'[290] Like Spoel et al, she suggests that this is because catastrophe gives normative punch to the ecological narrative by providing a moment of choice by which to judge ethical behavior. Globus Veldman is disagreeing directly with Barkun. She claims:

> [Barkun] was certainly correct to highlight the secular origins of the new environmental apocalypticism, for this helps distinguish it from its Christian counterparts. Yet it is also important to note that the use of science has not precluded religiosity entirely, particularly among radical environmentalists [...] While drawing heavily on science, and usually affirming human agency, environmental apocalypticism is thus best conceived not as a purely secular phenomenon, but as a syncretic tradition that combines both religious and secular elements to varying degrees.[291]

Looking at ecological narratives from the perspective activists, her intuition is that 'ultimately, while there are disagreements over what strategies will best achieve their desired goals, for most radical environmentalists, apocalypticism and activism are bound closely together.'[292]

Unlike most scientific authors relying on scientific norms of neutrality and rationality to give them authority, what these authors have suggested is a much different approach. As Globus Veldman notes, far from simply overwhelming the audience or tainting scientific neutrality, such apocalyptic narratives can be useful where they inspire

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[289] Spoel *et al*; p. 78.
[290] Robin Globus Veldman, 2012. 'Narrating the Environmental Apocalypse: How Imagining the End Facilitates Moral Reasoning Among Environmental Activists.' *Ethics and the Environment*, Vol. 17 No. 1; pp. 1-24; p. 1.
[291] Globus Veldman 2012; p. 3.
[292] Globus Veldman 2012; p. 7.

action by disclosing decisions in everyday life as fundamentally ethical. In this way, catastrophes link global scale crises to local conditions, and because the great scale of the disaster foretold increases 'feeling of responsibility to make good one one's moral intuitions.'[293] These authors believe that ecological crisis rhetoric is always already tied up with religious apocalypse, and that rather than a great shortcoming such a confluence presents a set of possibilities to do exactly what catastrophic rhetoric is intended for, as Killingsworth and Palmer contested—the expansion of perspectives in the debate and the need to move from education to motivation.

By traversing the barrier laid down in ideal form by Barkun between religious and secular, these authors all call for mediation which connects with the American public at the level of their everyday life and moralizes the actions leading to climate change. As a mediating frame, however, for Foust and Murphy, apocalyptic rhetoric need not be attached to short time lines and therefore inspire despair for action at effective scale.[294] They warn that 'certain versions of this frame may stifle individual and collective agency, due to their persistent placement of 'natural' events as catastrophic, inevitable, and outside of 'human' control,' but qualify the statement by claiming that:

> To promote a feeling of immediacy for global warming may not, by itself, hinder human agency. Warning readers that we currently feel some effects of global warming may promote a sense of urgency while retaining the potential for human action.[295]

This both acknowledges that such narratives, even religious ones, need not be purely disengaging.

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[293] Globus Veldman 2012; p. 12.
[294] See: David Barker and David Bearce, 2012. 'End-Times Theology, the Shadow of the Future, and Public Resistance to Addressing Global Climate Change.' *Political Research Quarterly*, Vol. 66 No. 2, pp. 267-279.
[295] Foust and Murphy 2009; p. 153.

If the gap between global ecological change and local understanding is at the heart of passive reactions to global crisis outreach, and many of those in the audience who most need to be reached are religious, it may be time to admit the usefulness of the secular/sacred apocalypse distinction is dubious at best. Rather than lament that scientific verification debates are not reaching an audience because religious people have shorter time horizons or have a cultivated skepticism towards science, this admission would instead require turning to the historical heritage of American apocalypticism for both evidence of the intermingling of secular and religious apocalypses and rhetorical lessons for contemporary outreach hoping to bridge the Promethean gap between global change and local consequence.

The three examples which follow show both the resources for environmental politics in the religious history of the US and also how environmental and religious themes are already intermingled in discernible and, from the perspective of rhetoric and democratic deliberation, important ways. The first compares Rachel Carson and Jonathan Edwards. The second puts the Millerites in conversation with Rob Nixon. And the third pairs Hal Lindsey and Paul Ehrlich.

III. Rachel Carson and Jonathan Edwards on Awakening

In *Silent Spring*, Rachel Carson set the enduring template for environmental outreach. A marine biologist by training, Carson made her case against pesticides by summoning a catastrophic future: a spring without birds and all the sounds of life which characterize nostalgia for the traditions and pastoral mythology of Americans. Her imagery is stark:

> It was a spring without voices. On the mornings that had once throbbed with the dawn chorus of robins, catbirds, doves, jays, wrens, and scores of other bird voices there was now no sound; only silence lay over the fields and woods and marsh.[296]

Her strategy was to present an idyllic natural scene and its absurd corruption, presenting the threat of catastrophic environmental consequences through the loss of cultural meaning it entailed. That she was so successful was not simply that she was a revered scientist delivering a dire warning from a neutral, authoritative pulpit, but rather that she embedded her fire and brimstone in dearly held cultural myths.

Carson's strategy depended on the fact that such a future, while imminent, had not yet arrived—*there was still time to act*. Such a strategy could rightly be called 'Great Awakening,' and it is perhaps this deep resonance which offers a lesson unobserved by most catastrophic political ecology in the era of 'secular' global-scale social-ecological crisis. Awakening rhetoric has a long tradition in the United States, dating back to at least the mid 1700s, and with historical precedents in the Anabaptists, Florentines in the age of Savaranola, and many other myths and religious beliefs. In particular, throughout the mid 1700s, fits of religious fervor swept the US countryside, making preachers like Jonathan Edwards an enduring part of standard histories of the US. Edwards' strategy was simple—present the very real, horrible conditions of eternal life in hell, then radicalize the anxiety created by insisting on the uncertainty of individual life.

Edwards' famous 'Sinners in the hands of an angry god' sermon from 1741 starts with a quote from Deuteronomy (32:35); he prefaces all that follows with: 'Their Foot Shall Slide in due Time.' For Edwards, because one could die at any moment the very

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[296] Rachel Carson, 1962. *Silent Spring*. Houghton Mifflin, New York; p. 2.

real catastrophic conditions of Hell were always looming just out of sight—as he warns 'The sword of divine Justice is every Moment brandished over their Heads, and 'tis nothing but the Hand of arbitrary Mercy, and God's mere will, that holds it back.'[297] His imagery is violent and anxiety-provoking:

> There are the black Clouds of God's Wrath now hanging directly over your Heads, full of the dreadful Storm, and big with Thunder; and were it not for the restraining Hand of God it would immediately burst forth upon you. The sovereign Pleasure of God for the present stays his rough Wind; otherwise it would come with Fury, and your Destruction would come like a Whirlwind, and you would be like the Chaff of the Summer threshing floor.[298]

The lurid reality of God's wrath was the anchor in the Great Awakening strategy. Its rhetorical connection to the weather, in the passage above as well as elsewhere, is clear. He quotes from Isaiah 63:3, and, explicating the direct quote, he embellishes:

> He will crush you under his Feet without Mercy; he'll crush out your Blood, and make it fly, and it shall be sprinkled on his Garments, so as to stain all his Raiment. He will not only hate you, but he will have you in the utmost Contempt.[299]

By insisting that 'their foot shall slide in due time,' Edwards insinuates that even those who feel most secure walking the path will be confronted with challenges, and the unknown and spontaneous nature of death meant that a kind of vigilance was necessary even amongst those who felt secure in their identity as Christians.

The Awakening strategy was thus tied up to the uncertainty of individual life. This allowed the crisis to appear both close and distant, possible at any moment but not until after death. This meant that as long as one was still alive they have a chance to

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[297] Jonathan Edwards, 1741. 'Sinners in the Hands of an Angry God. A Sermon Preached at Enfield, July 8th, 1741.' *Electronic Texts in American Studies.* Paper 54. Online at http://digitalcommons.unl.edu/etas/54; p. 6.
[298] Edwards 1741; p. 13.
[299] Edwards 1741; p. 19

change in time, and the popularity of the Great Awakening is a product of this effective channeling of anxiety into action. Edwards pleads with the crowd at Enfield:

> Their Case is past all Hope; they are crying in extreme Misery and perfect Despair; but here you are in the land of the Living, and in the House of God, and have an Opportunity to obtain Salvation. What would not those poor damned, hopeless Souls give for one Day's such Opportunity as you now enjoy.[300]

Like Carson, he preserves the reassurance that the catastrophe is still in the future. For Edwards, this pause required a kind of heightened preparedness for death and the afterlife, beginning with conversion or recommitment to Jesus Christ.

This reassurance necessary to channel urgency into effective action has largely disappeared from secular and religious apocalypse narratives, but can be found at the heart of traditional green rhetorical strategies throughout US history. The casting of environmental apocalypse as purely secular obscures lessons like Carson's deft use of Great Awakening themes to access powerful tropes specific to American history and national self-perception. The scaling up of ecological politics in our contemporary era has perhaps lost this balance, over-emphasizing the 'realness' of the catastrophic threat without parsing it in a language specific to the cultural experiences of its audience. Lost in this all is the sense of loss and urgency which Carson created.

Great Awakening and Green Movements

The goal of fire and brimstone was individual conversion of new worshipers and recommitment by existing Christians, but the effectiveness of the plea was augmented by the sense of a collective movement and identity of the Great Awakening crowds.

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[300] Edwards 1741; p. 23.

Edwards is clearly conscious of this social element, especially when speaking to young people. He says:

> Many are daily coming from the East, West, North and South; many that were very lately in the same miserable Condition that you are in, are in now an happy State, with their Hearts filled with Love to Him that has loved them and washed them for their Sins in his own Blood, and rejoicing in Hope of the Glory of God.[301]

He is brutally clear: 'How awful is it to be left behind at such a Day!' He targets the insecurity of his young audience; after describing the grisly details of the reality of Hell and the basic insecurity at the heart of individual life he brings the pressure of those convinced onto the undecided. Edwards asks 'will you be content to be the Children of the Devil, when so many other Children in the Land are converted, and are become the holy and happy Children of the King of Kings?'[302]

Edwards sought spiritual conversion at an individual level, but the proof of this conversion was the prudent and urgent change in habits as they were rendered in the Awakened community. Although beginning at this individual level, its final aim was cultural. Today global ecological catastrophe narratives search for the 'fact' that will produce the Great Awakening of political will necessary to avoid the catastrophe, rather than the political and institutional channels for turning such a response into meaningful change. In the absence of political debate, indeed at times *inspired by* frustration with the slow speed of adaptation, the temptation for scientists following Carson's strategy may again be to raise the certainty of the events, assuming that the role of such outreach was

[301] Edwards 1741; p. 23.
[302] Edwards 1741; p. 24.

informing a public which will then act, or individually converting important decision-makers.

Carson's formula, though, has become simplified, caught up in establishing 'the fact' of the crisis without offering an effective outlet for action. Seeking a universal audience, such outreach appeals to no one in particular, it is detached from the sources of cultural meaning, both in understanding how such trends will affect everyday life in specific places, and how the particularity of the audiences modulates the use of catastrophic rhetoric for generating collective agency.

IV. Disconfirmation and Slow Apocalypse: The Millerites

Stephen O'Leary notes that the catastrophic appeal offers the 'grandest tragic catharsis.'[303] At the same time, he still believes it is a risky strategy, built around placing the catastrophe in the immediate but not yet imminent future. The closer the date, the greater the potential penetration into everyday habits, but also the greater the danger of disconfirmation. O'Leary explains:

> If an arguer crosses the line by offering a specific prediction or time boundary that falls within the life span of the audience, he or she is no longer speaking *sub specie aeternitatis*; the subject or stasis of the argument moves out of the realm of abstract hypotheticals, and begins to directly address the concerns of the living. At this point, the audience's role expands beyond a judicial one, which involves weighing the claims of apocalyptic argument, to include a spectatorial one.[304]

This possible passive, spectator role, worries O'Leary, like Barkun and Foust and Murphy, because it potentially obscures agency. O'Leary wonders if a political system

[303] O'Leary 1997; p. 86.
[304] O'Leary 1997; p. 299.

built on deliberation and logical argument is capable of responding to the urgency created by the appeal to disaster.

This is a concern relevant to contemporary social-ecological disaster narratives. The lesson is that there is a difficulty inherent in any catastrophic prediction aimed at producing urgent change: the date set is very important. Set it too far in the future and people put it off or prioritize around it. Analyzing earthquake prediction, O'Leary notes this balancing act:

> The date that is offered must be relatively immediate; that is, audience members must believe that if the claim is true it will concern them directly. At the same time, the proposed date or schedule for the end cannot be too immediate, since this would place the prediction in danger of disconfirmation by external events. This danger does not disappear when a less immediate date for the end is proposed; however, after a movement or sect is formed, the apparent disconfirmation of prophecy can easily be rationalized.[305]

This generates a lesson for O'Leary, that 'both numbers and commitment levels appear to increase as the distance to the prophesied events diminishes.'[306] This creates a kind of perverse incentive for the predictor and accepting audience of the apocalypse, who must now wait for vindication in disaster. As O'Leary says: 'those who accept the argument and endorse the date will look forward to the catastrophe with eager anticipation, since it promises to validate the argument (about which they may still harbor doubts).'[307]

This experience, I'll argue in the next section, would have been a valid lesson to consider for survivalist human ecologist Paul Ehrlich, whose hyperbolic predictions of billions dead by the 1980s did little for the credibility of the movements he championed. Many today choose to illustrate worst case scenarios, as did Ehrlich's *Population Bomb*

[305] O'Leary 1997; p. 297.
[306] O'Leary 1997; p. 299.
[307] O'Leary 1997; p. 299.

and the wealth of survivalist tracts interpreted the MIT computer models in the report to the Club of Rome in 1972.

Writing about his activation as an ecological activist, Eric Zencey pinpoints the temporal challenge presented to action by long term crises. Explicitly connection religious and environmental apocalypses, Zencey works through his personal experience as a reformed survivalist in the terms of another famous chapter in American apocalyptic rhetoric. For Zencey, like Borchardt and O'Leary, apocalyptic thought adds gravity *and* threatens passivity. He says:

> There is a seduction in apocalyptic thinking. If one lives in the Last Days, one's actions, one's very life, take on historical meaning and no small measure of poignance. But along with that historic importance comes paralysis: my belief made it difficult for me to do anything that required planning very far in advance, for I could not conceive of a future that was an organic outgrowth of my moving present.[308]

Zencey compares this feeling to the experience of the followers of Baptist preacher William Miller. Miller, a New England farmer, predicted in 1818 that the world would end 26 years later, a prediction which generated little anxiety until around 1840 when the predicted date, which he narrowed to between March 21st 1843 and March 21st 1844, began to approach.

The Millerites are an interesting resource for catastrophic environmentalism for two reasons. First, they named a date and generated fear and anxiety at a huge level as it approached, but this date was instead a fundamental disconfirmation, known as 'the Great Disappointment.' Second, their movement *survived* this disconfirmation in an altered form, Seventh Day Adventism, which insisted on a slow apocalypse and now numbers in

[308] Zencey 1988; p. 55.

the millions in the US. Walking down from the hill, Miller and his followers began to think of their effort as 'buying time' for the species, laying out a series of adjusted dates based on new math. Miller himself went to his deathbed believing the end was near.

Robert Cialdini notes a similar attitude in many disconfirmed cults, a rededication of faith around the epiphany that their efforts had prevented the very apocalypse they predicted so exactly, but only for a time yet to be determined.[309] Cialdini notes that there have always been predictions of a 'cataclysmic end of the world,' which, 'to the acute dismay of the members of such groups, the end has never appeared as scheduled.'[310] This disconfirmation, however, seemed to paradoxically *strengthen* the belief of many members, such as his examples of the Montanists, Anabaptists, Sabbataists, and Millerites. As the predicted date passed, many redoubled their recruitment efforts and reaffirmed their belief. Cialdini notes: 'these were people whose certainty that they had the truth allowed them to withstand enormous social, economic, and legal pressures and whose commitment to their dogma grew as each pressure was resisted.'[311]

This was in contrast to behavior before the event, where Cialdini notes 'a curious form of inaction,' i.e. the fact that the devotees were willing to sound the alarm but not to evangelize, exposing a distaste for recruitment. Cialdini explains that when the apocalypse did not occur the leader told his devotees that their effort had saved the world, *for now!* This did not dispel despair and confusion for all, but there remained a strong core who 'had gone too far, given up too much for their beliefs to see them destroyed,'[312] for whom 'so massive was the commitment to their beliefs that no other truth was

[309] Robert Cialdini, 1984 (2007). *Influence: the Psychology of Persuasion*, Collins Business, NY.
[310] Cialdini 2007; p. 120.
[311] Cialdini 2007; p. 122.
[312] Cialdini 2007; p. 127.

possible.'[313] He sees the inaction of pre-flood existence as a sign of certainty. Passing into uncertainty created by the non-event, the remaining devotees sought social proof, i.e. embraced the idea that the more people believed the more true the belief was, that therefore 'it was necessary to risk the scorn and derision of the non-believers because publicity and recruitment efforts provided the only remaining hope.'[314]

Many in contemporary ecological politics debates clearly feel the pull of catastrophic prediction, and critical theorists should both be aware of the potential short term success of such strategies and their possible long term dangers, both to the movements as functioning agents of collective change and to earth systems themselves. For those remaining in Miller's fold after the trip up to the hills revealed the apocalypse would not occur as predicted, a similar recommitment likely occurred. Rather than setting another date for the apocalypse and risking disconfirmation again, the Millerites insisted instead that the apocalypse had been only slowed, that it now occurred at an incalculable pace. Today we perhaps perform a similar move by prescribing slow violence, abandoning the temptation to create binding predictions for confirmation or disconfirmation. Slow violence, like the Millerites' slow apocalypse, forecloses this ability to pinpoint a date. This lesson would paint our contemporary, more indeterminate catastrophes as not unlike the transformed 7th Day Adventists, reflecting on an apocalypse which has always already imperceptibly arrived.

The Great Disappointment and the Slow Apocalypse

[313] Cialdini 2007; p. 128.
[314] Cialdini 2007; p. 128.

Zencey imagined 50,000 people in the handmade clothes prescribed by Miller walking back down the hill to the rhythms and habits of everyday life which Miller's prediction, in the vague distance when made, had exposed to dramatic reevaluation as the date approached. He wonders: 'how, I want to know, did any of them find their way back down their mountain?'[315] This link is a warning of unintended effects of choosing the catastrophic narrative. Contemporary outreach seems transfixed on more confidently predicting the arrival of crisis conditions, assuming acceptance will activate the survival instincts of political elites in a position to act quickly. Disconfirmation is clearly the greatest risk of such a strategy, and one the Millerites faced head on.

Zencey was concerned that apocalyptic rhetoric may break continuity too effectively, de-prioritizing both potential learning from past lessons and conversations about the future to be approached. Placing the timescale outside the human lifespan, for Zencey, means:

> There won't be a particular morning in which we rise and stretch and, glancing out the window, realize that it has happened. The rhythm of the apocalypse will be in geologic time, where a crisis can last a thousand years and the moment of judgment—if indeed it is fair to use that word to describe a natural process—can be played out in centuries.[316]

This is transparently a problem for debates trading on the transition to geologic time scales. For Zencey, this temporal transition is deeply problematic because geologic time is 'imaginable,' but not 'inhabitable,' it is not understood in relation to everyday life. These notes echo some of the most important critical reflections on the transition to

[315] Zencey 1988; p. 54.
[316] Zencey 1988; p. 57.

geologic timelines by Dipesh Chakrabarty and Jesse Ribot, amongst many others, approached in different places in this project.

That 7th Day Adventists survive in the millions is potentially an insight for political action responding to the recognition of the long term, even geologic, time-scales of earth systems. Zencey suggests that: 'Theirs is a transition that those of us interested in radical ecology might do well to emulate.'[317] The concept of 'slow violence' was coined by Rob Nixon to capture the difference between global-scale ecological change and most apocalyptic scenarios from the past. He says:

> By slow violence I mean a violence that occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all […] a violence that is neither spectacular nor instantaneous, but rather incremental and accretive, its calamitous repercussions playing out across a range of temporal scales.[318]

That climate change and other major anthropogenic alterations of global earth systems must appear in such a 'slow' form, despite the urgency surrounding the 'fast' changes in more vulnerable and precarious areas of the world, reflects an adjustment from the first generation of global political ecology, which, at its extreme, laid down dates for the imminent collapse of civilization.

For Nixon slow violence is politically disruptive in democracies because the long-term targets of policies to mitigate ecological change make them impossible to claim in electoral politics, extending well beyond the normal residence time of elected officials. This is especially problematic when priorities must be weighed between short-term and long-term needs, since:

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[317] Zencey 1988; p. 57.
[318] Nixon 2012; p. 2.

> Politically and emotionally, different kinds of disaster possess unequal heft. Falling bodies, burning towers, exploding heads, avalanches, volcanoes, and tsunamis have a visceral, eye-catching and page-turning power that tales of slow violence, unfolding over years, decades, even centuries, cannot match.[319]

Understanding the political debate as fundamentally one about time, he worries that the imperceptible pace of global change makes violence appear random and uncoupled from its true causes, a sentiment echoed in the fears of return to homeostatic or divine disaster narratives which Barkun highlights. This is important for Nixon because the problem is more than just the perceptual challenge of the gap between cause and effect, it is also a political strategy: 'slow violence provides prevaricative cover for the forces that have the most to profit from inaction.'[320]

Slow violence is Nixon's attempt to characterize and imagine the effects of planetary crises taking place on a geologic time scale and the radical need for an expansion of perspectives to incorporate the little-considered societies and territories around the world. At one level this is an attempt, like the concept of the 'environmentalism of the poor' which he draws on from Joan Martinez-Alier, to value a different type of consequence than normally considered. Where Martinez-Alier and ecological economists create value for ecological externalities and geographical displacement related to economic growth which are hard to quantify, Nixon wants to create a sense of value for the delayed effects and indirect causality produced by geologic time-scales.[321]

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[319] Nixon 2012; p. 3.
[320] Nixon 2012; p. 40.
[321] See: Joan Martínez-Alier, 2002. *The Environmentalism of the Poor: A Study of Ecological Conflicts and Valuations*. Edward Elgar Publishing. Northampton.

Thus, while the concept of slow violence may on its face seem to extend and obscure damage, by extending the timelines of the catastrophe it fights the collapse of causality and agency at the center of survivalist resignation. For Nixon, overcoming the blindness of the developed world to the crises already occurring will require translation into meaningful cultural terms throughout the world. In the US, again, Rachel Carson serves as the example. Nixon, explaining his debt to Carson in the introduction, says that her 'extended view of risk's time frame encouraged citizens to campaign for more stringent environmental legislation. In doing so, Carson gave us pointers on how to hope and act across domains large and small.'[322]

Carson is important to Nixon because she reveals how small choices can affect the greater world, an insight which is largely lost on survivalist narratives concerning population and climate change. More importantly, perhaps, he thinks she affects the time frame of fear itself by generating a long-term crisis which can be acted upon, understanding the longer-term as an opportunity rather than simply a source of indifference or resignation. In this way, perhaps we can also interpret the experience of Miller walking back down his hill or Ehrlich backing off from his predictions of billions dead. Doing so means mixing secular and religious categories in uncomfortable ways for traditional ecological crisis outreach, but perhaps can help us understand global change in reference to our own history and in our own meaningful terms.

V. Post-Millennial Futures?

> The planet we live on has merely to shrug to take some fraction of a million people to their death. But this is nothing compared with what may soon happen; we are now so

[322] Nixon 2012; p. xi.

> abusing the Earth that it may rise and move back to the hot state it was in fifty-five millions years ago, and if it does most of us, and our descendents, will die. – James Lovelock

The crisis Edwards predicted was hidden around the corner of death, at a different time for each individual. In a passage which is very similar to the kinds of rhetoric used by many authors today discussing the effects of global-scale ecological crisis, he says:

> Were it not that so is the sovereign Pleasure of God, the Earth would not bear you one Moment; for you are a Burden to it; the Creation groans with you; the Creation is made Subject to the Bondage of your Corruption, not willingly; the Sun don't willingly shine upon you to give you Light to serve Sin and Satan; the Earth don't willingly yield her Increase to satisfy your Lusts; nor is it willingly a Stage for you Wickedness to be acted upon; the Air don't willingly serve you for Breath to maintain the Flame of Life in your Vitals, while you spend your Life in the Service of God's enemies.[323]

Humans living without accepting Jesus were not simply risking their own salvation, but rather *burdening* the Creation itself. This is subtle, since it allows Edwards to insist that although judgment would surely come in the afterlife, it was also already manifested in the fundamental elements of the corporeal world—in the soil, the sunlight, the air.

This prevarication between the Augustinian realms of the spiritual and physical cities is also common to premillennial authors like Hal Lindsey, Tim LaHaye, and Jerry Falwell, who, despite believing in a Rapture which would purportedly remove all true Christians from the final apocalyptic battle, continued to interpret signs in their contemporary world that that battle was already raging.[324] I don't think this is accidental and I don't think it is simply bad reasoning. Viewing these authors as presenting

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[323] Edwards, 1741; p. 13.

[324] Hal Lindsey's *Late Great Planet Earth* and Falwell's political assertions throughout the 1980s are sources I will return to at the end of this chapter.

coherent logical programs is confusing. Rather, they are employing a rhetoric intended to create anxiety. If there was a Rapture perhaps one had missed it!

For Barkun, and for those later questioning his secular/sacred distinction, the power of religious apocalypse in the 1970s and 1980s was an important source of frameworks for understanding catastrophic predictions. Analyzing shifts in religious belief in the US, Barkun notes the establishment of the state of Israel and the popularity of Lindsey's *Late Great Planet Earth* as seminal moments in the spread of pre-millennial dispensationalism. He blames popularizers like Lindsey for spreading ideas which had emerged with change in membership away from liberal churches towards traditions like Southern Baptists and greater resources and media access of fundamentalist organizations.[325] Part of the political surge of movement conservatism in the 1970s and 80s, Lindsey and others like LaHaye and Falwell began to self-consciously blur the lines between the present and the catastrophic future in order to provoke a collectivization of Christian political agency around the Republican Party and candidacy of Ronald Reagan.

This was not a project that ended in the 1980s. LaHaye eventually even produced a series of apocalyptic fantasy novels, the *Left Behind* series from 1995-2007, to complement several published works on marriage and self-help style manuals like 1987's *Why You Act the Way You Do*. In the early 1970s, however, Lindsey was still chiefly concerned with witchcraft and Satan worship, targeting college campuses and schools. In an article from 1972 titled 'Satan is Alive and Well on Planet Earth,' Lindsey insisted that a kind of poisonous culture which 'you might expect among the youth of the West

[325] Barkun 1983; p. 261.

Coast'[326] was spreading to other places, imagining hippie culture as a kind of 'occult influence,' and linking drug use and Satan worship, to new age gurus, Hare Krishnas, Buddhists, yoga, and meditation.

Lindsey warned 'average' Americans that 'witchcraft has become so widespread that most high schools and colleges have their own special witches. They live in dorms, go to class, and on the side meet in their covens.'[327] He asks a typical question of those playing on the blurry anxiety of living at the edge of Tribulation even in this article about witches in college by invoking the possible entrance to a new age, the hallmark of survivalist politics—he asks: 'are we in a new age of Satan?'[328] Lindsey frames his rhetoric to average people, claiming in the introduction to *The Late Great Planet Earth* that 'this is not a complex theological treatise, but a direct account of the most thrilling, optimistic view of what the future could hold for any individual.' He, like Edwards, couches his threat in an 'optimistic' premise, the fact that one is still alive and the end-times not yet truly begun, that one could still escape tribulation by becoming a true Christian before the Rapture. To do so, Lindsey preached, meant political activity.

Unlike Paul Ehrlich, Lindsey clearly thought about the peril of naming dates. He says early in the introduction to *Late Great…*: 'I make no claim of knowing exactly when the world is going to end. In fact, I have never taken to the hills with my possessions and loved ones to await Doomsday.' This is because, he says, 'I believe in a hope for the future.'[329] Lindsey perfected this prevarication over the entrance into the new age to create anxiety for dispensationalists. By reading current events for signs of

[326] Hal Lindsey and CC Carlson, 1972. *Satan Is alive and well on planet earth*. Zondervan, Grand Rapids.
[327] Lindsey and Carlson 1972; p. 26.
[328] Lindsey and Carlson 1972; p. 20.
[329] Hal Lindsey, 1970. *The Late Great Planet Earth*. Zondervan, Grand Rapids; Preface.

the Tribulation, his narrative was more than theological, it was intimately concerned with political, economic, and moral struggles. He located responsibility for change squarely on the shoulders of the current generation, never naming a specific date but always interpreting the signs of the apocalypse in the events occurring around the reader.

Lindsey's oeuvre is defined by this drastic search for urgent action: alongside his *1980s: Countdown to Armageddon* he published in 1977 *Terminal Generation*, in 1983 *Israel and the Last Days*, and in 1984 *There's a New World Coming: An In-Depth Analysis of the Book of Revelation*. In each he made the case that the apocalypse was about to pass a critical threshold and things needed to be urgently arranged to prepare. LaHaye and Falwell also stressed Christian political activism, encouraging engagement on short timelines as a way of redeeming America in the short time before the Rapture and together founding the influential Moral Majority group as well as countless pressure groups and think tanks. Their activism emphasized moral decay, especially in attitudes towards homosexuality, and the need for strong national defense, pitching the present historical moment as constantly teetering at the edge of war. This is a powerful lesson for climate outreach today—the power of the apocalyptic end became a cry for discrimination and rolling back social protections, for militarization and centralized authority.

Seeing the future as desperate but their part as limited, Falwell, Lindsey, and LaHaye insisted the Church must arrange things politically so that the US survives as much intact as possible. Still, as Susan Harding notes, Lindsey reassures his audience:

'We will not be here for Armageddon.'[330] Like Edwards and unlike Ehrlich, the reassuring pause was struck—the Rapture was not yet (at least fully) here. Lindsey insists in the *Late Great Planet Earth* that 'in this book I am attempting to step aside and let the prophets speak. If my readers care to listen, they are given the freedom to accept or reject the conclusions,' an assertion which would be hard to find a parallel for in contemporary climate outreach literatures. Despite this surety, this uncertainty this tactic created great anxiety and channeled the urgency into a campaign for conservative values at a national scale. Lindsey does not insist on facts or demand certainty, *his gift is creating uncertainty*.

The Gift of Uncertainty

> The astonishing thing to those of us who have studied the prophetic Scriptures is that we are watching the fulfillment of these prophecies in our time. Some of the future events that were predicted hundreds of years ago read like today's newspaper. – Hal Lindsey

In an article from 1999, cultural anthropologists Kathleen Stewart and Susan Harding look for ways that a worldview like Lindsey's might 'structure modern American life.' I think this observation is particularly important to take seriously in the context of supposedly secular contemporary ecological debates, since they are focused on the cultural inheritance of the American audience. Stewart and Harding note how millennialism and apocalypticism are each fascinated by endings, origins, and overturnings, and utilize a mixture of dystopic and utopian themes. Surveying American history, they find the end-times imprinted into dozens of American religious traditions since the colonial period, but they do not limit their analysis to religious experiences.

[330] Susan Harding, 1994. 'Imagining the Last Days: The Politics of Apocalyptic Language.' *Bulletin of the American Academy of Arts and Sciences*, Vol. 48, No. 3, pp. 14-44; p. 40.

They also find traces of apocalypticism in more 'secular' forms of American exceptionalism symbolized by the revolution, republic, abolition, social reform, technophilia and technophobia, progressive histories, manifest destiny, and the Cold War.

For them, 'the distinction between religious and secular apocalypticism is a scholarly one that obscures how much traffic there has always been across the line; how many movements, moments, visions are hybrids; and how much apocalypticism is a mode of thought that transcends that boundary.'[331] They draw attention to Barkun's own equivocation on 'improvisational apocalypticism' characteristic of the 1990s, which he called a 'bricolage of disparate elements from religion, ideology, the occult, and bits and pieces of esoteric knowledge' that had begun appearing as 'suppressed truths.'[332] For Stewart and Harding, such types of apocalypticism are becoming dominant organizing forces in everyday life in the US. Perhaps no phenomenon typifies this more than the campaigns to spread information about global warming science throughout the 1990s and early 2000s, which often used a mixture of the same techniques.

The rapture belief, or 'dispensationalism,' serves as the key turning moment, allowing some of the signs of the Last Days to appear *before* true Christians were saved and the most dramatic events of Revelations begin. Harding explains that premillennial dispensationalism, as a form of futurist interpretations, denied true Christians the ability to enact such prophecies, but made it unclear which were to constitute the Last Days and which would happen after the Rapture in the Tribulation.[333] The difference between the historic and futurist strains located by Harding is especially important to consider with

[331] Stewart and Harding 1999; p. 289.
[332] Stewart and Harding 1999; p. 294.
[333] Harding, 1994.

reference to climate change. As Harding noted, dispensational futurists do not see themselves as central actors in end-times events, they do not have to try to survive the apocalypse like others who do not believe, reducing, as theorists like Barker and Bearce feared, sociotropic time horizons to a point which is difficult for secular appeals to geologic timelines to penetrate.

This lack of agency creates what Barkun feared originally, the incentive to welcome catastrophic conditions as signs of one's own departure rather than extinction, the self-fulfilling prophecy. Those creating global apocalyptic scenarios around climate change may think they avoid this tendency since their appeal is nominally secular and backed by scientific facts, but in the democratic context the nearly half of all Americans identifying as end-times believers this is problematic. This may mean that the duel between ecological and premillennial dispensationalists is not best characterized by a conflict between secular and religious apocalypses, as Barkun had theorized, but rather between a secular breed of historical premillennialism and evangelical dispensational futurism, each reading a mixture of political, theological, and natural events together. Encountering slow violence which may not produce such a marked split between Now and Then, and lacking the Rapture to save the pious, ecological rhetoric insists instead that the time for action is now and the apocalypse has begun, hallmarks of historical premillennialism which clash with the shorter sociotropic time horizons of reborn, dispensational premillennialists.

Garrett Hardin's embrace of Tertullian, the 2nd century CE premillennialist welcoming plagues and catastrophe, is a hint that these themes have long been mixed by survivalist narratives. If born-again Christians in the US are interpreting events through a

frame which reads the news for signs of the end of human history, this analysis suggests, supposedly secular versions may invoke a profoundly mixed and contradictory reaction. To continue, in this cultural context identified by Stewart and Harding, to sideline the theological inheritance of the general public in the US is a gross mistake, because 'religious and secular apocalypticisms are constantly converging.'[334]

VI. Religious Lessons for Secular Apocalyptics

No scientist, perhaps, has been more outspoken and direct with their catastrophic ecological rhetoric than Stanford biologist Paul Ehrlich. Ehrlich does not figure as a central character in traditional narratives of 'progressive' environmental politics. If anything, he appears as a ghost of survivalists past, an extension of authoritarianism and technocracy to the realms of the most 'sacred' aspects of society, the reproduction of culture and family planning. Ehrlich played on his scientific credentials in the hope his work would serve as a powerful short-term catalyst for action.

Disclosing the possibility of his disproval late in *The Population Bomb*, Ehrlich turns to a theological trope:

> It is important for you to consider that I, and many of the people who share my views, are just plain wrong, that we are alarmists, that technology or a miraculous change in human behavior or a totally unanticipated miracle in some other form will 'save the day.'[335]

Despite the implied derision of belief in miracles, Ehrlich goes on to propose a version of Pascal's famous theological wager, modified to accommodate the precautionary principle of environmental movements. His deafness to his own tone is clear on the same page.

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[334] Stewart and Harding 1999; p. 289.
[335] Paul Ehrlich 1971. *The Population Bomb*. Sierra Club, NY; p. 179.

He insists, in an attempt at a dark joke, that in the worst case societies can repopulate if he is wrong and that 'fortunately, people can be produced in vast quantities by unskilled labor who enjoy their work.'

On its face, the passage above clearly resembles Hal Lindsey's folksy plea in the introduction to the *Late Great Planet Earth*. Although Lindsey was able to deflect from his own personal role interpreting God's word by claiming no special expertise, Ehrlich needed his position as a neutral scientist to give him authority to speak on behalf of science and secular truth. Lindsey is able to avoid making direct predictions, but Ehrlich's exaggerated emphasis on the scientifically-revealed planetary crisis drew Ehrlich to justify the prediction of what he knew were still very uncertain events in order to activate urgent change. Ehrlich, neglecting the lessons of rhetorical balance and danger of naming dates, proved less astute than Lindsey and others in the business of apocalyptic rhetoric in the 1970s. The first words of his 1971 prologue to a new edition of the *Population Bomb* are a perfect example. He begins:

> 'The battle to feed all humanity is over. In the 1970s and 1980s hundreds of millions of people will starve to death.'[336]

With no break between now and the catastrophic future, Ehrlich's apocalypse is already occurring—he claims in that 'we are today involved in the events leading to famine and ecocatastrophe; tomorrow we may be destroyed by them.'

Looking back from 2017 these fears were hyperbolic, a point which anchored the dismantling of many key environmental agencies in the 1980s. The solution, his detractors argued, was human ingenuity. The Club of Rome predictions and the

[336] Ehrlich 1971; xi.

survivalist certainty of catastrophic scarcity, Julian Simon and others claimed, had underestimated the efficiency of market substitution and technological advance. They are certainly right, in this regard at least, that the overblown apocalyptic images of people like Ehrlich might have resulted in a kind of government which no one wanted, one where the right to breed was restricted and resources were strictly rationed by a technocratic elite. They feared that such a government oversight would stifle the incentive for innovators to substitute and adapt different products and technologies to the changing conditions.

If the role of human advance seems revered, even deified in the work of market fundamentalists like Simon it may be for good reason: the audience of the appeal itself. Simon and others, who became powerful with the election of Ronald Reagan, understood that their libertarian arguments against government resonated with many religious audiences who both doubted the possibility of affecting Earth Systems at a global level[337] and subscribed to the shortened time horizons of premillennial Christianity as preached by Lindsey and politically activated by Falwell's Moral Majority.[338] The belief in human ingenuity central to Simon's dismissal of Ehrlich and the Club of Rome was buttressed by attacks on government itself, which was seen not as an extension of this human ingenuity but rather as its profound enemy, using overblown environmental crisis as justification for increased government revenue, distorting markets for innovation and preventing individual and corporate genius from solving problems. At its deepest level, these approaches stoke paranoia that the government itself, in a vast conspiracy with

[337] This of course is not unique to those with religious beliefs, many meteorologists and prominent scientists like Edward Teller also publically held this view.
[338] See Barker and Bearce 2012.

politicized scientists, *maintains or creates* the conditions of crisis to legitimize its increasing power.

The calls for sterilization and global government central to Ehrlich's survivalist premise served his enemies as warnings of the such drastic government overreach, anchoring the arguments of movement conservatism against environmental regulation and the executive bureaucracies tasked with carrying it out. Far from parallel narratives, Simon's ostensibly secular appeal is thus also welded to premillennial narratives in ways which do not make sense unless the audience is considered. Apocalyptic rhetoric is used to pierce the cloud of compensatory reactions by insisting that there was little time to reform these habits, for Edwards and Falwell which had taken his communities 'out of Christ,' and for apocalyptic scientists like Ehrlich and Lovelock 'out of balance' with natural systems. Both narratives insist on the inevitability of the oncoming disaster, the disruption and end of a way of life.

If we interpret Ehrlich and the survivalists as failures today we must focus in on those reasons, on the mistakes made and the context guiding their rise and fall from fame. It seems fair to say that their attempts to globalize the kind of fire and brimstone tactics of many successful movements in the US were too deep, too thorough accounts of social-ecological scarcity and civilizational decline that whatever urgency and anxiety was produced by their rhetoric had few if any channels to successful avoidance. Most ended, instead, with a resigned prescription of authoritarian 'soft landings' to manage the regress of modern civilization.

Historical Lessons Beyond Secular and Sacred

Political scientists David Barker and David Bearce, examining the use of apocalyptic religious themes in climate debates, insist that despite the fact that such narratives may observe Miller's mistake and never name a particular date for the end, they may still collapse time horizons for decision-making. What Barker and Bearce are suggesting is that the US, as a society which is characterized by widespread belief in the end-times, may prove to be a particularly vexing audience for appeals to geologic time horizons. This temporal discounting is exactly what Nixon's slow violence and Carson's *Silent Spring* are seeking to avoid.

Foundational works of green political theory like Lynn White Jr's 'The Historical Roots of Our Ecologic Crisis' saw the Christian worldview as emblematic of dominion and functionally intertwined with problematic Western views of the world as passive material for human consumption and enjoyment.[339] Barker and Bearce note that this interpretation may be shallow, since there are alternative lessons about stewardship, humility, and awe contained in the Bible. What they insist instead is that resistance to climate outreach is more about the sociotropic time horizons of those who accept those beliefs, i.e. that despite the rival moral lessons contained in the doctrine, the sense of the world as ending soon precludes the kind of geologic time horizons necessary for prioritizing action and collective change.

This certainty could even become perverse, as many end-times believers may even welcome destruction as a sign of the coming Apocalypse. On this view, the mismatch between the appeal to geologic timelines and the framing of 41% of Americans

[339] Lynn White Jr, 1968. 'The Historical Roots of our Ecologic Crisis.' In *Readings in Biology and Man*. Ed. Miguel Santos. MSS Information, New York.

is troubling. Harding notes that 'dispensational premillennialism is willfully 'mad rhetoric,' and 'speaking it (being spoken by it) is a political act, a constant dissent, disruption, and critique of modern thought.'[340] She believes that these kinds of 'mad rhetoric' can be attached to other discourses which may begin speaking it without knowing it, as I've argued here ostensibly secular activist scientists like Paul Ehrlich and market libertarians like Julian Simon show.

Lindsey's *Late Great Planet Earth,* released in 1970, eventually sold 18 million copies. By 1980, he claimed the new decade was likely the last on earth, which meant bringing morality to government and religion to foreign policy.[341] Lindsey called for Christians to organize politics urgently to steward the arrival of the Last Days, a call he continued into the new millennium as a television personality on the Trinity Broadcasting Network. Lindsey, by mingling secular and religious apocalypse and placing the apocalypse in the near but indeterminate future, in Barkun's opinion, had deemphasized natural calamities, the traditional warning signs of religious apocalypse, and prioritized political events.[342] This meant that there needed to be a transitional period where the signs were apparent and the apocalypse begun, before the rapture of saved Christians.

Guarding the scientific ethos Ehrlich gambled and arguably lost, the International Panel on Climate Change and other official scientific bodies tasked with studying global ecological change have remained conservatively poised behind the conditional predictions and verification of current trends, trusting that political advocacy will naturally follow from the most logical argument delivered to a democratic public. That

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[340] Harding 1994; p. 25.
[341] Hal Lindsey, 1981. *The 1980s: Countdown to Armageddon*. Bantam, New York.
[342] Barkun 1983; p. 260.

this has not happened only enhances the temptation to catastrophic illustration of worst-case scenarios, to the collapsing of global geologic time scales to flash points of local disaster narratives. Understanding this temptation is important, and it makes more sense when the target audience is more clearly envisioned.

Barkun warned that homeostatic disaster narratives return secular rhetoric to old religious tropes, and that this regression threatens to obscure the agency of humans in the catastrophe produced. Contrary to Barkun, however, I have tried to demonstrate here that treading the blurred line between secular and religious apocalypses may be necessary to better understand the American public, broadly conceived although increasingly politically polarized, that the catastrophic appeal seeks to reach. This intermingling of secular and religious apocalypse, is thus both problematic and useful. Because of the intended audience in the United States, it may be unavoidably so. If so, I've argued here, it will be important to return to the overlaps explored above, to the lessons of balance between imminence and action, the power and danger of naming a date, and how the expansion to greater temporal scale can mitigate disconfirmation.

Backed by the Club of Rome and logical models like the tragedy of the commons, the Ehrlich and survivalists of the 1970s presented a problem by their own definitions beyond the agency of the only institutions large enough to possibly confront them, inspiring compensatory rejection or accepting resignation. In contrast, Edwards' formula included a pause for reassurance and a prescription for urgently avoiding the catastrophic event. While Carson and most other green seminal works reinterpret this Great Awakening style, their target remains quite individual. They seek to channel that

individual moral or instrumental reaction into an effective movement which can influence collective norms.

The underlying belief in infinite substitution and the casual anthropocentrism of the opponents of Ehrlich's survivalist tradition remain largely unquestioned in contemporary debates, perhaps perversely *because* the credibility of the catastrophic predictions was demolished by Ehrlich and others seeking short-term action. Like Lindsey he placed the end of a way of life within a generation, but without a Rapture event to take true believers away the problem for the secular survivalists remained unavoidable, inspiring resignation and protective motivation.

VII. Conclusion

In the US, global ecological crisis narratives often appear highly abstract, and are prone to reinterpretation through the active framing of new problems in old apocalyptic tropes. Barkun claimed that the rise of environmental disaster narratives in parallel with millennial religious sentiments was worrying. Separating them in ideal form, he worried the two might agree on the signs, producing a more powerful and dangerous form of apocalyptic rhetoric. He thinks it is 'curious' that both could flourish simultaneously, that 'based upon different premises and utilizing dissimilar styles of argument, they nonetheless converge upon the belief that the accepted texture of reality is about to undergo a staggering transformation, in which long-established institutions and ways of life will be destroyed.'[343]

[343] Barkun 1983; p. 258.

Barkun's categories may be imperfect, but he is surely right to point out that 'the declining ability to learn from past disasters militates against more rational responses to future catastrophes.'[344] Those chiefly concerned with avoiding passive reactions, whether dismissive indifference or accepting resignation, can learn from the historical inheritance of American apocalyptic tropes, which may provide a key for producing mediating narratives which are both globally urgent and authentically specific. Classic American fire and brimstone catalyzes individual anxiety to encourage the transformation of habits built on small sins and indulgences of everyday life. Confronting such a choice, Edwards hoped, would capture the attention of those who wavered, for those seeking spiritual security in the long term and living a life of practical sacrifices and comfortable indulgences in the short term. The call of Carson was to wake up before this catastrophic present became a ruined future.

Since traditional Great Awakening themes had targeted the fragility of individual human life, such apocalyptic cults were tempted to concentrate the individual appeal into a cultural imperative. Given that people die on different days and at different times (the source of Edwards' appeal), efforts like the Millerites created a common existential crisis by naming the date, were, in the short-term, incredibly successful, but in the long term required the transformation of temporal parameters of the apocalyptic prediction. Understanding the examples of Edwards and Miller and how they reveal the need for balance between urgency and efficacy and the power and danger of predicting a specific and shortly-approaching date will be important for reevaluating the use and abuse of catastrophic rhetoric in contemporary ecological politics.

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[344] Michael Barkun, 1977. 'Disaster in History.' *Mass Emergencies*, Vol. 2, pp. 219-231; p. 230.

Ehrlich's example shows how ignoring such lessons because they are not 'secular' can damage both the effectiveness of such rhetoric for achieving long-term change and the lasting effect of disconfirmation on debates like our own which historically follow and perhaps at times unconsciously reproduce older tropes. These examples should show the resources of the religious tradition for environmental politics, and their existing interrelatedness in history, and should be interpreted as a call to engage the religious audience in the US in a new conversation.

06 Use and Abuse of Catastrophic Rhetoric: Fear, Politics, and Climate Change

I. Use and Abuse of Fear in Climate Outreach

One of the hardest tasks we face in life is to be the bearer of seriously bad news. – James Lovelock

Responding to the guarded recommendations of international scientific bodies and lack of concerted action regarding climate change and other global-scale social-ecological challenges, many researchers and popularizers in the environmental movement have turned to increasingly catastrophic rhetoric in the attempt to effectively convey the gravity of the ecological thresholds which are being reached. This has stimulated widespread debate over the use and abuse of such vivid, threatening, and fear-inspiring strategies within the environmental community, both whether or not it is effective and also how to target such appeals for maximum persuasion.

This debate inevitably draws in moral and political conflicts, since while most in the concerned environmental community agree on the deterioration of natural systems through human influence, they do not always agree on what the future should look like in such a changed world. In what follows I will look at some of the more popular objections to utilizing fear in political outreach over global ecological crisis, revisit some of the studies used by the most prominent arguments, and then link them to studies done in public health and advertising measuring the effectiveness of fear appeals. Drawing on these resources, I show how a two stage or 'parallel process' model for attention and activation can incorporate the problem of system justification and give better analytic

purchase on political agency than the simple linear models of fear and activation relied on by both catastrophic and reformist narratives.

This is in considered disagreement with the views of Ted Nordhaus and Michael Shellenberger, who have made the case throughout their work that catastrophic fear appeals are always depoliticizing. In the end, I want to suggest a more nuanced rhetorical strategy which, unlike their work, offers an honest evaluation of the kinds of very real losses which may be necessary to successfully avoid worst-case scenarios, a dialogue which is purposefully absent from many hopeful green narratives still relying on massive technological investment in the implicit despair for large scale changes in consumption habits and lifestyles. The parallel process model, by contrast, focuses on efficacy alongside system justification, and maintains that fear can be motivating where the audience perceives itself as able to confront the danger it poses.

This point is broader than simply arguing about the usefulness or morality of basing arguments on fear. Any sane observer would acknowledge that too much fear can be debilitating and may lead to mistakes in policy and errors in individual judgment. My argument, instead, is that falling back on a mirror image of positive opportunities and faith in progressive technological advance is just as debilitating from the perspective of those attempting to inspire radical political change to confront ecological crisis. Without an anchor in the dangers which must be faced, the hard work of critical reflection necessary lacks the urgency to transform compensatory dissonance into effective political action. Presenting alarming predictions to the public when the future predicted is objectively threatening can be politically pathological where it uncritically assumes the benign advance of technology. Global-scale social-ecological problems like climate

change require, instead, a form of political efficacy which cannot be formed purely by enticing language about new industrial revolutions, nor by 'pragmatic' logics accepting crisis as license to engineer the planet.

II. The Case Against Fear and Green Political Theory

> In the name of indisputable facts portraying a bleak future for humanity, green politics has succeeded in de-politicizing political passions to the point of leaving citizens nothing but gloomy ascetism, a terror of violating nature and an indifference towards the modernization of modernity. Everything happens as if green politics has *frozen* politics into a kind of immobility. –Ulrich Beck

Lacking context, contemporary debates over the use and abuse of catastrophic rhetoric are often frustratingly simplistic. These debates, based on simple linear understandings of the relationship between fear and activation, are characterized by two basic extremes: 1) fear works, therefore it should be raised to the scale necessary to create effective action at the largest level; and 2) fear doesn't work, therefore catastrophic visions should be replaced with positive and encouraging visions of technological promise and the potential of human ingenuity.

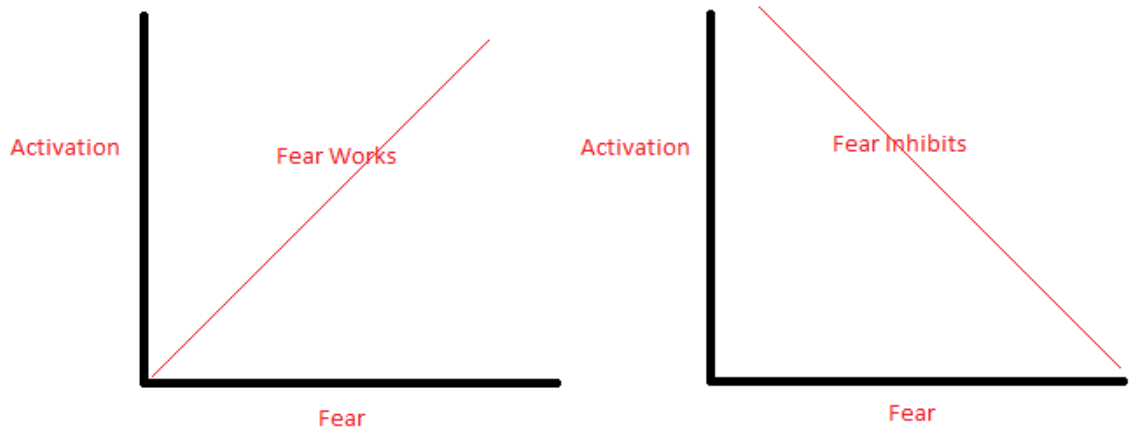

Figure 2: Linear Relationships Between Fear and Activation

These two reactions are based on widely different assessments of the speed and severity of the problem faced, as well as a deeper-seated normative debate over the justice of continuing current cultural habits *and* the individual morality of scaring someone and potentially causing chronic anxiety. Modernist and reformist narratives cast fear as a great inhibitor for the necessary technological adjustments to avoid catastrophe. Radicals and pessimists worry that avoiding fear by reducing complex crises to engineering problems disables the agency necessary to address problems rather than their symptoms. Both see the catastrophic threat as an opportunity, in a way, whether to radically change or to double-down on existing practices.

Self-styled 'Eco-Modernist' and other reformist ecological politics narratives in the wake of the survivalist 1970s have claimed that those preaching ecological catastrophe cause their audience to tune out bad news. They recommend, instead, reorienting rhetorical strategies around the potential for humans to develop revolutionary technology. Today, this is the position clearly taken by Ted Nordhaus and Michael Shellenberger, who have made a career telling a loose, straw-man category of 'environmentalists' to 'quit scaring people.' Their contention, reflecting clearly the 'Fear Inhibits' scenario above, is that 'doom and gloom' scenarios trigger system justification which disables the necessary agency to confront the problem, and insist instead that visions of green futures must be both modern and appear achievable. Following from their 2004 book, which announced the end of the environmental movement, they have written a series of articles and op-eds calling for radical government investment in green

technologies, a 'new Apollo project,' now rebranded as the Breakthrough Institute.[345] There is much that is admirable in this approach, and the idea seems perfectly valid when left underspecified: scaring people may overwhelm any sense that effective change is possible. Relying too heavily on catastrophic predictions, such reformists claim, causes resignation and protective behavior.

Shellenberger and Nordhaus thus insist that much of the rhetoric in green politics which illustrate in great detail the possible outcomes are making a fundamental mistake about the motivating role of fear in habit change. They assume simple linear relationship between fear and action, where less fear is always better because it keeps people proportionately more efficacious. In a special edition of *Ethics and the Environment*, green political theorist Cheryl Hall responds by asking: 'What will it mean to be green?'[346] In this paper and the attached responses, the idea of fear appeals and the use of catastrophic rhetoric are given sustained attention, with particular reference to the provocative words of Nordhaus and Shellenberger.

Hall's argument is calibrated—she claims 'while positive visions are crucial, though, it is ineffective to deny that living more sustainably will involve any loss,' which means that rather than watering down alarming trends to avoid system justification, 'environmentalists must help articulate new possibilities of a greener future without dismissing the value of what must be given up.'[347] She sees reformist narratives for what they intend to be, cognitive therapy to address dissonance with activating visions. She

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[345] Ted Nordhaus and Michael Shellenberger, 2007. *Breakthrough: From the Death of Environmentalism to the Politics of Possibility*. Houghton Mifflin, NY.
[346] Cheryl Hall, 2013. 'What Will it Mean to be Green? Envisioning Positive Possibilities Without Dismissing Loss,' *Ethics, Policy and Environment*, Vol. 16, No. 2, pp. 125-141.
[347] Hall 2013; p. 125.

recognizes, however, that when such narratives are based on technologically determinist assumptions they can be pacifying and encourage token participation.

Hall wants to treat the audience as adults, to 'embrace the need for a more profound transformation of life in industrialized and industrializing countries and rewrite the story about this transformation in a way that allows for complexity in people's values and appreciation of the inevitability of sacrifice in *any* way of life.'[348] This is far beyond what Nordhaus and Shellenberger pitch as the 'real' green revolution. In a famous speech at Yale they claimed that 'what most greens mean when they suggest that we need to fundamentally change our way of life isn't so fundamental at all. They mostly mean that we need to stop crass consumerism, live in denser cities, and use public transit,'[349] positioning their 'pragmatic' analysis as a moderate point between acceptance of catastrophic trends and wholesale transformation called for by more radical critics. Any sense of loss or major change, Nordhaus and Shellenberger warn, will spoil the appeal, which means even real loss needs to be spun as a hopeful opportunity.

Hall, in contrast, is claiming that optimism is necessary, but that it has to be set against the reality of loss. This is because of the divergent interests of the people who must experience change, many of whom will not share the same optimistic interpretations or fear setting up false expectations. This is less a rejection of Nordhaus and Shellenberger than a folding of their concerns over system justification into a larger framework of pluralistic interests. She accepts the premise of their and critique, but insists:

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[348] Hall 2013; p. 136.
[349] Ted Nordhaus and Michael Shellenberger, 2011. 'The Long Death of Environmentalism,' Delivered at Yale School of Forestry, available at http://thebreakthrough.org/blog/2011/02/the_long_death_of_environmenta.shtml; p. 6.

> Given the scope of the problem, though, a solution such as the one offered by Nordhaus and Shellenberger is not sufficient. In putting their faith almost entirely in economic growth and the expectation of technological progress, they underestimate the changes needed. Once again, technology cannot do the job on its own, and economic growth intensifies ecological destruction more than it reduces it.[350]

While accepting their premise of a need for hopeful messages, Hall's analysis is a sober check on their optimism, principally because she rejects the idea that economic growth and technology *on their own* will be able to solve the problem—she claims 'if everything Nordhaus and Shellenberger advocate were done, not only would it not be enough, it could make the situation worse.'[351]

Since, for her, economic growth exacerbates climate change, reformist positions relying on simple bans on fear risked dramatically underselling the kind of change necessary. For Hall this is because technology does not fundamentally change public opinion or policy but rather, by the reformists' own admission, 'buys time' for more thorough change. Reducing carbon emissions to achieve 350ppm levels by 2050 would require cuts of 90% or more, which is bound to hurt some people, require changes in energy, land, and transportation use, and alter development patterns across the world.[352]

The responses to Hall in the same issue of *Environmental Ethics* are interesting because they show the kind of calibrated, cautious response of green theory to the climate crisis. Anthony Weston seconds Hall's call for loss frames to be included, but also wants to reemphasize the justice frame, which demands 'clear, unflinching awareness,

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[350] Hall 2013; p. 135.
[351] Cheryl Hall, 2014. 'Beyond 'Gloom and Doom' or 'Hope and Possibility': making room for both sacrifice and reward in our visions of a low-carbon future', in *Culture, Politics and Climate Change: How Information Shapes Our Common Future*, Ed. Deserai Crow and Maxwell Boykoff, Routledge, NY; p. 32.
[352] Hall 2013; p. 127.

unobstructedly leading to right responsiveness and right action.'[353] Brad Mapes-Martin proposes 'greater attention to incompleteness,' sympathizing with Nordhaus and Shellenberger but erring on the side of Hall's pragmatic acceptance of loss frames and sacrifice.[354] Others, like Gruen, Johnston, and Loo agree that there must be more complicated frames than either doom and gloom or optimistic narratives, and that such an analysis also take on the framework of global justice, that 'since these threats are by and large the result of choices and actions of those who live overconsumptive lifestyles, it is only fair that those who have historically lived in such unsustainable ways accept the greatest losses.'[355]

Many, like environmental political theorists Steve Vanderheiden and John Meyer, remain wary of the idea of sacrifice and loss suggested by Hall, and instead want to pitch green living as qualitatively *better*, attempting to influence everyday values by attaching the losses which Hall sees to positive social values. Others, like Michael Maniates and Tim Luke have pointed out the efficacy of war time ideas of sacrifice and mobilization to make painful adjustments.[356] Vanderheiden insists that sacrifice for ecological crises is different from the war metaphors generated by many environmental political theorists to demonstrate how massive social transformation is possible. This, for Vanderheiden, is because the sacrifices necessary for the green transition are permanent. [357] His argument

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[353] Anthony Weston, 2013. 'As paradigms turn: what it *might* mean to be green.' *Ethics, policy and Environment*, Vol. 16, No. 2, pp. 159-161; p. 160.
[354] Brad Mapes-Martin, 2013. 'Frames without Lenses: A Response to Hall's 'What will it mean to be green?'', *Ethics, Policy and Environment.*, Vol. 16, No. 2, 145-148; p. 147.
[355] Lori Gruen, William Johnston, and Clement Loo, 2013, 'Changing Values: A commentary on Hall,' *Ethics, Policy and Environment*, Vol. 16, No. 2, pp. 142-144; p. 142.
[356] See: Michael Maniates and John Meyer, 2010. *The Environmental Politics of Sacrifice*. MIT Press, Cambridge, MA; Tim Luke, 2015. 'On the Politics of the Anthropocene.' *Telos*, Vol. 172, Fall, pp. 139-62.
[357] Steve Vanderheiden, 2010. 'Living Green and Living Well: Climate Change and the Low-Carbon Imaginary.' *Annual Meeting of the Western Political Science Asssociation*, San Francisco.

is, rather than a rejection of growth, a plea to redefine it, to stress the perks of green living, more leisure time, more personal relationships, and pleasurable relationships with cultivating and eating food.

Even disagreeing on the usefulness of fear, all the environmental political theorists considered above, unlike the simpler reformist arguments peddled by Nordhaus and Shellenberger, reject the blanket assumption that technology will save contemporary lifestyles and the implied assumption that culture in the developed world could not and should not change. From this agreement, however, they differ a lot in how vivid or explicit to be in order to encourage the reassessment of values. They acknowledge that any green political transition, if it happens at all, will be a slow process, in contrast to the rapidity of the space race metaphor guiding Nordhaus and Shellenberger's 'Breakthrough' and 'New Apollo Programs.' Hall notes her own ambivalence given the drastic changes necessary: 'the urgency of the situation makes it extremely difficult to recommend such a slow, deliberate approach, yet without this work the chances of any democratic transformation seem slight indeed.'[358]

Nordhaus and Shellenberger, instead, insist that such democratic transformations are not possible on the 'deliberate' timelines of democratic green theorists. Like the past and current generations of ecological catastrophists they viciously parody, their technocratic narrative depends on the acceptance that everyday life in the 'developed' world will not or *should not* change, which must urgently drive the need for technological advance and substitution of polluting aspects of everyday life (energy and transportation chief amongst them). Many of these reformist commentators see any criticism of

[358] Hall 2014; p. 35.

transition fuels, nuclear power, and even global climate engineering as romantic mistakes that will end in widespread suffering.[359]

Protective Behavior and Fear in the Laboratory

Nordhaus and Shellenberger are not alone in the campaign against fear.[360] They claim that catastrophic theorists are contradicted by the 'clear evidence' from the laboratory results in various disciplines. They draw on the experiences from public health and psychology, principally the application of Carl Rogers' Protection Motivation Theory (PMT) and tests of Just World Beliefs performed by the Willer lab at Berkeley.

PMT was Rogers' attempt to codify protective behavior like cognitive dissonance observed in psychoanalysis, where people dismiss information that is hurtful or contrary to their own worldviews, a tool he used to examine the maladaptive reflexes of denial, dismissal, and reinforcement. Nordhaus and Shellenberger's interpretation of these arguments is that when confronted by something overwhelming, individuals will naturally 'turn off' in order to avoid both the effort to change and mental dissonance produced by the new information. As a result, they claim that catastrophic language causes cognitive dissonance and irresolvable anxiety, both of which disable political agency. The possibility of such defensive behavior, their argument claims, means recalibrating outreach to emphasize positive possibilities, to the complete exclusion of fear-creating messages, even where they are accurate scientific predictions.

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[359] At WPSA 2014 a visibly intoxicated advocate and visiting European academic pointed at the crowd and accused the crowd of being 'for evil' by opposing technological detachment of humans from natural systems. Paul Crutzen and other geoengineering advocates have made a similar case, if in more professional terms, in response to calls for bans on small-scale tests of solar radiation management.

[360] Matthew Feinberg and Robb Willer, 2011. 'Apocalypse Soon? Dire Messages Reduce Belief in Global Warming by Contradicting Just World Beliefs.' *Psychological Science,* Vol. 22, pp. 34-40.

In this argument, the second key piece that Nordhaus and Shellenberger cite is from the Willer lab at Berkeley. Using small-n psychological experiments in one centrally-cited example, Feinberg and Willer attempted to understand how just world beliefs influenced global warming skepticism. Their conclusion was that priming with just world beliefs increases skepticism and decreases willingness to change lifestyle. This, they claim, has implications for outreach campaigns:

> Our results imply that because dire messaging regarding global warming is at odds with the strongly established cognition that the world is fair and stable, people may dismiss the factual content of messages that emphasize global warming's dire consequences. But if the same messages are delivered coupled with a potential solution, the information can be communicated without creating a substantial threat to deeply held beliefs in a just world.[361]

Nordhaus and Shellenberger interpret this description as a blanket condemnation of fear appeals, and mobilize the Willer study in their own work to try and influence national outreach campaigns. They ignore, however, the second clause above which states dire messaging can work 'if the *same messages* are delivered coupled with a potential solution.' Nordhaus and Shellenberger instead claim, citing and simplifying the passage above, that 'catastrophic presentations of global warming actually reduce belief in global warming,' and that the doomsday claims made by greens were 'increasingly inconsistent, ironically, with the scientific consensus whose mantle greens claim.'[362]

Like the survivalist fear-mongers they pillory, deep down Nordhaus and Shellenberger fear that contemporary culture will not be able to change, that presenting environmental problems as catastrophic activates protective, and ultimately passive,

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[361] Feinberg and Willer 2011; p. 36.
[362] Nordhaus and Shellenberger 2011; p. 5.

responses. Willer's provisos in the paper cited are interesting in this context, as are the details of the study itself. Feinberg and Willer cast their findings in terms of earlier work on fear appeals in public health outreach, which had incorporated Rogers' PMT into a larger conceptual model of threat response.[363] Unlike Nordhaus and Shellenberger, these studies suggested that fear could be useful given there was an adequate response presented and people felt capable of performing it.

As the level of fear is raised by apocalyptic narratives, principled optimism like Nordhaus and Shellenberger's becomes more appealing, whether in the search for an 'active' channel to confront crisis or as itself a form of system justifying cognitive dissonance in the face of overwhelming catastrophe. This is the essential finding of most of the laboratory studies of fear and political motivation, that fear produces 'mixed results.' Surveys of the literature claim that fear creates better recall, others that it triggers protective, system-justifying behavior. These mixed results highlight the relative lack of evidence considered by Nordhaus and Shellenberger from advertising and smoking research, both of which interact with broader public health outreach debates. This omission is likely because smoking and drunk driving outreach have been at least mixed and perhaps tipped towards the effectiveness of fear appeals.

III. Fear, Advertising, and Public Health

> The Use may be of *Awakening* to unconverted Persons in this Congregation. This that you have heard is the Case of every one of you that are out of Christ. That World of Misery, that Lake of burning Brimstone is extended abroad under you. –Jonathan Edwards

[363] Kim Witte and Mike Allen, 2000. 'A Meta-Analysis of Fear Appeals: Implications for Effective Public Health Campaigns.' *Health Education and Behavior,* Vol. 27, No. 5, October, pp. 591-615.

Models from public health studies are interesting in their mixture of results. At least part of this mix was due to early articles regarding dental hygiene and an assumed taboo on causing anxiety in the target audience. This attitude persists today, despite relative lack of support in more modern studies. In one such article from *Pscyhology and Marketing* in 2004, Gerard Hastings and coauthors criticize fear appeals in social marketing.[364] This article followed a 2002 piece in a special edition of *Tobacco Control* where, despite emphasizing the 'limitations of fear messages',[365] they claim in a surprisingly similar prevarication to the Willer study, that 'the power of warnings is enhanced with evocative creative executions, provided the resulting fear does not overwhelm the audience, and adequate support with quitting is offered.'[366]

Hastings argued that linear models are problematic because they assume the audience is rational, passive, and have an automatic stimulus response which translates fear into action or inaction.[367] At heart, however, his objection is also transparently moral. He and his coauthors believe that causing 'chronic heightened anxiety' among the most vulnerable targeted poorer populations for greater negative effects of outreach. In place of fear appeals, they recommend positive reinforcement, humor, and (if obliquely) 'postmodern irony.'[368] He claims that threat-based ads manipulate human behavior and may result in transference of anxiety onto the brand itself over the long term, and ends in a characteristically moral tone:

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[364] Gerard Hastings, Martine Stead, and John Webb, 2004. 'Fear appeals in social marketing: strategic and ethical reasons for concern.' *Psychology and Marketing*, Vol. 21, No. 11, pp. 961-986.
[365] This is their title…
[366] Gerard Hastings and L. MacFayden, 2002. 'The Limitations of Fear Messages,' *Tobacco Control*, Vol. 11, 2002, pp 73-75; p. 73.
[367] Hastings and MacFayden 2002; p. 73.
[368] Hastings, Stead and Webb 2004; p. 961.

> Despite evidence that fear messages are persuasive, marketers in both the commercial and social sectors should exercise caution over their use. The case for using fear appeals may be tentatively proven in the laboratory, but, in the real world, marketing questions about the use of fear remain unanswered (and often unexplored). There is a compelling need to examine the effects of fear messages on real consumers, in natural settings.[369]

In place of a linear model where more or less fear is always better, Hastings argued for an inverted U-shaped model, which he acknowledges has yet to carry any significant laboratory support.[370] The problem has to do with fatigue, a word used also by Nordhaus and Shellenberger (what they call 'Apocalypse Fatigue').

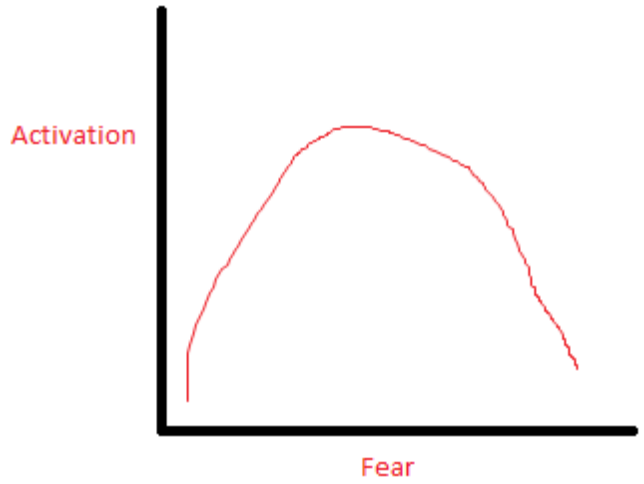

Figure 3: Hastings' 'Inverted U'.

Hastings, despite arguing in this series of coauthored pieces in *Tobacco Control* that fear must be avoided to avoid overwhelming the audience, still cites Australian anti-smoking campaigns using high fear messaging as successes in the second paragraph. His

[369] Hastings, Stead and Webb 2004; p. 978.
[370] For the classic example see: Irving Janis, 1967. 'Effects of fear arousal on attitude change: Recent developments in theory and experimental research.' *Advances in experimental social psychology*, Vol. 3, pp. 166-224; also, more recently: Valerie Quinn, Tony Meenaghan and Teresa Brannick, 1992. 'Fear Appeals: Segmentation is the way to go.' *International Journal of Advertising*, Vol. 11, No. 4, pp. 355-366.

contention, instead, is that in the 'second generation' of tobacco control these may not as useful, that sustained, overwhelming fear campaigns will desensitize the audience, a conditions which was not easy to measure in traditional laboratory studies. He also cites concerns with the artificiality of the decision environment, lack of long-term measurements, and unrepresentative sample populations, usually of college undergraduates and heavily female samples (as Feinberg and Willer admit as well).

This moral opposition is not ubiquitous in the surrounding literature. Hilt, Chapman, and Donovan see principled opposition like Hastings' as a 'profession-wide neurosis intent on avoiding opprobrium.'[371] Adding to the Massachusetts smoking campaigns cited by others, they also cite Australia's 'mother of all scare campaign' targeting smokers with a cessation (rather than prevention) agenda. The key, for them, was elevating the priority of the need to quit on smokers' personal agendas, which meant campaigns should try to develop a 'conditioned association' between images of bodily harm and smoking.

Biener and Taylor also draw on the example of Massachusetts' anti-smoking campaigns, claiming the most effective are 'those that depict the serious consequences of tobacco use in emotionally evocative ways.'[372] Their critique is focused on the perceived optimistic nature of Hastings—they claim:

> Hastings and McFadyen argue that public health media campaigns should be promoting a host of healthy lifestyles rather than focusing on individual behaviors. Although this seems like an inspiring goal, we fear that it would be an extremely hard sell.[373]

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[371]David Hill, Simon Chapman, and Robert Donovan, 1998 . 'The return of scare tactics.' *Tobacco Control*, Vol. 7, pp 5-8; p. 5.
[372] Louis Biener and TM Taylor, 2002. 'The continuing importance of emotion in tobacco control media campaigns: a response to Hastings and MacFadyen.' *Tobacco Control*, Vol. 11, No. 1, pp. 75-77.
[373] Biener and Taylor 2002; p. 76.

Their doubt comes from the fact that in their own research strong negative emotions were successful in increasing attempts to quit from smokers at high stages of readiness to quit, and were perceived by former smokers as the most effective. Reducing the fear at these key stages (quitting and relapse), they believe, reduces the chances of positive outcomes. They insist that campaigns be simple, straightforward, and framed in a way that redefines the issue for the target audience.[374]

Although never formally supported in the laboratory, the essence of Hasting's 'inverted U' remains the underlying metaphor in many popular arguments over climate communication. Because catastrophic predictions break the vague limit of 'too much' fear, this seemingly more complex model often lapses into simpler, more linear arguments about avoiding fear altogether. This linear understanding leads to extremes, to either the maximizing of or total embargo on fear appeals. For example, Foust and Murphy claim that 'the apocalyptic tone of climate change rhetoric may not only encourage a feeling of despair in the face of impending disaster, but also contributes to skeptics' ability to discredit climate scientists as alarmists.'[375] This is the essential fear of reformist arguments, but Foust and Murphy go further, insisting that there would be ways to frame catastrophic consequences rather through irony and humor.

Shellenberger and Nordhaus do not think this kind of tact will work either. They prefer a centralized government program of technological advancement and consistent set of positive 'gain frames' for enticing change in an incremental way. In a well-cited

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[374] Their example is the Truth campaign, which 'exposes' the tobacco industry as murderous, and the PhilipMorris 'think don't smoke' ads, which were shown to actually soften attitudes toward smoking.
[375] Christina Foust and William O'Shannon Murphy, 2009. 'Revealing and reframing Apocalyptic Tragedy in Global Warming Discourse.' *Environmental Communication*, Vol. 3 No. 2, pp. 151-167; p. 152.

science communications paper, O'Neill and Nicholson-Cole also seem to also support gain-only frames, writing that fear is 'generally an ineffective tool for motivating genuine personal engagement,' and recommending instead 'nonthreatening imagery and icons that link to individuals' everyday emotions and concerns.'[376] Directly focused on the collective rather than individual problem of climate change politics, like Hastings, they also call into question the generalizability of lab studies to emphasize the inconclusivity of research on fear appeals for climate change outreach.

Like Foust and Murphy, however, they claim that 'a consistent message that does arise from the fear appeals literature appears to be that both an individual's perceived sense of action effectiveness and the individual's perceived sense self-efficacy are imperative for a fear appeal to be successful,'[377] essentially accepting the effectiveness of fear appeals in certain situations. This, like the citation in the Feinberg and Willer piece, is a different conclusion than cited to support by Nordhaus and Shellenberger, and points to a more nuanced, and interesting, conversation that considers parallel processes of fear arousal and danger control.

Scientific Authority: From the Lab to the FIeld

The abstract nature of the political problem presented by ecological crisis at the global level underlines the perceived inability to act collectively to change problematic habits in industrialized nations. This sense of climate change as a 'wicked problem, ' a kind of special case perfectly wrong for usual human decision-making and collective

[376] Saffron O'Neill and Sophie Nicholson-Cole, 2009, 'Fear Won't Do It: Promoting positive engagement with climate change through visual and iconic representations,' *Science Communication*, Vol. 30, pp. 355-381; p. 355.
[377] O'Neill and Nicholson-Cole 2009; p. 361.

agency, permeates academic and popular discussions. Noting the mixed results of fear appeals, many have insisted on returning to consider narratives for meaningful communication at less abstract levels, and call for returning to rhetorical analysis to find ways to make ecological crisis both understood and a spur to action.

Like Hastings, O'Neill and Nicholson-Cole claimed that repeated exposure can damage public trust in the organizations utilizing the fear strategy, at bottom drawing on Rogers' Protection Motivation Theory to understand internal fear controls like denial and apathy. Their actual evidence is thin, however. Beyond their summary of the literature, they perform a small-n survey of the effects of dramatic imagery on self-reported self-efficacy. In their study of 30 women in the UK, they found that 'the images that made participants feel most unable to do anything about climate change tended to be depictions of the most dramatic impacts of climate change, the causes of climate change, political unwillingness to act on climate change, and the scientific evidence.'[378] The question remains: are the opinions of thirty British women generalizable?

Rifkin and many others have argued alongside Nordhaus and Shellenberger that relying on fear produced by scientific predictions would shift collective perceptions of efficacy and make change impossible.[379] As Matthew Nisbet put it in his 2009 paper: 'others worry that the news media has moved from an earlier era of false balance to a new phase of over-dramatization, one that skeptics can easily exploit to dismiss climate change as a problem.' Instead, Nisbet notes, 'they offer an alternative communication strategy, which involves turning the *economic development* frame in favor of action,

[378] O'Neill and Nicholson-Cole 2009; p. 373.
[379] See: Jeremy Rifkin, 2011. *The Third Industrial Revolution: How Lateral Power is Transforming Energy, the Economy, and the World.* Palgrave, NY.

recasting climate change as an opportunity to grow the economy.'[380] This should be a familiar frame for green political theory, recalling 'soft energy paths,' 'natural capital,' 'sustainable development,' and 'ecological modernization' theories which have been popular as reformist counters and sometimes complements to more radical environmental movements and academics. Nisbet calls this frame 'techno-optimism,' a label which Nordhaus and Shellenberger's 'Breakthrough' and 'New Apollo Program' brandings would likely not contest. Nisbet sees this frame as particularly vulnerable to uncertainty, attenuated by the same problem which haunts more sober climate outreach: the fact that the problem diagnosed is global and at great temporal scale, and being principally concerned with the future, is uncertain.

Critical technological themes, whether by design or lack of insight, are suspiciously absent in the calls of those seeking outreach composed of solutions and opportunities alone. Instead, Nordhaus and Shellenberger browse opinion polls, measuring how people feel rather than their sense of efficacy. They insist 'the lesson would appear to be that apocalyptic threats are unlikely to become priority concerns,'[381] but don't offer any examples. Instead they work through a sentence or two of psychological jargon about threat salience and system justification. They claim:

> Most Americans aren't alarmed enough to pay much attention, and efforts to raise the volume simply trigger system-justifying responses. The lesson of recent years would appear to be that apocalyptic threats—when their impacts are relatively far off in the future, difficult to imagine or visualize, and emanate from everyday activities, not an external and hostile source—are not easily acknowledged and are unlikely to become priority concerns for most people. In fact, the louder and more alarmed climate advocates

[380] Matthew Nisbet, 2009. 'Communicating Climate Change: Why Frames Matter for Public Engagement.' *Environment: Science and Policy for Sustainable Development*, Vol. 51, No. 3, pp, 12-23; p. 19.
[381] Ted Nordhaus and Michael Shellenberger, 2009. 'Apocalypse Fatigue: Losing the Public on Climate Change.' *Yale Environment 360*, pp 16-19; p. 17.

> become in these efforts, the more they polarize the issue, driving away a conservative or moderate for every liberal they recruit to the cause.

They notably aver when talking about the lesson of recent years by saying that it 'would appear,' but the relative surety with which they claim that 'louder and more alarmed' advocacy would alienate necessary segments of the population ('a conservative or moderate') is firm.

This problematic low salience is, ironically, the very problem catastrophic rhetoric was supposed to solve. Nordhaus and Shellenberger claim:

> The same efforts to increase salience through offering increasingly dire prognosis about the fate of the planet (and humanity) have also probably undermined public confidence in climate science. Rather than galvanizing public demand for difficult and far-reaching action, apocalyptic visions of global warming disaster have led many Americans to question the science. Having been told that climate science demands that we fundamentally change our way of life, many Americans have, not surprisingly, concluded that the problem is not with their lifestyles but with what they've been told about the science.

Here it is not clear whether the problem is the apocalyptic nature of the response or the doubt sown by threatened interests which created the urge to catastrophism. They are focused on individual psychology and say very little about collective responses beyond abstract government funding programs and catchy references to scientific advance. This includes, tellingly, fracking and nuclear power, both of which are treated as necessary bridging fuels to buy time. They claim, for instance, in the speech to the Yale School of Forestry in 2011, 'we are going to have to get over our suspicion of technology, especially nuclear power. There is no credible path to reducing global carbon emissions without an enormous expansion of nuclear power.'[382]

[382] Nordhaus and Shellenberger 2011; p. 6.

That such a position was once taboo in environmental circles is supposed to be proof of their assertion that the new era of global ecological crisis was one where old values would need to change. In mirror to Bill McKibben's assertion that 'Nature is dead', they insist that environmentalism to must die and a new pragmatic, nuclear powered, modern society must rise to continue the comfort and success of the American way of life. They claim: 'the world in which we live, economically, technologically, politically, and most importantly ecologically, has so profoundly changed that the every foundations upon which contemporary environmental politics was constructed to no longer hold.'[383] The sense of a break is clear in Nordhaus and Shellenberger's framework, beyond the Promethean 'breakthrough' moniker. They refer obliquely to many central tenets of the traditional environmental movement as outdated, including the mantra popularized by Schumacher, Snyder, Dasmann and others that 'small is beautiful.'

In indirect response to the history of environmental thought, they claimed bluntly that 'big is beautiful,' that development of the peripheral economies around the world was inevitable, and that 'the solution to the ecological crises wrought by modernity, technology, and progress will be more modernity, technology, and progress.' They envision a world of 'large central station power technologies,' 'intensification of industrial scale agriculture,' and innovation in cultivation technologies 'that might allow us not only to pull back from forests and other threatened ecosystems but also to create new ones.' The vision of the redeemed future here is a *more* modern modernism of global proportions, one which pragmatically accepts the resistance of the public as its fundamental challenge, but also which sees the solution in national policy and grand-

[383] Nordhaus and Shellenberger 2011; p. 10.

scale investment in technological change. After claiming the profound change in the world has disqualified historical reference, they confess that: 'there's a weird, optimistic recklessness that could easily be construed as nihilism but is really the opposite.'[384]

IV. Extended Parallel Process Models

Enlightenment must also find a psychological point of entry. – Rudolph Bahro

Kim Witte's work extending from a 1992 paper titled 'Putting the fear back into fear appeals,' advocates for the adoption of a hybrid model for fear appeals research based on the differentiation of fear and danger control, as well as the possibility of protective behavior contained in Rogers' PMT and Expectancy Valency theories.[385] Witte maintains that fear and danger control were motivated by parallel emotional and cognitive processes, but that as long as the key factor of self-efficacy was 'greater than perceptions of threat' danger control will dominate. She claims 'overall, fear appeals have great potential for stimulating behavioral change—if used correctly.'[386]

Witte and coauthors follow up this theoretical model with evidence from HPV outreach in a paper from 1998. They claim that 'the results demonstrated that fear appeals can be powerful persuasive devices if they induce strong perceptions of threat and fear (which motivate action) and if they induce strong perceptions of efficacy with regard to a recommended response (which channels the action in a health protective

[384] Norhaus and Shellenberger 2011; p. 10.
[385] Kim Witte, 1992. 'Putting the fear back into fear appeals: the Extended Parallel Process Model.' *Communication Monographs*, Vol. 59, December, pp. 329-349.
[386] Witte 1992; p. 22.

direction).'[387] Witte acknowledges the limitations of the laboratory study and its limited generalizability, but goes on to claim that their explicitly theoretical framework allowed for this problematic specificity. The core of this theoretical insight was that 'the EPPM states that first, individuals need to feel susceptible to a severe threat before they will be motivated to act,'[388] and that 'when young women did not feel susceptible to genital warts and/or did not believe genital warts to be a severe disease, they did not respond in either a positive or negative way to the campaign—they simply ignored it.'[389]

Far from an inverted U or simple linear model predicted by emotional drive models, Witte and coauthors assert that 'by increasing these perceptions of threat, individuals will be motivated to act,' but, in parallel, 'to channel this motivation to act in the proper direction, all fear appeal campaigns should be accompanied by high efficacy messages regarding the recommended response.'[390] In this Extended Parallel Process Model (EPPM), it is an interplay between the assessment of danger and the perceived ability to respond to it which creates either the maladaptive denial actions ('fear control') or the desired habit change ('danger control'). Witte's model is thus particularly interesting because it accounts for mixed results across other experiments by disaggregating the fear appeal into two essential stages.

Witte's theoretical framework predicts two general possibilities, either the limitation of the fear perceived (through protective dismissal) or the limitation of the danger or threat perceived (change in habits). This 'danger-control' is the target of most

[387] Kim Witte, Judy Berkowitz, Kenzie Cameron, and Janet McKeon, 1998. 'Preventing the Spread of Genital Warts: Using Fear Appeals to Promote Self-Protective Behaviors.' *Health Education and Behavior*, Vol. 25, pp. 571-587.
[388] Witte *et al* 1998; p. 582.
[389] Witte *et al* 1998; p. 582.
[390] Witte *et al* 1998; p. 583.

appeals in public health, whether concerned with mammograms, tobacco, or drunk driving. It also should be the target of effective climate appeals. Reformist narratives often claim that fear appeals produce maladaptive avoidance, but in the parallel process model this system justifying cognitive dissonance is only one possible result of fear appeals. Witte's theory suggests, to the contrary, that fear appeals are potentially useful when connected to actions to remedy the crisis and focus on self-efficacy of the audience.

EPPM in the Environmental Literature

In a 2001 issue of *Psychology and Health*, Ruiter, Abraham, and Kok try to disentangle emotional and cognitive responses to potentially frightening imagery, defining fear arousal as 'an unpleasant emotional state triggered by the perception of threatening stimuli'[391] This adopts Leventhal's parallel process model, which Witte is also working from, distinguishing between fear and danger control, but again creates an inverted U relationship where vaguely understood levels of too little and too much fear are not effective.

High fear risked what Rogers would eventually call the 'boomerang effect,' or maladaptive protective behavior.[392] Ruiter *et al* adapt the parallel and code fear control as emotional and danger control as cognitive, folding the two models into each other. Turning to Witte's work, Ruiter *et al* note that EPPM accounts for the relationship between fear and danger control processes. However, Ruiter *et al* contest whether the process is as sequential as Witte seems to imply, i.e. whether fear precedes action or if

[391] Robert Ruiter, Charles Abraham, and Gerjo Kok, 2001. 'Scary warnings and rational precautions: a review of the psychology of fear appeals.' *Psychology and Health*, Vol. 16, No. 6, pp. 613-630; p. 614.
[392] Carl Rogers, 1977. *Carl Rogers on personal* power. Delacorte, Oxford; also: 1974. 'In retrospect: 46 Years.' *American Psychological Association*; 1973. 'Some New Challenges.' *American Psychologist*, Vol. 28, No. 5; pp. 379.

the process works in parallel. The implied sequential nature emphasizes the role of the fear in processing threat-relevant information. Some of these studies appear to show the need for reassurance and attention to the attenuated defensive strategies of those with chronic fear. By disentangling cognitive threat and emotional fear, Ruiter *et al* suggest that the precautionary avoidance instructions, i.e. self-efficacy concerns in the parallel process model, are more important than fear. Understanding the process as truly parallel in a way which Witte clearly does not, Ruiter *et al* come closer to Nordhaus and Shellenberger and Hastings in recommending solutions-based outreach rather than fear.

Martign Van Zomeren and coauthors address the evidence for dual pathways in climate outreach, also highlighting the need for self-efficacy and the difference and special challenge when thinking about problems which require collective action, or, essentially, 'group-efficacy beliefs.' Their citation for this difference refers to Garrett Hardin, which is a telling if shallow reference to survivalist lessons. They address Witte directly, complaining that individual self-efficacy beliefs 'should be much less relevant for collective actions that solve problems perceived as collective (e.g., the climate crisis).'[393] To investigate, they employ a series of small-n university psychology studies (all below 110 respondents, with average age of under 20, and overwhelmingly female). Their results follow Witte, however, suggesting that group efficacy is the key factor, and that:

> A more practical implication of the results is that they suggest that raising fear can be effective in increasing individuals' intentions to engage in action to solve a collective problem. In fact, the dual pathway model moves beyond this question by suggesting that organizers or other

[393] Martijn van Zomeren, Russell Spears, and Colin Wayne Leach, 2010. 'Experimental evidence for a dual pathway model analysis of coping with the climate crisis.' *Journal of Environmental Psychology*, Vol 30, pp. 339-346; p. 341.

> practitioners of environmental action should *also* try to raise individuals' group efficacy beliefs.[394]

The 'also' is key, it indicates that a parallel process is taking place, not a single, uniform linear relationship between fear and activation.

I agree with van Zomeren that despite differences the EPPM model is useful for organizing our thoughts about how to use or not use catastrophic rhetoric. Witte predicts the most crucial moment in the translation of received fear appeals to effective action regards the perceived self-efficacy of the target audience. In this framework, catastrophic rhetors like Bill McKibben may be able to generate individual receptivity, but it is likely McKibben's plea to 'settle for decline' and the very tenacity and overwhelming nature of the interconnected problems he spends much of the book representing will not be able to create the kinds of collective agency necessary for managing such a transition. Instead, the best it delivers seems to be home gardens and individual advocacy (again, not bad things, just not *enough to match the scale of the problem*).

Shellenberger and Nordhaus, on the other hand, seem to have accepted that fear generates resignation, and thus try to skirt it altogether. In the EPPM model, this means that few people will perceive the problem as relevant enough to address, which means that the crucial second step (what must be done?) is never approached. In order to make the efficacy more feasible, they sacrifice the first step (perceived threat and perceived susceptibility), losing the relevance and with it the hope for piercing individual and collective indifference. Essentially, then, one linear strategy uses fear to reach the audience, but doesn't tend to the efficacy concerns, and thus results in resignation and

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[394] van Zomeren *et al*, 2010; p. 345.

other maladaptive responses. The other refuses fear, playing on technological optimism and efficient state power, but forgets to make it relevant to the audience.

V. Conclusion: Towards a More Interesting Debate

> One of the penalties of an ecological education is that one lives alone in a world of wounds. Much of the damage inflicted on land is quite invisible to laymen. An ecologist must either harden his shell and make believe that the consequences of science are none of his business, or he must be the doctor who sees the marks of death in a community that believes itself well and does not want to be told otherwise. –Aldo Leopold

Relying on vivid, even apocalyptic rhetoric is has served a powerful role in social-ecological crisis discourse in the US. This should be both a sign of its potential and also cause for real concern, given the ambiguity of the political response many hope to inspire with catastrophic visions. The practical response of reformist narratives to the increasing tenor and pitch of catastrophic rhetoric in social-ecological crisis literatures has been to frame the romantic themes of many green theorists about simpler living and local sustainability as good-hearted but ultimately misguided attempts to approach problems which are begging for technological innovation. They seek to drive a reflexive, sustainable, but still comfortable modernity, not a fundamental rethinking of how modern life should look and feel. They believe this will increase their access to traditional sources of economic and political power, while it also indirectly reminds other moderates of the consequences predicted by 'extremists' without having to make claims themselves.

In the end, however, it is clear that most reformist narratives relying on all-positive approaches end with calls for a return to centralized, technological answers not because they believe fear itself is the problem, but because they doubt that people will change in time. Understanding the profound, sweeping cultural change called for by

many radical ecological political theorists as impossible, they 'pragmatically' recognize the inertia of everyday life, a move which pushes them to focus on changing the energy system feeding destructive lifestyles rather than lifestyle itself, including the expansion of nuclear power as a bridging energy, the expansion of natural gas production through hydraulic fracturing techniques, and even the 'pragmatic' prescription of proactive global climate manipulation.

In a way this is right. Not even the most romantic Luddite wants to see climate change mitigation proceed so slowly that people suffer, and most do not explicitly want to see the developing world continue with sub-standard access to health care, clean water, and livelihood. At the same time, reformist analysis intentionally effaces the fact that very real losses and sacrifices may have to be made to get to this technological green future. They purposefully do not address a simple question at the silent heart of the environmental movement which they so proudly proclaim to be dead: What if the problematic habits targeted conflict with a set of cultural habits which people would rather not focus on? What if people act *because* they are alerted to the problem by the vividness of the catastrophic future presented? These are not meant to be opaque or abstract questions, and do not have to remain so. The all-positive rhetoric of Nordhaus and Shellenberger is the exact foil of the dire survivalist rhetorical strategy they lament, emphasizing the reassuring conversion moment the survivalists so dourly exorcised.

Nisbet claimed that social science expertise must be used to solve the communication problem presented by climate change, whether by changing the more abstract focus of climate change to its public health implications or by localizing the frame for ecological indicators. As he says: 'if major policy change is to be achieved,

new meanings and messengers for climate change are needed.'[395] This conviction is supported by Spence and Pidgeon, who argue that while 'gain' or positive framings promoted 'more positive attitudes towards mitigation,' the much maligned 'loss' frames showed higher information recall and had an associated 'positive association with attitudes towards climate change mitigation.'[396] Spence and Pidgeon, in contrast to Nordhaus and Shellenberger's assertion that fear appeals always negatively affect decision-making, observe that, 'following this line of reasoning, it is again possible that there will be circumstances where loss frames might be more effective than gain frames, if this involves attitudes towards detection of climate change or its impacts.'[397]

Today, it seems clear that many recoil at the possibility of using fear in outreach, out of either moral certitude that it is immoral to scare people or because they fear that it will cause people to turn off and give up. What Spence and Pidgeon claim, and the explosion of catastrophic imagery in environmental politics counts on, is that fear can also be a powerful motivating and information retention tool. In Witte's formula, honed from public health outreach on HPV and mammograms, Nordhaus and Shellenberger's gain frames would never engage the active attention of the people they seek to reach. Seeing fear and catastrophe as disengaging and depoliticizing, they neglect the first challenge of the EPPM model, the engagement of the audience to generate productive urgency towards accomplishing change. Without this appeal, visions of green capitalism and technological salvation will continue to be fatally prone to cooptation and comfortable indifference, regardless of the ease or desirability of the changes proposed.

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[395] Nisbet 2009; p. 21.
[396] Alexa Spence and Nick Pidgeon, 2010. 'Framing and communicating climate change: the effects of distance and outcome frame manipulations.' *Global Environmental Change*, Vol. 20, pp. 656-667; p. 662.
[397] Spence and Pidgeon 2010; p. 663.

Such reformist narratives effectively avoid resignation, but return to indifference rather than encouraging action. This means that blanket calls for an end to fear appeals risk cooptation, but also that loss frames which emphasize the overwhelming scale of the problems confronted without positive content about how to confront them also potentially create passivity, the resignation to survive until the catastrophe arrives. Shying from reporting the very real and very alarming trends which are the basis of such catastrophic scenarios for fear of appearing alarmist may perpetuate the indifference felt by many who cannot or would rather not find a trusted source of information conveying this message. Overly cautious, technically-worded climate change communication impairs this sense of self-efficacy.

The International Panel on Climate Change and other 'official' scientific bodies have remained conservatively poised behind the conditional predictions and verification of current trends, trusting that political advocacy will naturally follow from the most logical argument delivered to a democratic public. That this has not happened only enhances the temptation to catastrophic illustration of status quo or worst case scenarios, to the collapsing of global geologic time scales to flash points of local disaster narratives. Unlike survivalists past, we must do the hard work of developing flexible institutions that can socially learn and reengaging consumers to critical reflection on their habits, without relying so heavily on the force of catastrophic anxiety. This should encourage critical political ecologists to pause for reflection, deliberation, and political debate on how to collectively move forward and not merely consider dourly how to individually survive.

The parallel process model suggests, instead, that fear is useful where parallel traits of self- or, in this case, collective-efficacy are high. What this suggests to the

debates over the use and abuse of catastrophic rhetoric in environmentalist circles is that simple linear relationships between fear and activation underlying some of the most prominent testimonies for and against catastrophic fear appeals is not supported by the same literatures it shallowly samples as a kind of symbolic scientific currency. This analysis has suggested that by considering both the crisis and the perceived self-efficacy of the audience a different, more complicated message can be crafted. This is the challenge James Lovelock reflected on at the start of this chapter that 'one of the hardest tasks we face in life is to be the bearer of seriously bad news.'[398] I've argued here that just because this is hard does not mean we can avoid it.

[398] Lovelock 2006; p. xiii.

07 Surviving the New Era: Searching for a Specific Politics of the Anthropocene

I. Critical Theory in Warmer Times

> In order not to despair and feel disgust in the midst of weak and hopeless idlers, surrounded by apparently active, but really only agitated and fidgeting companions, the active man looks behind him and interrupts the path to his goal to take a momentary deep breath. His purpose is some happiness or other, perhaps not his own, often that of a people or of humanity collectively. –Friedrich Nietzsche

If there is a need for critical theory in dark times, there is certainly also need in warmer ones. Attempting a critical analysis of the politics of ecological crisis is untimely in the deepest sense, it risks splintering consensus when the time for mitigation is short and it potentially slows a process of adaptation which requires urgent collective action. But at the same time, as noted by Nietzsche in the *Untimely Meditations* above, a critical slowness is paradoxically necessary in times characterized by passivity, despair, and resignation.

Today, much of what might qualify as environmental political theory, philosophy, and sociology has largely become a competition to name the reason why ecological problems continue despite growing acknowledgment of deleterious trends. 'Theories of non-response,' each attempts to name the disease causing the symptom of apathy and passivity, in order to also prescribe the treatment. It is time to move past these battles for setting the agenda of change to begin experimenting with the changes necessary to generate the social resilience to withstand the worst consequences of our fossil-fueled great acceleration to industrial modernity. This cannot be done by simply planning for uncertain events and waiting passively for technological salvation. The chief obstacle in this path, as Nietzsche saw, is passivity.

The permeation of the concept of the Anthropocene across research programs has given form to many of the continuing debates over the shape of the future to be worked towards in the 'Age of Man.' In this process, assuming the carbon apocalypse makes many once unpalatable options appear more feasible, just as the idea the world had passed its human carrying capacity had in the 1970s. I think this is a reference which is informative considering many of the authoritarian and technocratic undertones of scientific crisis literature and its foil in the Promethean technological ingenuity response peddled now by 'pragmatic' and reformists accepting the existence of global change.

I will show here how attitudes toward global-scale geoengineering, or intentional manipulation of Earth Systems, most clearly reveal the rival visions of the future contained in the Anthropocene literature, one where 'modernists' and 'pragmatists' can claim that the misguided moral romanticism of their opponents is going to cause great suffering,[399] and one where romantics and skeptics can argue that the rationalistic hubris of technical rationality is exposing the world to novel, global forms of risk without addressing the root cause of the problem.[400] This is important in our contemporary context because in the critical social sciences and humanities the new era of the Anthropocene that is supposed to invalidate old understandings is often an amalgamation of trends, relying on a few selected scientists' warnings of an urgent choice between rapid deterioration or planned adaptation.

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[399] An early version from an economist: William Nordhaus, 1992. 'An Optimal Transition Path for Controlling Greenhouse Gases.' *Science*, Vol. 258, pp. 1315-1317; for a popular French version see: Pascal Bruckner, 2013. *The Fanaticism of the Apocalypse: Save the Earth, Punish Human Beings*. Polity, NY; Bruno Latour's '50 Shades of Green' addresses the danger of the label 'ecomodernism' in satirical detail, see: Bruno Latour, 2015. '50 Shades of Green.' *Environmental Humanities*, Vol. 7, pp. 219-225.

[400] Naomi Klein, 2012. 'Geoengineering: Testing the waters.' *New York* Times, Oct. 27, 2012. Accessed 2/27/16 at http://www.nytimes.com/2012/10/28/opinion/sunday/geoengineering-testing-the-waters.html?_r=0; Clive Hamilton, 2013. *Earthmasters: The dawn of the age of climate engineering*. Yale University Press, New Haven.

The Anthropocene has thus become a boundary object, organizing disparate critiques around the strength of its scientific appeal, but the newness of such an era an obstacle. Entering such unprecedented, even 'survivalist,' times presents a direct challenge to the critical historical method. In response, the now dominant theories of non-response end, disappointingly, in only an abstract assertion that social and natural are actually intertwined systems or with a considered rationale for why the author's pre-climate-catastrophe research was imperative to revisit.[401]

The arrival of universally catastrophic conditions which survivalist theories of the 1970s glumly assumed was predicated on the inability of humans to act collectively to mitigate the crisis.[402] Today this assumption that meaningful action is impossible is used by many, including popularizer of the Anthropocene term himself, atmospheric chemist Paul Crutzen, to make things like nuclear energy, hydraulic fracturing, and large-scale climate geoengineering appear plausible in order to reduce short-term suffering.[403] This argument based on 'better than extinction' is at the heart of a dangerous transition to a politics of survival which focuses on short-term fixes and an engineering resilience, or bounce-back to pre-disturbance conditions, and, as the survivalists show, can end in advocacy for technocracy and authoritarianism.

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[401] Usually indicated with '… In the Anthropocene' at the end of the paper title.

[402] Paul Crutzen, 2006. 'Albedo Enhancement by Stratospheric Sulfur Injections: A contribution to resolve a policy dilemma?' *Climatic Change*, Vol. 77. There are several comprehensive reviews of geoengineering which include Solar Radiation Management in discussion later in this paper. See: The Royal Society, 2009. *Geoengineering the Climate –Science, Governance and Uncertainty*. London; National Academy of the Sciences, 2015. *National Research Council Report on Climate Intervention: Carbon Dioxide Removal and Reliable Sequestration.* National Academies Press, DC.

[403] See: David Keith, 2000. 'Geoengineering the climate: History and prospect.' *Annual Review of Energy and the Environment*, Vol. 25, No. 1, pp. 245-284.; David Victor, M. Granger Morgan, Jay Apt, John Steinbruner, and Katherine Ricke, 2009. 'The Geoengineering Option: A Last Resort Against Global Warming?' *Foreign Affairs*, Vol. 88, No. 2, March/April, pp. 64-76.; Douglas MacMynowski , David Keith, Ken Caldeira. and HoJeong Shin, 2011. 'Can we Test Geoengineering?' *Energy & Environmental Science,* Vol. 4, pp. 5044–5052.

The idea that we have entered 'survivalist' times, or an era where the fate of the species is considered an object of active political speculation, should also be a spur to critical history. For the survivalists of old the over-generality of their campaign against population growth in the 1970s proved to be disappointing. This was for two reasons. The first is that their analysis targeted birth rates without considering historical responsibility, which meant their 'global' analysis focused on the species as a whole specifically placed blame for global ecological crisis on the developing world where birth rates remained the highest rather than those areas consuming the most resources. The second is that their analysis targeted an abstract agent, the human species as a whole, that lacked meaningful local reference or an institution of collective decision-making able to politically act at the scale of the problem they identified.

Today, the cross-disciplinary Anthropocene literature and binding narratives like it proclaiming the entrance to a new era of ecological crises must recognize the survivalist precedent and avoid overplaying the universal appeal of global ecological problematics. In the critical social sciences, this should be an opportunity to become specific, to modulate the universal appeal of the Anthropocene for an audience that can act together in a meaningful political way to reshape the habits of everyday life in the developed world driving the deterioration of natural systems.

Following Foucault, I will show below how climate scientists have become a new form of universal intellectual, and suggest the example of Robert Oppenheimer, Foucault's archetype for the new 'specific intellectual,' as a counter to the continued presence of his arch-nemesis Edward Teller in emerging contemporary debates over the technological manipulation of the climate system. It is interesting, then, that Paul

Ehrlich, Paul Crutzen, S. Fred Singer, Edward Teller, and even Roger Revelle joined Sagan and peace activists in debating nuclear winter as well. The point here is that despite the intense feeling of novelty that accompanies the Anthropocene realization, there are examples to draw on from history that give evidence of past struggles against such apocalyptic novelty. This is especially true where scientists enter the public sphere, where their specific expertise becomes of global importance.

Oppenheimer's fight against the hydrogen bomb was similar to Sagan, Crutzen, and others warning against limited nuclear strikes with the threat of nuclear winter, and each faced similar challenges to climate outreach today. The favored strategy by Crutzen, Carl Sagan, Paul Ehrlich, and others was to keep the scientific authority by presenting the findings as pure science and therefore neutral. While in practice they seldom left policy out, they used their scientific authority to claim that the policy implications were implied rather than fought for. This led to opposition questioning their scientific credentials rather than debate over the ways to avoid such an outcome, chief amongst them the case for nuclear disarmament in the peace movements of the 1980s.

Likewise, Edward Teller, the arch nemesis of Oppenheimer, surfaces in this debate. This should signal to critical theorists concerned with history that many of the themes of the original debate over nuclear weapons from 1945 and extending through the Cold War may be fertile material for historical lessons, even if the Anthropocene is 'new' in some way. It should also draw focus to gaining a more specific analysis than the global species perspective of the failed Survivalist attempts at cultural and political change in the 1970s. Given the reliance of such survivalist population narratives on the

specter of the total nuclear apocalypse, that Paul Ehrlich also appears as Teller's radical other in the nuclear winter debate should not be surprising.

There is thus both a clear overlap in themes and strategies, as well as a very literal overlap in the personalities of the driving advocates for and against climate change and nuclear problematics like those surrounding nuclear winter in the 1980s. In 2000 Paul Crutzen, a Nobel Prize winner for his work on the ozone layer, announced that humanity, in geologic terms, had entered a new age. This age he dubbed the Anthropocene.[404] This, essentially, recognizes the carbon problematic as supremely urgent to the point where public opinions over nuclear power (unfavorable since Fukushima) and the need for a public debate over the development and governance of geoengineering techniques seem to once again be cumbersome obstacles rather than necessary steps towards change. Nuclear winter, in many ways, was a similar story.

In 1982, Crutzen and others were authoring the SCOPE Report, detailing the possible climatic effects of the fires initiated by nuclear wars.[405] This scientific report was created in the climate of tension over short range missiles being placed on both sides of the Iron Curtain in Europe. Nuclear winter had a limited effect on policy in the US despite Sagan's dedicated advocacy, but it did resonate in the New Left in Europe, especially those countries set to receive strategic missiles as forward NATO bases, the possible site of 'limited' nuclear strikes. To Europeans, this represented a stage of total

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[404] Paul Crutzen and Eugene Stoermer, 2000. 'The Anthropocene.' *Global Change Newsletter*, Vol. 41, pp. 17-18.

[405] See: Paul Crutzen, 1985. 'A Summary of the Scope Report by One of its Authors: The Global Environment After Nuclear War.' *Environment: Science and Policy for Sustainable Development*, Vol. 27, No. 8, pp. 6-39.

disempowerment, where the stakes of their continent lay in the hands of two seemingly unopposable forces of annihilation who only seemed to see each other.

I try here to understand better how the campaign for public understanding of the possibility of post-nuclear fires leading to freezing temperatures became a spearhead in the political battle against 'limited strike' and 'strategic' nuclear arms. This section points out that the contemporary campaign for geoengineering places Crutzen in Teller and Singer's camps rather than his former affiliation with Sagan's public outreach campaign. Rethinking the Anthropocene in this specific register should be a challenge both to formulate the global crises predicted in locally-meaningful terms and also to gain focus on the political ramifications of technological fixes. Despite the lure of uncertain technological fixes, the turn from verification to responsibility to act presented by entrance to the Anthropocene cannot be accomplished without critically interrogating the assumptions about what it means to lead a modern life, an image which buttresses the inertia of the developed world as it drives the accelerating extraction and degradation in the developing world.

This is the role of critical theory in warmer times. Allowing debates like those surrounding climate geoengineering to proceed as if the politics of such technologies was merely a managerial project of selecting techniques is dangerous because it leaves the problem generalized, naturalizes existing conditions, and obscures normative debate over the justice of habits in the 'developed' world. These half efforts appear understandably cynical to many in the 'developed' world whose livelihoods are endangered by technological shifts, and, perhaps more importantly with reference to the survivalist premises which the Anthropocene reanimates, to the majority of the world still

'developing,' living in increasingly urbanized and unevenly precarious cities who are historically un-responsible for many of the global ecological trends now changing everyday life, but living without the security of comfort that the degradation bought.

II. The Value of Historical Analysis in New Eras

> To re-politicize the Anthropocene, we argue, means fostering a vibrant public space where manifold and divergent socio-ecological relations and nature concepts can be exposed and debated. In order to enable such constructive politics of the environment, environmental scholars need to demonstrate that the Anthropocene is not the end of politics. – Eva Lovbrand

Atmospheric chemist Paul Crutzen and coauthors have pushed for formal scientific recognition of a new geologic epoch of time called the 'Anthropocene' through the International Union of Geologic Sciences, the scientific group in charge of designating geologic epochs based on major changes in planetary systems.[406] Their concept is politically important because it clearly extends natural crises to the social realm, warning that 'global warming and many other human-driven changes to the environment are raising concerns about the future of Earth's environment and its ability to provide the services required to maintain viable human civilizations.' This is followed by a vague threat that: 'worst-case scenarios paint a gloomy picture for the future of contemporary societies.'[407]

The push for recognition of a new era where the human species collectively rivals the great forces of the planetary system is intended to illustrate the change underway due to human influence and to motivate urgent collective action. The agreement on entering such a new era, however, conceals important political and ethical debates about what

[406] At the time of writing in January of 2017, it was still under consideration.
[407] Will Steffen, Paul Crutzen, and JR. McNeill, 2007. 'The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature?' *Ambio*, Vol. 36, No. 3, pp 614-621; p. 614.

exactly entering this new era means for existing institutions.[408] The lack of political detail is important. Some, including Crutzen himself, have suggested that the pace of current change requires overcoming traditional green taboos on 'transition fuels' like natural gas, nuclear energy, and even the testing of climate geoengineering techniques to mitigate the unavoidable effects of rapid change in global systems. All of these technological solutions require a strong role for the national state to regulate, construct, and monitor. The same assumption of state power was assumed by survivalists past, whose disbelief in existing political institutions *was the predicate for* their authoritarian prescriptions.

Treating our era as fundamentally new, many across ideological and disciplinary lines have attempted to link their own analyses to the emerging concern with climate change. Clearly it is rhetorically attractive because it demands change, it says that old bets are off, life cannot go on as it has. Thinking of this issue as unique or novel is dangerous, though. The speed and synoptic scale of the contemporary social-ecological crises presented may be new, but it is not the first time such a recognition of a radical break at a global level has occurred. Consider the words of the Port Huron Statement, written 50 years ago and focused on nuclear war:

> Our work is guided by the sense that we may be the last generation in the experiment with living. But we are a minority -- the vast majority of our people regard the temporary equilibriums of our society and world as eternally-functional parts. In this is perhaps the outstanding paradox: we ourselves are imbued with urgency, yet the message of our society is that there is no viable alternative to the present. Beneath the reassuring tones of the politicians, beneath the common opinion that America will "muddle through", beneath the stagnation of those who have closed their minds to

[408] As explored recently by John Dryzek, 2016. 'Institutions for the Anthropocene: Governance in a Changing Earth System.' *British Journal of Political Science,* April, pp. 1-20.

> the future, is the pervading feeling that there simply are no alternatives, that our times have witnessed the exhaustion not only of Utopias, but of any new departures as well.[409]

That survivalist political theorist William Ophuls, famous for predicting a dramatic choice between 'Leviathan or Oblivion,' makes frequent use of the term 'muddle through' is no accident.[410] By the 1970s, this feeling of generational urgency had been frustrated into a profound sense of anxiety. Political, economic, and social instability all combined to produce an unspoken consensus that things were out of control, but in the grips of energy crisis no system seemed up to the challenge.

Describing the movement he wished to inspire, Hayden wrote in the PHS:

> Doubt has replaced hopefulness -- and men act out a defeatism that is labeled realistic. The decline of utopia and hope is in fact one of the defining features of social life today…To be idealistic is to be considered apocalyptic, deluded. To have no serious aspirations, on the contrary, is to be 'tough-minded.'[411]

Hayden's call is for urgent activity, motivated by racial and social injustice, but underlined by nuclear weapons and the Cold War. His words to his movement are interesting, if only because they seem also appropriate to the task of avoiding indifference and resignation: he says we 'must transform modern complexity into issues that can be understood and felt close-up by every human being. It must give form to the feelings of helplessness and indifference, so that people may see the political, social and economic sources of their private troubles and organize to change society.'

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[409] Students for a Democratic Society, 1962, 'The Port Huron Statement.' In 1987. *Democracy is in the Streets: From Port Huron to the Siege of Chicago*. Ed. James and Jim Miller, Harvard University Press.
[410] Sale's work on 'human scale' politics with the SDS before his turn to bioregionalism and eventually secessionism is another example of this carryover from the disappointment of the 1960s student movement. See: Kirkpatrick Sale, 1980. *Human Scale*. Coward, McCann, and Geoghegen, NY.
[411] SDS 1962.

The feeling that there were no workable alternatives, the pervading depoliticization and exhaustion literally embodied in the Energy Crisis, marked the era as survivalist times. This resignation, the despair for acting at appropriate scale to affect the problem identified, turned the tables for many who had been optimistic in the 1960s. This era of thought was deeply pessimistic about the capacity of humans to self-govern, and tried to jar loose critical attention with vivid depictions of the possible catastrophic future to come. What they saw was dire, and their rendition of it is fused with traditional American tropes from great awakening to nuclear winter.

Lacking the reassurance necessary to make the traditional conversion pivot common to environmental politics and fire and brimstone preaching, survivalists instead gave a picture of the future as they cynically saw it without any positive prescription to recommend, culminating in a kind of exhausted surrender to the implacability of the coming catastrophe. The contention of the survivalists was that the growth consensus across liberal and socialist institutions throughout the 'Great Acceleration' of the post-WWII era (to phrase it in terms of the Anthropocene literature) may have inadvertently created the conditions for their own demise in a global state of ecological crisis. Degradation of the global commons was identified as an unintended side effect of the greatest force for preventing human conflict: shared, sustained economic growth and increased human mobility.

The favorite reply of those ideologically attached to the *status quo* was the rejection of the survivalist central premise, the inability of humans to technologically overcome their situation. They claimed that through the application of Promethean cleverness to create large-scale technological solutions, problems caused by the

externalities of modern anthropocentric cultures could be progressively solved with technological ingenuity. Today, discussion in many 'pragmatic' discourses (i.e. those accepting that it is too costly to change 'developed' ways of life) has turned to technologically-mimicking volcanoes to manage solar radiation, setting giant carbon-capturing fans near high emitting areas, and even placing a cloud of tiny mirrors in space to reflect sunlight. This discussion mirrors the Promethean rejection of survivalist premises, they maintain a sense that technological solutions, properly incentivized, could maintain a 'modern' way of life. Neither approaches the possibility of social learning or questions the possible moral need for urgent change in 'developed' ways of life.

Instead, today some search for funding for programs which once would have been unimaginable to our ancestors, eminent among them controlling the weather, without two key discussions. The first is the question of whether we *should* do such things, or whether the great scale at which techniques like global-scale geoengineering act also implies the exponential rise in risk, which, performed at such a global scale, leaves little room for learning. The second problem is about who the *we* in the prior question is, and is related to the almost total lack of political perspective in most of these arguments. Technology, in its hopeful Promethean tone, is the product of individual genius or concentrated government investment, not a collective discussion about a lifestyle which unequally consumes the world's resources and endangers global ecosystems. Instead of having this difficult conversation, Prometheans promise to maintain the 'developed' way of life and continue to offer it to the 'developing' world as a shining example.

Leaving these developmental hierarchies intact provides distance from the displacement of waste and degradation produced by the global commodity chains of the

high-consumption ‘developed’ world and also slows the urgency to address imbalances in political and economic institutions which drive the degradation of global ecosystems. The problem this generates is complicated. It is *not about a simple rejection of all technology*, as some radical strands of eco-primitivism and patronizing noble savage narratives have taken it, but rather the urgent need for an active response to the possibility of a catastrophic future *which does not itself contain the risk of a more catastrophic one*. The geoengineering narrative is appealing because it appears active and as if it does not depend directly on political progress at national and international levels. This appearance, however, is misleading, since climate management programs and other large-scale technological solutions carry with them government and regulatory infrastructures which will be hard to dismantle once in place.

Searching for an active response, critical theorists in survivalist times must insist on politics that can learn from the inevitable mistakes rather than those that passively wait for technological salvation. In the past, similar survivalist narratives presenting a catastrophic departure from natural equilibrium prescribed urgent centralized and drastic action. In the Cold War political environment of the time, this critique cut across traditional ideological cleavages, questioning both systems globally at war with its seemingly universal threat, carried to its powerful extreme through the prospect of nuclear war. In both climate and nuclear contingency planning, the source of the danger is assumed, not because it was a fact but because it was a threat so great that must be planned for regardless of its possibility. The essence of the threat of nuclear apocalypse, and what makes it particularly interesting to consider alongside climate change, was that

it would affect all people, that it offered augmentation of appeals (whether religious, political, economic, or ecological) to the level of global, universal significance.

Climate change, today, increasingly fills a similar, universal role. As philosopher Allen Thompson notes, 'not unlike the threat of a nuclear holocaust during the Cold War, global warming has aroused profound concerns about the future of humanity and the planet as a whole.'[412] Critiquing the catastrophic rhetoric of Bill McKibben's *Death of Nature* arguments, Thompson hints that 'global warming is something analogous to warfare by means of nuclear, rather than conventional weapons,' because it threatens the fabric of the living planet at a scale which commands moral attention. Noting this initiation of a new era of responsibility, Thompson obliquely observes that 'it may be that the global warming/nuclear weapon analogy goes further.'[413]

Indeed, I think it does. The question I want to ask also mimics ecocritic Cheryl Glotfelty's concerns about the differences between Cold War and climate change problematics, differences which Dipesh Chakrabarty highlights in his 2009 paper on the Anthropocene.[414] Glotfelty says 'thankfully, the Cold War is over. Should people who are committed to enlightened stewardship of the earth continue to invoke it?'[415] I think this question is most interesting when it considers the opposite possibility, that many have instead forgotten the Cold War, along with the lessons offered by engaging the

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[412] Allen Thompson, 2009. 'Responsibility for the End of Nature: Or, How I Learned to Stop Worrying and Love Global Warming.' *Ethics and the Environment*, Vol. 14, No. 1, pp. 79-99; p. 80.
[413] Thompson 2009; p. 90.
[414] Chakrabarty says 'how the current crisis can precipitate a sense of the present that disconnects the future from the past by putting such a future beyond the grasp of historical sensibility.' Dipesh Chakrabarty, 2009. 'The Climate of History: Four Theses.' *Critical Inquiry*, Vol. 35, No. 2, pp. 197-222; p. 197.
[415] Cheryl Glotfelty, 2000. 'Cold War, Silent Spring: The Trope of War in Modern Environmentalism.' in *And No Birds Sing: Rhetorical Analysis of Rachel Carson's Silent Spring*. Ed. Craig Waddell, Southern Illinois Press; p. 167.

nuclear problematic, that we confront, as Chakrabarty suggests in his highly-cited 'Four Theses on the Anthropocene,' a profound disconnection from historical experience.

That today many prominent scientific voices call for 'clean' nuclear energy (meaning: low carbon) to buy time for society to adapt illustrates how surprisingly absent the technological ambiguity that accompanied the prospect of nuclear war has become. Slow violence is confusing in this sense, since it asks a more fundamental question about the intergenerational and uneven global consequences of 'buying time'—it asks time for who? to continue what? Instead of asking whether we should invoke the Cold War, perhaps we need to ask whether we accidentally transpose the scale and anxiety of nuclear weapons onto our contemporary visions of climate catastrophes without also absorbing the potential lessons of irreversibility, humility, and the critique of technology which accompanied the old nuclear debates.

Noting this curious lack of reference to nuclear debates, it is interesting that Paul Crutzen remains a central figure in the climate geoengineering debates, as he spent much of the 1980s (before his oft-cited Nobel prize for work on the ozone hole) researching the cooling effects of nuclear fires, a research program which attempted to influence public debate over so-called 'strategic' nuclear wars with limited strikes by showing the consequences of nuclear war for the climate system. He was joined publicizing 'nuclear winter' by influential scientists and popularizers like Carl Sagan, Paul Ehrlich, and Richard Turco, amongst many others,[416] and opposed vehemently by nuclear advocates

[416] Richard Turco, OB Toon, TP Ackerman, JB Pollack and Carl Sagan, 1983. 'Nuclear Winter: Global consequences of multiple nuclear explosions.' *Science*, Vol. 222, No. 4630, December, pp. 1283-1292.

like Edward Teller[417] and professional skeptics like S. Fred Singer,[418] who continues to anchor the core of non-specialist scientists driving global warming denial strategies.[419]

That today Crutzen opposes both Ehrlich and Turco,[420] and supports some of the same research proposals (if for different reasons) as Edward Teller, is demonstrative of the activating power of the catastrophic future. There is some irony to found here: novel social-ecological crises drove Crutzen to seek an emergency fix so urgently that he considers a cognate for nuclear winter, despite his sustained work on the tragic prospects of 'darkness at noon' following a nuclear war.[421] He eventually advocates for Solar Radiation Management research, despite its effect on the atmospheric ozone levels for which he earned his Nobel Prize studying.[422] This is proof that, as Sheila Jasanoff and Dipesh Chakrabarty have warned, global catastrophe scenarios have dangerously disconnected contemporary debates from historical comparison.

That some of the most high-profile appeals for geoengineering come from Crutzen is not surprising—he has worked on 'big problems' throughout his career, including climate change, his Nobel Prize-winning work on the ozone hole, and the atmospheric effects of fires after nuclear war. What is surprising, considering the sober and cautious views expressed in this past research, is the startling lack of humility or

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[417] Edward Teller, 1984. 'Widespread after-effects of nuclear war.' *Nature*, Vol. 310, Issue 5979, pp. 621-624.
[418] S. Fred Singer, 1984. 'The big chill? Challenging a nuclear scenario.' *Wall Street Journal* 3; also: S. Fred Singer, 2003. 'Editor bias on climate change?' *Science* 301.5633, pp. 595-596.
[419] Eric Conway and Naomi Oreskes have coined the term 'merchants of doubt.'
[420] Richard Turco, 1995. *Global Environmental Engineering: Prospects and Pitfalls*. Jones and Bartlett Sudbury, MA.; Scott Barrett, TM Lenton, A. Millner, A. Tavoni, S. Carpenter, JM Anderies, FS Chapin III, A. Crépin, G. Daily, P. Ehrlich, C. Folke, V. Galaz, T. Hughes, N. Kautsky, EF Lambin, R. Naylor, K. Nyborg, S. Polasky, M. Scheffer, J. Wilen, A. Xepapadeas, and A. de Zeeuw, 2014. 'Climate Engineering Reconsidered.' *Nature Climate Change*, Vol. 4, July 2014, pp. 527-530.
[421] Paul Crutzen, 1984. 'Darkness after a Nuclear War.' *Ambio*, Vol. 13, No. 1, pp. 52-54.
[422] Paul Crutzen, 1996. 'My life with O3, NOx, and other YZOx compounds (Nobel lecture)." *Angewandte Chemie International Edition in English* Vol. 35, No. 16, pp. 1758-1777.

critical debate over the use of geoengineering technology. Scientists may consider this a tool which we should develop and understand 'just in case,' but their isolation from public scrutiny and the erasure of important debates over the appropriate use of technology in the geoengineering proposals is dangerous.

Crutzen began his career by studying the effects of supersonic air travel, and the difference between his tone then and now is striking. In a passage summing up the recommendations from his dissertation published in 1972, Crutzen wrote:

> Although it is not possible to assess at this stage the real environmental consequences of future supersonic air transport, present knowledge indicates that there exists a real possibility of serious decreases in the atmospheric ozone shield due to the catalytic action of oxides of nitrogen, emitted in the exhaust of supersonic aircraft. **The minimum requirement is therefore that extensive supersonic air traffic should not take place in the stratosphere before reliable predictions can be made of the possible environmental consequences of such operations**.[423]

This summary did little to ingratiate him with the Concorde project, nor did it convince those like Teller and Lennart Bengtsson that natural systems were fragile. They continued to believe, with many, that human actions had little effect on Earth systems. Doubting the fundamental assumption that humans could modify the planetary environment, such narratives also implicitly made the case that humans were in no position to change it for the better either. It pushed politics and administration to the background, centering all hope for avoiding change on technology. Critique, in this context, is often seen as time-wasting, a form of passive bickering when work needs to be done, enhancing the appeal of more active-seeming, 'pragmatic' approaches.

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[423] Paul Crutzen, 1972. 'SST's: A Threat to the Earth's Ozone Shield.' Ambio, Vol. 1, No. 2, pp. 41-51; p. 49. My emphasis.

For a theoretical tent which now hosts many different disciplinary and practical perspectives, emerging research programs centered on the Anthropocene concept should be interpreted as a call to become more specific and to embrace the complexity of the social-ecological world as an opportunity, rather than an invitation to a comforting resignation. For critical theorists of the Anthropocene, the beginning of debates over climate geoengineering and increasing focus on the potential for global emergency conditions should signal the need to return to the analysis of politics to complement emerging scientific awareness. Recognizing the potential for despair presented by acceptance of the new era, however, is not the same as putting forward a different positive vision of Anthropocene politics. This imaginative task still lies waiting for most theorists concentrated on explaining the mismatch in public acceptance and political behavior with theories of non-response.

Becoming Specific

As many today consider our era new and as Garrett Hardin clearly considered the epoch of world overpopulation novel, the advent of the nuclear era also created a feeling of living in unprecedented times. Hardin and the survivalists played on these fears, stoked in the 1960s by the Cuban Missile Crisis, detonation of the Tsar Bomb, and war in Southeast Asia. That Ehrlich figured his population theory as a kind of 'population bomb,' that Garrett Hardin begins his famous tragedy paper with a quote on nuclear strategy, and that William Ophuls and Robert Heilbroner warn of nuclear proliferation shows the integrating force of nuclear imagery, the way that connection to nuclear holocaust elevated whatever issue attached to universal significance.

The power of contemporary modernist arguments for 'bridging fuels' and geoengineering research is augmented by the loss of the nuclear debate because it effaces the ambiguity of technological progress, which often hides real conflicts within the broader Anthropocene umbrella about the need to change deleterious lifestyles and consider seriously historical responsibility for carbon emissions and other global ecological harms. More, it absorbs many of the global catastrophe tropes without the humility to ask critical questions about what these miraculous future technologies will sustain—about, essentially, what it will mean to live a 'modern' or 'developed' life in this new world of planetary risk and earth system management.

The moral issues of such a call are largely ignored because of the perceived urgency of the need to adapt, still delinked from any causal structure linking it to global systems the responsibility for change that they might imply. This cannot be done in a purely universal register, as the survivalists showed in the 1970s. Moving to a specific analysis, Foucault explained in 'Two Lectures' meant:

> A new mode of the 'connection between theory and practice' has been established,' that there was a new binding force and activity to intellectual life. This was because 'intellectuals have got used to working, not in the modality of the 'universal', the 'exemplary,' the 'just-and-true-for-all', but within specific sectors, at the precise points where their own conditions of life or work situate them.[424]

Considering the atomic era, Foucault detailed the transformation of the critic and intellectual from the aggrandized and universal days of Hegel and Sartre to the technical expert and specialized researcher, the 'specific' intellectual. Naming the father of the atomic bomb, Robert Oppenheimer, as its exemplar, Foucault saw that the key for the

[424] Michel Foucault, 1980. 'Two Lectures.' In *Power/Knowledge: Selected interviews and other writings 1972-197*. Pantheon, NY; p. 126.

new kind of intellectual was to connect their specialization to global issues of great importance, where their specific expertise could affect the species at a universal level.

Describing a new kind of expertise inaugurated in the nuclear era, Foucault defines his idea of the new 'intellectual' as a distinctly political expert; he says:

> What we call today 'the intellectual' (I mean the intellectual in the political, not the sociological sense of the word, in other words the person who utilizes his knowledge, his competence and his relation to truth in the field of political struggles) was, I think, an offspring of the jurist, or at any rate of the man who invoked the universality of a just law, if necessary against the legal professions themselves.[425]

Here Foucault invokes Voltaire, but students of green theory will hear also Rachel Carson, Aldo Leopold, and other pioneering ecologists thrust into the political limelight by their concerns for the subjects of their studies. In our times, most likely, no figure embodies this specific yet universal role as clearly as climate scientists like Crutzen.

This proximity, the specificity of the struggles in which ideas become practice, for Foucalt created a 'more immediate and concrete awareness of struggles.' Foucault felt that theorists in the universal mode became so caught in the intricacies of their abstract theories that they had helped to allow the state of knowledge to arrive unreflectively on the door of nuclear annihilation. He saw the threshold of modernity as the moment when humans wagered their existence on their politics.[426] Crossing this point signaled the transition to 'biopower,' or life brought 'into the realm of explicit calculations.' In the first volume of *The History of Sexuality* he claims:

> What might be called a society's 'threshold of modernity' has been reached when the life of the species is wagered on its own political

[425] Foucault 1980; p. 128.
[426] Michel Foucault, 1980b. *The History of Sexuality: Vol. 1*. Vintage, NY; p. 143.

> strategies. For millennia, man remained what he was for Aristotle: a living animal with the additional capacity for political existence; modern man is an animal whose politics places his existence as a living being in question.[427]

It is this instability aimed *universally* at the persistence of the species created by the prospect of nuclear holocaust which generates the call for the specific intellectual.

It is no surprise, given the argument about universal appeal above, that Foucault designates Oppenheimer, the architect of the nuclear bomb and crusader against the development of the hydrogen bomb, the model specific rather than universal intellectual. In a passage from 'Two Lectures,' Foucault claims:

> It seems to me that this figure of the 'specific' intellectual has emerged since the Second World War. Perhaps it was the atomic scientist (in a word, or rather a name: Oppenheimer) who acted as the point of transition between the universal and the specific intellectual. It's because he had a direct and localized relation to scientific knowledge and institutions that the atomic scientist could make his intervention; but, since the nuclear threat affected the whole human race and the fate of the world, his discourse could at the same time be the discourse of the universal.[428]

Essentially, Oppenheimer is the exemplar of the 'specific' kind of intellectual because he grasped specific problems and used his training to advocate, at great expense, against the extension of his creation to the thermonuclear level sought by Edward Teller and others. That Teller continues to appear into the late 1990s in the geoengineering debate is a hint that something about the normative imperative which Oppenheimer felt, famously quoting the Bhavagad Gita at the first Trinity test in 1945 ('Now I am become destroyer of worlds…'), has been lost.

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[427] Foucault 1980b; p. 143.
[428] Foucault 1980,; p. 127.

Figure 4: Trinity test, July 16th, 1945. Source: US State Department.

The Anthropocene and Nuclear Winter

If climate scientists have largely replaced the nuclear scientist as archetypical specific intellectual, working simultaneously at minute scientific and immense global scales, it also true that thinking about climate change 'specifically' can lead to very different trajectories of research depending on how the subject is approached and the kinds of assumptions made about social and economic systems. The nuclear connection sits largely unspoken in the background of these debates, not simply through omission or the particular history of one atmospheric chemist, but as a fundamental prerequisite for the generation of the monitoring, processing, and modeling of climate data at all. It is not a coincidence, in this sense, to see Lawrence Livermore Labs at Berkeley, the one time home of Teller, Bala, and Caldeira, also involved in the debates over geoengineering.

Concepts like geoengineering have deep roots in the US security structure and government science funding, related primarily to detecting radioactive evidence of nuclear tests and even including environmental modification schemes aimed at weaponizing the weather.[429]

The entrance into the nuclear era created the need to generate a baseline knowledge of how climate and ocean systems circulated in order to detect nuclear tests, a project which took on significance for people like ocean scientist and eventual director of Scripps Institution of Oceanography, Roger Revelle. Revelle was tasked with assessing nuclear tests at Bikini Atoll in 1946 as the chair of the National Academy of Sciences committee evaluating the effect of radioactivity on fisheries, a job which required creating some of the first general global ocean circulation models. This line of research would eventually yield the lesson that oceans cannot infinitely absorb carbon, as many initial critics of Svante Arrhenius and Guy Stewart Callendar's early theories of the greenhouse effect assumed, and lead to some of the first academic publications on climate change in the late 1950s and early 60s.

Today, for Crutzen and his many coauthors, 'human activities have become so pervasive and profound that they rival the great forces of Nature and are pushing the Earth into planetary *terra incognita*,' or new, unknown epoch where the credentials for human survival will be tested.[430] Anthropocene coauthor JR McNeill made an early version of this argument in his 2000 environmental history, *Something New Under the Sun*: 'in the twentieth century, humankind has begun to play dice with the planet, without

[429] Jacob Darwin Hamblin, 2013. *Arming Mother Nature: The Birth of Catastrophic Environmentalism*. Oxford University Press, New York.
[430] Steffen *et al* 2007; p. 614.

knowing all the rules of the game.'[431] McNeill's word choice closely mirrors that of Revelle and Hans Suess in one of the first reports on climate change in 1957. There, they conclude provocatively:

> Thus human beings are now carrying out a large scale geophysical experiment of a kind that could not have happened in the past nor be reproduced in the future. Within a few centuries we are returning to the atmosphere and oceans the concentrated organic carbon stored in sedimentary rocks over hundreds of millions of years. This experiment, if adequately documented, may yield a far-reaching insight into the processes determining weather and climate.[432]

That little of this message seems fundamentally changed from 1957 to the interdisciplinary cutting-edge represented by the Anthropocene literature is both a general and specific clue to the usefulness of the history which the 'new era' seems to disqualify. In the general sense, it shows the lack of historical markers for success or failure in contemporary debates, how the sense of urgency and inevitability has unmoored many traditional taboos against large-scale earth system modification, nuclear energy, and hydraulic fracturing. In a more specific sense the similarity of Revelle's comments to Crutzen's points again to the relevance of the nuclear debate.

The nuclear winter debate in the 1980s is interesting to add to this historical consideration for two reasons. First, many of the key authors in contemporary climate debates are pursuing long-laid rhetorical strategies from prior debates, especially those surrounding nuclear weapons in the 1950s and 60s and the population debates of 'human ecologists' in the 1970s. Second, cultivating a public understanding the relation between

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[431] JR McNeill, 2000. *Something New Under the Sun: an Environmental History of the Twentieth Century World.* Norton, NY.; p. 3.

[432] Roger Revelle and Hans Suess, 1957. 'Carbon Dioxide Exchange Between Atmosphere and Ocean and the Question of an Increase of Atmospheric CO2 during the Past Decades.' *Tellus,* Vol. IX.; p. 20.

global catastrophic imagery and local collective response, a challenge at the center of the nuclear winter debate, remains the key task for social scientists and humanities scholars interpreting climate change through concepts which blend social and natural analysis.

Crutzen, in the early 1980s, worked on the Special Committee on the Protection of the Environment (SCOPE) report, which claimed that nuclear war and the possibility of nuclear winter represented the greatest threats to the environment.[433] In the same year, he published 'Twilight at Noon' in *Ambio*, followed by articles in 1984, suggestively titled 'Darkness After a Nuclear War' and 'The Atmospheric Effects from Post-Nuclear Fires.' Not content with the joint-authored report delivered by SCOPE, he also wrote a single-author summary of the original report on nuclear war in 1985. His findings strengthened resistance from Europe and the developing world to nuclear exchanges by denying the surgical precision of a 'limited' nuclear war. Nuclear winter meant that nuclear war anywhere was a threat to life everywhere, whatever the rhetoric of limited or precision engagements.

Crutzen was not alone considering nuclear winter. Amongst many other high profile personalities, Carl Sagan became the voice of the anti-nuclear campaign in the US because of his willingness to risk his credibility as a scientist to apply the analysis to policy, In the abstract of a coauthored paper in *Science* in 1983, Sagan and Ehrlich insist on the global nature of the consequences of nuclear conflict, selecting some of the worst case scenarios from the more neutral SCOPE reports:

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[433] See: Richard Turco, OB oon, TP Ackerman, JB Pollack, Carl Sagan, 1983. 'Nuclear Winter: Global Consequences of Multiple Nuclear Explosions.' *Science* For a later summary, see: Richard Turco, OB Toon, TP Ackerman, JB Pollack, and C. Sagan, 1990. 'Climate and Smoke: An Appraisal of Nuclear winter.' *Science*, Vol. 247.

> Subfreezing temperatures, low light levels, and high doses of ionizing and ultraviolet radiation extending for many months after a large-scale nuclear war could destroy the biological support systems of civilization, at least in the Northern Hemisphere. […] In either case the extinction of a large fraction of the Earth's animals, plants, and microorganisms seems possible. The population size of Homo sapiens conceivably could be reduced to prehistoric levels or below, and extinction of the human species itself cannot be excluded.[434]

Chairman of the SCOPE studies, Frederick Warner insisted on the clear policy implications of the more measured language in the initial report. Still, Sagan and others attempted remain nonspecific and preserve their scientific authority, if only in order to have an effect on policy by swaying public opinion and changing the terms of the debate.

The primary tactic for those opposed to nuclear winter as an idea was largely to attempt to discredit the science. One researcher in particular has a long history with this kind of embarrassment, Paul Ehrlich, seized on the idea of nuclear winter and the direst scenarios presented by other scientists, as he had in the 1970s concerning global population and resource scarcity. Sagan was, like Ehrlich, clearly working in the policy realm. His concerted effort to popularize scientific education and recognition of the danger posed produced things like the TV movie depicting nuclear war, *The Day After*, and the subsequent televised roundtables with experts broadcast on network TV.[435] Throughout, he attempts to make the idea of total war imaginable, trying to raise the imagination of the consequences to the appropriate level in order to stimulate an educating public deliberation.

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[434] Paul Ehrlich, J. Harte, MA Harwell, PH Raven, C. Sagan, GM Woodwell, J. Berry, ES Ayensu, AH Ehrlich, T. Eisner, 1983. 'Long-term biological consequences of nuclear war.' *Science*, Vol. 222, No. 4630, December, pp. 1283-1292.

[435] On which, it is no coincidence, the modern climate disaster movie *The Day After Tomorrow* (Emmerich 2004) is modeled.

The tactic in response, as S. Fred Singer clearly shows, was the same as it is now with climate change. Acting from a position of moral inferiority (for who could be *pro* nuclear war?), opponents were forced to work directly on the credibility of the scientists themselves. Recognizing the self-imposed limits of many scientists reluctant to enter a public arena, several scholars with equally impressive (although comically unrelated) academic credentials weighed in against the gloomy predictions with seemingly plausible explanations to scientific novices. Singer, in his trademark style, raised oblique questions about the science and questioned the motivations of the authors. This has won him handsome support in contemporary times from major energy companies. His embrace of 1500 year warming cycles has made the full gamut of passive intended responses, moving from scientific indifference to overwhelming resignation.

Singer, it should be noted, specializes in magnetic fields, not climate science or nuclear physics or anything directly related to either problematic. He represents a small cadre of scientists who make money doubting unpopular scientific findings in order to generate confusion, as outlined in Conway and Oreskes' *Merchants of Doubt*. The similarity of Singer's articles from the two periods is clear and his specialty in magnetic fields not directly applicable to either debate. A small selection of his immense publishing record shows this clearly:

> 1984. 'Is the 'nuclear winter' real?' *Nature,* 310, 23 August, p. 625.
> 1984. 'The big chill? Challenging a nuclear scenario.' *Wall Street Journal.* p. 3.
> 1992. 'Benefits of global warming.' *Society,* Vol. 29, No. 3, pp. 33-40.
> 2001. 'Global warming: An insignificant trend?." *Science* Vol. 292, No. 5519; pp. 1063-1064.
> 2003 'Editor bias on climate change?' *Science* Vol. 301, No. 5633; pp. 595-596.

Singer's tactic, like those used against Rachel Carson and those leveled against social movements in the late 60s and early 1970s, is in many ways determined by the strength of the arguments from scientific authority. It seeks to slow down change at all costs and sees the potentially powerful appeal of neutrality and scientific authority as also a potential weakness to be exploited.

Current obsession with improving confidence intervals and debating the reality of the catastrophe falls into this trap, performed by several of the exact same people, a set of PhD scientific hitmen for hire, the so-called *Merchants of Doubt*. What they understand is the lesson of the survivalists of the 1970s, that rhetorical strategies based on presenting the worst possible scenario were prone to hyperbole which could invalidate the theory in the long-run and could be assuaged or confused by counter-arguments from similarly authoritative technical experts.

No one in modern history has done more for this counter-strategy now employed by Bjorn Borg, S. Fred Singer, the Heartland Institute, and prominent politicians like Jim Inhoffe, than Stanford biologist and survivalist Paul Ehrlich. Ehrlich's *Population Bomb* shot to fame in the late 1960s as social movements became frayed by war and political instability. The oil shocks made Ehrlich's dire rhetoric even more popular, and seeing the chance to elevate the discourse on population to a popular level, Ehrlich used his authority as an ecologist (he studied butterfly populations) as a blunt policy tool for advancing forced sterilization and other extreme measures only possible in authoritarian regimes. Ehrlich's population campaign adapted the worst-case scenarios the same way Ehrlich and Sagan eventually adapted the worst predictions of the SCOPE report to present the possible worst case. He does this to try and jar the public into action.

Following on the heels of debates over placement of American missiles in Europe, the nuclear winter campaign radicalized the arms control debate across Europe and the United States. Challenging the imagination of the greater public to comprehend the potential global repercussions of nuclear strikes was meant as a counter to the Reagan and Thatcher administration's rhetoric about limited strikes, mobile missiles stationed in Europe, and the idea of nuclear weapons as a 'strategic strike force.' The rise in rhetoric on the international stage drove increasing domestic pressure in the West to 'Protect and Survive' by becoming prepared for a possible future *after* catastrophic nuclear war.

Thus, like climate change, nuclear winter presented a problem for translating science into policy. The favored strategy by Crutzen, Sagan, Ehrlich, and others was to maintain scientific authority by presenting the findings as pure science and therefore neutral. This left them vulnerable to attacks on the certainty of their predictions. Consider the abstract in famous nuclear campaigner Edward Teller's response to the nuclear winter papers in *Nature* in 1984:

> Radioactive fallout and depletion of the ozone layer, once believed catastrophic consequences of nuclear war, are now proved unimportant in comparison to immediate war damage. Today, 'nuclear winter' is claimed to have apocalyptic effects. Uncertainties in massive smoke production and in meteorological phenomena give reason to doubt this conclusion.[436]

The point here is that nuclear winter was debated in a similar fashion as climate change continues to be, and the enduring presence of several specific authors is interesting to track for a variety of reasons related to the analysis presented in the chapters preceding.

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[436] Edward Teller, 1984. 'Widespread after-effects of nuclear war.' *Nature*, Vol. 310, No. 5979, pp. 621-624.

The campaigns of scientists like Sagan, Ehrlich, and Crutzen were based on raising awareness, and how these campaigns were countered by opponents like Teller and Singer, ghosts of past debates over hydrogen bombs and tobacco smoke, and figures in future debates over climate change. As the techniques for generating higher confidence levels grow in complexity, so does the gap between the knowledge of the general public, *and even other highly specialized scientists*. This creates a dizzying effect felt acutely in the social sciences and humanities as well, where academics couch their language in probabilistic generalizations and shy from making connections between climate change and current weather patterns, long-term droughts, or clear changes in sea level, even when the links are established in respected journals.

III. Is There a Specific Politics of Geoengineering?

> For millennia, humans have behaved as rebels against a superpower we call "Nature." In the 20th century, however, new technologies, fossil fuels, and a fast-growing population resulted in a "Great Acceleration" of our own powers. Albeit clumsily, we are taking control of Nature's realm, from climate to DNA. We humans are becoming the dominant force for change on Earth. – Crutzen and Schwagerl

It is in the emerging debates over geoengineering where one most clearly gets a sense of the rival values between discourses accepting the dawn of a new age of human influence. Geoengineering is the intentional manipulation of biogeophysical systems to accomplish a finite goal.[437] This definition can be stretched to consider many different kinds of large-scale interventions intended to mitigate the effects of climate change

[437] There are several definitions in discussion. I use this as an approximation of the Royal Society and National Academy of Sciences definitions: John Shepherd, K. Caldeira, J. Haigh, D. Keith, B. Launder, G. Mace, G. MacKerron, J. Pyle, S. Rayner and C. Redgwell. *Geoengineering the Climate –Science, Governance and Uncertainty*. London: The Royal Society, 2009; National Academy of the Sciences, 2015. 'National Research Council Report on Climate Intervention: Carbon Dioxide Removal and Reliable Sequestration.' National Academies Press, DC.

(including spraying sea water in the atmosphere to brighten clouds,[438] fertilization of iron in the ocean,[439] and schemes for carbon capture ranging from aggressive reforestation[440] to giant intake fans combing carbon from the air to be stored in underground or underwater reservoirs[441]). Here I will be dealing largely with climate geoengineering through sulfate injections in the atmosphere, as proposed by Crutzen and Teller.

For Crutzen and many others guarding their scientific authority, stewardship fills the void left by the projects for domination of nature.[442] Lack of political detail means that he remains ambiguous, however, what that stewardship means and who will decide on the part of humans for the rest of the entwined natural-social world.[443] Seldom in Crutzen's call or support from several prominent geoengineering advocates (Caldeira, Keith, etc) is there a discussion about how such technologies would be governed, some kind of Baruch Plan for Solar Radiation Management. The crux of this oversight is the relative 'cheapness' of solar radiation management schemes results in the potential for unilateral large-scale experiments that could affect global weather patterns in ways we

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[438] Govindasamy Bala, Ken Caldeira, Rama Nemani, Long Cao, George Ban-Weiss, Ho-Jeong Shin, 2011. 'Albedo enhancement of marine clouds to counteract global warming: impacts on the hydrological cycle.' *Climate Dynamics*, Vol. 37, pp. 915-931.

[439] Howard Browman and Philip W. Boyd (eds), 2008. *Implications of large-scale iron fertilization in the oceans*. Marine Ecology Progress Series, Vol. 364, pp. 213-218; also: Markus Lederer, 2012. 'REDD+ Governance.' *WIREs Climate Change*, Vol. 3, pp. 107-113.

[440] See: Til Pistorius, 2012. 'From RED to REDD+: The Evolution of a forest-based mitigation approach for developing countries.' *Current Opinion in Environmental Sustainability*, Vol. 4, pp. 638-645.

[441] NAS 2015

[442] Will Steffen, A. Persson, L. Deutsch, J. Zalaseiwicz, M. Williams, K. Richardson, C. Crumbley, P. Crutzen, C. Folke, L. Gorden, M. Molina, V. Ramanathan, J. Rockstorm, M. Scheffer, H. Joachim Schellnhuber, and U. Svedin, 2011. 'The Anthropocene: From global change to planetary stewardship.' *Ambio*, Vol. 40, pp. 739-761.

[443] For an example of this critique see: Mike Hulme, 2014. *Can Science Fix Climate Change?* Polity Press, Cambridge.

don't fully understand.[444] These unintended effects are largely downplayed by those developing uncertain the technologies, which they both claim are for 'emergency use only,' and that this makes testing necessary, a seemingly paradoxical argument.

The lesson from history, and the 20th century in particular, however, is that such emergency times can come and go. These are the 'ugly' interpretations geographer Simon Dalby refers to in his article about different framings of the Anthropocene. He says there:

> The Anthropocene is neither good nor bad but is going to be shaped by a politics that is necessary and probably will be rather ugly given the resistance of the fossil fuel industry in particular to attempts to keep 'rocks' in the ground. Climate change matters of biodiversity, ocean acidification, and nutrient amplification too then become a matter of what is being made for the future, a political choice rather than a matter of technological inevitability or imminent unavoidable doom.[445]

Dalby's concern is reflected in the continued ambiguity many feel towards the Anthropocene, despite using it as a platform to a more universal conversation. Making the jump to this level of generality can hide questions like Dalby's—the messy, political, and economic issues tied up in the advance of both changes in the earth system *and* in technologies designed to respond to them.

Others with more modernist orientations like Nigel Clark have concluded, instead, that 'that geoengineering might itself be viewed as an occasion for political adventure

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[444] Such drastic consequences as the collapse of the halocline cycle responsible for ocean circulation, the end of the monsoonal rains in Southeast Asia, and the redirecting of the Gulf Stream current have been suggested.

[445] Simon Dalby, 2015. 'Framing the Anthropocene: The Good, the Bad, and the Ugly.' *Anthropocene Review*, Nov. 20th.

and change—without in any way denying the tensions and risks involved.'[446] That Clark, geographer Erle Ellis, and other modernist social scientists sound like Teller arguing against Oppenheimer is lesson lost on those treating our era as constitutively new.[447] Clark claims 'with regard to geoengineering, it is important for social thinkers to keep firmly in mind that even advocates of the most audacious proposals to intervene in the earth's climate are aware that they are only 'tweaking' a vast, massively complex system,' that, essentially, the planet was simply too big to really change drastically, enabling a new era of technological experimentation.[448]

Clark has in mind more 'moderately scaled and easily reversible strategies' and is not directly arguing for climate engineering, but rather water brightening, modifications to the built environment, carbon capture, and other more palatable technology.[449] These 'less-than-global' technologies, though, beg the question since his pitch is presented as a kind of new freedom of experimentation. Essentially, he wants a stewardship plan stocked with a portfolio of technologies. It is assumed climate geoengineering would sit in the back of such portfolios 'for emergency use only,' which makes his lack of political detail in his generic endorsement more troubling.

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[446] Nigel Clark, 2013. 'Geoengineering and geologic politics.' *Environment and Planning A*, Vol. 45, pp. 2825-2832; p. 2827.

[447] Not the least of whom is Crutzen himself, who argued against Teller in a long career of debates over supersonic air travel, nuclear winter, and ozone depletion.

[448] Teller argued for atmospheric tests of thermonuclear weapons under the same logic that humans could not really affect the planetary system. This idea reappears in many prominent climate denial arguments decrying the 'arrogance' of believing humans. Teller also proposed 'planetary sunscreen' in 1997, and is involved in the climate geoengineering debate. See: Edward Teller, R Hyde, M Ishikawa, J Nuckolls, L Wood, 2004. 'Active climate stabilization: presently-feasible albedo-control approaches to prevention of both types of climate change.' Presentation to a symposium held in Cambridge, England on 7–9 January.

[449] Nigel Clark, 2014. 'Geopolitics and the disaster of the Anthropocene.' *The Sociological Review*, Vol. 52, No. 1, pp. 19-37; p. 33; The same rhetorical strategy of diminishing the possible effects of human intervention in the face of a seemingly infinite Nature both served Teller well in the battles for atmospheric testing of nuclear weapons and continues to anchor the rhetorical appeal of denialists like S. Fred Singer and the mouthpieces of the energy industry in Congress like Jim Inhoffe.

So-called 'good Anthropocene' narratives nearly always end in such an argument for stewardship, and, as Andrew Dobson has warned, often reassume the centrality of humans in the ecological system.[450] Chapin *et al*'s widely cited piece on 'Earth Stewardship' in 2011 made the terms of such a relationship clear on the first page. They claim: 'The goal of Earth Stewardship is not to protect nature from people; rather it is to protect nature for human welfare,' foregrounding human concerns as a kind of pragmatic appeal to those who do not care to steward their environment.[451] Their definition of geoengineering, although exceedingly abstract, also makes clear the anthropocentric nature of its rationale. They define it as: 'Intentional management of the global environment to achieve a societal goal.'[452] That there is no recognizable global society to set such a goal maintains the political ambivalence of their managerial project.

The controversial prescriptions of contemporary arguments similarly diagnose the 'death of nature,' entrance to the Anthropocene, or whatever their catchphrase, as a chance to revalue long-standing pillars of green thought.[453] In a telling example, Ellis concludes that the arrival of the Anthropocene means that preserving wilderness is doomed for a series of reasons, that 'it is increasingly recognized that human interactions with protected wildlands cannot be stopped; only guided towards more sustainable

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[450] See Andrew Dobson, 2011. *The Politics of Post-Growth*. Green House Publishing, London; and Andrew Dobson, L. Semal, S. Szuba, and O. Petit, 2014. 'Trajectories of green political theory.' *Nature Sciences Sociétés*, Vol. 22, pp. 132-141.

[451] F. Stuart Chapin, Mary Power, Steward Pickett, Amy Freitag, Julie Reynolds, Robert Jackson, David Lodge, Clifford Duke, Scott Collins, Alison Power, and Ann Bartuska, 2011. 'Earth Stewardship: science for action to sustain the human-earth system.' *Ecosphere*, Vol. 2, No. 8, pp. 1-20; p. 1.

[452] Chapin *et al* 2011; p. 3.

[453] For a particularly obnoxious version see: Ted Nordhaus, 2011. 'Introduction to Love Your Monsters: Postenvironmentalism and the Anthropocene.' *Love Your Monsters.* Ed. Michael Shellenberger and Ted Nordhaus. Breakthrough Institute, Oakland.

outcomes,'[454] many of which would involve humans as stewards of what he calls 'anthromes.'[455] This move is mirrored by Crutzen himself, and points to one end of the spectrum of Anthropocene politics. Given the optimistic predisposition of Ellis and of Crutzen toward technology, the survivalist novelty of the Anthropocene does not signal inevitable defeat, but rather the impetus to survive at any cost by assertion of an intentional force of human stewardship to rival the unintentional experiment diagnosed by Revelle in 1965.[456]

This difference in perspectives on technology between survivalist eras past and current demonstrates the modernist underpinnings of many calls for technological investment as a form of planetary stewardship. Unconsidered *by design* in these neutral-sounding scientific metaphors is the fact that they assume that the work of urgent adaptation is to preserve the conditions and rhythms of everyday life as they exist in the developed world today. This is not seen as normative, but rather, like the survivalists lamenting the impossibility of politically addressing global population growth, as *pragmatic*. Assuming culture remains resigned to the disease, the engineering approach reasons, 'how can we invent a way around the symptom instead?' This logic is at the heart of calls by proponents for real world testing of global climate geoengineering schemes, many of whom, like the survivalists, explicitly frame their proposals as a type of insurance against the intransigence of political institutions of all ideological stripes.[457]

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[454] Erle Ellis, 2013. 'Sustaining biodiversity and people in the world's anthropogenic biomes.' *Current Opinion in Environmental Sustainability*, Vol. 5, pp. 368-372; p. 370.
[455] In contast to 'biome', which Ellis feels conceals human influence.
[456] See: Roger Revelle and Hans Suess, 1957. 'Carbon Dioxide Exchange Between Atmosphere and Ocean and the Question of an Increase of Atmospheric CO2 during the Past Decades.' *Tellus* IX, pp. 19-20.
[457] Douglas MacMynowski, David Keith, Ken Caldeira, and Ho-Jeong Shin, 2011. 'Can we test geoengineering?' *Envergy and Environmental Science*, Vol. 4, pp. 5044-5043.

The politics of such strategies are opaque, but the urgency is not. Ellis calls the Anthropocene 'the disaster of disasters,' and argues that the old state of preanthropogenic Earth is not returning.[458] He draws on accounts by Ruddiman and others ostensibly showing that humans had changed the biosphere before the industrial revolution, which had been touted by Crutzen and others as the beginning of the Anthropocene, to try and show that human influence was inevitable, historical, and must continue in a more rational way.[459] Opaquely, given the acceptance of the crisis, Ellis remarks: 'If we are ultimately called on to directly manage climate, storms, rivers, and other major Earth systems, this will only increase human responsibility for the current and future state of Earth systems.'[460] For Ellis, this is a product of evolution, recognizing human dominance as a sign of both responsibility and danger. He claims: 'As with the rise of photosynthetic organisms and the emergence of the biosphere, human systems have driven the Earth along a new and unprecedented path,' or into the 'postnatural paradigm' of the Anthropocene.

Jeremy Baskin, Clive Hamilton,[461] Mike Hulme, [462] Tim Luke,[463] and others have argued that the Anthropocene is, instead, depoliticizing and often hubristic. Such 'Bad Anthropocene' narratives see work by Ellis and Crutzen as profoundly depoliticizing. In one recent article 'The Ideology of the Anthropocene,' Jeremy Baskin claims: 'it is

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[458] Ellis 2013; p. 19.
[459] See: Ruddiman and other theses on the 'golden spike.' I don't find this a very interesting debate.
[460] Erle Ellis, 2009. 'Earth science in the Anthropocene: New epoch, new paradigm, new responsibilities.' *Eos*, Vol. 90, No. 49, December 8th, pp. 473-474. 474
[461] Clive Hamilton, 2013. *Earthmasters: The Dawn of the Age of Climate Engineering*. Yale University Press, New Haven..
[462] Mike Hulme, 2008. 'The conquering of climate: discourses of fear and their dissolution.' *The Geographical Journal*, Vol. 174 No. 1, March, pp. 5-16.
[463] This analysis is largely in line with Luke's note that 'the missing human links in the Anthropocene thesis are crucial.' Timothy W. Luke, 2015. 'On the Politics of the Anthropocene.' *Telos*, Vol. 172, Fall, pp. 139-62.

important to note the deeply authoritarian and de-politicizing tendencies of Anthropocene discourse.'[464] He draws attention to the framing of the argument, how:

> Framing through exceptionality can legitimate the need for exceptional rule and authoritarian responses. This is enhanced by the promise of technology (machines, techniques, human-centered risk management) as the basis of action and 'salvation.'[465]

His point echoes the lessons gleaned from the survivalist and nuclear winter examples consulted above: that 'the emphasis on 'the rule of experts,' and the associated endorsement of a technocratic consciousness, depoliticizes society and tends to reduce the political to the technical, justifying decisions on technical grounds.' Asserting the authority to begin any global climate regulation regime, such 'Bad Anthropocene' narratives emphasize, draws state legitimacy into the question, and would encounter strong opposition from nations that are vulnerable to changes like sea level rise or ocean acidification which will not be targets of climate geoengineering, or from those who are not technologically advanced enough to participate as equals in the conversation.

This addition of political detail is important and uncomfortable for geoengineering advocates. In his paper from 2014 drawing comparisons with genetic engineering, Scott Barrett elaborates the kinds of governance schemes which could result from climate geoengineering, many as revealed by actual iron fertilization schemes.[466] These institutions could be multilateral, a consortium of technologically advanced nations, or unilateral. His emphasis is specific in a way which is uncomfortable for those

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[464] Jeremy Baskin, 2015. 'Paradigm Dressed as Epoch: The Ideology of the Anthropocene.' *Environmental Values*, Vol. 24, pp. 9-29; p. 22.
[465] Baskin, 2015; p. 22.
[466] Scott Barrett, 2014. 'Solar geoengineering's brave new world: thoughts on the governance of an unprecedented technology.' *Review of Environmental Economics and Policy,* Vol. 8, Issue 2, pp. 249-269.

recommending unilateral or consortium approaches—it lays bare the clear tendency to let the matter be decided by experts in the interest of distinct national actors, in at best a consortium of powerful nations and at worst unilaterally.

Comparing geoengineering's political logic to the World State of Huxley's *Brave New World*, Barrett identifies no clear global authority, a prospect which he believes may stimulate international conflict.[467] This lack of a clear political agent to confront the scale of the issues presented was a chief obstacle of past eras of survivalist thought. Today, we confront a similarly universal threat with none of the technological ambiguity those first theorists felt confronting entwined universal threats of population and nuclear war. This difference may be profoundly important for the future of planetary systems, and sits as a challenge to critical theorists in our era.

Governing Geoengineering

The influential 'Oxford Principles' for geoengineering research and testing put forward by Steve Rayner and colleagues at Oxford insist (in their final point of five concluding notes) on governance before deployment, encouraging continuing research, public participation, open publication, and regulation by governments as a public good.[468] Rayner and coauthors note that:

> The Oxford Principles highlight the fact that the question of social control over geoengineering technologies will be key, and signal core societal values that must be respected if geoengineering research and any possible deployment is to be legitimate. They also emphasize the need for various stakeholders to begin the process of ensuring that scientists, officials and

[467] Barrett 2014; p. 250.
[468] Steve Rayner, Clare Heyward, Tim Kruger, Nick Pidgeon, Catherine Redgwell and Julian Savulescu, 2013. 'The Oxford Principles.' *Climatic Change*, Vol. 121, pp. 499-512.

> politicians involved in development of geoengineering can be called to account.[469]

While stressing the 'bottom-up' nature of the construction of 'flexible governance architecture,' the Oxford Principles are uncomfortable for some who believe small-scale testing is necessary and who fear lack of understanding will create political backlash against geoengineering's use as insurance and potential, as the Oxford Principles propose, as a 'global public good.' This is because the Oxford Principles call for continued research, but also a ban on testing. This ban is already being challenged in many quarters, often claiming to champion the poor and inevitably impacted of the world, creating a moral duty to violate what was a clear taboo.[470]

The 2015 National Academy of Sciences report asks in its sixth (of seven) closing recommendations for further analysis of governance over climate geoengineering research, but political control over these techniques remains obscure.[471] Their call, despite coming as a seeming afterthought in the report, also goes much further than advocates like David Victor, David Keith, or Ken Caldeira would likely prefer, since these advocates have cautioned against involving the greater public in deliberation until the science is better understood and the public better educated. In contrast to the NAS caution, Victor writes: 'meaningful research may also require actual trial deployment of geoengineering systems so that norms are informed by relevant experience and command

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[469] Rayner *et al* 2013; p. 502.
[470] MacMynowski *et al*, 2011; p. 43.
[471] Rose Cairns and Andy Stirling, 2014. ''Maintaining planetary systems' or 'concentrating global power?' High stakes in contending framings of climate geoengineering.' *Global Environmental Change*. Vol. 28, pp. 25-38; also see: Adam Abelkop and Jonathan Carlson, 2013. 'Reining in Phaëthon's Chariot: Principles for the Governance of Geoengineering.; *Transnational Law and Contemporary Problems*. Vol. 21, pp. 763-808.; John Virgoe, 2009. 'International governance of a possible geoengineering intervention to combat climate change.' *Climatic Change*, Vol. 95, pp 103-119.

respect through use.'[472] He believes involving nations without the technological or economic capacity to participate would create incentives for a worldwide ban. This ban, for Victor, would jeopardize the health and safety societies in the future.

Ken Caldeira and other scientists have followed the public good argument and asserted that whether membership in geoengineering governance was exclusive or inclusive in the consortium of geoengineers, all would have some incentive to influence the global thermostat, and therefore would join efforts. Refuting this claim, Scott Barrett shows with reference to Nuclear Non-Proliferation that the assumption that other countries would not gain technological capacity to geoengineer (i.e. that it could be controlled by the consortium at all) is naïve. In a contrasting Cold War reference, Victor seems nostalgic for the arms race, where risks involved were shorter-term. He says:

> Unlike an arms race—in which breakout has the effect of making an adversary feel less secure, thus breeding further expenditure on weapons and rattling of sabers—a breakout in geoengineering could be stabilizing, because its transparent endpoint is to re-assert collective control over the technology. […] But once the process of geoengineering begins—whether unilateral or collective—it is likely the world will be unable to stop.[473]

Such a 'break out' of climate geoengineering would set up a deterrence situation, and Victor thinks, force collaboration to avoid 'termination effect,' where temperatures would rapidly return to normal after the cessation of short-term cooling regimes. Who would collaborate is largely left unspoken in his analysis, as is the question of whether humans actually have the technological capacity to manage such complex systems.[474] The

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[472] David Victor, 2008. 'On the regulation of Geoengineering.' Oxford Review of Economic Policy, Volume 24, Number 2, 2008, pp. 322–336; p. 322.
[473] Victor 2008; p. 334.
[474] Timothy W. Luke, 2016. 'Reconstructing Social Theory in the Anthropocene.' *European Journal of Social Theory*, pp. 1-15.

continuing effects of sea level rise, ocean acidification, and biodiversity loss are also left off the table, cut short by the perceived urgency of impending human suffering.[475]

The 2009 Royal Society report, most clearly influenced and written by advocates for technological management, nods to such ethical issues, even listing typologies of ethical systems and defusing moral hazard arguments as empirically unsupported. Instead, in an homage to survivalists past, they claim:

> Overall it is clear that ethical considerations are central to decision-making in this field. However when evaluating the role that different approaches to geoengineering could play, it is not possible to make simple yes or no decisions on the basis of ethical reasoning.[476]

Some of the most vocal critics of such techniques, like Mike Hulme and Clive Hamilton, would clearly disagree in principle. In a more specific register, Virgoe is concerned that there are few binding international legal instruments that could enforce a ban on geoengineering, making 'good, science-based multilateral decision making' the key for research into social issues presented by technological management schemes. He, like many who recognize the plausibility of some techniques at current technological levels, is concerned that 'ignoring geoengineering today, and only considering it when all else has failed, is a recipe for bad, politics-led decision-making.'[477]

Beginning with a more political focus, Virgoe argued that the policy process could take place at one of three levels, from unilateral, a consortium of nations, or with the international community as a whole.[478] While shy from advocating for a consortium

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[475] P.J. Irvine, R.L. Sriver, and K. Keller, 2012. 'Tension between reducing sea-level rise and global warming through solar-radiation management.' *Nature Climate Change*, Vol. 2, February, pp. 97-101.
[476] Royal Society 2009; p. 39.
[477] Virgoe 2009; p. 117.
[478] Barrett uses Virgoe's category breakdown in his piece.

approach directly, the Royal Society noted several possibilities for governance based on the duty not to cause significant transboundary harm, requiring 'due diligence' for self-regulation within their own territory and cooperation across borders. At the international level there are several treaties and organizations which could claim to have some governance function over geoengineering, including the Convention on Biodiversity,[479] UNFCCC, Convention on Long-Range Transboundary Air Pollution, Convention of the Protection of the Ozone Layer, Outer Space Treaty, Convention on the Prohibition of Military or Any Other Hostile use of Environmental Modification Techniques, UNCLOS, and London Convention on Marine Pollution.[480] As Virgoe notes, however, all lack specific applications, and many, especially those passed during the Cold War, have very little to say about actual governance or legitimate authority to act. Instead, the Royal Society says atmospheric and oceanic geoengineering require 'some level of consensus among governments,' but nothing like a veto on use.

They also rarely address private, non-state actors, a factor made more politically relevant by the low initial cost of some forms of climate geoengineering. David Victor has warned, in line with this thought, of a futuristic Bond villain figure, a private climate engineering entrepreneur ('Greenfinger'), which could escape all UNFCCC, UNCLOS, ENMOD, CBD, and LC restrictions. This, for Victor, should be a spur to continue active research programs and small-scale testing, since once initiated climate geoengineering would be hard to stop. At the same time, advocates like Victor fear opening research to global deliberation will foreclose it prematurely as an object of research and testing,

[479] Used to block iron fertilization schemes. See on the SPICE iron fertilization scheme pursued and canceled due to public outcry by the UK. The Royal Society report is clear that these are moral hiccups and should not 'inhibit research', perhaps based on Genome or Nuclear examples.
[480] Abelkop and Carlson 2013.

making such rogue figures more dangerous. Advocates have hoped, instead, for a consortium approach to governance of geoengineering research and testing based on the International Atomic Energy Agency, and, as in many calls for a smaller agreement between major polluters at climate negotiations, again seems to want the technologically advanced nations to set their own standards and norms, which, in an emergency, the international community could use to guide intervention.[481]

This clearly follows the insurance-based, 'portfolio' approach used by most advocates, burying geoengineering in a portfolio of other carbon reduction and mitigation strategies as a last-ditch but maybe-essential method for mitigating suffering.[482] The fear of geoengineering researchers and advocates is that the same political confusion that has made geoengineering research plausible (i.e. the inability to make meaningful political changes) will also make its implementation impossible, that fractious politics will cripple any active response. Instead, advocates ready the tools for that eventual global conversation quietly, hoping not to engage real deliberation for fear of once again placing the research under strict taboos. Because of the plausibility of some geoengineering schemes at current technology levels,[483] these commentators fear banning responsible

[481] For another version see:, Katherine Ricke, Juan Moreno-Cruz, and Ken Caldeira. 2013. 'Strategic incentives for climate geoengineering coalitions to exclude broad participation.' *Environmental Research Letters*, Vol. 8, No. 1, pp. 1-9.
[482] Michael MacCracken. 2006. 'Geoengineering: worthy of cautious evaluation?' *Climatic Change*, Vol. 77, pp. 235–243.
[483] The Royal Society report (2009) claims: 'As geoengineering is a relatively new policy area there are no regulatory frameworks in place aimed specifically at controlling geoengineering activities and consequently the risk exists that some methods could be deployed by individual nation states, corporations or even one or more wealthy individuals without appropriate regulation or international agreement.'

research will drive the research to riskier and more unilateral contexts, making it far harder to contain and regulate in the future.[484]

Barrett, reflecting on the governance of nuclear tests, genetic engineering, and satellite technology, sees some of the same problems.[485] Examining David Keith's suggestion that climate geoengineering be 'powered up' slowly and limited to only half the warming to encourage carbon replacement,[486] Barrett claims Keith 'fails to explain why countries would act collectively to reduce emissions dramatically after they had begun using geoengineering when they have thus far failed to do much to reduce emissions.' He fears that 'limited' intervention will give way to the use of geoengineering as 'a semi-permanent solution' that eliminates incentives to change. For him this would encourage both the exponential multiplication of risks entailed by those unintended consequences and the total elimination of ethical concerns about 'what kind of people would make the choice to geoengineer?'[487]

IV. Moral Quandaries for Warmer Times

> The Committee is concerned that understanding of the ethical, political, and environmental consequences of an albedo modification action is relatively less advanced than the technical capacity to execute it. – Martha McNutt, Preface to the 2015 NAS Geoengineering Report

[484] Andy Parker, 2014. 'Governing solar geoengineering research as it leaves the laboratory.' *Philosophical Transactions of the Royal Society A*, Vol. 372, pp. 1-17.
[485] The argument, essentially, is that authoritarian politics will not solve the problems identified by survivalist authors, and therefore do not represent a lesser evil but simply *another* evil.
[486] Juan Moreno-Cruz and David Keith, 2013. 'Climate Policy Under Uncertainty: a case for solar geoengineering.' *Climatic Change*, Vol. 121, pp. 431-444.
[487] The quote is Gardiner's. See 2013. 'Is 'Arming the Future' with Geoengineering Really the Lesser Evil? Some Doubts about the Ethics of Intentionally Manipulating the Climate System.' *Draft Version*. Final version eventually published in *Climate Ethics*, Ed. Dale Jamieson and Henry Shue, Oxford University Press, Oxford.

Moral questions like those posed in the epigraph of this section continue to sit at the heart of the abstract battles over earth stewardship and climate control. Reference to the nuclear debate is particularly interesting as a window into this disagreement—it exposes political disagreements between 'pragmatic' modernists and more radical 'romantic' greens taking place behind the scenes of the scientific verification battles. The increasing urgency of predicted crisis strengthens the appeal of pragmatically-framed arguments, especially those which promise to maintain everyday life as similar as possible. The prescription of nuclear power as a 'bridging' energy, along with hydraulic fracturing and deliberately misleading campaigns for 'clean coal,' are attempts to sidestep important political debate about the consumer economy and lifestyle driving global crisis.

This engineering approach sees the problem as fundamentally about 'buying time' for innovation to solve harder problems. Theorists with more romantic orientations largely consider this a fruitless measure. Seeking deeper roots of the crises, they paradoxically ask to act for society as a whole to act urgently and to critically reflect. This call for reassessment sees the source of the problem as a world-view and the material habits of everyday life which instantiate and support it. Modernists do not touch everyday life in developed countries, whether because they regard these habits and world-views as essential to a hard-won process of progressive liberation from need, or for more cynical reasons related to fears of losing their audience. This audience problem is accentuated in contemporary, technology-obsessed America and other so-called 'post-material' consumer economies in the developed world where technology remains essentially unproblematized in public consciousness.

This is for good reasons. Advances in modern medicine, long distance travel, digital communications, and pollution control have improved the lives of many. This means that initial attempts to begin a debate about technology are quickly rebuffed as romantic (a slur in our 'pragmatic' world) or even misanthropic. A full romantic rejection of technology, however, is not the intent of this analysis. Technological innovation must be a part of any transition to sustainable ways of life. What I am seeking to point out is that hopes for a technological silver bullet ignore the social and economic problems that make political solutions like carbon taxes seem impossible in contemporary politics. The absence of the nuclear reference in contemporary discussions accentuates the tendency to make technology appear as an end in itself, a messianic solution to grave problems, rather than an aid for the hard work of reimagining a modern life in warmer times.

Technology sits at the heart of the most important and fractious global efforts to govern sustainably, and its distributive implications for standards of living and major ecological crises remain as enduring stumbling blocks for the production of international agency. The nuclear question is particularly interesting to consider because it exposes how far the environmental movement has come since the 1960s and 70s. Where Rachel Carson obliquely referred to radiation as 'the ultimate pesticide,' and survivalist authors like Ophuls and Heilbroner linked ecological scarcity to Mutually Assured Destruction, today many of those accepting that contemporary times constitute the Anthropocene have forgotten the ambivalence which nuclear technology once inspired.

Instead, critics have been caught up either scientifically proving the fact of the coming catastrophe or generating new science fiction narratives where humans 'buy

time' for cultural change by relying on nuclear power, other 'transition fuels,' and geoengineering schemes. The political questions behind the more specific forms of this proposal, such as encouraging transition fuels like natural gas and innovations in nuclear power, as well as the possible deployment of emergency geoengineering, are weighed on a utilitarian calculus which is both stacked on the cost side by inevitable environmental catastrophe and also vastly under-qualified for weighing cultural or moral concerns.

There are many examples in several different kinds of registers, from aesthetic to ethical to political. For instance: How would one quantify the 'cost' of changing the color of the sky, as any permanent Solar Radiation Management scheme might entail?[488] How can one compare potential local tragedies against each other when weighing intervention? And, crucially, who will get to count in these calculations? What justice will be possible for those in the world majority who will have no access to such techniques yet share the globally-distributed consequences, good and bad?

Philosopher Steven Gardiner and others have contested the public good framing of the Oxford Principles and Royal Society Report, claiming it ignores intergenerational transfers of risk, and is ethically misleading since it is neither nonrival nor nonexcludable as a good.[489] Gardiner complains: 'What is missing is the social side of the intervention.' This is important because 'social intervention (e.g., political, legal and economic innovation) may be less costly, less risky and easier to bring about than asking scientists

[488] A consequence of Solar Radiation Management with sulfate injections is that the silver particles will scatter more blue light, making the sky a bright gray rather than blue. This aesthetic affect is hardly considered in more than passing by scientific advocates. See David Keith, 2000. 'Geoengineering the Climate: History and Prospect.' *Annual Review of Energy and Environment*, Vol. 25; pp. 245-284.
[489] Stephen Gardiner, 2013. 'Why geoengineering is not a 'global public good', and why it is ethically misleading to frame it as one.' *Climatic Change*, Vol. 121, pp. 513-525

to find technological ways to meet the same goals.'[490] He concludes with a point which should resonate with the survivalist history consulted above: 'considered against a baseline of true catastrophe almost anything counts as an improvement.'[491]

For Gardiner, this is important because 'the vulnerability of nonproviders [those technologically unable to participate] is really an ethical issue, most properly confronted with concepts such as rights, justice, political legitimacy and virtue.'[492] Considering climate change and other ecological crises only with an engineering or economic mindset, he worries, makes geoengineering more attractive by ignoring the social consequences of change, which Gardiner has argued elsewhere are radically unevenly distributed onto future generations. He says at the end of his pointed 'Why Geoengineering is not a Global Public Good,' which refers directly to the Oxford Principles, Barrett, and Caldeira:

> Rather than a seemingly benign supply of a universal benefit, implementation of SSI [stratospheric sulfur injections] looks more like the exertion of monopoly power. Since this is power over the basic ecological circumstances of the planet, affecting the life prospects of all concerned, geoengineering raises very serious, indeed foundational, questions about political legitimacy, justice and humanity's relationship with the rest of nature. The need to discuss such matters should not be obscured behind the rosy façade of a misleading and unhelpful technical term.[493]

Gardiner's point, taken uncharitably by some, was that new framings for climate action needed to be practiced that involve more stakeholders and explicitly ethical consideration. Gardiner sees the concept of geoengineering itself as a threat because by

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[490] Stephen Gardiner, 2013b. 'The desperation argument for geoengineering.' Draft version, final in *PS: political Science and Politics: Symposium on Climate Change.* Ed. Thom Brooks; p. 5.
[491] Gardiner 2013b; p. 7.
[492] Gardiner 2013b; p. 10.
[493] Gardiner 2013b; p. 12.

appearing active and in reaction to inevitable change, it sidesteps large-scale collective action which has been so frustratingly absent in developed countries. His comments resemble many fighting nuclear weapons—although his analysis is highly critical, he stops short of a simple normative argument that it is wrong on its own terms, seeking to discredit the foundations of the engineering logics that lead to it.[494]

This moral reasoning is truncated by the scientific, insurance-based framing. At its worst, such portfolio approaches cast anyone seeking further moral consideration as creating great suffering in the future, distracting from important concerns with moral hazard, termination effect, and lack of governance. The question of the burden imposed on those who have not contributed in any meaningful way to climate change presents a key problem, and a reason to be sensitive to the possible obfuscation of historical memory when considering the immediate survival of the species. Inadvertently, such narratives can reinforce the old nuclear tropes of universality, distant agency, and flash-point destruction, unconsciously legitimizing both underlying assumptions regarding the textures and flows of everyday life in the 'developed' lifeboats and the techniques and apolitical engineering strategies built to maintain conditions at any cost.

Survivalist Echoes

Understanding contemporary ecological challenges to politics-as-usual and the rhythms of everyday life, and seeing them as inexorably linked to a global web of relations is difficult, but not impossible. To do so sincerely requires allowing time for a

[494] This is tricky territory. For an economist's response, see For a critical response see David Morrow, 2014. 'Why geoengineering is a public good, even if it is bad.' *Climatic Change*, Vol. 123, pp. 95-100. After critiquing Gardiner's arguments, he agrees that provision and governance are key questions to be addressed. He believes, instead, that the public good framing benefits this process by relinking the conversation to traditional literatures in economics, philosophy, and other social sciences.

pause for critical reflection and deliberation about the shape and speed of 'modern' life, both as practiced and as aspired to in our globalized and radically unequal world. These conversations are effaced by technological salvation discourses and survivalist catastrophe narratives alike, and their continued weakness potentially ushers in emergency conditions for climate control, the expansion of nuclear energy, and scientific political authority based on the logic that *anything is better than extinction*.

In our contemporary era, where we consider without public reflection the prospect of controlling the weather, it seems that many of the lessons of both the nuclear debates and the population debates are frustratingly lost. This is important because familiar patterns of counter-argument have reappeared, sowing doubt and buying time. To project the choice of developing geoengineering research as an apolitical choice, as Crutzen did in his controversial 2006 article, in the sense that it is something subject to technical experts in case of emergency, is depoliticizing in the textbook sense. It shirks the responsibility for an active public debate about the stakes of the crisis for lifestyles in the developed and developing worlds and the kinds of competing visions of the future which split even committed climate activist camps along their evaluation of the redemptive potential of technology.

Remembering the experience of Ehrlich in the population debates is instructive. Ehrlich made a textbook mistake learned long ago by the Millerites and other millennial sects, which was that setting the date of the disaster increased urgency and anxiety, but also exposed the predictor to disconfirmation. Predicting billions dead on a decade long timeline in the early 1970s, Ehrlich suffered from a severe lack of credibility by the time he entered the debate over nuclear winter. He was neither a specialist in nuclear politics

nor atmospheric chemistry, and his selective use of the worst case scenarios from more authoritative scientific reports like the SCOPE created a perfect target for the kinds of doubt and delay techniques learned by his opponents in the 1970s.

The lesson here is that Ehrlich's power to reach the broader audience was mediated by his ability to channel the urgency created into an active change. This mismatch produced a set of perverse incentives: 1) it makes the validation of the theory depend on the occurrence of the catastrophe it seeks to avoid, and because 2) people may be profoundly bitter if they change and the apocalypse doesn't arrive on time. Deeply suspicious of the potential for belief in technological progress to stymie active change in the short term, Ehrlich errs rather on the side of unsupportable claims about the direness of the global situation. Famously losing a bet over commodity prices to the chief architect of the Reagan-era response to doom and gloom scenarios about population in the 1970s, Julian Simon, Ehrlich was repeatedly disconfirmed in his public predictions.

Narratives like the Anthropocene today are again caught in this perverse set of incentives, predicting a vague but certain change, waiting for that change itself to validate the predictions. A full list of the burgeoning literature taking up climate change and other global-scale ecological problems is not possible here. A small sample of the titles of some of the most dire works, however, gives a good sense of the returning survivalist tenor and pitch. They are named things like *Gaia's Revenge*, *Full Planet Empty Plates*, *Climatic Cataclysm*, *A Perfect Moral Storm*, and simply *Hot*.[495] Across disciplines,

[495] See: James Lovelock, 2006. *The Revenge of Gaia: Earth's Climate in Crisis and The Fate of Humanity*. Basic Books, NY; Lester Brown, 2012. *Full Planet, Empty Plates: the new geopolitics of food scarcity*. WW Norton and Co, NY; Kurt Campbell (Ed.), 2008. *Climatic Cataclysm: The Foreign Policy and National Security Implications of Climate Change*. Brookings, Washington D.; Steven Gardiner, 2006. 'A Perfect Moral Storm: Climate change, intergenerational ethics and the problem of moral corruption.'

celebrated academics like Ulrich Beck, Anthony Giddens, Sheila Jasanoff, John Urry, Paul Virilio, and others have reoriented their theories around the universal challenge of global-scale social-ecological crises like climate change.[496] Accepting the new era, many critics argue, requires a critical departure from politics and everyday habits as usual.[497]

The perceived mismatch in temporal and geographic scales of ecological and political systems is clearly displayed in many US public opinion polls where majorities treat climate change as a real but continue to give it low-priority. For instance, while Gallup's 2015 polls have 65% of the US population believing in anthropogenic climate change, 57% still believe that it will not affect their way of life within their own lifetime. Other major polls have consistently shown climate change ranked far below other national economic and social priorities. This mismatch and set of perverse incentives are also crucial in traditionally secular scientific and academic publications which accept the new era as an inevitable ecological state of emergency.[498]

The interpretive gap is transparently a problem for political discourse based on planetary limits like the 1.5 and 2 degree planetary warming thresholds.[499] Perceptions of global ecological crises as 'too big' or 'out of sync' with human time horizons plague

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Environmental Values, pp. 397-413; Mark Hertsgaard, 2011. *Hot: Living through the next 50 years on Earth.* Houghlin Mifflin Harcourt, NY.

[496] Ulrich Beck, 2010. 'Climate for Change, or How to Create a Green Modernity.' *Theory, Culture and Society,* Vol. 27, No. 2, pp. 254-266.; Anthony Giddens, 2011. *The Politics of Climate Change.* Polity, NY; Sheila Jasanoff, 2010. 'A New Climate for Society.' *Theory, Culture and Society,* Vol. 27, No. 2-3, pp. 233-253; John Urry, 2011. *Climate Change and Society*. Polity, NY.; Paul Virilio, 2010. *University of Disaster*. Polity, NY.

[497] Usually leading back to reconsidering their own prior theoretical interests, now punctuated with the urgent threat of ecological change.

[498] See: Thomas Homer-Dixon, 2015. 'Synchronous failure: The emerging causal architecture of global crisis.' *Ecology and Society,* Vol. 20; p. 6.

[499] Kennel, Burney, and Victor recommend dropping 2c, and the consensus to 'try really hard' to keep the world under 1.5 at Paris signals greater acceptance of this point in the international community. See Burney *et al* 2013.

the contemporary search for meaningful collective action, and not just within the denier community. The threat is repeating Ehrlich's mistake, of focusing so much on the inevitability of the oncoming disaster that we suspend our usual moral qualms about things like controlling the weather under the assumption that the catastrophic conditions are here and unavoidable.

Such a message is in many ways true, since some aspects of climate change, like sea level rise, are not entirely avoidable. But the traditional strategy of paradoxical neutrality and urgency pursued by scientists attempting to influence public debate is weak to comfortable counter-attacks and sidesteps important public debate over techniques with highly uncertain outcomes and morally problematic goals like experimentation with Solar Radiation Management. Continuing to see the problem as one of engineering alone, as a problem in need of technical solution, in the end means increasing mastery as an emergency preparation and future menu of political choice without thinking critically about the kinds of governance structures necessary to regulate such new techniques with potentially uncertain and far-reaching consequences.

V. Conclusion

It's no longer us against 'Nature.' It's we who decide what nature is and what it will be. -
- Crutzen and Schwagerl

The search for the 'active' man which Nietzsche sought through critical history, subject of much of Deleuze's *Nietzsche and Philosophy*, is the challenge which the return of survivalism presents.[500] A task of critical history, understanding the logic that made emergency authoritarianism appear inevitable in prior survivalist times, provides

[500] Gilles Deleuze, 1962 (2006). *Nietzsche and Philosophy*. Columbia University Press, NY.

historical benchmarks for critiques aimed at confronting the resignation of those most responsible for historical degradation, who also, paradoxically, have the most resources to stimulate change.

Caught in the Cold War bipolar politics much as survivalist authors during the population debates, Carl Sagan and others created a public education campaign that led to a specific policy purpose, but did so through their perceived neutral authority as scientists. That this authority was attacked then is not itself surprising, since those attempting a similar campaign to prove climate change as a spur to economic and political change have confronted a similarly organized and well-funded denial campaign. What is surprising is that many of the people in contemporary debates, before even their now recognized roles in denial campaigns over tobacco and health,[501] were also sources of doubt during nuclear winter debates, including, most conspicuously, Edward Teller and S. Fred Singer.

That Teller, Oppenheimer's chief antagonist, appears in both debates shows a consistent line of argument against the rhetoric of the specific intellectual, in this case the concerned scientist entering the public sphere. The humiliation of Paul Ehrlich should sit alongside this example, as he too appears to trade on the universal appeal of the nuclear threat, both in a veiled form in the population debate and a more obvious way in the debates over nuclear winter. The tools generated to raise the scale of the response to the Anthropocene must both act across and within the strictures of the traditional nation state, paradoxically empowering local communities and regulating earth systems. Confronting

[501] See: Erik Conway and Naomi Oreskes, 2011. *Merchants of Doubt: How a handful of scientists obscured the truth on issues from tobacco smoke to global warming.* Bloomsbury, New York.

the need for a shift in institutional power, the political naivete of the scientific edge of the Anthropocene literature is important—in this rush to rid the world of carbon, powerful lobbies for nuclear power and natural gas have recast themselves as a *relatively* unproblematic ways to continue our way of life without making fundamental changes. They tacitly assume huge government infrastructures and levels of technical expertise which are not globally distributed, such as the very simple question of whether the proliferation of nuclear technology will be encouraged.

The relative nature of the benefit of such transition energy, however, is important, given that today it is compared increasingly to a global catastrophe scenario. The label 'transition fuel' focuses on the relatively clean emission profile of natural gas, but discounts the relative potency of unburned methane as a greenhouse gas, and does not consider the possibility of events like those in Porter Ranch, north of Los Angeles, where catastrophic failures endanger entire towns and release tons of a greenhouse gas more than 20 times more potent than the carbon dioxide it was replacing. Proponents present natural gas alongside the mythical 'clean coal' as a kind of 'powered landing,' a way of softening the transition in energy production without sacrificing jobs and economic growth. Its inclusion in the portfolios of reformist narratives is justified by the need for time for the more complicated economic and social transition.

The same argument logically extends to nuclear power as well, at least in theory. In practice, local communities in the US have successfully opposed the construction of nuclear power facilities and waste storage and decommissioned plants not meeting regulations, in part, recently, in response to the disaster in Fukushima, Japan in March of 2011. But as the costs of cutting carbon increase, nuclear power begins again looking

like a valuable piece of any portfolio capable of preserving high-energy consumption economies. Long taboo in environmental political discourse, the promise of carbon-free, 'fourth generation' nuclear technology is thus beginning to eclipse historical connections between the environmental movement and anti-nuclear campaigning, largely because political change appears increasingly impossible.

The nuclear apocalypse so close to the political imaginary of those living through the Cold War was interpreted as an instant and universal threat. While abandoning explicit reference to nuclear weapons, contemporary debates often transform the highly variable and long-term consequences of climate change into an urgent, instantaneous-seeming threat. This threat lacks the agency of the nuclear apocalypse, fleeting and unstable as it may have seemed to many around the world, and promotes a return to projecting that agency on nature itself. Where the nuclear bomb was (ostensibly) an instrument of nations and blocs of nations, modern ecological challenges are largely unintentional, byproducts of economic growth and changing standards of living for a growing world population. The bomb's effect, at its most terrifying, would be quick and potentially total. The global war would end in nuclear winter and could threaten all life and memory in an instant of calculation, miscalculation, or tragic misunderstanding, ending life as known before in a matter of years or even days.

If critical theory is necessary in dark times, as Wendy Brown and others have suggested, it is thus clearly also urgently required for warmer ones, as a remedy for passive, fatalistic critique and blind technological optimism leading to system justification that hamstrings political agency. The challenge of green political theory in an epoch defined by the seemingly inevitable return to the politics of survival is to

provide the political and critical tools to understand resistant problems in new ways, especially those so ingrained in the way of life of industrialized societies that they no longer appear for critical debate. These deeper concerns are often buried in both cynical denialism and triumphant technologism, which both offer comfort without stimulating critical debate over 'developed' lifestyles or pragmatically assessing the kinds of political institutions they advocate to mitigate and adapt to changing conditions.

The critical task is important, but should not signal the end of the role of any critical political ecology, environmental political theory, or other hybrid strain of social-ecological thought. These strands of green theory, confronted by the urgent need to adapt to changing conditions at cultural and political levels, need to become active, to learn, and restore commitments to effective collective agency at many scales. Barring such a move, even many well-intentioned critics will instead be resigned to perversely wait for catastrophe to vindicate their analysis, potentially cementing the very future they foretold as a way of controlling their fear when it appears impossible to address the source of the danger itself.

08 Confronting Climate Exterminism: A Critical Theory of Universal Appeal

I. On the Prospect of Climate Exterminism

In what follows I attempt to critically read the surge in public attention to global-scale social-ecological crises like climate change through the specific historical lens of a parallel debate regarding nuclear weapons, in particular, the debate between socialist historians EP Thompson and Mike Davis.[502] Approaching catastrophic environmental politics that stress the arrival of a new age of human influence on natural systems through the lens of Thompson's concept of 'exterminism' and Davis' critical response, I'll argue here, provides a valuable understanding of the ways that climate change is being mobilized in a similarly 'exterminist' way today.

This reopening of specific context and history is intended to countervail the possible effects of a kind of 'climate exterminism' which projects the agency for the climate crisis onto the natural world itself and the responsibility for it onto all humans as a species, without considering the competing visions of modernity continuing to fragment collective agency. The warning produced by the critique of nuclear exterminism is that the search for universal appeal as a motivating force can also dilute the specific responsibility and agency necessary to confront the problems presented. This insight is already evident in the history of the environmental movement in the US, perhaps no better illustrated by the obsession with absolute population numbers in the 1970s. This 'survivalist' generation of literature considered the human species at a global level

[502] Originally published as EP Thompson, 1980. 'Notes on Exterminism, the Last Stage of Civilization.' *New Left Review,* Vol. 1, No. 121, May-June; republished with associated articles and responses in 1982. *Exterminism and Cold War*. Verso Books, NY.

unmatched by political agency, driving desperate political solutions to what were seen as unsolvable problems.

In an effort to shock collective agency out of this fragmented state, recent publications by atmospheric chemist Paul Crutzen, climatologist Will Steffen, environmental historian JR McNeill, paleobiologist Jan Zalasiewicz, and others have vividly illustrated the catastrophic, multi-scale consequences of continuing 'business-as-usual' practices in terms of biogeophysical and ecological consequences.[503] The authors insist that humans now act on the world at the scale of a geologic force over space and time, restructuring the land, changing the level and chemistry of the oceans, diverting and polluting freshwater on a massive scale, reducing global genetic diversity, and releasing carbon dioxide into the air through combustion. Noting this cumulative stress on the planet's major systems, the authors identify 'the Anthropocene' as a new epoch of geologic time that replaces the Holocene when human factors began acting on par with the forces of nature.[504]

Humans as a species, in this perspective, have become a global geologic agent, spewing CO_2 into the air and pressing down with the weight of its population on nearly every ecosystem on Earth. The crafters of the Anthropocene concept see the 'Great Acceleration,' or period of exponential growth following WWII, of global industrialized societies as 'reaching critical condition,' characterized by 'enormous, immediate challenges [that] confront humanity over the next few decades as it attempts to pass

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[503] Paul Crutzen, 2002. 'The Geology of Mankind.' *Nature*, Vol. 415; see also: Jan Zalasiewicz, M. Williams, R. Fortey, A. Smith, T. Barry, A. Coe, P. Bown, P. Rawson, A. Gale, P. Gibbard, J. Gregory, M. Hounslow, A. Kerr, P. Pearson, R. Knowx, J. Powell, C. Wars, J. Marshall, M. Oates, and P. Stone, 2011. 'Stratigraphy of the Anthropocene.' *Philosophical Transactions of the Royal Society A*, Vol. 369, pp. 1035-1055.

[504] When, exactly, remains a matter of (relatively uninteresting) debate.

through a bottleneck of continued population growth, excessive resource use and environmental degradation.'[505]

Like many writing after Hiroshima and Nagasaki, the new age, for those confronting climate change, is already here, if announcing itself on slower terms. The connection to nuclear issues is both historical and theoretical, as the green movements were often packaged with anti-nuclear movements. Environmental crisis have come to represent a species of secular apocalypse once reserved for nuclear tropes, which drives many conscious and unconscious equations of nuclear and climate problematics.

Current fixation on global averages and large-scale ecosystem change presents the problem in stark and at times horrifying terms, but often lacks attention to local impact and specific responsibility to act. This is in part because there is great uncertainty predicting local conditions in the distant future, but also because seeing the world as *already precarious* ties debates about technology transfer and carbon emissions into conversations about historical responsibility which are uncomfortable at best in the 'developed' world. Although undoubtedly unpleasant to consider, the possibility of an ecological exterminism makes revisiting critiques of similar nuclear and population exterminist beliefs important and urgent, if perhaps untimely from the perspective of those in the 'developed' world.

It is widely recognized today that the great complexity of the atmosphere and its interactions with the land, oceans, and human factors creates a particularly, and perhaps even singularly, difficult challenge for policymakers, students, and activists. Using

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[505] Will Steffen, Paul Crutzen, and JR McNeill, 2007. 'The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature?' *Ambio,* Vol. 36 No. 3, pp 614-621; p. 620.

Davis' critique of Thompson's exterminist perspective, this paper draws out some lessons regarding maintaining agency and flattening implicit developmental hierarchies to begin the expansion of voices and examples to be considered. Moving beyond system justifying passivity and resignation will require incorporating these 'other' perspectives, both to draw out the moral consequences of inaction and also to serve as a potential well-spring of alternative and potential hybrid models of modernity.

These themes cannot be approached in a serious way without opening uncomfortable debates about historical responsibility and resisting the temptation to lay the fate of global communities in the uncertain hands of progressing technological mastery. Understanding the problem as one of collective agency rather than information or technology makes such critiques appear untimely in periods of relative comfort, but they also lay the necessary groundwork for the urgent response by moving beyond the resigned authoritarian dictum that 'anything is better than extinction.' Theorists in such survivalist times are tempted to project the agency onto nature itself, once defined by its lack of agency and now portrayed as an angry, impersonal entity.

This kind of 'climate exterminism' closely resembles many of the arguments surrounding nuclear weapons, and revisiting these debates provides fertile ground for critique aimed at stimulating change rather than passively waiting for the catastrophe to validate a theory of non-response. In a critical response to Thompson's 'Notes on Exterminism,' fellow historian Davis insists on looking beyond the 'central fracture' in Europe to the experiences of other areas of the world, and seeks out the historical sources of the policies driving the arms race. Unwilling to surrender the specific, Davis insists that the exterminist drive is not laid into an abstract bipolar schism in the 'deep structure'

of the Cold War, but rather produced by a particular set of conditions and strategies. Thus, he believes, it is neither inevitable nor inaccessible to human agency.

Many social science and humanities theorists have already sought to complicate and reground conversations about climate politics by critiquing abstract concepts of climate catastrophe such as the popular Anthropocene literature. One stand-out recent paper by Jesse Ribot which I will explore in detail here exemplifies Davis' lesson, reminding contemporary analysts to seek out causal connections and determine the responsibility necessary for making collective change.[506] With Ribot, this chapter claims that, facing the possibility of a cognate 'climate exterminism,' the lessons offered by Davis' evaluation of exterminism suggests paths forward for those accepting the Anthropocene. Key is the need to challenge discussions like those centered around on the Anthropocene to gain specificity, to understand the dangers of over-generalizing responsibilities or consequences to all humans evenly. The survivalist lesson requires stimulating an active debate across developmental hierarchies about what the future in such conditions will look like—what it will mean, essentially, to lead a 'developed' life in the age of the Anthropocene.

II. EP Thompson and the Concept of Exterminism

Seeking to demonstrate the dangers of nuclear politics with 'the most urgent and mobilizing of toxins,'[507] socialist historian and anti-nuclear activist EP Thompson claimed in 1980 that nuclear strategy had absorbed global politics, that through an

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[506] Jesse Ribot, 2014. 'Cause and Response: vulnerability and climate in the Anthropocene.' *Journal of Peasant Studies*, Vol. 41, No. 5, pp. 667-705.
[507] Mike Davis, 1982. 'Nuclear Imperialism and Extended Deterrence.' In *Exterminism and Cold War*. New Left Publishing, London; p. 42.

impersonal logic born out of the deep, bipolar structure of the Cold War the human race had initiated an apocalyptic countdown to its own eventual destruction.

Thompson's contention was that the logic of atomic warfare had come to drive politics and this capture, unopposed and perhaps unopposable, would lead inexorably to the extermination of humans as a species. In this sense:

> Exterminism designates those characteristics of a society—expressed, in differing degrees, within its economy, its polity, and its ideology—which thrust it in a direction whose outcome must be the extermination of multitudes.[508]

The general sense of exterminism, for Thompson, was directly related to the possibility of nuclear holocaust. Realizing the negative potential of atomic war, for Thompson, signaled the entrance of the human species into a new era, since the great thinkers of the past had never imagined the completeness of the extermination that would become possible with nuclear weapons.

This newness justified innovation on older themes, which is unsurprising since Thompson was already engaged a version of this critique leveled at scientific Marxism and actually-existing Marxism-Leninism in the Soviet Union. He left the British Communist Party in 1956 after Khrushchev's 'secret' speech to the 20th Communist Congress and the invasion of Hungary. Radicalized by the revolts in Hungary and later in Czechoslovakia and Poland, Thompson was deeply critical of both the USSR and US blocs, and was one of many Marxists after 1968 to begin consciously opposing Stalinism as a precondition to a purer or more modern form of socialist humanism.

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[508] Thompson 1982; p. 20.

Thompson believed that Soviet policy in Eastern Europe and elsewhere showed that imperialism was possible in both capitalist and socialist systems, an independence which doctrinaire Marxists and liberal capitalists equally denied. In his famous *The Making of the English Working Class* he insisted that class itself was a historical category, subject to change, rather than an enduring structure.[509] While unorthodox, Thompson's argument was still logical: since Marxist thought emphasizes the link between material conditions and consciousness, insisting on the fundamental change in material conditions meant also the cultivation of a new type of consciousness.

By 1980, Thompson was a key figure in the peace and anti-nuclear campaigns in Britain and across Europe. He drafted the European Nuclear Disarmament Appeal, signed by major leaders dissidents from the East and West of Europe, and devoted himself to anti-nuclear advocacy. A key part of this commitment was asking his audience to see past the normalization of scare tactics to the deeper structure the danger producing the fear. Drawing attention away from short-term crises often used by the British government to subdue public criticism, he sought the sources of the danger itself in the structure of the conflict between the US and USSR. His acerbic parody of the British governments 'Protect and Survive' pamphlet, which described how to maintain order in the event of 'limited' nuclear attack, served as a powerful galvanizing force in the Europe-wide campaigns for peace and nuclear disarmament.[510]

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[509] EP Thompson, 1966. *The Making of the English Working Class*. Vintage, NY.

[510] *Protect and Survive* was the first publically-aimed Civil Defense scheme. It was a version of a long running series of radio shows, films, and pamphlets used during World War II, beginning to be adapted for nuclear attack in the early 1960s. The nuclear information campaigns were designed originally to be secret and used only in the event of an actual attack.

As in our contemporary era, the early 1980s was a time of high international tension. While there is a paucity of popular environmentalism in the US at the height of the Reagan, Gorsuch-Buford, and Watt days in federal office, debate over nuclear politics remained hotly contested. Of special importance in the eyes of many was the positioning of strategic missiles in Europe, a move which Americans interpreted as a safety shield for Western Europe, and Soviets as an act of aggression. The debate over nuclear politics is important to revisit because it also produces feelings of powerlessness and despair which stand as barriers for active confrontation of the problem. Europe, for centuries the privileged actor in world politics and driver of major wars, found itself largely reduced to a passive playing field for the global ideological struggle in the 1980s.

The idea of 'exterminism' presented by Thompson in his writing supporting European Nuclear Disarmament is flagrantly European in this respect, it is born out of the feelings of impossibility and powerlessness challenging residents of 'the European theater,' caught as they were between two ideologies with global ambitions and the powers of unimaginable destruction. Nuclear and climate exterminist problematics thus share a common lack of clear intentionality, which complicates the kinds of responsibility and moral horror which can be drawn upon to encourage effective action. As unintended consequences for which we are still responsible, the irony of climate exterminism is precisely its inability to be solved by existing institutions and logics.

Thompson, in reference to nuclear exterminism, asks:

> What if the object [of study] is irrational? What if events are being willed by no single causative historical logic ('the increasingly aggressive military posture of world imperialism,' etc.)—a logic which then can be

> analyzed in terms of origins, intentions, or goals, contradictions or conjunctures—but are simply the product of a messy inertia?[511]

This 'messy inertia' appears to be the source of the burgeoning literature diagnosing non-response to climate change from across perspectives. It also serves as a warning that less 'rational' or 'scientific' methods of problem solving may be necessary to avoid hyper-technical Promethean dreams (and potentially nightmares) of controlling the weather or simply replacing all fossil fuel power sources with nuclear generators. These dreams, consideration of Thompson warns, may be radically mismatched for the problems of unintentional effects.

In this way, I think Davis' challenge to Thompson's 'exterminism' is enlightening for our contemporary conversations about climate change, which appear dire and threaten, even where accepted, to result in exterminist resignation. Davis seeks more perspectives and pursues a kind of dedicated specificity. Remembering the current effects on island nations, biodiversity, and vulnerable communities (becoming specific, as Davis challenges Thompson) is not to forget the potential for global disaster. Instead, it is an opportunity to understand better the historical causes of precarity which make communities vulnerable to natural hazards by understanding the social and economic factors underlying the potential disaster, rather than focusing on the disaster itself to the exclusion of historical responsibility or effective agency.

'Protest and Survive' or 'Protect and Survive'?

In the 'Protest and Survive' pamphlet, Thompson mixed satire and criticism. He presented the problem of survival in times of Cold War as one of perceptions between the

[511] Thompson 1982; p. 1.

great powers. Each needed to appear to the other as if it was ready to use nuclear weapons in order for deterrence to work effectively. This sent a message that one was committed to an irrational path to discourage the attempt to call their bluff, and also gave an effective rationale for stamping down domestic conflict in each respective sphere of influence. As Thompson writes: 'the military and security elites in both blocs, and their political servitors, cannot pursue their expensive and dangerous policies without continually terrifying the populations of their own countries with sensational accounts of the war preparations of the other bloc.'[512]

Loosely modeled on the release in 1980 of a pamphlet from the British government titled 'Protect and Survive,' Thompson's piece focused on the language used in a letter to the London Times from Professor of War at Oxford Michael Howard. Howard made a case for accepting American missiles as a form of deterrence for Britain under the pretense of 'civil defense.' Thompson pulls the letter apart into 'two distinct elements' which are 'interwoven,' the speculative scenario of future events, including the possibility of a 'limited' Soviet nuclear strike on Britain, and a treatment of the correct postures and pretences appropriate in the theater of nuclear diplomacy.

This exchange followed the decision by NATO in 1979 to place missiles in Western European allied territories, although their placement was eventually delayed until 1982. This decision, for Thompson, was unacceptable, since it placed nuclear missiles in Britain, which he believed would make it a likely first strike target. He reacts strongly against the word choice of Howard, who describes the casualties of such a limited strike (near 15 million, potentially!) as 'disagreeable.' The profound

[512] EP Thompson and Dan Smith, 1981. 'Protest and Survive.' NYU Press, NY; p. 8.

understatement of this comment enraged Thompson, who saw the exercise in 'Protect and Survive' as a kind of illusory dream, focused as it was on maintaining order after such a 'limited' nuclear attack.

The consideration of how to return to form after such a disastrous event and the military's focus on maintaining order, for Thompson, hid the true moral question about whether or not such weapons should be in Britain or Europe at all. He says:

> Professor Howard's arguments are designed to hurry us past these questions without noticing them. They are designed to carry us across a threshold from the *unthinkable* (the theory of deterrence, founded upon the assumption that this must *work*) to the *thinkable* (the theory that nuclear war may happen, and may be imminent, an, with cunning tactics and proper preparations, might end in 'victory').[513]

This transition between the unthinkable and the normalcy produced by making a limited strike 'thinkable,' i.e. ordinary enough to be rationally-planned, he felt would 'permit the mind to progress from the unthinkable to the thinkable *without thinking*—without confronting the arguments, their consequences, and, indeed, without knowing that any threshold has been crossed.'[514]

This unreflective relation to concepts which once may have seemed morally unthinkable is reproduced in the literature advocating for global climate geoengineering schemes and reactive calls for 'transition' fuels (including nuclear energy and fracking), which sidestep the hard economic questions and moral reflection necessary to make a decision about the moral viability of such schemes. That these 'pragmatic' discourses do so is justified out of the perceived urgent need to reset the order of increasingly chaotic natural systems. Thompson seeks to expose this unreflective progression to the light of

[513] Thompson 1981; p. 23.
[514] Thompson 1981; p. 23.

critical attention, believing that, once presented in terms of a choice, the public of Britain and Europe would clearly prefer not to be the theater for nuclear war. Likely the same is true of technological schemes like climate geoengineering, which explains why its biggest advocates specifically warn against a global conversation.

This intuition, for Thompson, was supported by the highly publicized reaction of the residents of Hiroshima and Nagasaki, where the forgotten slow, long-term effects of nuclear weapons were apparent, yet the great sentiment was still for peace. He notes:

> It is not as if nuclear weapons are a completely unknown quantity, which have only been tested in deserts and on uninhabited islands. They have been tested upon persons also, in 1945 at Hiroshima and Nagasaki, and to some effect… One remarkable consequence of those two detonations is that the survivors in those two cities, and the descendants of the sufferers, were transformed into advocates, not of revenge, but of international understanding and peace.[515]

'Protest and Survive' sought to expose the tactics of normalization inherent in the calls to prepare for the unthinkable. De-naturalizing and de-sanitizing the language of such debates, Thompson felt, was necessary to avoid entering into a stage where such things became thinkable, or worse, were casually assumed to be the natural order of things.

The Universal Appeal of Total Catastrophe

Much of Thompson's lasting appeal was due to his willingness to critique both of the major players in the Cold War, to see past the connection between imperialism and capitalism proclaimed by Lenin and see the potential for fault on each side. In the 'Protest and Survive' pamphlet he claimed:

> I have based my arguments on the *logic* of the Cold War, or of the 'deterrent' situation itself. We may favor this or that explanation for the

[515] Thompson 1981; p. 13.

> origin of this situation. But once this situation has arisen, there is a common logic at work in both blocs. Military technology and military strategy come to impose their own agenda upon political developments.[516]

For Thompson, critics could not any longer waste time locating responsibility with one side or the other—these games of shirking blame by pointing fingers only exacerbated factionalist struggle without recognizing that 'this is an inter-operative and reciprocal logic, which threatens all, impartially.'[517] This appeal is grounded on the negative universal of the possibility of nuclear war, underlining the stakes of ideological conflict. Locating the cause in the relationship between the two ideologies rather than one in particular, for Thompson, emphasized the need for a shared concept of humanity to invalidate Cold War oppositions and generate a new path.

Imperialism, for Thompson heterodoxically possible in both systems, no longer captured the scale of the problem presented by the arms race. This new level of nuclear annihilation produced a kind of anti-consciousness, an awareness of the fragility of the species before the technologies of war. This was what Thompson named 'exterminism.' Contemporary history, for him, had become *world* history through the possibility of the nuclear threat to integrate the globe 'into one vast field of inter-related conflicts.'[518] The scale of this analysis, predicated on the negative image of nuclear holocaust, was barely imaginable and presented a new problem which could not rely on old categories to describe it effectively; as Thompson claims, 'it is a situation without precedent, and it becomes lost from view when we try to stuff it into inapposite categories.'[519]

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[516] Thompson 1981; p. 25.
[517] Thompson 1981; p. 25.
[518] Thompson 1982, p. xii.
[519] Thompson 1982, p. 4.

The new category of 'exterminism' is thus a kind of bastard outgrowth of historical progress and dystopic after-image of the hopeful 19th century narratives of progress which animated famous progressive thinkers like Marx. Adapting Marx's developmental story of production and human progress to this new possibility of total extermination, Thompson says:

> There is an internal dynamic and reciprocal logic here which requires a new category for its analysis. If 'the hand-mill gives you society with the feudal lord; the steam-mill, society with the industrial capitalist,' what are we given by those satanic mills which are now at work, grinding out the means of human extermination? I have reached this point of thought more than once before, but have turned my head away in despair. Now, when I look at it directly, I know that the category which we need is that of 'exterminism.'[520]

This concept of exterminism was explicitly not intentional and lacked criminal foresight. It was a negative image produced by the possibility of an absolute, universal destruction, and thus not a stage emerging from the Marxist tradition or liberal progressive narratives. Instead, it was a caricature and corruption of traditional notions of progress.

Seeking a greater audience, Thompson laid the blame squarely on all sides trapped in the potentially disastrous logic of deterrence and mutually assured destruction. His vision is at times incredibly bleak. He is clear that limited war in Europe means the end of European civilization. He claims, in a particularly vivid passage:

> What this would destroy would be Northern civilization and its economic and societal life-support systems. The survivors (one might suppose) would then be exposed to waves of plague and famine; great cities would be abandoned to rats and to rattish genetic mutants. People would scatter to uncontaminated lands, attempting to reinvent a sparse economy of subsistence, carrying with them a heavy inheritance of genetic damage. There would be banditry; fortified farmsteads, fortified monasteries, fortified communes; a proliferation of strange cults. Eventually these

[520] Thompson 1982; p. 4.

> might be the re-emergence of petty city-states, nudging towards new trade and new wars.[521]

Rather unconvincingly in the next line he avers: 'Or this scenario could be all wrong.' The very fact that it was possible at all, he felt, meant that civilization must adjust drastically to avoid collapse. This collapse would threaten all, thus for Thompson it was in the interest of all Europeans to oppose militarization and work urgently for a common goal of European Nuclear Disarmament.

Attributing exterminism to an irrational product of conditions produced by the new power of atomic weapons and the military-industrial complexes of both dominant global ideologies, he attempted to sweep aside old arguments and get to a point of consensus built on the possibility of universal destruction to replace the old hopes for a universal class of disenfranchised proletarians. Thompson notes this universal potential in the foreword to the compilation based on his 'Notes on Exterminism' published by the New Left Review in 1982. He claims there that nuclear weapons present a new challenge for Marxists in particular, since 'the possibility of planetary destruction affects all classes, as it does all societies.' This is important for Marxists because 'it poses the question of a common humanity *before* the advent of the classless society that socialist thought has always insisted could alone realize it,' and unites the formerly divided classes around 'a shared interest in human survival.'[522]

This possibility of uniting classes in a shared set of concerns revealed by the possibility nuclear war, for Thompson, promised an 'ultimate universalism.' Recognizing the problem of exterminism in the symmetrical relationship between

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[521] Thompson 1982; p. 27.
[522] Thompson 1982; p. viii.

Western capitalism and Marxism-Leninism, dueling global ideologies armed with the tools of extinction, Thompson did not interpret exterminism as the collapse of capitalism, as others might have, but rather saw it as a corrosion of *each* of the dominant ideologies, caused by their mutual antagonism and reciprocal militarization. Instead of a goal or a stage, then, exterminism represented simply an outcome. It was not an accident because it was foreseeable, but it was also not intentional in the sense of being the conscious goal of either ideological competitor. It was a perversion produced by the face-off of militarized political systems, underlined by the universality of the threat of nuclear holocaust extending to the rest of the world.

Projecting Agency Out of Human Hands

The contemporary ecological crisis, symbolized increasingly by global climate change, has increasingly come to serve as a parallel universal bonding agent. Every person, regardless of their specificity, is dependent on the natural world for support, sustenance, and aesthetic pleasure. Threats to the natural world serve as a universal appeal, in theory a plea to all humans regardless of race, class, ethnicity, or religion. This possibility of moving past old divisions by using a universal threat to the species-in-general explains the powerful rhetorical appeal of climate change and the Anthropocene as organizing themes, which makes it important for the profusion of theories of non-response in contemporary green theory, a genre increasingly laden with catastrophic images and apocalyptic predictions.

At once, Thompson is insisting on the *global* nature of the threat of atomic bombs in an overarching negative universal example, but at the same time he is inevitably

glossing very real differences in experiences and historical responsibility in order to directly make his case to the British or European public. Presenting the problem as one of humans as a generalized entity threatens to problematically transfer the powerless experience of Europe in the Cold War to the entire world, obscuring causes and responsibilities as distractions from the countdown to absolute annihilation.

Thompson prevaricates over the agency of the bomb itself, and this shifting projection of agency is instructive. At first he is insistent that the bomb itself is a Thing, and that 'a Thing cannot be a historical agent.'[523] In a confessional moment, though, Thompson is infected with a kind of paranoia that he cannot dismiss. He notes shortly after that 'nuclear weapons (all weapons) are things: yet they, and their attendant support-systems, seem to grow of their own accord, as if possessed of an independent will.'[524] The idea here is confusing in many ways, but essentially means that weapons are things, but they are a new kind of thing which promote the construction of rigid military control over political decisions, which in turn reinforces the logic of further militarization and increasing destructiveness of weapons.

Decisions about weapons, then, tend to dictate future political decisions, in a strange, contingent sort of agency produced by the feedback between ideological military complexes in competition. 'Weapons, it turns out,' he says, 'are political agents also.'[525] This transfer of agency to the bombs themselves is complicated and can be, potentially, a powerful source of resignation. Thompson predicts an inevitable 'collision' between the super-powers within 20 years (by 2000). Rudolph Bahro, East German dissident and

[523] Thompson 1982; p. 3.
[524] Thompson 1982; p. 3.
[525] Thompson 1982; p. 7.

foundational theorist of the Green Party in West Germany, would later explicitly draw the exterminist metaphor into a union of theological, political, and ecological issues.[526] In this sense, Bahro goes much further than Thompson is willing, adjusting Marxist doctrine to a spiritual argument for communal living which made him a wanted man in the Soviet bloc. For both the issue is the fragmentation of collective will, which, in their view, if properly brought to bear on social problems would result in socialism and eventually communism. Each sees this separation as problematic, a product of false consciousness, but each sees this false consciousness best overcome with different tactics.

Thompson tries to historicize and generalize the responsibility to a point where no particular party is more guilty to deflect inevitable and time-consuming debate over *who* should act. Bahro, like many deep ecologists, believed that such a generalization was only possible with the help of spirituality, and began pushing for parallels between Christian and ecological doctrine in a way which must have made the secular humanist Thompson uncomfortable. The threat of passivity entailed in importing this discourse directly into political ecology is clear already in Thompson's work. He says:

> As we know from history, this conjecture of crisis and opportunity is the most dangerous moment of all. The ruling groups habituated to the old modes and controls, sense the ground moving beneath them. The hawks and doves form factions. Actions are precipitate and impulsive. Neutralism, internationalism—democratic impulses in the East, socialist impulses in the West—appear as hideous threats to established power, challenging the very *raison d'etre* of exterminist beliefs. In that situation of impending superpower collision and of ideological instability, it is not likely that 'we'—with our poor resources, our slight political preparations, our wholly inadequate internationalist communications—can succeed. It is probably that exterminism will reach its historical destination.[527]

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[526] Rudolph Bahro, 1994. *Avoiding Social and Ecological Disaster: the politics of world transformation and an inquiry into the foundations of spiritual and ecological politics*. Gateway Books, NY.
[527] Thompson 1982; p. 25.

In many ways, the example of the potential castrating force of projecting agency onto a global hazard is equally useful for the Anthropocene, which seeks to activate a new scale of responsibility for entwined social and ecological outcomes. Addressing the problem at this level of abstraction, projecting the problem into a nonhuman logic or process, may explain the insistence of people like James Lovelock, David Keith, Paul Crutzen, and others to promote research into controversial technological fixes and advocate for nuclear powered-landings and atmospheric aerosols, rather than seeking the kinds of effective collective agency necessary to adapt to the changing conditions entailed by the new era of human influence on the planet. The threat of such a resigned 'climate exterminism' depends on the premise that the climate has absorbed politics, that agency was no longer centered in humans as individual or collective agents.

Contemporary critics responding to disaster narratives centered on climate change and global ecological degradation can learn from the debate over exterminism. Mike Davis' response should, I'll argue, give form to ongoing contemporary critiques for several reasons. Chief among these is the restoration of historical analysis and the critical need to expand perspectives. What this reveals, in contrast to Thompson's exterminism and survivalist catastrophe narratives, is how focusing on the seemingly inevitable march towards nuclear annihilation hides both ongoing suffering in places outside Europe and the historical causes of the suffering itself.

III. Mike Davis Responding to Exterminism

Davis, sympathetic to the movement within European Marxism against Stalinism and Soviet influence in Eastern Europe, demands that the analysis be expanded to include

the 'hot' wars on the periphery. This shift radically decentered traditional Cold War narratives in Europe because it drew attention to the shadowy international politics of supporting dictators and fighting proxy wars to prevent the spread of the rival ideology. The Marshall Plan and victory in Europe gave the US a strong moral high ground, opposed as it was to the Soviet occupation in Eastern Europe. Looking to Latin America, Asia, and Africa gave rise to a very different picture, where the excesses of anti-communist American foreign policy gave no such assumed moral strength.

This emphasis is radically different from Thompson's. Thompson had become known for his work on early English examples of socialist thought, in both his biography of William Morris[528] and his famous *Making of the English Working Class.* His campaigns for nuclear disarmament were squarely focused on the European continent and national politics in Britain. His object was to find historical sources of socialist ideals in the British tradition, which is both smart critical work and also narrowly focused on one historical example, which privileges the potential catastrophic vision of Europe as a passive theater for 'limited' nuclear exchanges over the going on throughout the third world of the early 1980s. Davis, in a vivid passage, claims:

> As future megadeaths multiply to incomprehensibility in their underground crypts, present slaughters are dulled in our conscience and made matter-of-fact by repetition and sheer enormity.[529]

For Davis, the focus on Europe hides the growth of 'absolute immiseration' in the periphery. Today, a parallel problem is emerging in the climate discourse of the developed world. Transfixed by the possibility of the coming catastrophe, other regions

[528] EP Thompson, 1955 (2011). *William Morris: romantic to revolutionary*. PM Press, London.
[529] Thompson 1982; p. 63.

experience the change as a current crisis, unprotected by the security and comfort of consumer life in the developed countries.

Expanding Historical and Geographic Perspectives

For Davis, making exterminism purely about the relation between the two ideological forces (in an attempt to get beyond blame to action) obscured the responsibility of each system for the impending crisis, and made the historical actions taken to arrive at the brink of nuclear war opaque. Davis' emphasis on the 'developing' world is especially important for interpreting the Anthropocene because he purposefully decenters the conflict and the over-generalized sense of powerlessness 'exterminism' entails. Instead, Davis remarks, Western Europe had been largely happy to allow the US to spend enormous sums to dominate and eventually maintain parity with the USSR. What the abstract logic of 'exterminism' did, Davis claimed, was draw attention away from the very real and preventable injustices occurring throughout the world on the periphery of the Cold War.

Where Thompson had insisted that whatever the sources the exterminist problem was now a universal threat, for Davis, the role of the globalizing market was paramount in creating a subsistence crisis, which meant that global capitalism had created the conditions for the loss of traditional agriculture and old ways of life without a viable alternative to replace them. To think in terms of restoring a British heritage or form a pan-European identity, as Thompson's advocacy strategies clearly did, for Davis missed the underlying drivers of the crisis, which he felt was the aggressive expansion of global markets and the muddled and resource-challenged Soviet response.

The year of Davis' rejoinder to Thompson's exterminism essay in 1982 was a year of turmoil in international markets of the developing world, creating social strife and economic change. The conditions generated by the permeation of market culture into the developing world, Davis believed, made the crisis something qualitatively new. He says: 'there has never been a 'subsistence crisis' of the ferocity and global dimensions of the current unfolding catastrophe,'[530] recalling the claims of nuclear, population, and current environmental discourses which claim their conditions constituted a new era. For Davis, 'the present crisis is entirely different' because the most vulnerable were being displaced from the land, local food sources were being weakened, and massive out-migrations from the rural areas were swelling cities (a future line of research for which he is justly well-known in urban studies).

The worst hit in this process were those forced to bear the costs of large-scale structural adjustment to national economies. For Davis, this created the possibility of 'absolute pauperization,' a level of suffering defined by the total loss of even the means for feeding oneself and one's family. To ignore such suffering, transfixed on the possibility of a world-ending nuclear confrontation in Europe, for Davis was irresponsible and distracting. In this perspective, ideas like exterminism threaten to displace discussions of historical responsibility and geographic inequality in the urgent search for survival—it emphasizes the coming inevitability of the disaster at the expense of identifying the historical and geographic specifics necessary to begin confronting the possibility of extermination in an active way. This is perhaps the strongest lesson

[530] Davis 1982; p. 61.

generated by Davis' critique, that treating humans as a general category lacks the historical nuance to identify causes and transform political institutions.

Today, a parallel discourse has clearly risen out of climate change advocacy and research. What we should learn from Davis' response is twofold. First, he demands the return to history in a serious way to seek out the sources of historical and present injustice. Second, he forces the narrow focus of debates in Europe to expand their geographical awareness to less-considered parts of the world, places where the European nightmare of a future nuclear catastrophe had effectively masked public recognition of a slower kind of economic violence taking place already throughout the developing world. This sort of analysis potentially moves beyond the kind of generalized cultural malaise diagnosed by survivalists of all ideological stripes, and the projection of agency onto the bombs themselves performed by Thompson's exterminist dystopia.

The warning to discourses like the emerging Anthropocene literature is that the abstraction of climate change to a universal indicator of 'the era of human influence' can potentially draw attention away from more certain and local concerns where it remains a generic narrative about the age of humans in general. Although gaining a kind of universal appeal, many fear that linking everything to climate change drains activism on things we can easily affect. A similar example of overemphasis on CO2 reductions has led several prominent researchers to recommend tackling more achievable problems that affect people currently, such as black soot, first in order to build public trust and institutional cooperation to then tackle longer-term issues like CO2 emissions.

The universal appeal climate narratives achieve is powerful, but the need for context to understand how to avoid it is potentially paralyzing for the same people it

seeks to activate. Those wielding these narratives for rhetorical effect need to pay attention to the kinds of agency involved and the temporal and geographic unevenness of the effects. Following Davis, this should also serve as an urgent demand to consider examples from other places outside the 'developed' world. Critical theorists need to follow Davis and begin critically rethinking the use of universal threats. These, like the nuclear bombs in Thompson's exterminism, are not really agents, but stand-ins for complicated relationships between individuals, their society, and natural systems. Davis accepts the level of destruction possible, but he insists on clarity at its sources rather than giving agency to the arms race itself.

Historical Responsibility and Agency

Thompson's identification of an outcome which is both not accidental and not intentional rejects notions that human individuals and societies are released in some way from responsibility for the exterminist era. He claims that 'the outcome will be extermination, but this will not happen accidentally (even if the final trigger is 'accidental') but as the direct consequence of prior acts of policy, of the accumulation and perfection of the means of extermination, and of the structuring of whole societies so that these are directed towards their end.'[531] Despite this, however, Thompson believed that the US and USSR had become secondary actors, ceding agency to the bipolar structure of international conflict.

This is a fatalistic image, one which projects the choice to go to nuclear war back onto the bombs themselves in order to guarantee to the opposing military complex the

[531] Thompson 1982; p. 20.

willingness to commit to a universally impoverishing path of action. While accepting the gravity of the catastrophic possibilities presented by exterminism, Davis was worried by the transfer of agency away from historical-analytic frameworks which have the possibility of attaching responsibility to descriptions of inevitable hazards. While understanding the use of drastic rhetoric, Davis doubts 'whether the concept of exterminism provides an adequate analytic framework or, what is more important, a sufficiently realistic assessment of the present war danger.'[532]

Davis' response to the idea of exterminism is valuable for evaluating the possible paths of the Anthropocene trajectory. He diagnoses a profound, unconscious over-generality in Thompson's analysis, typified by describing the problem as one of 'immobilism.' For Davis, this rhetoric problematically assumes that the central conflict that drives all others is the fracture along the Iron Curtain splitting Europe. Thompson clearly says: 'what is known as the 'Cold War' is the central human fracture, the absolute pole of power, the fulcrum upon which power turns in the world,'[533] but in practice he refers almost exclusively to the struggle in Europe. His analysis of Europe leads him to insist that inertia is the chief problem to be confronted. This inability to do things, or imagine how to do them, was predicated on the fact that the 'Cold War passed, long ago, into a self-generating condition of Cold War-ism (exterminism), in which the originating drives, reactions and intentions are still at play, but within a general inertial condition.'[534]

Today, many make a similar claim about climate change, our new fount of secular, universalized destruction. This sort of universal appeal, however, also comes at

[532] Davis 1982; p. 36.
[533] Thompson 1982; p. 3.
[534] Thompson 1982; p. 21.

the expense of crucial details, many of which make clear that the most urgent effects of climate change were not spread equally over a singular humanity facing extinction, but rather an uneven temporal and geographic distribution of local crises around the world.

In response to exterminist historical agnosticism, Davis insists on expanding perspectives of exterminist analysis to address 'the greater vulnerability' of capitalism on the periphery of the conflict, and acknowledge that the fragility of Cold War ideology in the Third World '(so far) has dictated the greater importance of this zone for the permanence of the Cold War.'[535] This paradoxical centrality of the periphery was due, Davis believed, to the fact that socialism on the periphery threatened the supply of raw materials to the 'developed' nations and closed potential marketplaces for US companies.

The scale of world 'immiseration,' in Davis' eyes, was a new, emergent phenomenon, and worthy of naming a new age, as Thompson too asserted. Rather than an abstract concept for Davis, however, it is one which was historically complicated by the global debt crisis of the early 1980s and expansion of neoliberal economic programs under Thatcher and Reagan. He wants to, instead, 'reintegrate' exterminism with historical materialism as a method in order to historicize the identification of key factors and to insist on the kinds of specific actions which could mitigate the crisis.

Davis says 'the paradox is that Thompson, after insisting on the random and disaggregated character of the forces generating exterminism, then presents their summation as a popular culture that is literally all-pervasive.' Although many historical and institutional trends lead up to exterminism, exterminism itself describes the universal corruption of ideological systems under the weight of preparing for atomic war. At this

[535] Davis 1982; p. 49.

point, 'having dispersed and minimized the *causes* of exterminism, one might say, he [Thompson] magnifies its *effects* out of all scale, to a point where it becomes coextensive with the social order as a whole, as the ubiquitous sickness of a poisoned civilization.'[536]

Davis is clearly not convinced that the search for the origins of exterminism is as fruitless as it seems to Thompson, even if it violates the appeal to universal vulnerability which Thompson (and dire environmental catastrophe narratives since) seek to mobilize. Far from the abstract isomorphism which annihilates special responsibility or historical causation, Davis' account seeks out the specific path of exterminist politics in the different national experiences of WWII and the immediate post-war era, a differentiation that allows him to both attribute responsibility and make less fatalistic predictions. Agreeing in part with Thompson about the newness of the era, Davis goes much further to establish the specific nature of the problem.

For Davis, then, the new era is real but it is not based on 'Cold War-ism' inertia, but rather negative universal of 'absolute immiseration' and the ongoing struggle against the historical elements of neoliberal and communist imperialism which drive it. These conflicts, while smaller in scale (at least relative to the total extermination envisioned by Thompson), were pervasive sources of violence throughout the 'immobile' world. As Davis reopened the universal packaging of nuclear exterminism, those interested in history and responsibility now are ever more vital critiquing forms of climate exterminism. Today, Jesse Ribot and others, such as Dipesh Chakrabarty, are beginning a similar critique with the Anthropocene, breaking down the universal appeal of its

[536] Davis 1982; p. 40.

narrative into both local consequences and deeper causal relationships, to 'a common but differentiated responsibility.'

IV. Ribot and the Return to Causal Analysis

The consumption of the concept of the Anthropocene as a medium for claiming a kind of universal appeal has been a success in providing a boundary object for different disciplines within academia concerned with environment or development to weave together new types of narratives. At the same time, where the analysis remains highly global or abstract, such as in Crutzen's controversial call for geoengineering research,[537] this analysis also seems prone to the problems of effective action and active acceptance exposed by Thompson's exterminism. These observations are borne out by past generations of survivalists attempting (and failing, even on their own terms) to blend nuclear and ecological problematics into a persuasive case for economic change.

Thompson's exterminism is a clear example of the problems with projecting the responsibility for the perceived catastrophe onto an impersonal force. The exterminist times he identified were ones which lacked any clear human hand on the wheel of history. If 'climate exterminism' is a possible response to the resignation produced by confronting a steadily increasing warming blanket of carbon in the atmosphere, and one which does not appear affected by human agency, this should be a stark warning to similarly global discourses built around Cold War themes to avoid projection and focus on local agency. This, I argued above, is what Davis' critique of 'exterminism' offers to

[537] Paul Crutzen, 2006. 'Albedo Enhancement by Stratospheric Sulfur Injections: A contribution to resolve a policy dilemma?' *Climatic Change*, Vol. 77, pp. 211-219.

contemporary debates, that confronting projections of agency into non-human realms requires expanding perspectives and avoiding over-generalization.

Geographer Jesse Ribot's recent paper 'Cause and Response: Vulnerability and Responsibility in the Anthropocene'[538] exemplifies the kind of work that needs to be done to follow this example and not simply 'magnify effects into a ubiquitous sickness of a poisoned civilization.'[539] Approaching the Anthropocene as a social scientist, Ribot warns that the growing acceptance of anthropogenic climate change has encouraged a problematic transfer of agency away from political and economic institutions and onto natural disasters. This transfer privileges outdated hazards approaches which do not yet see that disasters are produced by natural disasters *and* the existing precarity of human communities living in the affected area. 'In doing so,' he claims, 'rather than seeking causality in social history, they continue to locate risk within the hazard to which people adjust, implicitly attributing pain and suffering to droughts, floods, and storms,'[540] squarely blaming nature, and over-generalizing responsibility to abstract uselessness.

Instead, he asserts: 'in the Anthropocene, climate events and associated suffering can no longer be cast as acts of God or nature.'[541] Ribot's fear, like Davis', is that focus on the probability of future disasters was obscuring the causes of vulnerability at the source of the suffering generated by the probabilistic event, that 'ironically, while some responsibility for stressors may now travel through the sky, the renewed focus on climate hazard is clouding attention to the grounded social causes of precarity that expose and

[538] Ribot 2014.
[539] Davis 1982; p. 40.
[540] Ribot 2014; p. 671.
[541] Ribot 2014; p. 667.

sensitize people to hazard.'[542] As in Davis' analysis, Ribot refuses to give up seeking the origins of the Anthropocene challenge even as the process of urgent adaptation is ongoing. This is because these crises are products of human actions, whether social, economic, or political, and have been generated over time by specific actors.

Ribot's background in development theory and resource governance provides the specific and historical view which Davis challenges Thompson to include. He sees that pursuing such an analysis will be untimely because 'cause indicates blame, responsibility and liability, linking damages to social organization and human agency.'[543] Nevertheless, he sees that without such an analysis there can be no real progress towards solving the short-term problems of vulnerability of specific communities to climate-related disasters, and also the long-term issues about how economics and politics will have to change at a global level to reflect responsibility for the new state of social-ecological systems throughout the world. This is importantly more than hazards and preparedness planning, which assume the probabilistic event in order to focus on how to most efficiently return systems to pre-existing form.

Worried by the shift to adaptation rhetoric currently underway in global policy discussions and scientific circles, Ribot reasserts the need for social theory and history, insisting that 'the inability to sustain stresses is produced by on-the-ground processes of social differentiation, unequal access to resources, poverty, poor infrastructure, lack of representation and inadequate systems of social security, early warning and planning.'[544] This means that 'social-historical vulnerability analysis is a necessary complement of

[542] Ribot 2014; p. 668.
[543] Ribot 2014; p. 668.
[544] Ribot 2014; p. 671.

adaptation planning,'[545] not a problematic drain on time which draws out damaging conflicts between likeminded factions to the surface.

A key example he uses to explain the danger of leaving out such a social analysis is the legalistic wording of UN Framework Convention on Climate Change adaptation funding requirements, which must be targeted only at 'additional stresses' of climate change. While accepting the responsibility of the world community to compensate the areas hardest hit by the uneven distribution of climate-related events, this approach also implicitly denies responsibility for 'preexisting precarity,' effectively obscuring the historical production of social vulnerability; he says 'the targeting of adaptation funds toward the anthropogenic increment of climate change accepts that nature has been cultured, but, paradoxically, requires that the pre-existing misery of precarity be naturalized—as a background condition.'[546]

Since funds cannot be targeted solely at the social conditions producing precarity, the potential resilience of those communities which are not currently suffering a disaster or cannot provide a link between social and natural vulnerability is drastically reduced. As he claims: 'paradoxically, then, in its welcomed emphasis on human agency, response to anthropogenic climate change has the effect of naturalizing and thus obscuring pre-existing anthropogenic vulnerability.'[547] This analysis follows the two lessons from Davis' analysis noted above because it pays attention to the mismatch in agency between processes and actors and it expands perspectives to prevent over-generalizing the inertia of the 'developed' world as a universal malaise.

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[545] Ribot 2014; p. 671.
[546] Ribot 2014; p. 672.
[547] Ribot 2014; p. 673.

V. Final Notes on Climate Exterminism

Writing in Britain, a possible site a 'limited' exchange in the event of war between the Cold War powers, Thompson may have felt, like many caught on the *realpolitik* chessboard of the European theater, powerless to affect the path to nuclear war. Constant maneuverings of missiles and troops in European countries and a state of high alert maintained a general state of anxiety that, unmatched by agency at an effective scale, led Thompson to externalize of the threat to *the arms race itself*. He made exterminism the final dystopian stage of human civilization inevitably moving towards extinction, and gave agency to the relationship created between the great dueling ideologies with the invention of the atomic bomb.

The universality of Thompson's appeal hid the real narrowness of the exterminist analysis. Davis, instead, recommends incorporating perspectives from different times and places in order to show clearly where exterminist globalism is contradictory on its face. Exposed to an analysis of conflict in the non-European world, theories diagnosing generalized 'immobilism' are exposed as profoundly provincial. They show the long-unconscious privilege of Western intellectuals to create universal theories without reference to the experience of the rest of the world, a central finding of post-colonial history. This is part of what makes Chakrabarty's thoughts on the Anthropocene so interesting to approach, in a clear parallel with the tactics of Mike Davis in his critique of exterminism.

Davis purposefully decenters both the perceived centrality of Europe to the conflict and the over-generalized sense of powerlessness 'exterminism' entails. What the abstract logic of 'exterminism' did, Davis claimed, was draw attention away from the

very real and preventable injustices occurring throughout the world on the periphery of the Cold War. Thompson's perceived powerlessness before the prospect of nuclear 'exterminism,' or the inevitable march towards annihilation produced by the new power of technological destruction in play between the US and USSR, parallels the kind of resignation now often encountered toward climate change, where the perceived agency of change appears unconnected to individual lives or even national sovereignty.

Critical theorists of the Anthropocene should follow Davis and perform the same kind of exorcism of the distance and resignation which Thompson's 'exterminism' seemed to be inspired by. This is, broadly, a task of critical history, of which Davis's work is an exceptional example. By pointing out the reality of ongoing conflict throughout the 'developing' world, Davis rejected the idea that the fate of the species was inevitable or out of our hands by calling attention to the very real struggles ongoing in places most 'developed' citizens were not paying attention to, so transfixed as they were on the Doomsday Clock and the struggle in Europe. For Davis, the amount of time and attention spent on recalling things like Prague's 'socialism with a human face' belies the fact that there may have been other contemporary examples in the 'developing' or 'third' world which could provide perspectives and examples for moving 'developed' society to a non-exterminist route.

Re-examining ecological crisis literature through the lens of nuclear exterminism challenges theorists, whether accepting or denying the Anthropocene label, to keep from externalizing social-ecological problems into natural disasters or some inevitable, ironic geologic consequence of the increased standards of living which once legitimated the

great ideologies in struggle. The threat of such a resigned 'climate exterminism' depends on the premise that the climate has absorbed politics.

The explicit question which Davis asks Thompson to consider is whether by concentrating so much on the irrational and inertial dangers of the arms race, 'it tends to ignore the deliberate and dynamic calculations of nuclear politics'[548]—to ask, essentially, 'how does the bomb serve power?' This lesson is broadly useful for reading the Anthropocene literature and other potentially catastrophic social-ecological theories because it challenges theorists to focus on the historical causes of crisis rather than simply emphasizing the total nature of the catastrophe to be avoided, and because it does not project the effective agency of the process onto processes or things which are resistant to human agency.

[548] Davis 1982; p. 43.

09 Development and Simultaneity: Post-material Politics at the End of History

I. Development and Modernity at the End of History

> There is little change here in the gulf. We think it would be very difficult to astonish these people. A tank or a horseman armed cap-a-pie would elicit the same response—a mild and dwindling interest. Food is hard to get, and a man lives inward, closely related to time; a cousin of the sun, at feud with storm and sickness. Our products, the mechanical toys which take up so much of our time, that preoccupy and astonish us so, would be considered what they are, rather clever toys but not related to very real things. It would be interesting to try to explain to one of these Indians our tremendous projects, our great drives, the fantastic production of goods that can't be sold, the clutter of possessions which enslave whole populations with debt, the worry and neuroses that go into the rearing and education of neurotic children who find no place for themselves in this complicated world; the defense of the country against a frantic nation of conquerors, and the necessity for becoming frantic to do it; the spoilage and wastage and death necessary for the retention of the crazy thing; the science which labors to acquire knowledge, and the movement of people and goods contrary to the knowledge obtained. How could one make an Indian understand the medicine which labors to save a syphilitic, and the gas and bombs to kill him when he is well, the armies which build health so that death will be more active and violent. It is quite possible that to an ignorant Indian these might not be evidences of a great civilization, but rather of inconceivable nonsense. – John Steinbeck

> Now that we are over six billion hungry and greedy individuals, all aspiring to a first-world lifestyle, our urban way of life encroaches upon the domain of the living Earth. – James Lovelock

The two epigraphs of this chapter may initially appear unrelated. Writing from the Gulf of California expeditions with influential ecologist EF Ricketts, Steinbeck's reflections on the sparse native populations of Baja California are indicative of a common insight across scientific and humanistic fields of inquiry working in areas of what is now known as the 'developing' world. This insight was that the problems of modern life were not universal features of human societies, but rather particular manifestations of cultural habits and national histories, exposed by the relative unimportance of 'modern' societies in other places compared to everyday survival.

The implicit suggestion, followed by many using ecological metaphors to understand politics, was that the great crises of industrial modernity had a potential alternative, embodied by the ways of life of marginalized and indigenous peoples who lived life 'closer' to the land, consuming and possessing less material things, and living outside the global economic order. That today that romantic yearning for local, indigenous systems appears grossly inadequate for contemporary problems is due to two related trends. The first is globalization, with the communications and mobility that (unevenly) link disparate places in webs of information and commerce. The second is global ecological change, which affects local communities across the world regardless of their historical responsibility.

The cultural critique in each of these quotes is the starting point of this part of my research, a challenge to understand how ecologists and crisis prophets have arrived at similar intuitions and how this common critique can and should structure how we think about controversial and contested concepts like 'progress,' 'development,' and 'modernity' in the light of global ecological change. Lovelock's quote is tied to the foundational insight of global ecological studies since the 1960s—that the world's material inputs are limited, and therefore growth cannot continue forever in the industrial way it is currently conceived. Lovelock is radicalizing this claim—understanding the ecological crisis as already past the point of no return, he claims that the 'first-world lifestyle' which Steinbeck puts in perspective is the major driver of this inevitable change, both through historical industrialization and, now, through the entrance of the 'developing' world into the same urban, mobile, and industrial lifestyle.

In this chapter I work through several academic literatures to critically interrogate the relevance of traditional Western/Northern narratives of development in the context of planetary ecological change. Throughout, I analyze how ecologically-based social theories like Environmental Political Theory (EPT) and Political Ecology can help critical theorists in warmer times refocus on the ways of life driving ecological change. In particular, I want to highlight how post-colonial history can supplement these traditions of thought and provide a cultural rather than economic argument for expanding historical and geographic perspectives in the political debate over Earth System change. Post-colonial history illustrates in detail the contradictions between national economic growth and global ecological change through the lens of culture and the novel perspectives created by engagement between epistemic communities and ways of life, rather than their individual appropriateness for planetary generalization, as both growth and anti-growth schools within the EPT community often do.[549]

The post-colonial project, moving away from reciprocal colonial and anti-colonial positions, provides a model for moving beyond the pro- or anti-growth debate to a more meaningful discussion about the shape and rhythm of everyday life in the post-growth world. In the rest of this chapter I will try to bring three lines of thought together to critically interrogate the idea of a hierarchy of national development still implicitly contained in many 'green' narratives. I begin by thinking about the Anthropocene and post-colonial historian Dipesh Chakrabarty's challenge to the ahistoricity of global crisis

[549] I will explore in much greater detail the pro-growth school. For a hint of the anti-growth response see the work of Zerzan, Sachs, or Sahlins.

narratives through the nested cultural model of 'simultaneity,' linking it to how EPT has interpreted growth, development and institutions in the light of ecological change.

In its dominant strands, EPT looks to expand democratic participation or proactively accept authoritarian technocracy, based on the kinds of assumptions maintained about the effectiveness of collective agency and the escapability of crises. Political ecology, approaching problems from a complementary 'developing' perspective relative to the standard immanent critique of Western culture in EPT, calls for a flattening of development hierarchies, stressing the 'materiality' of 'developed,' 'post-material' societies and their connection to extraction and degradation in the peripheries of the globalized economic system. Provocatively, many suggest that historical responsibility for things like climate change in industrialized nations requires the payment of a climate or 'ecological debt.'

In this chapter I work through how the insights from political ecology can be helpful to the EPT debates seeking greater pluralism of experience and perspective. Beginning from the explicit rejection of the 'post-material hypothesis' and nesting of local communities in global economic and national power structures, I show how such a nested model follows from the history of EPT and more recent incorporation of resilience thinking, and, later, how these insights map onto the potential contributions of post-colonial history in emphasizing co-management and revaluing of Traditional Ecological Knowledge (TEK). I will argue that this flattening of development hierarchies and reembedding in ecological systems suggests strategies degrowth in the industrialized world and '*buen vivir'* in the 'developing' complement, i.e. two separate rhetorics aimed at similar results at the global level, but with specific discourses to engage the histories

and contemporary perspectives of different cultures. I end by reflecting on the contribution of post-colonial history to these debates, focusing in particular on how Chakrabarty's experience moving from anti- to post-colonial, his diagnosis of a loss of historical memory, and reconnection of global, cultural, and individual identities through the concept of simultaneity.

The concept of simultaneity can help critical theorists of development confront epistemic and consequential forms of remoteness identified by EPT and the patronizing developmental hierarchies abandoned by political ecology. Pulling together these strands of scholarship, my argument is that these rival debates across disciplinary trainings show the need to expand the sources of debate and contestation by opening up history (PCH), debating political visions of the good life (EPT), and exposing contemporary inequality (PE). At the bottom of all of it, however, lie two deeper and more serious questions that must be asked: What does the expansion of perspectives imply for green development politics? Is the 'developed' way of life also the gateway to extinction?

II. Is Catastrophe the Secret Destination of Progress?

> The notion of sustainable growth has been a salve to the many environmental organizations and movement groups that have been reluctant to launch a frontal assault on the values and practices underpinning the consumer society—preferring instead to channel their energies into regulatory and technological strategies of environmental protection. The ironic result is that, at a time when social theorists see consumption, consumerism, and the globalization of consumption patterns as increasingly important phenomena, the centrality of consumption to ecological worldviews and environmental activism seems to have faded. – Ken Conca

Today, many popular and academic sources advance visions of post-catastrophic society. Alan Weisman's best-selling *The World Without Us* is just one in a long series of books, articles, television shows, movies, and video games projecting a post-

apocalyptic world. Although Weisman is focused on the return of nature in the absence of man, he also offers advice for mounting ecological crises. Reflecting back after contemplation of a human-less world, he asserts that:

> More crucial to us still here on Earth, right now, is whether we humans can make it through what many scientists call this planet's latest great extinction—make it through, and bring the rest of Life with us rather than tear it down. The natural history lessons we read in both the fossil and the living records suggest that we can't go it alone for very long.[550]

The critical content of this question is reflected across both popular culture, now permeated by post-apocalyptic themes, and also in the activist literature focused on mounting social-ecological crises. It should be interpreted, I'm arguing here, as a challenge to modern ways of life, and in particular the idea of 'development' contained in the sustainable growth discourse Conca refers to in the section epigraph.

Post-colonial historian Dipesh Chakrabarty notes the attraction of Weisman's premises, of assuming the catastrophe without its causes. He says: 'I am drawn to Weisman's experiment as it tellingly demonstrates how the current crisis can precipitate a sense of the present that disconnects the future from the past by putting such a future beyond the grasp of historical sensibility.'[551] The impetus of Chakrabarty's contribution was the high profile research program where atmospheric chemist Paul Crutzen and coauthors renamed the contemporary epoch 'the Anthropocene,' or age of human influence at a geologic scale.[552] Crutzen claims that 'global warming and many other

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[550] Alan Weisman, 2007. *The World Without Us*. St. Martin's Press, NY; p. 269.
[551] Dipesh Chakrabarty, 2009. 'The Climate of History: Four Theses.' *Critical Inquiry*, Vol. 35, Winter, p. 197.
[552] Will Steffen, Paul Crutzen, and JR. McNeill, 2007. 'The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature?' *Ambio*, Vol. 36 No. 3, pp 614-621; also Paul Crutzen, 2002. 'Geology of Mankind.' *Nature*, Vol. 415, January; Paul Crutzen and Christian Schwägerl, 2015. 'Living in the Anthropocene: Toward a New Global Ethos.' *Yale Environment 360*, Online.

human-driven changes to the environment are raising concerns about the future of Earth's environment and its ability to provide the services required to maintain viable human civilizations,' and that 'worst-case scenarios paint a gloomy picture for the future of contemporary societies.'[553]

An interdisciplinary collective of scientists and social scientists, the major publications on the Anthropocene all make the case that human systems are embedded in ecological systems, and all of these component parts are part of a planetary balance which has now been thrown off by anthropogenic degradation. They understand the challenge of global change as both a material one, related to limits and ecosystem services, and also a cultural one. They claim:

> The Great Acceleration is reaching criticality. Enormous, immediate challenges confront humanity over the next few decades as it attempts to pass through a bottleneck of continued population growth, excessive resource use and environmental degradation.[554]

The crisis at planetary proportions, for the most scientific of the Anthropocene purveyors, means that there are critical thresholds in danger of being breached, beyond which irreversible and catastrophic change are inevitable. In its most scientistic and technological determinist modes, this acceptance of inevitable change can validate extreme measures that introduce new kinds of risks.

Environmental historian JR McNeill's contributions are outstanding in this sense, and in stark contrast to the technological stewardship that Crutzen advances elsewhere, because he insists that the major shifts since the mid-20th century are due to a lack of

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[553] Steffen *et al* 2007; p. 614.
[554] Steffen *et al* 2007; p. 620.

value assigned to nature in industrial systems. His words stand out amongst the scientific writing of his coauthors:

> The Great Acceleration took place in an intellectual, cultural, political, and legal context in which the growing impacts upon the Earth System counted for little in the calculations and decisions made in the word's ministries, boardrooms, laboratories, farmhouses, village huts, and, for that matter, bedrooms.[555]

Here, humans are 'not an outside force perturbing an otherwise natural system but rather an integral and interacting part of the Earth System itself,'[556] and the distinct challenge this realization of embedding presents is how to make human societies into self-conscious and active agents in preserving the ecosystem services vital to human life and cultural survival. This is complicated by the danger of nonlinear change, of transgressing the 'limits to growth' that, in an echo of survivalists past, Rockstrom *et al* have renamed as 'Planetary Boundaries.'

Returning to Weisman's thought experiment, the changes constitutive of Anthropocene represent a reason for the depopulated Earth he imagined, a rationale for how we got to this world recovering from human domination. Weisman's effort, however, remains intentionally vague. By starting from the catastrophe he looks to inspire critical thought about the ways of life driving the crisis itself in an open way. Chakrabarty reads this in the context of climate change and growth of global markets, and diagnoses a profound loss of historical context with the rise in scale to the global imaginary. This is important because the Anthropocene's power as a boundary object is

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[555] Steffen *et al* 2007, p. 618.
[556] Steffen *et al* 2007; p. 615.

manifest in the thousands of academic publications across disciplines of thought modulating their authority by appending the words '…in the Anthropocene' to their title.

The first major current of thought that I want to draw into conversation here is post-colonial history, both to bring Chakrabarty's theses on the Anthropocene into context and to begin working out how his nested, simultaneous image of the human can contribute to the debates on development and modernity in the Anthropocene approached above through environmental political theory, resilience theory, and political ecology. The main way this analysis is relevant is that political ecology, like post-colonial history, rejects developmental hierarchies as a prerequisite for understanding the relation between global power and local life. Post-colonial history is concerned with how colonial power is still instantiated in the culture and politics of post-colonial societies. Because of the centrality of colonial 'scientific management' regimes to damaging extractive projects, post-colonial theory is both highly sensitive to how the 'scientific' nature of those systems concealed the exploitative motives behind its deployment and how the legacy of these strategies continues to affect how individuals think about nature and themselves.

In an article from 2006, political theorist Douglas Torgerson claims that post-colonial history presents a similar insight to 'perspectival anthropologist, Eduardo Viveiros de Castro's concept of 'multinaturalism,' the conceptual framing of 'many naturalisms.''[557] For Torgerson, this conceptual insight captures the existence of what he calls the 'green public sphere.' His idea is that there is no unified movement that constitutes the green public sphere, just a generalized opposition to industrialism and

[557] Douglas Torgerson, 2006. 'Expanding the green public sphere: Post-colonial connections.' *Environmental Politics*, Vol 15, No. 5, pp. 713-730.

colonialism. For Torgerson, this lack of structure is not a problem—the idea of a green public sphere is based on the exchange of ideas. For him, post-colonial history helps to facilitate this exchange, as theorists like Homi Bhabha and Chakrabarty focus on hybridity rather than opposition, containing the radical otherness of the colonized and producing partial connections and distinct asymmetries which become the basis for further negotiation.

Like many post-1968 thinkers with Marxist backgrounds, Homi Bhabha, an Indian cultural theorist now directing the Mahindra Humanities Center at Harvard, followed non-traditional Marxists like Antonio Gramsci, Herbert Marcuse, Andre Gorz, and Rudolph Bahro in looking for subaltern communities which might hold the seeds of an alternative modernity, looking in particular at migrant workers, asylum seekers, and refugees, i.e. those deprived of the most basic human conditions for flourishing.[558] Tracking the internalization of colonial discourses in 'modern' India, Bhabha was cautious about declaring the novelty which Chakrabarty announces in the Anthropocene. Bhabha says: 'we are in no position to represent what is emergent or 'new' within our contemporary global moment,' and that, poetically, 'the 'new' is only a historic destiny that lives among us like the ghost of the future; slender as a leaf of time turning, a sheet of space folding, inscribed on one side by the past, and the other by the present.'[559]

Although cautious, Bhabha is also determined. In the final thoughts of the 2003 essay on 'Democracy Derealized' (meaning: made 'unfamiliar' and 'unreal'), he lays out the active manifesto that the critical theories of colonialism engendered. His call is,

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[558] Homi Bhabha, 1984. 'Of Mimicry and Man: The Ambivalence of Colonial Discourse.' *October*, Vol. 28. Special Issue on Psychoanalysis, pp. 125-133.
[559] Homi Bhabha, 2003. 'Democracy De-realized.' *Diogenes*, Vol. 50, No. 1, pp. 27-35; p. 30.

essentially, a leveling of developmental hierarchies, a plea to treat the diverse perspectives of the world as part of an unfolding conversation, rather than adjudicate amongst them or dictate their concerns from on high. Seeking an alternative world, for Bhabha, meant also entertaining the possibility that new and novel worlds might need to be constructed. He says:

> We have no option but to be interested in constructing buildings; at the same time, we have no choice but to place, in full view of our buildings, the vision of the Unbuilt—'the foundation of possible buildings', other foundations, other alternative worlds. Perhaps, then, we will not forget to measure Progress from the ground, from other perspectives, other possible foundations, even when we vainly believe that we are, ourselves, standing at the top of the tower.[560]

Such a commitment to 'measure Progress from the ground' with all the diverse and at times contradicting perspectives included, to Bhabha, is the opposite of the monological epistemologies which colonial powers, infused with a sense of their own superiority, had utilized and unceremoniously bequeathed to the new Indian state upon their physical exit. The intuition across post-colonial history is that this physical departure of the colonizing power was only the first step in decolonization—the epistemological and legal structures which the colonial powers created remained as their legacies, preserved by anti-colonial nationalism and former colonial elites.

The ideas Torgerson draws upon, that nature could be perceived in fundamentally different ways and that this difference had major consequences for ideas of development and modernity, was Colombian political ecologist Arturo Escobar's major contribution in the early 1990s.[561] By insisting the 'culture sits in places,' he reconnected territorial and

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[560] Bhabha 2003; p. 35.
[561] Arturo Escobar, 1999. 'After Nature: Steps to an Anti-essentialist Political Ecology.' *Current Anthropology*, Vol. 40, No. 1, February, pp. 1-30.

epistemological issues, placing a post-modern concern with discourse over an empirical foundation of field work in the Colombian Pacific and attention to the politics of conservation and governance which rival interpretations of nature mobilize.[562] Concerned with how different worldviews delivered different results, Escobar questions whether concepts of development are coherent across these different epistemic 'games of truth,' or networks of reinforcing truth claims that make up the basis of individual relations with culture.[563]

Combining Escobar and Bhabha, as Torgerson asks EPT to do, produces provocative results. He claims 'a post-colonial political ecology would draw attention not simply to an objective nature, but to discourses of nature and the ways these have been culturally and historically constituted,' linked together by their plundering of nature, dismissal of local knowledge, and use of ecology as science of empire.[564] It posits that the colonial discourse on scientific vs. indigenous management is played out on in abstract forms through rival definitions of nature, reproducing old tropes in development discourse that assume the 'Third World' is in poverty because it is somehow backward economically and culturally. Not yet an orderly and prosperous modern society, the colonial power, through its 'advanced rationality' and 'modernity,' thus remains in a paternalistic role.

In order for this colonial mentality to flourish, post-colonial history claims, history must be in meaningful ways forgotten by post-colonial subjects, either through

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[562] He is referring directly to Foucault here. See: Arturo Escobar, 2001. 'Culture Sits in Places: reflections on globalism and subaltern strategies of localization.' *Political Geography*, Vol. 20, pp 139-174.
[563] Arturo Escobar, 1992. 'Imagining a Post-Development Era: Critical Thought, Development and Social Movements.' *Social Text*, No. 31032, pp. 20-56.
[564] Torgerson 2006; p. 720.

rejection of national histories for colonial elitism and Eurocentrism, or in the simplified nationalist reactions which preached return to simpler times. In the rest of this section, I work through Chakrabarty's influential four theses on the Anthropocene through the lens of his contributions to post-colonial history, before working out how his concept of simultaneity answers the problems posed by economic globalization and the fading of history. My argument, following Torgerson, is that post-colonial history is 'post-' in a way that is productive for moving *past* growth/anti-growth debates and forward to a more honest debate about what development itself *should* mean. Fikret Berkes' work on co-management and traditional ecological knowledge (TEK) broadly follows this insight—co-management relies on equal valuations of scientific and traditional knowledge.

For both Chakrabarty and Berkes the conversation produced between the two epistemological perspectives is better understood where it is historically and culturally grounded, meaning that it can direct the more rationalistic tools towards culturally-appropriate and ecologically-sound outcomes. As a kind of tonic for over-simplified models resting solely at global or local levels of analysis I will suggest that Chakrabarty's discussion of 'simultaneity' is productive to consider in the context of contemporary debates. What simultaneity means is that no scale at which humans now operate supersedes any other, that individual, cultural, and global identities are three images of the human, simultaneous figures with radically different spatial and temporal horizons.

Globalization and History in the Anthropocene

> My ultimate proposition in this essay is simple: that the current conjuncture of globalization and global warming leaves us with the challenge of having to think of human agency over multiple and incommensurable scales at once. – Dipesh Chakrabarty

Chakrabarty's 2009 reflections on the Anthropocene begin from the now almost-uncontroversial claim, emphasized by the Anthropocene literature, that social and natural systems are entwined in complicated and inseparable ways and the old distinctions between natural and human are no longer tenable. Chakrabarty groups the Anthropocene, with the realization of the drastic possible effects of climate change, with nuclear weapons as a kind of 'negative universal history,' or universalized threat to humans as a species. He claims that 'climate change poses for us the question of a human collectivity, an us, pointing to a figure of the universal that escapes our capacity to experience the world.' This gap 'calls for a global approach to politics without the myth of a global identity, for, unlike a Hegelian universal, it cannot subsume particularities.'[565]

The fragility exposed by climate change, for Chakrabarty unlike Bhabha, was new because the negative universal it generated was non-ideological in a way which Cold War narratives like the ones surrounding 'nuclear winter' in the 1980s could not be. He says:

> Whatever our socioeconomic and technological choices, whatever the rights we wish to celebrate as our freedom, we cannot afford to destabilize conditions (such as the temperature zone in which the planet exists) that work like boundary parameters of human existence. These parameters are independent of capitalism or socialism. They have been stable for much longer than the histories of these institutions and have allowed human beings to become the dominant species on earth. Unfortunately, we have now ourselves become a geological agent disturbing these parametric conditions needed for our own existence.[566]

The 'common but differentiated responsibility' which the non-ideological appeal of climate change produced (enshrined in legal form in international climate treaties), for Chakrabarty, was a result of its unintended genesis—lack of clear agency presents a

[565] Chakrabarty 2009; p. 222.
[566] Chakrabarty 2009; p. 218.

problem for assigning historical responsibility. This threat was amplified by the collapse of old social and natural histories into each other, by the dizzying effect that globalization and climate change introduced to closed ideas of culture and unfettered individualism.

The loss of a specific history is a threat to culture itself, for Chakrabarty, because the global level has no form of meaningful political agency, *it must be mediated* through particular languages and adapted to specific places and historical traditions. Viewing the bitter debates over ecological debt and historical responsibility at the level of global institutions, Chakrabarty asserts that effective forms of political responsibility require a sense of history in direct relation to new understandings of human power to change Earth Systems. Thus Chakrabarty approaches many of the same problematic silences in the Anthropocene literature that Ribot identifies five years later.[567]

In a 2011 piece diagnosing the 'Muddle of Modernity,' Chakrabarty notes how calling one modern puts another in the 'waiting room of history.'[568] His allusion to modernization theory is important still, forty years after the discrediting of structural Marxism. It claims that modernization and modernism as concepts are tainted by the problem Bhabha noted above, the tendency to consider one's own culture the highest representation of progress. This line of research is broadly in line with Chakrabarty's past work because it identifies a tendency in Western historians to use Europe as a 'silent referent' for all Third World studies, that while Western theorists produce universal theories they are largely ignorant of how the majority of the world actually lives. In an influential piece from 1992 he claims:

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[567] Jessie Ribot, 2014. 'Cause and Effect in the Anthropocene: vulnerability and climate in the Anthropocene.' *Journal of Peasant Studies*, Vol. 41, No. 5, pp 667-705.
[568] Dipesh Chakrabarty, 2011. 'The Muddle of Modernity.' *American Historical Review*, Vol. 115, No. 3, June, pp. 663-675.

> For generations now, philosophers and thinkers shaping the nature of social science have produced theories embracing the entirety of humanity. As we well know, these statements have been produced in relative, and sometimes absolute, ignorance of the majority of humankind—i.e. those living in non-Western cultures.[569]

This early work is intentionally biting—he asks 'What allowed the modern European sages to develop such clairvoyance with regard to societies of which they were empirically ignorant? Why cannot we, once again, return their gaze?' What he is recognizing, like Bhabha, is what Nietzsche called in the *Untimely Meditations* the 'epigone problem,' or tendency to put one's own culture at the ideal end point of chronological and theoretical progress. This 'entelechy of universal reason' is clearly evident in Francis Fukuyama's work from the same year and constitutes the basis of a 'transition narrative,' or logic of developmental stages that place industrialized societies at the pinnacle of social (and moral) achievement.

In later work, Chakrabarty remains focused on how systems of thought come to be organized as 'rational' or 'traditional,' and how this Western definition of secular and sacred was grossly inadequate for examining an Indian society which remained spiritual in their everyday lives. He claims, like Bhabha, that enduring binaries persisted after the end of colonialism that coded Western (and thus colonial) knowledge as rational and Hinduism as religious superstition.[570] The evidence of this colonial legacy, for Chakrabarty, lay in the fact that an entire class of 'hyper-modern' Indian intellectuals and bureaucrats had come to fill the old colonial roles with the same patronizing sense of being more developed and advanced than their native brethren.

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[569] Dipesh Chakrabarty, 1992. 'Postcoloniality and the Artifice of History: Who Speaks for 'Indian' Pasts?' *Representations*, No 37, Winter, pp 1-26; p. 3.
[570] Dipesh Chakrabarty, 2002. *Habitations of Modernity: Essays in the Wake of Subaltern Studies*, University of Chicago Press, Chicago; p. 24.

Chakrabarty sees that cultural visions of the universal threat presented by climate change, a 'negative universal,' risk overwhelming the critical reflection necessary for meaningful change. The problem presented by the negative universal is that relative historical responsibility and uneven future suffering is hidden by the novelty and globality of the appeal. Chakrabarty clearly sees contemporary times characterized by globalization and global climate change as qualitatively new, and in this way accepts the Anthropocene framing. The ultimate threat, for Chakrabarty, is that the 'current crisis can precipitate a sense of the present that disconnects the future from the past by putting such a future beyond the grasp of historical sensibility,' or, essentially, the lessons of the past will be lost by claiming that conditions are unsuitable to traditional analyses.[571]

Meditating on Weisman's *World Without Us*, he notes that the sense of the present as wholly new 'has thus become deeply destructive to our general sense of history.'[572] This loss of history represents an existential question for human collectives, it re-organizes identities around the negative universal of the catastrophe, imploring a kind of agency which does not clearly exist, a kind of 'global approach to politics without the myth of a global identity.'[573] Relying solely on global identity, from this perspective, risks leaving responsibility for action to collectives which do not exist in practice, and eventually the projection of that fugitive global agency onto the weather itself. Failing to generate a global response, these externalized bearers of frustrated collective agency, embodied by the weather and natural disasters, appear unruly and selfish.

[571] Chakrabarty 2009; p. 197.
[572] Chakrabarty 2009; p. 198.
[573] Chakrabarty 2009; p. 222.

This kind of thinking, the resignation produced by accepting the scale of the problem without a clear active outlet for addressing it at requisite scale, produces the urge to control the unruly factors which sits at the source of harsh calls for authoritarian checks on population growth, the profligate fatalism of critics waiting for the catastrophe to begin in earnest, and, now, the urge to technologically control the global climate. Concepts like the Anthropocene announce the arrival of new ages as a cause for radical break from history. If we have, indeed, entered another new era, a time of 'Great Acceleration,' as the Anthropocene literature suggests we have, Chakrabarty warns that this designation should not separate the world from its history, that it should be seen as part of the unfolding globalization of world social and ecological systems.

Chakrabarty's work is interesting to consider in the debate over 'green' development because he rejects the distinction between colonial and anti-colonial in a way that fruitfully learns from both, and seeks to create hybrid spaces rather than fortify a rigid half of a modern/non-modern binary passed from the colonial discourse itself. He claims in his contribution to *Habitations:* 'the task is not to reject ideas of democracy, development, or justice. The task is to think of forms and philosophies of history that will contribute to struggles that aim to make the very process of achieving these outcomes as democratic as possible.'[574] Unlike Bruno Latour's spiritual ruminations on the Anthropocene, which begin from the idea that modernity is an unachieved goal of developed and developing societies alike, Chakrabarty is insistent that what Indians had was rather an alternative and hybrid form of modernity. He chides Latour indirectly:

[574] Chakrabarty 2002; p. 33.

‘’modernity still awaits us’—this is the refrain of the hyperrational colonial modern.’[575] Seeing modernity, with its colonial legacies and hubristic universalism, as a clear internalized goal of these ‘colonial moderns,’ Chakrabarty insists that ‘what we had, warts and all, was, indeed, our modernity.’[576]

What he asks for, instead, at the end of the 2002 essay, is ‘an idea of the political that did not require us to imagine totalities.’[577] The Four Theses essay, published seven years later, avoids universalist claims—it purposely stays at the level of partial connection, claiming that ‘we experience specific effects of the crisis but not the whole phenomenon,’ a clear problem given the planetary scale of the climate crisis.[578] Chakrabarty asks the question here that I want to extend directly to the idea of development in several other literatures: he claims that scientists have suggested that we call this period ‘the Anthropocene’ to mark the end of the Holocene that named the geological ‘now’ within which recorded human history so far has unfolded. But, he wonders, who is the ‘we’ of this process? How do we think of this collective human agency in the era of the Anthropocene?’

History and Simultaneity: Degrowth or Post-Growth Politics?

> We write of pasts through the mediation of the experience of humans of the past. – Dipesh Chakrabarty

Post-colonial history is thus an important starting point in the search for cultural and institutional renewal or the more extreme task of identifying the components to build a new worldview. Where radical EPT and other political and economic thought

[575] Chakrabarty 2002; p. 28.
[576] Chakrabarty 2002; p. 28.
[577] Chakrabarty 2002; p. 35.
[578] Chakrabarty 2009; p. 221.

considering ecological crisis often stress the qualitatively new ecological challenges faced in contemporary times as a call for major social and political change, post-colonial history returns to history to ask uncomfortable questions for Western green theorists about historical responsibility, existing inequality, and blanket assumptions of universality buried in 'developed' narratives on environmental conservation—essentially, about the unspoken assumptions of the relationship between economic development and the environment that underlie the 'developed' consensus.

Analyzing the renaming of the geologic age from the perspective of a subaltern studies historian, Chakrabarty is particularly lucid in his critique, showing his experience as a scholar long-entangled in debates about the way the 'developed' world appears to speak for the entire world without any actual reference to those places. A founder of the influential Subaltern Studies collective with Gayatri Spivak and other influential Indian historians and theorists, Chakrabarty's perspective is particularly interesting for those hoping to gain specificity to counteract the universal threat utilized by many today in debates over climate change.

The danger for research programs like the Anthropocene dialogue is that reliance on catastrophic imagery, justified to create urgent response to unpredictable future events, can reify human categories which are at the root of the problem and must be critically appraised for a genuine long-term answer to be generated. Reading this challenge through the lens of historians like Chakrabarty, I want to insist that this also requires a kind of humility on the part of academics and activists in 'developed' societies regarding possible sources of lessons, a demanding level of critical attention to one's own culture, and a receptive openness to the examples of the historical and also-modern

experiences of other places in the world. In the rest of what follows I want to pursue several different strategies and lines of academic thought which seek to do exactly this: expand the sources of historical and geographic perspectives active in the discussions about the shape of modernity in the future.

In a paper from *New Literary History* in 2012, Chakrabarty addressed postcolonial studies directly to the challenge of climate change, beginning from the assumption that the dual (and linked) processes of globalization and global climate change present a unique challenge to imagine human agency as multiple, both species, individual, and collective. That these scales are incommensurable Chakrabarty assumes as well. Nevertheless, he insists:

> These views of the human do not supersede one another. One cannot put them along a continuum of progress. No one view is rendered invalid by the presence of others. They are simply disjunctive.[579]

Chakrabarty, lamenting 'fruitless' debates throughout the 1990s between cultural relativists and individualists, claims that the challenge of global climate change reveals each is only a partial image of the many scales at which humans now act. Because of this, 'any effort to contemplate the human condition today—after colonialism, globalization, and global warming—encounters the necessity of thinking disjunctively about the human, through moves that in their simultaneity appear contradictory.[580]

Responding to the impossibility of experiencing one's individual self as a geophysical force, he asserts that humans also now understand it and must work to translate it into meaningful cultural terms that nest individual and cultural approaches in a

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[579] Dipesh Chakrabarty, 2012. 'Postcolonial Studies and the Challenge of Climate Change.' *New Literary History*, Vol. 43 No. 1 Winter, pp. 1-18; p. 2.
[580] Chakrabarty 2012; p. 2.

shared enterprise. He wants both universal human rights and contextual readings of the subject common to cultural theory because he believes that each is necessary. The processes of economic globalization complicate this picture more—Chakrabarty thinks we need to 'negotiate our attachments,'[581] knowing that the global effects will be mediated through the power and inequity that already exists in the world.

Chakrabarty claims that the need for effective agency is more akin to the need to reimagine the human itself at different levels, *simultaneously*. Knowing that an age of change and potentially social struggle awaits, he insists on utilizing all forms of alternative discourse possible, that 'the need arises to view the human simultaneously on contradictory registers: as a geophysical force and as a political agent, as a bearer of rights and as author of actions; subject to both the stochastic forces of nature (being itself one such force collectively) and open to the contingency of individual human experience; belonging at once to differently-scaled histories of the planet, of life and species, and of human societies.'[582]

Keeping in mind the many layers of potential agency in which individuals, communities, regions, nations, continents, and international levels interact, Chakrabarty's contribution is to re-connect themes of globalization to global warming, to historically analyze the supposedly 'new' era, and to extend the critiques of development and modernity pursued in post-colonial studies to the catastrophic images of Alan Weisman and the Anthropocene literature. Coming from a training in history, he focuses in on the universal appeal wielded by ecological crisis narratives and rather than choosing one

[581] Chakrabarty 2012; p. 13.
[582] Chakrabarty 2012; p. 14.

level as the 'most appropriate' (one would guess culture given his training), he insists instead on simultaneously embracing the universalist rights bearing citizen, the culture of anthropological difference, and the global image of anthropogenic climate change, warning against the privileging of one over the other as well as the combining or collapsing of categories. Humans, for Chakrabarty, are simultaneously all three.

III. Critical Challenges of Environmental Politics

> The discourse of post-Enlightenment English colonialism often speaks in a tongue that is forked, not false. If colonialism takes power in the name of history, it repeatedly exercises its authority through the figures of farce. – Homi Bhabha

The global and uneven nature of climate change increasingly serves as a kind of rhetorical glue for those interested in cultivating broad appeal. Winning the Nobel Prize for his work on atmospheric ozone depletion, the coiner of the Anthropocene term, Paul Crutzen, has a long history of approaching big problems. His PhD dissertation analyzed the effects of supersonic travel on the chemistry of the atmosphere, and was hotly opposed by advocates of the Concorde program. His transition from work on the ozone layer to climate politics and the increasingly popular Anthropocene research program is testament to the will to apply his specific expertise to matters of global importance.

The universal appeal he courts through global ecological crisis is powerful, but my argument here is that it also exposes the need for specific context in order to understand to avoid paralyzing the same people it seeks to activate. This is because, as the Anthropocene announces, there are distinct opportunities and challenges to our contemporary era. The traditional green focus on disseminating information should be greatly enhanced in efficacy in an era of instant communication, but is now running into

the problem that the methods and form of the Anthropocene message, being both technical and global in nature, are often so overwhelming that the message inspires passive rather than active acceptance.

It is telling in this respect that many scholars drawn to climate change began their engagement by seeking to spread information, but, in the face of continued inaction, have reassessed their communication strategies and moved to narrativizing the information to give it a practical resonance at the scale of everyday life. For example, Naomi Oreskes, cited admirably by Chakrabarty and by Al Gore, became famous for the traditional information strategy.[583] Her book with Eric Conway, *Merchants of Doubt* (2007), traced the careers of many high profile climate change deniers to the campaigns to suppress knowledge of the deleterious health effects of cigarettes and served as a potent rejoinder to denialist tactics aimed at slowing comprehension of climate trends by claiming 'the science is still out.'[584] A science studies scholar originally trained in geology, Oreskes looked at climate change denial tactics and devised a simple measure for the number of dissenting climate scientists who had undertaken the study of global climate change.

The number in the consensus that she generated, 97%, is instructive because it allowed people to see past the media representations of two even sides of scientists in the interest of 'neutrality.' It is interesting in this respect that recently, rather than debating scientific certainty, Oreskes and Conway's new book on climate change signals that fighting sources of false doubt might no longer be as important as activating those who accept the possibility of catastrophic climate change to act to prevent it.

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[583] Chakrabarty 2009 and Gore 2006 *An Inconvenient Truth*, respectively.
[584] Naomi Oreskes, 2007. 'The scientific consensus on climate change: How do we know we're not wrong?' *Climate Change: What it Means for Us, Our Children, and Our Grandchildren*, Ed. Joseph Dimento and Pamela Doughtman, MIT Press, pp. 65-99.

Rather than sociology of science, *The Collapse of Western Civilization: A View from the Future* (2014) is an apocalyptic narrativization of the possible effects of global warming.[585] It is a stark contrast to their own work, more like the catastrophic memoirs of disenchanted scientists, whether the grandfatherly recommendations of nuclear energy in NASA climate scientist James Hansen's *Storms of my Grandchildren*,[586] or the more dystopic rumblings of chemist James Lovelock, who followed the Hurricane Katrina catastrophe with a huge full color satellite photo of the Hurricane on the cover of his book *The Revenge of Gaia*.[587]

Lovelock, a self-described 'maverick' scientist, is the creator of the Gaia hypothesis, which treats the biosphere as a self-maintaining system (and therefore 'alive,' if not conscious in the individual way humans imagine it). By 2006, this holistic view had persuaded him that only visions of a ruined future would be powerful enough to pierce the normal habits of most people. For Lovelock, inevitability has been given form by the idea that Gaia herself considers humans a cancer, which meant a drastic decline in human populations was not only necessary, but inevitable and already underway. By locating the catastrophe in the present, Lovelock externalizes the agency of the disaster, attempting to place it beyond the ingenuous technology of human ingenuity or changing trends of political regulation, as a problem to be adapted to rather than mitigated.

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[585] Erik Conway and Naomi Oreskes, 2014. *The Collapse of Western Civilization: A View from the Future*. Columbia University Press, NY.
[586] James Hanson, 2010. *Storms of My Grandchildren: The truth about the coming climate catastrophe and our last chance to save humanity*. Bloomsbury, NY.
[587] James Lovelock, 2006. *The Revenge of Gaia: Earth's Climate in Crisis and the Fate of Humanity*. Basic, NY.

Lovelock insists instead on 'sustainable retreat,' and breaks from many by recommending forms of large scale geoengineering, rejecting wind and solar power for nuclear energy, and proposing the spread of nuclear waste as a conservation measure.[588] It is from the dystopic world imagined by theorists like Lovelock that Conway and Oreskes begin in their *Collapse of Western Civilization*. The shift from defining the problem to narrativizing its consequences is clear here, and resonates with the frustration of many social theorists approaching climate change. Crises are seen as a way to pierce the post-political age and begin a new kind of active politics which resists the resignation that we've reached the end of history.

The 'piercing' effect of catastrophic urgency, however, is less useful where crisis appears inevitable or unaffected by human agency. This is Lovelock's position, echoing the concepts of tragedy and resignation activated by influential survivalist commentators in the 1970s. Writing in 2009, he claims in *The Vanishing Face of Gaia* that it is already too late, and that this tardiness would expose humans to a drastic population reduction and return to pre-industrial lifestyles. He begins, like Oreskes, discussing smoking:

> To expect sustainable development or a trust in business as usual to be viable policies is like expecting a lung cancer victim to be cured by stopping smoking; both measures deny the existence of the Earth's disease, the fever brought on by a plague of people.[589]

The underlying problem, the cancer in the smoking metaphor, has already taken control by the time the smoker stops (smoking cessation is his metaphor for sustainable development). Complementing this halt in emissions, following the metaphor, humans

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[588] Lovelock 2006. The idea here is ensuring the absence of humans. The effects on other living things, he thinks, will be (on average) less than the human impact, and may encourage rapid adaptation.
[589] James Lovelock, 2009. *The Vanishing Face of Gaia: A Final Warning*. Basic, NY; p. 3.

will still have to live with the cancer of warming, sea level rise, and species loss, and may have to take on enormous sacrifices to survive it.

Sustainable development, or smoking cessation, still depends, for Lovelock, on a privileged human sense of superiority to the natural world, an attitude which he spreads evenly over the entire species in an ahistorical and over-general way. He sees all human systems as marked by 'humanism,' an anthropocentric priority of human survival which licenses natural degradation and increasing material exploitation. This trend, for Lovelock, continues in 'sustainable development':

> Despite their difference, they come from religious and humanist beliefs which regard the Earth as there to be exploited for the good of humankind. When there were only one billion of us in 1800, these ignorant policies were acceptable because they caused little harm. Now, they travel two different roads that will soon merge into a rocky path to a Stone Age existence on an ailing planet, one where few of us survive among the wreckages of our once biodiverse Earth.[590]

Lovelock, turning the smoking metaphor on its head, is actually insisting that *humans* are the cancer, that the species is a plague that causes a 'fever' or global warming. He insists that Gaia, the self-regulating earth system itself which he famously posited with Lynn Margulis in 1973, [591] is not going to die, but instead would drive human populations down to a 'sustainable' 1 billion or less. His idea of the catastrophic future is figured with images of the economic other. As he says, with all the colonial undertones of a regression to primitive ways of life, that 'what we need is sustainable retreat.'[592]

The End of History and Global Development

[590] Lovelock 2009; p. 3.
[591] James Lovelock and Lynn Margulis, 1973. 'Atmospheric homeostasis by and for the biosphere: the gaia hypothesis.' *Tellus*, Vol. 26, pp. 1-2.
[592] Lovelock 2009; p. 7.

> The postmodernist professor who asserts that there is no coherent direction to history would most likely never contemplate leaving his comfortable surroundings in Paris, New Haven, or Irvine, and move to Somalia, or raise his children under the hygienic conditions prevailing in Burundi, or teach postmodernist philosophy in Teheran. – Francis Fukuyama

The epigraph above expresses in its ultimate essence the resentful reaction shown by market liberals to the attempts to expand perspectives, respect value pluralism, and, in the end, reject traditional concepts of economic development. Fukuyama's quote is almost hilarious, in a way—he makes any critic who lives in a 'developed' country appear to be biting the hand that feeds, free-riding off the benefits of wealth, unwilling to make sacrifices to make it different. I personally have had the same argument raised when asking about the safety of climate geoengineering. Responding to my assertion that other kinds of development were possible that did not create planetary risks, a modernist critic replied, 'if Bolivia is so nice, why don't you live there?' and then pointed a finger at the audience and angrily told them they were hurting poor people.

The irony of this kind of argument is baked into the epigraph above. Fukuyama, who himself is an American who does not speak Japanese, rails against 'postmodernist professors' in comfortable settings criticizing progress while utilizing the fruits of technological society. Of course, Michel Foucault, the central figure of post-modernist thought, actually taught in the 'Third World,' and, with hilarious specificity, for a time in Tehran. This lack of specificity is both comically ignorant and intentionally misleading. It follows from Fukuyama's certainty that liberal democracy is, while imperfect, the only ethical political option, an insight he applies with an universal brush indifferent to cultural context or path dependent histories. This, in turn, follows from his mentor Samuel Huntington's assertion that modernization, built on scientific advance, proceeds

in a set of uniform stages on which societies could be ranked, and which, in certain stages, required considerable sacrifices of environmental and labor rights to fully 'modernize' into a Western democracy.[593]

Following this logic, Fukuyama made the case in his 1989 article and 1992 book 'The End of History' that modernization was, 'industry + reason.' What he meant was that development into a 'modern' nation depended on societies passing through a painful period of transition characterized by Huntington's common stages, that 'the unfolding of modern natural science has had a uniform effect on all societies that have experienced it.' These effects are, chiefly, military advantage and expanded desires enabled by greater and more efficient accumulation of wealth, a cultural change enabled by technology, and which, for them, guaranteed some level of homogeneity across cases, a 'uniform horizon of economic production possibilities.'[594] He concludes, strongly, that:

> All countries undergoing economic modernization must increasingly resemble one another: they must unify nationally on the basis of a centralized state, urbanize, replace traditional forms of social organization like tribe, sect, and family with economically rational ones based on function and efficiency, and provide for the universal education of their citizens.[595]

Fukuyama, like Huntington, linked progress of scientific reason to social progress, and considered scientific rationalism to be both universal *and* distinctly a product of the Western scientific and philosophical traditions. He contended that any rejection of technology at a national or society-wide level would entail deindustrialization that would turn 'Europe, America, or Japan' into 'an impoverished Third World country.'

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[593] Samuel Huntington, 1968. *Political Order in Changing Societies.* Yale University Press. New Haven.
[594] Francis Fukuyama, 1992. *The End of History and the Last Man*, The Free Press, NY; p. xiv.
[595] Fukuyama 1992; p. xiv.

Any reversal of progressive momentum, for Fukuyama, threatened regression in terms of historical development—as he claims 'rather than freeing man from the cycle of new wants, most people would become reacquainted with the life of a poor peasant tied to the land in an unending cycle of backbreaking labor.'[596] His contempt for these conditions, the 'unending cycle of backbreaking labor,' and warning to other 'developed' societies not to return to it, contains an unguarded sense that ecological health was a benefit of working hard and succeeding, that, in particularly abrasive language from the perspective of the 'developing' majority of the world:

> A healthy environment is a luxury best afforded by those with wealth and economic dynamism; the worst environmental offenders, whether in the disposal of toxic wastes or deforestation of tropical rain forests, are developing countries that feel their relative poverty does not give them any option but to exploit their own natural resources, or that do not have the social discipline to enforce environmental laws.[597]

Fukuyama would later claim, perhaps to deflect accusations of blatant bigotry, that his contention was split into both 'empirical and normative accounts,' and that the end of history was not a description of the world but rather 'a normative argument concerning the justice or adequacy of liberal democratic political institutions,' which, itself, was linked to empirical evidence.[598] That this empirical evidence is slim compared to the sweeping philosophical claims made by Fukuyama does not really concern him.

In a footnote on the next page, he drops a telling caveat on normative theory, that he does not like the term because 'it implies that there is a multiplicity of 'norms' or 'values' among different societies, or within the same society, about which there can be

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[596] Fukuyama 1992; p. 85.
[597] Fukuyama 1992; p. 86.
[598] Francis Fukuyama, 1995. 'Reflections on the end of history, five years later.' *History and Theory*, Vol. 34, No. 2, May, pp. 27-43; p. 27.

no rational consensus and no rational discourse.' This straw man he opposed to 'empirical' facts, 'about which consensus can, through application of proper method, be reached.'[599] Rational discourse, the operative normative term concealed by his insistence on the empirical proof of his argument, is the measure by which he weighs the empirical reality of counter-arguments. Whatever their differences, all societies, by this logic, are subject to four common experiences of technological modernization: urbanization, rationalized authority, bureaucratization, and an ever more complex division of labor.

While he follows classic definitions from Weber and others in his formulation, Fukuyama's insistence on an end to History and implicit assumption of scientific perfectability underlying the possibility of infinite growth, are distinctly un-Weberian. In the 'End of History' Fukuyama is not declaring the end of day to day strife, but rather the exhaustion of political alternatives elevating liberal democracy and markets to dominance. The end of the Cold War and the ideological collapse of communism, for Fukuyama, was a watershed moment where an idea became unopposed, a kind of perfect *zeitgeist* that offered the possibility of a world of free individuals freely choosing to act in accordance with universal maxims, the so-called 'Germanic Age' of Hegel's *Philosophy of History*, mixed by Fukuyama with Kantian *pax Americana*.

Despite his contentions that his theory is both normative and empirical, the fact that such a world does not exist does not actually trouble Fukuyama. His model was never really about history at all, but about getting all human effort rationally aligned to work for a future where people will have the material comfort and security of law to

[599] Footnote 2 on 27. As noted by Derrida and others, the footnotes are often the most interesting parts of such theories.

begin caring about more *luxurious* things, chief amongst them the environment. Responding to Fukuyama's bold statement and fierce responses to criticism, many established social thinkers have bristled at the thought that History, even in an abstract sense, had somehow come to an end when the world agreed together on liberal market principles and democratic elections. Fukuyama has thus been attacked, in part because of his high profile and the easy target his theoretically-light work represented, but also because the sense of such an ending was emergent in 'developed' cultures.

As Slavoj Zizek notes in his polemical *Nature and its Discontents* essay from 2008, 'it is easy to make fun of Fukuyama's notion of the End of History, but the majority today is 'Fukuyamian': liberal-democratic capitalism is accepted as the finally-found formula of the best possible society; all one can do is to render it more just, tolerant, etc.'[600] Zizek, like the other strands of research considered seriously here, wants to refocus on the assumption that liberal capitalist ideology is now forever ascendant. Instead, he claims that 'the only true question today is: do we endorse this 'naturalization' of capitalism, or does today's global capitalism contain strong enough antagonisms that will prevent its indefinite reproduction?'[601]

Zizek identifies several contemporary problems for such a 'naturalized capitalism,' including ecological limits, challenges to private property by digital technology, consequences of large-scale techno-scientific progress, and the related production of walls and expansion of slums worldwide. In this essay he is especially focused on the urban populations of the Earth, living in informal slums and working in

[600] Slavoj Zizek, 2008. 'Nature and its Discontents.' *SubStance*, Vol. 37, No. 3, pp. 37-72; p. 37.
[601] Zizek 2008; p. 37.

alternative markets, lacking access to the safety of 'modernity' lauded by Fukuyama—access to health care, clean water, secure living space, and work with dignity.[602] For Zizek, 'they are the true 'symptom' of slogans like 'Development,' 'Modernization,' and 'World Market': not an unfortunate accident, but a necessary product of the innermost logic of global capitalism.'[603] Specifically, Zizek connected this migration to the global food industry, who used better technology, government subsidies, and structural adjustment plans to open new markets for themselves and drive traditional forms of agriculture to extinction.

In regards to ecology, Zizek acknowledged the radical changes currently underway, claiming that history, which had once been the source of wisdom for intervention, was now being threatened by the progress of reason, what Gunther Anders elsewhere called 'the double-death' of the human species, both physical and temporal. Zizek, echoing Anders, claims: 'no longer can we rely on the safeguarding role of the limited scope of our acts: it no longer holds that, whatever we do, history will go on.'[604] Instead, now humans face the possibility of self-extinction, whether purposeful or unintentional, a product of nuclear war or an unintended change due to economic growth.

Fukuyama himself acknowledged that environmental catastrophes, along with biogenetics and nuclear war, could end the consensus on the End of History, but believed that it could do so only by regressing back to a kind of feudal localism without modern amenities or political rights. In parentheses after naming nukes and biowar as potential threats, he inserts 'an ecological catastrophe such as the melting of the ice caps or the

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[602] See also: Mike Davis, 2006. *Planet of Slums*. Verso, NY.
[603] Zizek 2008; p. 40.
[604] Zizek 2008; p. 38.

desertification of North America and Europe through global warming could lead to a similar effort to control the scientific inventions that led to the disaster.'[605] When I asked him about how the acceptance of the Anthropocene challenged this caveat at the Annual Meeting of the American Political Science Association in 2015, he refused the link and pointed to the great progress made since the 19th century as evidence that Western liberalism was an appropriate goal for 'developing' societies even in the Anthropocene.

In this chapter I am trying to avoid this over-generalization and make a concentrated effort to show what this indictment of Western progress and development means for the non-Western, or 'developing' world. This struggle takes form as an imperative to reassert and reinterpret traditions which do not have the Western consumer lifestyle and permanent growth as their end goal. This is important because the challenge of development in the 'developing' world may be decisive, both because the West may not be able to change habits before everything dies, and because the bulk of the remaining natural capital lies in countries which still are seeking the level of comfort and distance from necessity achieved (at their expense?) in the 'developed' world.

EPT in the Anthropocene

To call all human beings geological agents is to scale up our imagination of the human. – Dipesh Charkrabarty

Environmental political theory (EPT) is, in a variety of more specific forms, often an effort to gain a sort of universal appeal, to harness the growing awareness of global climate change, bleaching coral, mass extinctions, deforestation, ocean acidification, nuclear waste, etc, into a coherent set of symptoms. This is what Andrew Dobson means

[605] Fukuyama 1995; p. 87. Again, that this is in parentheses is interesting of itself in the Derridean sense.

when he claims that ‘ecologism’ is a kind of ideology—it is a system of thought organized around the sense of urgency produced by the realization that the direct opposition of human freedom against natural necessity, which drove Western science to a greater instrumental efficiency in delivering the vital needs of some people, may also have effects we did not foresee.

Radical forms of EPT do not accept the Hegelian argument putting liberal, market oriented societies at the pinnacle of historical development for the same reasons that Zizek and Fukuyama himself took exception to the End of History argument: the scarcity of raw materials necessary for growth and the proper functioning of ecological systems for preserving vital services relied on for human survival. This rejection, in EPT, largely comes from within the Western tradition itself, whether by attempting to revalue economic concepts of ‘growth’ or by rejecting the focus on growth altogether to examine underlying concepts of ‘rationality’ and ‘reason’ which enable and justify ecological degradation on a planetary scale. The three principal agents of political theory, individuals, markets and states, are often debated based on relative merit for delivering on or both of two outcomes: cultural or institutional change.

EPT, through its many variations, is thus largely concerned with the relative urgency of such cultural or institutional challenges, i.e. how and where to spend limited energy to create both urgent and long-lasting political and economic change. This includes the sequence and timing of institutional and cultural efforts, often weighing the importance of the three major agents against each other in a zero-sum way. More importantly, radical strains insists on the expansion of perspectives within the debate and at the level of policy-making. This has produced a set of rival theories with different

kinds of institutional prescriptions, from authoritarian technocracy, neoliberal markets, anarchist communes, and different forms of democratic institutions.[606] All contain assumptions about the proper scale of ecological politics, the efficacy of communities to solve their own problems, and the inevitability of global change.

In an era of globalization, these critiques have spread and combined in geographically- and historically-promiscuous way, which should draw them into productive conversation (and productive conflict) with other traditions of thought. One concept that should transition to the interdisciplinary canon is 'remoteness,' a catch-all concept theorized by Val Plumwood for identifying and reducing a wide range of epistemic, consequential, historical, and geographic distances.[607] This idea is useful for understanding the targets of collective change—it insists on the extension of debate to a wider range of perspectives, which, for Plumwood and many EPT scholars, includes both the variety of cultural interpretations of progress and the tangled agencies of the natural world itself so poorly represented in both liberal and Marxist development theories. Remoteness presents an 'environmental crisis of reason' for Plumwood, i.e. it organizes together a series of discursive and material challenges of the modern globalized world sitting at the end of Fukuyama's universalizing progressive history.

Plumwood considers the contemporary neoliberal era, both constituting and implicated in the Great Acceleration of the Anthropocene theorists, as the most historically-remote, *en marché* to an ever-more-perfect distance culminating in fantasies of total detachment and historical exhaustion. Understanding humans as ecologically

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[606] The best summaries are Dryzek 1997 and Dobson 1991.
[607] Val Plumwood, 2002. *The Ecological Crisis of Reason*. Routledge, NY.

embedded, she sees this remoteness as pathological, both obscuring evidence of mounting degradation and muddling ethical responsibilities to human and non-human others revealed by the crisis. Her critique is a philosophical attack on modernity, but also carries institutional concerns, primarily the need to rupture pathological distances obscuring material commodity chains and ethical considerations like justice for those in the 'developing' world who must experience the changing ecological conditions alongside the historically responsible in the less vulnerable 'developed' world. Her vision of the future is laced with decentralist and democratic ideals, as well as an abiding respect for human and nonhuman agency obviously lacking in contemporary development arguments.

EPT identifies institutional and cultural tasks for adaptation to global ecological crises, with little agreement on the sequence or priority of their accomplishment. Those who argue for institutional change largely focus on re-inscribing the national policy arena with environmental welfare concerns and strengthening regulations and conservation measures. Those arguing for cultural change recognize that the institutional task is part of a larger effort to change the habits of everyday life as well as well as more abstract ideas like development, modernity, and progress that guide the goals and processes of those more mundane rhythms. Remoteness amalgamates these cultural and economic arguments in a project to expand the concept of reason to consider the agency of human and non-human others.

This project is often conceived as an attack on Western modernity itself, when actually it is an attempt to immanently reconfigure the goals of progress without abandoning reason itself, to move to a post-growth rather than anti-technology or anti-

growth stance. This task relies, however, on external sources of inspiration, and could be more self-reflective if it included more perspectives, embraced the social-ecology of real places, and began thinking in less sequential and zero-sum ways about the kinds of scales and agents it considers. EPT, however, at times sees the local, national, and global in a strict trade-off, similarly to how many argue the relative merits of state, market, or community for delivering positive policy outcomes. The insistence of the greater argument here is that these reductionist metaphors need to be replaced by nested and simultaneous versions, and that these ideas directly address the variety of material, epistemic, and institutional pathologies grouped together under Plumwood's concept of remoteness.

In the rest of this chapter I analyze several lines of thought which appear to have valuable contributions to this process, including the distinction between ecological resilience and preparedness doctrines, the rejection of developmental teleologies in political ecology, and the movement beyond colonialism proposed by post-colonial history. While EPT can be institutionally and ideologically promiscuous, the dominant historical strand has attacked the ideas of growth and development underlying Western theories of progress, and, following from Critical Theory, technocratic forms of rationality itself.[608] Usually a critique immanent to 'developed' contexts, rival interpretations of the possibility for cultural transformation have often dictated the resulting institutional and activist prescriptions, whether in profoundly pessimistic terms in authoritarian arguments, or in the optimistic terms of local deliberative democracy.

[608] This is true in both authoritarian and democratic forms, as EPT is concerned with measures of economic growth that underpin all kinds of 'modern' political ideologies.

EPT's dominant democratic strand sees the need for cultural transformation as a challenge to radically pluralize institutional representation and reembed individuals In their ecological contexts. The debate, however, is often characterized by the relative prevalence of traditional actors like the state, markets, or local communities confronting global problems, components which are placed in a zero-sum rather than a complex interrelationship. This reductionism produces a simplistic choice between growth and degrowth that draws in unproductive debates about economics and conservation, so exquisitely utilized by Oreskes' 'merchants of doubt,' rather than deliberating and collectively enacting an alternative future of good living that can redefine modernity in the Anthropocene, as concepts like degrowth and *buen vivir* (which I discuss later in this chapter) claim to be doing. The trickiness of this idea lies how to decide who was responsible for something as diffuse as climate change, and even if we can figure this out, what sort of action this demands. Are we to punish for something no one in 1850 had any idea was happening? Are those especially vulnerable (poor, urban, island nations, low sea level, etc) due some compensation? Should they pay us, as Coase suggested?[609]

While EPT can clearly be modulated based on ideology, contemporary accounts, regardless of political intuitions, have converged on a set of nested models to represent the interactions between local and global levels as well as those between human and natural systems, reflecting the influence of complex systems theory and impatience with reductionist scalar debates between anarchists and green state advocates, as well as ideological conflict between liberals, socialists, and authoritarians. This nested, network

[609] Coase famously remarked that if pollution was bad enough the price would rise until someone was willing to fix it, effectively saying that downstream polluted communities should pay the upstream polluters to internalize their wastes or fund a technological solution. See: Ronald Coase, 1960. 'The Problem of Social Cost.' *Journal of Law and Economics,* October.

metaphor, however, does not eliminate politics—even in systems dominated by subsidiarity, or the principle that government functions should be carried out by the most local form possible, there remains debate over which levels are the most important in regards to limited funding, relationships with the market and globalization, and the emergence of global institutions to match planetary scale ecological problems.

The difficulty which presents itself to EPT and other social-ecological research programs is that accepting the Anthropocene means that the 'developing' world cannot follow the path laid for it by international monetary institutions, development NGOs, and the Washington Consensus, which, even granting them good intentions (not a simple assumption), privilege growth through extraction and conversion of natural resources which is not globally sustainable. To this point, historian JR McNeill, coauthor on many of the initial Anthropocene publications, quotes Gandhi, who, reflecting on 'modernization' in India said: 'God forbid that India should ever take to industrialism after the manner of the West. […] If an entire nation of 300 million [this was in 1928] took similar economic exploitation, it would strip the world bare like locusts.'[610]

Political alternatives, however, have rarely entertained the thought that the developing world should not 'develop.' This controversial word packs a very different punch depending on the implied goal of that development. If, as Gandhi noted, the developing cannot become developed in the image of the industrial West without endangering the collective source of vital ecological services, the question becomes whether to abandon development (industrialization and consumption) or to redefine what

[610] JR McNeill, 2000. *Something New Under the Sun: an Environmental History of the Twentieth Century World.* Norton, NY; p. 330.

it means to be developed, i.e. begin shaping theories of noneconomic flourishing. The rest of the world does not do this alone, and the isolation and stubbornness of US politics only increases the perception that green laws are a form of colonialism.

Adding intellectual resources to EPT, I'm arguing, is important. The insistence that the Anthropocene is here, that the new age has already begun, is a claim about the timelines of the reaction which cannot afford time-consuming critical reflection. Questions go unanswered: Is the American way of life still the metaphorical end point of teleological histories? Is the struggle in the developing world one of bounce-back or of transformation? How does this affect the perceived trajectories of those in the 'developing' world?

IV. Political Ecology: Scale and Materiality

> Today, it is precisely the 'survival of the species' on a 'world-wide scale' that is largely in question. All progressive political thought, including postcolonial criticism, will have to register this profound change in the human condition. – Dipesh Chakrabarty

Part of the problematic gap between knowledge and action which drove Oreskes and Lovelock alike to catastrophic imagery has been the relative inability (or unwillingness) of 'developed' societies to consider the experience of 'developing' societies dealing with global change, and, importantly, to recognize their historical and current responsibility for that change. In the context of both triumphant liberal modernism and romantic ecological catastrophism (i.e. pro and anti growth stances), the stakes of debate over terms like 'development' and 'modernity' has both taken on global proportions and, at the same time, remained surprisingly narrow in the official development institutions and academia.

The Washington Consensus so charmingly presented in philosophical form by Fukuyama at the end of the Cold War had been that liberal institutions, democratic elections, and free markets were the ticket to enhanced economic growth, which in turn carried a bundle of normative goods like enhanced participation, lowered crime, and, even, environmental protection. The logic was that there was a kind of tipping point of per capita wealth where social problems became manageable, all based on the presumed History Ending success of US democratic institutions and liberal capitalist ideology.

From the perspective of researchers in the global South, the idea that environmental protection (as well as labor laws and better governance) would come with relative affluence was also the central spirit behind trade liberalization and rejection of state-led modernization programs which had dominated the 1960s and 70s in the post-colonial world. Again, the argument was accepted without real empirical evidence that economic growth, properly secured with property rights, would provide the resources for addressing all other social ails, including those related to environmental health, conservation, and natural resource extraction. Considerations of Fukuyama- or Huntington-style development became the backbone of the neoliberal consensus in the early 1990s, spread through the world through structural adjustment programs.

Political ecology and ecological economics directly contest this idea that there is a coherent and universal path to modernity, specifically through repudiation of the 'post-material hypothesis,' or idea that modernization and economic growth were necessary to begin caring for 'post-material' or luxury values like the environment. The basic insight of the neoliberal 'green growth' logic was captured in the mid 90s and early 2000s by

Martinez-Alier and fellow resource geographers and ecological economists: the logic is 'developing' societies are 'too poor to be green.'

First coined in the 1970s by Eric Wolf, political ecology was adapted by geographers and cultural anthropologists interested in natural resource extraction. This current of thought drew on dependency theory, or the extension of Marxist world systems theory (*a la* Wallerstein) to explicitly consider the production of raw materials on the periphery. This was a key target of post-1968 Marxists seeking alternatives and new iterations of classes with universal interests. The 'post-material hypothesis' claimed that when societies became middle class and removed themselves from the struggle for day to day survival they would begin protecting nature for its own sake. This idea is naïve and rightfully unsettling to popular environmental movements in 'developing' countries.

Political ecologists (in the initial phase really political economists of natural resources) saw through the environmental issues that affected poor communities that the alleged 'post-materiality' of 'developed' economies was only possible through expanding resource extraction, suspension of labor rights, and wholesale ecological degradation in the 'remote' peripheries. Like Plumwood, political ecologists of the first wave were focused on how the effects of consumption were hidden from consumers in the 'developed' world. EPT does this immanently in the 'developed' world through a shock campaign of information dissemination and quest to awaken democratic concern. In the 'developing' context, often characterized by weak national institutions and low state capacity coupled with major foreign debt, the evidence of environmental degradation is paradoxically everywhere, in plain sight, unhidden and also unsought.

Originally, these theories followed quite directly from dependency theory and world systems theory, forms of structural Marxism. World systems theorist Emmanuel Wallerstein believed the new core-periphery in the neoliberal era was built around access to complex technology.[611] This was, in part, a reaction to the failures of state led industrialization (Import Substitution Industrialization) schemes developed by structural economists like Cardoso and Prebisch, and popular with leftist and military governments alike across Latin America and the 'Third World' throughout the 1960s and 70s.[612] ISI had encouraged high protective tariffs and limited access of foreign investment, substituting state and public-private schemes to 'kickstart' local economies and reduce dependence on foreign imports producing trade deficits. These attempts may have initially proved promising, but eventually fell apart with the combination of the energy crisis, changes in monetary policy, and international intellectual property rights preventing technology transfer.

This failure was complicated by the new unipolar world order ushered in by the dissolution of the USSR. For Marxists of all stripes, the fall of the USSR was also the end of an ideal way of life, poorly realized, but nonetheless philosophically articulated and existing. ISI looked less appealing and support from the communist bloc was gone. Closure to international markets had stifled competition and adoption of more efficient technologies necessary to build more complicated and complex industries demanded by 'developed' lifestyles. Wallerstein, writing in the 1980s after the collapse of ISI and first major market reforms (and subsequent social turbulence) in closed and formerly Marxist-

[611] See: Immanuel Wallerstein, 1979. *The Capitalist World Economy*. Cambridge University Press, Cambridge.
[612] Fernando Cardoso and Enzo Faletto, 1979. *Dependency and Development in Latin America*. University of California Press, Berkeley.

Leninist or military regimes, is explaining this mistake—he is recognizing that the national level of analysis is not large or expansive enough to understand the full functions of specific regions in the world system which became the focus of his scholarship.

Such structural economics had distinctly fallen out of favor by the time of Fukuyama's remarks. In political ecology, influences from post-structuralist theory, instead, in this period were increasingly incorporated alongside the core-periphery economic analysis. Moving beyond structural economics and absorbing post-modern methods as well as insights from cultural ecology (anthropology) and common pool resource theory (public economics), political ecology begins from the perspective of the developing world to reframe the political economy of resource governance in terms of power and culture. Researchers like Richard Peet and Michael Watts directly respond to Fukuyama, situating their influential 1993 piece in 'An Era of Market Triumphalism.'[613]

The concept of an 'ecological debt' owed to developing countries and the respondent resentful resistance in 'developed' societies to changes in way of life are often phrased as if they are in competition, where really they should be seen as nested and interconnected. More recently, political ecology has expanded across disciplines of academic thought, both making it a target for criticism (fittingly from 'where's the politics?' to 'where's the ecology?') and a less coherent platform for resource geographers and cultural anthropologists.[614] What it maintains is the reliance on evidence

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[613] Richard Peet and Michael Watts, 1993. 'Introduction: development theory and environment in an age of market triumphalism.' *Economic Geography*, Vol. 69, No. 3; pp. 227-253; see also Thomas Bierstecker, 1992. 'The triumph of neoclassical economics in the developing world.' In *Governance without government: Order and change in world politics*, ed. J. Roseneau and E.O. Czempiel, pp. 102-131; Cambridge University Press, Cambridge.

[614] Paul Robbins, 2003. *Political Ecology* in Political Geography.' *Political Geography,* Vol. 22, pp. 641-645.

from real places with varying economic and ecological circumstances, the distinct emphasis on scale as a central problematic, and a principled opposition to biased assumptions about 'modernity' underlying developmental hierarchies that replaced Cold War designations like First, Second, and Third world.

In the rest of this section I will talk about three major contributions that political ecology can make to the critical analysis of development in the Anthropocene pursued here. First is that it uses ecological metaphors and is focused on real places. Second, it explicitly rejects in economic and cultural terms the assumptions underlying links between wealth and conservation. Third, it can be fruitfully connected to more culturally-oriented contemporary discourses, of which I give two examples, the concept of degrowth, largely pursued in 'developed' contexts, and the idea of *'buen vivir*' or good living which has come from the 'developing' context of South America and is inspired by indigenous cosmovisions as a potential alternative to, rather than reflexive renewal, of ideas of modernity, progress, and development.

Rejection of the Post-Material Hypothesis

> La palabra 'ecología' no se refiere a los lujos estéticos de la vida sino al flujo de energía y materiales, a la diversidad biológica y al uso agroecológico del suelo, y por tanto resulta absurdo pensar que la consciencia ecológica es una novedad nacida en círculos ricos de los países ricos. – Joan Martinez-Alier

Sociologist Ulrich Beck, reflecting on universal history, acknowledges that Western academics have been over-general in their analysis of the developing world. Often, he claimed, old European theories were stretched to account for what appeared to be parallel events in the developing world; for Beck 'this attempt to apply nineteenth-century ideas to the twenty-first century is the pervasive *category mistake* of social

theory, social sciences and politics.'[615] This is certainly a mistake which most theories in the 1970s were still making, and one which is obvious in the survivalist attempts to assign to different cultures 'peasant' categories, or insisting that the new age post-scarcity will revert to Hobbes or feudalism, i.e. a stage in Western society from the distant past.

Dismissing the perspective and ethical considerability of the developing world is, unfortunately, a historical aspect of both market liberalism and survivalist authoritarian environmentalism, which identified the root of problems in the developing world. Where triumphant liberals like Fukuyama urged the Third World to 'develop,' their survivalist foil called for an end to end international aid and the hardening borders because the developed lifestyle was unsustainable at planetary levels and growing population in the Third World threatened to push humans as a species over a tipping point. The unspoken consensus between the two very different theories was that the developing world's centrality lay in its chaotic attempt to achieve 'developed' lifestyles coupled with their incomplete liberal institutions or inability to limit population growth.

Concepts like ecological debt extend dependency theory without its ISI developmentalist goals, modulated through concepts of cultural autonomy and alternative development, said to be 'closer' to nature, whether spiritually (Berkes/Naess) or attuned by subsistence (Scott). In contrast to neoliberal self-discipline and 'government from nowhere,' forms of indigenous and rural governance represent to many a territorially-grounded alternative, one which culturally argues for a new relationship with natural

[615] Ulrich Beck,2000. 'Risk Society Revisited: Theory, Politics and Research Programmes.' *The Risk Society and Beyond: Critical issues for social theory*, pp 211-229; p. 224.

systems and which pursues political autonomy and hybrid forms of indigenous modernity.

For the concept of 'indigenous modernity' not to appear as an oxymoron (as it is in terms of modernization theory and dependency theory alike) societies around the world cannot exist on a unidirectional continuum of development. Catalan ecological economist Joan Martinez-Alier points out that most dominant ideas of environmental politics depend on this unspoken assumption about the path of social development for humans-in-general, what he calls 'the post-material hypothesis,' also known in environmental economics as the 'Kuznets Curve.' He sees this assumption as deeply flawed, noting that environmental degradation is driven globally by the consumption occurring in such 'post-material' societies, and that this assumed transition in values was predicated on the exploitation of people and resources in the 'developing' world.[616]

The post-material hypothesis claimed that environmentalism was a middle-class phenomenon, only possible with the shift away from material focus made possible by being secure enough in the economics of day to day life to reflect on the cost to the environment. This theory, formalized by Ronald Inglehart, is still contentious within environmental literatures.[617] It identifies of environmental consciousness with the establishment of national bureaucracies to manage the environment and sees the shift in pollution occurring as societies transition to consumer-, service-, or, increasingly, information-driven economies. In its least subtle forms, it explicitly places the US at both the genesis of environmental consciousness and the epigone of bureaucratic

[616] Joan Martínez-Alier, 2002. *The Environmentalism of the Poor: A Study of Ecological Conflicts and Valuations*. Edward Elgar Publishing. Northampton, MA.
[617] See: Ronald Inglehart, 1981. 'Post-materialism in an environment of insecurity.' *American Political Science Review*, Vol. 75, No. 4, pp. 880-900.

environmental institutions, which further reinforces the Washington Consensus that economic growth must come before environmental protection.

Martinez-Alier, an economist, considers the identification of the post-material hypothesis and its empirical rejection his central task. Mainstream liberal and Marxist economists, he claimed, relied on a shared set of intuitions and theoretical models which suggested that states only put aside parks and created natural resource agencies when their citizens had achieved enough freedom from day to day economic needs to value 'non-material' things. Addressing this assumption, Martinez-Alier claims: 'my objection to Inglehart (who is a political sociologist, not an anthropologist) is not that he forgot about the 'environmentalism of the poor,' but rather that he has not considered the material roots of the environmentalism of the rich.'[618] His point is that post-material societies are can only conceive of themselves as so because they have forgotten the source of the materials that make up 'developed' lifestyles.

In economics the relationship between modernization and economics was formalized by the Kuznets Curve. Describing the post-material hypothesis Martinez-Alier tries to unravel, the Kuznets Curve says that as affluence increases there is a critical moment where minimum individual and familial needs are secured and post-material concerns become relative priorities. Martinez-Alier is alleging that the Kuznets curve, viewed from a global rather than just 'developed' perspective, both does not adequately measure 'environmental concerns' and also ignores how degradation in 'developing' contexts closely matches the perceived decreases in 'developed' world pollution. This

[618] Joan Martínez-Alier, 1995. 'The environment as a luxury good or 'too poor to be green'?' *Ecological Economics,* Vol. 13, pp. 1-10; p. 2.

means there is a secret materiality to post-material life which is predicated on keeping the experiences of the 'developing' majority remote temporally and geographically. That this can happen in a globalized world with near-instant communication seems bizarre from the standpoint of the 'developed' world, partly because, Martinez-Alier thinks, the cultural baggage of the post-material assumptions.

Many other established economists have taken aim at the Kuznets Curve and its most vocal advocates, like Wilfred Beckerman, author of *Small is Stupid*, a scorching and brazenly inaccurate response to EF Schumacher's *Small is Beautiful*, and related currents of ecological economics. Stern claims that 'the evidence presented in this paper shows that the statistical analysis on which the environmental Kuznets curve is based is not robust.'[619] Cole finds evidence of a discernible 'pollution haven' effect produced by inequality, targeting the displaced pollution that becomes consumer products, noting that actually the relative economic share of manufacturing output has a significant relationship with pollution.[620] Dinda claims that 'there are increasing grounds to be cautious about EKC hypothesis and related policies,' because 'environmental degradation, actually, is a multifaceted problem and different stages of environmental damage have some definite relations with economic growth.'[621] What this means, practically, is that measuring environmental degradation at a national level does not track

[619] David Stern, 2004. 'The Rise and Fall of the Environmental Kuznets Curve.' *World Development*, Vol. 32, No. 8, pp. 1419-1439; p. 1435.
[620] Matthew Cole, 2004. 'Trade, the pollution haven hypothesis and the environmental Kuznets curve: examining the linkages.' *Ecological Economics*, Vol. 48, pp. 71-81.
[621] Souumyananda Dinda, 2004. 'Environmental Kuznets Curve Hypothesis: A Survey.' *Ecological Economics*, Vol. 49, pp. 431-455.

the long and obscure commodity chains that make the economy truly global—that, in effect, the lifestyle of the post-material was compensated by the poor.[622]

Wilfred Beckerman, an economist at the World Bank and professor at Oxford, claimed that global warming was 'an unjustifiable diversion of attention from the far more serious environmental problems facing developing countries,' phrasing his indifference in terms of the urgent need to grow material economies to the point where post-material values become operative. Because of the inherent uncertainty of the future, Beckerman placed heavy discount rates on its consideration in economics. He says:

> Thus the aggregative concept of global 'sustainability' that is so widely encountered these days in any environmental discussion seems to be either morally indefensible or devoid of operational value […] Scientists, even social scientists, should not expect to be taken seriously if they go around asking unanswerable and meaningless questions.[623]

He thinks that this uncertainty intellectually bankrupts the basis of political ecology and EPT, that projecting future needs was impossible, as if things like water, food, and shelter are particularly uncertain needs. Beckerman thus rejects intergenerational ethics as subsumed to the urgency of developing the Third World, and relies on hierarchy of concerns—because of the assumed relationship between growth and conservation, he believed even more desperate and urgent attempts to spread markets in the 'developing' world were necessary.

In a particular strange example, however, Beckerman shows just how indifferent this attitude is towards nature itself. Criticizing the claims to intergenerational justice and

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[622] John Dryzek, 1997. *Politics of the Earth: Environmental Discourses*. Oxford University Press, Oxford; Ken Conca, 2000. 'The WTO and the undermining of global environmental governance.' *Review of International Political Economy,* Vol. 7, No. 3, pp. 484-494; This is also Plumwood's explicit starting point for the idea of 'remoteness'; Val Plumwood, 2002. *The Ecological Crisis of Reason*. Routledge, NY.
[623] Wilfred Beckerman, 1992. 'Economic growth and the environment: Whose growth? Whose environment?' *World Development,* Vol. 20, No. 4, pp. 481-496; p. 492.

long-term human welfare as inherently uncertain, he also asserts the inherent fungibility of natural systems from the perspective of neoliberal economics. He says:

> In the absence of any knowledge of future preference patterns and technological possibilities it is impossible to know what substitutions would permit the same level of welfare to be obtained from different combinations of assets. More trees and fewer insects? More machines and fewer fish?'[624]

The callousness this approach shows to nature is matched by the way it treats 'under-developed' societies. On the surface Beckerman appears concerned primarily with the least fortunate, but this concern is channeled through a particular emphasis on raising economic prosperity. He says:

> Of course, every assistance must be given to developing countries to enable them to raise their levels of energy consumption per capita, in order to achieve higher levels of prosperity. This should be done on the basis of technologies that do not waste energy and that are less intensive in carbon dioxide emissions—provided they are also economically viable.[625]

Although he mentions technology transfer, here, a contemporary figure of redistribution and makeweight against historical ecological debts in the global climate arena, such offers of technological transfer, as evidenced in the failure of governments to make promised contributions to UN clean development mechanisms from 1992 onwards, appear as historically hollow in substance as they appear casual in Beckerman's analysis.

Responding to *Small is Stupid,* survivalist human ecologist Paul Ehrlich strikes much the same note as Zizek earlier in this chapter—a mix of derision and empirical refutation. He says: 'Beckerman's slim new book, *Small is Stupid,* is certainly aptly titled, although not everything in it is wrong.' His central rejection comes in response to

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[624] Beckerman 1992; p. 491.
[625] Beckerman 1992; p. 492.

the idea that growth can solve environmental problems, the exact opposite of the survivalist focus on limits and pragmatic power. He claims:

> The basic answer to the challenge has long been clear. Since the poor will never be able to match the consumption patterns of today's rich without destroying Earth's life-support systems, growth in the physical economies of poor nations must be matched by shrinkage in those of rich nations.[626]

Herman Daly, author of the influential *Steady State Economics* reader in the early 1970s has a similarly disgusted reaction to Beckerman. He claimed that:

> The book is really a generalization of the demographic transitionist policy-by-correlation theme. Whatever the problem, its solution is correlated with economic growth, and therefore its solution *is* economic growth.[627]

Daly cuts to the core of this argument by asking a more question—does economic growth make us 'richer'? He believes that, accurately measured, environmental externalities would show that the benefits of growth are actually marginal. By doing so, Daly separates economic growth, 'quantitative increase in resource throughput,' from development, or 'qualitative improvement in efficiency of resource use.'[628]

Beckerman, arguing that aspects of growth had improved the lives of the masses, for Daly, was confusing growth with development, which had indeed increased welfare. The real disagreement, at heart, is about the relative nesting of economic and ecological systems and the assumed overlap of economic growth and social development. Daly sees economics nested in 'an ecosystem that is finite, non-growing, and materially closed,'

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[626] Paul Ehrlich, 1995. 'Economics and the Environment: Review of Beckerman's Small is Stupid.' *TREE,* Vol. 10, No. 9, September. Ehrlich agrees with Beckerman that 'weak sustainability' or 'sustainable development' ideas dominant in the early 1990s were destined for failure, but carves out a 'strong' sustainability category that he feels Beckerman doesn't understand or adequately treat. There are clear references here to Naess's deep and shallow environmentalisms, as mirrored in Dobson's environmentalism vs. ecologism distinction, advanced in roughly the same two years.

[627] Herman Daly, 1995. 'Review of Small is Stupid by Wilfred Beckerman.' *Population and Development Review,* Vol. 21, No. 3, September, pp. 665-677; p. 665.

[628] Daly 1995; p. 666.

Beckerman sees ecosystems as nested in greater economic concerns, which to Daly is patently absurd. These assumptions, however, continue to structure the actions of many powerful actors in global and national development agencies, international credit institutions, and reformist environmental narratives which privilege economic growth as a gateway to ecological health and habitat protection.

This perspective is particularly patronizing from the view of 'less-developed' countries, who see themselves minimized by narratives that explain their degraded working and environmental conditions as a necessary sacrifice to become 'modern' individuals. Political ecology, by working against the post-material hypothesis that provides the logic of this subsumption of environmental concerns to economics, attempts to bring these perspectives back into the conversation, a task complicated by the tangled nature of social and environmental movements in the global South where global markets and state development strategies appear at times only remotely connected to local struggles. Political ecologists expose those global economic influences, both reporting back to the allies in the area in question (often the place of extensive field work) and also figuring global change as a challenge to cultural survival on the world stage.

Degrowth and Indigenous Cosmovisions

> An alternative modernity will have to include a new vision of prosperity which will not be the economic growth held by those worshipping at the altar of the market. It will define wealth not in gross economic terms but as overall 'well-being'' – Ulrich Beck

The word 'nature' is used in a variety of ways, and this protean quality can be problematic from the perspective of a politics of nature. From Latin, *natura* is related to

nasci, which means birth, and is closely related to the Greek *physis*, or coming to be.[629] When we talk about 'nature' in the Western tradition we are often presented with two very different sorts of ideas; nature in the West, many 'green' political theorists argue, comes to be separated into external and internal natures, the realm of the passive environment and that of willing human culture. The 'naturalization,' or commitment to unconscious memory through habituation, of this split is what in many ways perpetuates the distances opened up between humans and the nonhuman world(s).

This idea of the 'natural' as the culturally self-evident is contested and difficult to access, and different writers at different times assign it varied qualities and roles. Bruno Latour in the *Politics of Nature* gathers this insight into an abstract political program, one which he calls (without reference to others claiming this title) 'political ecology.'[630] He insists that a new politics, untied to naturalized assumptions about historical progress and what counts as a political agent, will respond to two essential questions. First, he claims we must ask 'how many are we?' This is the power to take into account, and culminates in a search for good spokespersons for both speaking and unspeaking entities, tied together in an assemblage which he obliquely calls 'a proposition.' This power of counting, for him, also requires a form of consultation and reciprocality, one which does not allow the discussion be short-circuited by appeals to 'nature.'

The second essential question relates to the power to rank order. After assessing who and how many 'we' are, that collective needs to ask 'can we live together?' This is, essentially, the institution of good habits, and relies on hierarchization. Crucially, for

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[629] Oxford English Dictionary.
[630] Bruno Latour, 2004. *Politics of Nature: How to bring the sciences into democracy*. Harvard University Press, Cambridge.

him, this requires publicity and transparency, and once decided, the development of institutions which create the air of 'naturalness' and legitimacy, simply by becoming habit and closing (for now) the discussion of how we should live together. The movement of history, then, is a story about the swing between these two powers, which he is at pains to assert is a process. Progress, in this frame, is the expansion of the voices accommodated conditioned by the fact that, at some point, decisions have to be made.

Latour uses the word 'natural' in a very particular sense. In his earlier work, *Science in Action*, he claimed that the 'Natural' is a label only given to settled controversies, or stabilized relations between different 'actants' (propositions strung together by human and nonhuman agency).[631] Often capitalized, Nature is, for Latour, a post-hoc kind of authority based on unproblematic and unconsciously accepted assumptions. Latour notes in *The Politics of Nature*, that the realm of the 'Natural' in Western politics is usually just such an aftereffect, a blurred after-image left by whatever people are most scared of or ashamed of enough to define themselves as a species constitutively against. This opposition allows for a kind of rhetorical shortcut, a bracketing of debate, which can be wielded by different combinations of agents in a Machiavellian way.

The splintering of 'Science into sciences' which Latour advocates is mirrored in work by anthropologists like Philippe Descola and Eduardo Viveiros de Castro that insists there is no single Nature to which all scientific theories refer.[632] Working in the

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[631] Bruno Latour, 1987. *Science in Action: How to Follow Scientists and Engineers Through Society*. Harvard University Press, Cambridge, MA; p. 75.

[632] This can be interpreted in epistemological and ontological ways. Viveiros de Castro is explicitly referencing Nietzschean perspectivism, which implies the flattening of these concerns (i.e. lack of concern for essence/ontology). See: Eduardo Viveiros de Castro, 2004. 'Perspectival Anthropology and the Method

far reaches of Amazonia, Descola and Viveiros de Castro understand the radical difference between worldviews their research details as a kind of opportunity. The concept of 'multi-naturalism' reflects the concern that the many *representations* of nature (a form of multiculturalism) all assume a single, static nature by which to compare them (an implicit 'mononaturalism').[633] In the mononatural 'Western' cosmology the human, with its rational and linguistic faculties, sits in opposition to the struggle for survival. Latour describes 'Nature' in the West, thus, as an oppositional entity, an afterimage of the agency humans ascribe themselves.

Although Latour does not directly cite it as such in his definition of 'political ecology,' the academic tradition of political ecology's focus on hybridity and other boundary objects has been also been permeated with the struggles of indigenous and rural peoples to validate their own types of knowledge in the face of Western development schemes. Foundational thinkers like Blaikie, Bryant, Martinez-Alier, Peet and Watts, and others have emphasized alternative epistemic communities and the possibilities of learning important lessons about our own unconscious habits by dismissing the common relegation of rural and indigenous peoples to long-past feudal arrangements in Europe, or as 'pre-modern.'[634]

The debate is not only active in the 'developing' world, where decolonization and decentralization of centralized bureaucratic authoritarian regimes are renegotiating the

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of Controlled Equivocation.' *Tipití: Journal of the Society for the Anthropology of Lowland South America*, Vol. 2, No. 1, pp. 3-19.

[633] See: Eduardo Viveiros de Castro, 1998. 'Cosmological Deixis and Amerindian Perspectivism.' *The Journal of the Royal Anthropological Institute*, Vol. 4, No. 3, September, pp. 469-488.

[634] Piers Blaikie, 1995. 'Changing environments or changing views? A political ecology for developing countries.' *Geography*, Vol. 80, No. 3, July, pp. 203-214; Raymond Bryant, 1998. 'Power, knowledge and political ecology in the third world: a review,' *Progress in Physical Geography*, Vol. 22, No. 1, pp. 79-94; Martinez-Alier 2002; Peet and Watts 1993.

terms of what it means to be indigenous, as others in the global north continue to confront such issues as well. Continued integration of the US EPA with tribal authorities has allowed for growing challenges to use of resources in places like Alaska and the American Southwest, where indigenous challenges to development, often based around territory and its link to language and cultural preservation, inhibit large scale industrial actions. Formally recognized as a sovereign nation, although limited in many ways and spatially dispersed, many tribes in the US are currently pursuing a form of autonomy aimed at growth and development, including casinos, but also health centers, housing infrastructure, and cultural centers. In Canada, a rich vein of scholarship across disciplines engages the issues surrounding the controversial hunts performed by indigenous groups in contradiction of Canadian law, and the growing interest in arctic resources.

What is important about tying these two experiences together is not to enforce a monolithic term like indigenous on every non-capitalist or pre-colonial system of governance, but rather to reveal how common challenges have created common rhetorics and vocabularies, tying traditional notions of place attachment to cultural preservation and, increasingly, to ecological virtues and preservation. This current of transnational thought was formalized by the International Labor Organization and eventually in the UN Declaration on the Rights of Indigenous Peoples. Martinez-Alier's 'third current' of environmentalism recognizes these 'alternative' groups and movements which are not traditionally accounted for in the mainstream histories of the environmental movement which began with Rachel Carson or further back to John Muir.

The environmentalism of the poor (*ecologismo de los pobres*), Martinez-Alier insists, is not about reverence for a separate, pure form of nature (what he calls 'the cult of the wilderness'), nor is it simply a story about technological progress and technical mastery (what he calls 'the gospel of eco-efficiency'). Both of these traditions, from the perspective of the 'developing' world, paint environmentalism as a middle-class phenomenon. Instead, Martinez-Alier claims:

> The present book is concerned with the majority of humankind, those who occupy relatively little environmental space, who have managed sustainable agroforestal and agricultural systems, who make prudent use of carbon sinks and reservoirs, whose livelihoods are threatened by mines, oil wells, dams, deforestation and tree plantations to feed the increasing throughput of energy and materials of the economy within or outside their own countries.[635]

He is centrally concerned with the different dialects of environmentalism that have been ignored in previous histories, a concern which ecocritic Rob Nixon follows throughout his narrativizations of post-colonial struggles which interwove environmental and cultural themes through the vocabulary of territory, sacredness, and livelihood.[636]

This is a path which EPT and other forms of critical political theory must also take to begin approaching 'development' in a new way. Two types of examples are particularly interesting in this regard: the concepts of 'degrowth' in Europe and of '*buen vivir*' in South America. Advocates for both insist on revaluing growth, but each pursues this task in a different way based on how it relatively values culture and economics as causal mechanisms. Since it is obvious that both of these are necessary elements of envisioning a democratic green future, I want to propose here, after some very brief

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[635] Martinez-Alier 2002.
[636] Nixon 2012.

background on each, how they should be thought of as parallel rhetorics for different audiences—degrowth for the 'developed' and *buen vivir* for 'developing'.

Degrowth

Degrowth, a translation of the French 'décroissance,' or 'reduction,' is the idea that economic contraction (as far as productivity and GDP) is necessary in 'developed' countries, recalling the steady-state economics of Georgescu-Reogen and Daly in the 1960s and 70s.[637] Popularized by Serge Latouche, degrowth theories draw on the work of ecological economists like Georgescu-Roegen and Daly, as well as post-Marxist thinkers like Andre Gorz, James O'Connell, and Rudolph Bahro, who tried to show how economic growth in the industrial model was untenable in limited ecological and political systems.[638] Coalescing as an activist movement in France in the early 2000s, degrowth focuses on tactics of resistance, promoting alternatives and maintaining a revolutionary stance in contrast to reformist positions, and doing so with a specific focus on work, agricultural production, and consumption.[639]

Latouche contends that industrial development models are tangled in the concept of development itself, which requires leaps in the social imaginary and repoliticization of seemingly technical and apolitical technologies.[640] By positing an alternative future without economic growth, he and others seek to polemicize and politicize the

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[637] See: Nicholas Georgescu-Roegen, 1973. 'The Entropy Law and the Economic Problem,' in *Towards a Steady-State Economy*, ed. Herman Daly, WH Freeman and Co, San Francisco.
[638] Serge Latouche, 2009. *Farewell to growth*. Polity, NY. Daly's response to Beckerman above is an indication of how this lineage positions degrowth narratives against the contentions of Beckerman and Fukuyama.
[639] Filka Sekulova, Giorgos Kallis, Beatriz Rodríguez-Labajos, and Francois Schneider, 2013. 'Degrowth: from theory to practice.' *Journal of clear Production*, Vol. 38, pp. 1-6.
[640] Serge Latouche, 1993. *In the wake of the affluent society: An exploration of post-development*. Zed Books, NJ.

conversation about the future shape of modernity.[641] Thus, degrowth is not meant as a panacea to be applied across contexts, which would be a gross violation by its own terms; it is rather more a destructive concept, what they call (in what one can only hope is a bad translation…) a 'word missile,' that 'is not a concrete and universal alternative to growth, but a matrix of multiple alternatives that will reopen the space for human creativity, after removal of the plaster of economic totalitarianism,'[642] meaning that it is opening the terms for a new kind of conversation between many different kinds of voices.

This pluralism, alongside the concrete actions of identifying and naming alternative futures, is foundational to the appeal of degrowth. Anderson claims that 'the attractiveness of degrowth emerges from its power to draw from and articulate different sources or streams of thought and to formulate strategies at different levels,' and that a serious case could be made on the simple grounds that growth economics have become 'socially counter-productive, ecologically unsustainable, and uneconomic' in 'overdeveloped' societies.[643] As political theorist Andrew Dobson notes in his piece on the 'politics of post-growth,' the choice may not really be between growth or no growth, but rather between planned and unplanned degrowth, a kind of politics of contraction and convergence based on fulfilling the minimal basic needs of every member of society.[644] He peppers his analysis with controversial images that entice a defensive localist stance, including the phrase: 'Detroit is what unplanned degrowth looks like.'

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[641] Richard Heinberg, 2011. *The end of growth: Adapting to our new economic reality*. New Society Publishers, British Columbia.
[642] Federico Demaria, Fracois Schneider, Filka Sekulova and Joan Martinez-Alier, 2013. 'What is degrowth? From an activist slogan to a social movement.' *Environmental Values*, Vol. 22, No. 2, pp. 191-215; p. 208.
[643] Samuel Alexander, 2012. 'Planned economic contraction: the emerging case for degrowth.' *Environmental Politics*, Vol. 21, No. 3, pp. 349-368; p. 349.
[644] Andrew Dobson, 2011. *The Politics of Post-Growth*. Green House Publishing, London

Given that degrowth is often set against the backdrop of inevitable, 'unplanned degrowth,' or the arrival of conditions of scarcity, such theories are pragmatically framed as concerned with the political mechanics of downscaling and planned economic contraction, a painful but inevitable path to a different kind of life necessitated by the slow violence of long-term ecological change. Giorgos Kallis argues in 'In Defense of Degrowth' that if such catastrophic change is inevitable and it will lead to re-localization when supply chains and industrial agriculture are disrupted, the degrowth project will require 'intertwined cultural and political change,' i.e. both conceptual clarity and a radical activist project.[645] This is for several reasons, related closely to the rejection of the post-material hypothesis and flattening of development hierarchies mentioned above in reference to political ecology.[646]

This entails a 'strong' form of sustainability (rather than weakly focused on efficiency gains, especially with relation to curbing overconsumption), and recalls the distinction between shallow and deep environmentalism in the work of Arne Naess and environmentalism and ecologism by Dobson in his earlier work.[647] This deeper concern is common to Dobson, the representative of EPT, and Martinez-Alier, the representative of political ecology, alike, and its subtle everyday presentation of extremely radical ideas has been pointed out as a kind of spur to greater engagement and commitment on the part of activists.[648]

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[645] Giorgos Kallis, 2011. 'In defense of degrowth.' *Ecological Economics*, Vol. 70, No. 5, pp. 873-880.
[646] That Martinez-Alier figures prominently in both literatures is no coincidence.
[647] Sylvia Lorek and Doris Fuchs, 2013. 'Strong sustainable consumption governance – precondition for a degrowth path?' *Journal of Cleaner Production*, Vol. 38, pp. 36-43.
[648] Ted Trainer, 2012. 'De-growth: Do you realize what it means?' *Futures*, Vol. 44, pp. 590-599.

The practical appeal of degrowth as a concept is thus intentionally limited—it is an attempt to break apart old rules and set up more interesting and concrete conversations about what the future could and should look like, done with the express intent of not crowding out other ideas if they are respectful of the new rules of the conversation and address the problems sincerely and collaboratively. In places without economic security or wealth, the rhetorical prospects of a narrative of 'degrowth' or 'reduction' seem likely to be seen as unsuitable. By the terms of ecological debt and the more cautiously worded 'common but differentiated responsibilities,' the 'developing' majority is technically due some growth as well as technology transfer as payment for the historical legacy of industrialization providing middle-class comfort in the 'developed' world, fueled by raw materials and labor from the 'developing.' It is likely that projects seeking similar goals to degrowth will find fertile soil in these 'developing' contexts, but that the form of the challenge to Western development hierarchies may be different.

While sometimes criticized by critics in the 'developing' world as over-general and in the 'developed' context as 'unattractive,' the concept of degrowth has incorporated its critique of growth with a positive project of redefining modernity and progress in non-economic terms, and been powerfully expressed by Pope Francis and other major leaders in the Western world. Francis says in the 2015 encyclical: 'put simply, it is a matter of redefining our notion of progress. A technological and economic development which does not leave in its wake a better world and an integrally higher quality of life cannot be considered progress.'[649] This idea is deeply resonant with the history of EPT and

[649] Pope Francis, 2015. *Laudato Si: Encyclical Letter of the Holy Father Francis On Care for our Common Home*. Vatican; p.142.

environmental philosophy in Europe, especially the idea of simple living central to both back-to-the-land radical localists in the western United States and the tradition of 'Deep Ecology' stemming from the writings of Norwegian naturalist philosopher Arne Naess.

Bucking (almost) all the traditional EPT critiques of Christianity as fatally implicated in Western narratives of control over nature, Pope Francis reminds his followers and readers of his namesake: his caring conduct toward animals and his spiritual conviction that all creatures were equally God's creation. I say 'almost all' because Francis returns to a theme of stewardship that recenters humans (due to their power/responsibility) in the ecological narrative. Francis' attack is, like *buen vivir*, an attempt to draw up powerful past narratives to create an argument, not for change, but for renewal. The first Latin American head of the Catholic Church, his call mingles the austerity and cultural critique of decadence with more optimistically and spiritually-framed vocabularies of possibility and hope.

Degrowth reflects this renewal narrative, seeking a reaffirmation of values and return to prior conditions. The 2015 encyclical, a statement of global Catholic Church policy, is a kind of rival source of similar values—humility, respect, and conviviality. In this manner, I will argue below, *buen vivir* and degrowth are compatible, rejecting together that economic growth is necessary for environmental conservation, and placing human systems in a set of decentered, nested systems of ecological and human factors.

Buen Vivir

> Time does not always flow according to a line… nor according to a plan but, rather, according to an extraordinarily complex mixture, as though it reflected stopping points, ruptures, deep wells, chimneys of the thunderous acceleration, rendings, gaps—all sown

at random, at least in a visible disorder. Thus, the development of history truly resembles what chaos theory describes. – Michel Serres and Bruno Latour

Anthropological work in remote areas of the Amazon jungle by Philippe Descola and Eduardo Viveiros de Castro points out that many cultures do not conceive of a strict divide between human culture and nature the way it is often perceived in the West.[650] For them, the danger of thinking about the nonhuman world as merely a setting for human development, and not a coevolving symbiotic relationship, is that it risks naturalizing assumptions about cosmological priority and preserving historical biases in a form which is inaccessible to critical thought. As Latour does in *Politics of Nature,* Descola explicitly links the growing science of ecology to a cosmology built around the project of understanding the world differently—he attempts to learn from the radical interrelation between all things and adjust the form of life accordingly. Latour suggests this is a 'non-modern perspective on time.'[651]

As early as the 1940s, people like Aldo Leopold and EF Ricketts saw the potential for critical power in the ecological worldview. The 1960s saw the emergence of scientists like Rachel Carson willing to step out of the 'objective' role demanded of intellectuals during the Cold War and expose the insulated realm of scientific progress to public scrutiny. By 1969, the influential Odum brothers, Paul Ehrlich, and Garrett Hardin were applying ecological issues directly to society (with important and *very* different ideas of how…), and others, like Gary Snyder and EF Schumacher, were fusing the food web and economics alike with Buddhism. 'Dark Green,' radical environmentalism like Arne Naess's Deep Ecology and Murray Bookchin's Social

[650] Philippe Descola, 2006. *Beyond Nature and Culture*. Gallimard, Paris; Viveiros de Castro 1998.
[651] Bruno Latour and Michel Serres, 1995. *Conversations on Science, Culture, and Time*. University of Michigan Press, Ann Arbor; p. 57.

Ecology are also born out of the milieu of political and cultural critiques expressed through ecological metaphors.

This understanding of ecology changed drastically with the acceptance of second order systems theory, as pioneered in CS Holling's influential work on resilience of socio-ecological systems. It is this image of ecology, discarding static equilibrium and accepting punctuated equilibria, which is reflected most heavily in Latour's adaptation of network theory to the ecological crisis.[652] The shared metaphor is that of a network, and has a similar warning: if one entity or idea builds many connections to a certain 'fact' or an 'assemblage' of automated (ready-at-hand, self-sustaining) traces, then one also must beware destabilizing efforts which might tear this box out of the network and open it up for reinterpretation.

Considering the concept of '*crecimiento negativo*' (negative growth), Viveiros de Castro claimed that such types of sufficiency ethics were incompatible with capitalism.[653] His call there was for Brazil to develop a new style of civilization based on new, geographically, culturally, and ecologically specific ideas of development:

> *que no fuera una copia empobrecida del modelo de América del Norte y Europa. Podríamos empezar a experimentar, tímidamente, algún tipo de alternativa a los paradigmas tecno-económicos desarrollados en la Europa moderna.*
> (that don't come from impoverished copies of North American or European models. We could start to try out, cautiously, some types of alternative to techno-economic paradigms developed in modern Europe).[654]

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[652] CS Holling,1973. 'Resilience and Stability of Ecological Systems.' *Annual Review of Ecology and Systematics*, Vol. 4, pp. 1-23; CS Holling, 1996. 'Surprise for Science, Resilience for Ecosystems, and Incentives for People.' *Ecological Applications*, Vol. 6, No. 3, August, pp. 733-735.
[653] Julia Magalhães, 2013. 'Entrevista a Eduardo Viveiros de Castro: El Capitalismo sostenible es una contradicción en los términos.'*Lobo Suelto!* Online. http://anarquiacoronada.blogspot.com/2012/11/entrevista-eduardo-viveiros-de-castro.html.
[654] Magalhães 2013.

Such a new type of model, grouping left and right of the European political spectrum together, Latour claims, could act like a kind of bomb dropped into old systems of thought, a kind of inherently-destructive method for decolonizing thought. He is sure that the concept 'destroys the notion of nature as an overarching concept covering the globe.'[655] He sets up a yes or no choice between an ecological future characterized by *buen vivir* values or becoming 'developed' in the Washington Consensus standard.

For Latour, who unlike Ulrich Beck believes in an existing modernity, the concepts of modernization and development perform violence towards the free choice of identities of the subjects themselves; he says: 'to modernize is to distribute agencies along a gradient that allows the orientation of action in such a way that those who resist—who remain backward, who remain archaic, etc—are beaten into submission.'[656] This is the opposite of politics, characterized by discussion, struggle, and enforcement, and the source of the apolitical tendencies of such discourses on modernity. Politics, instead, for Latour, begins from the moment 'you cannot beat anyone into submission.'[657]

Uruguayan social theorist Eduardo Gudynas, drawing intellectually on Latour, Viveiros de Castro, and Descola, claims that the roots of a qualitatively different kind of life lie in the embrace of a change in spiritual and material perspective from debates over living more (growth) or living less (anti-growth) to a conversation about what it will mean to 'live well.' This has obvious resonance with EPT, especially in its most localist and culturalist phases. Gudynas, like Snyder, Naess, and many others, is inspired by

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[655] Bruno Latour, 2009. 'Perspectivism: Type or Bomb?' Guest Editorial, *Anthropology Today*, Vol. 25, No. 2, pp. 1-2.
[656] Latour 2009; p. 221.
[657] Latour 2009, p. 221.

indigenous worldviews, impressed by Viveiros de Castro's 'perspectival anthropology' and idea of 'multinaturalism' as a complement to multiculturalism. *Buen vivir,* like the more abstract arguments made in EPT, insists that consumer life in industrial societies is the key target for ecologically-inspired change. Gudynas points to the lack of happiness, peace, and conviviality (a reference to Ivan Illich) in such 'developed' areas, which ironically serve as idealized economic and political models for 'developing' societies.

Figure 7: Decrescimiento, simplemente diferente. Source: La Vanguardia.[658]

Gudynas claims that '*Buen Vivir* emerges as a term of engagement with the questions confronting conventional development, and at times as an alternative to it. It incorporates the perspectives, and includes the talents, of indigenous knowledges, and also other alternative currents of thought.'[659] He is clear that *Buen Vivir* should not be interpreted as a renewal or reinterpretation of Western thought through the mediation of indigenous worldviews and it should not be seen as a kind of 'regression' to historically

[658] Antonio Cerrillo, 2014. 'El Decalogo de Descrimiento.' *La Vanguardia,* December 30. Accessed online: http://www.lavanguardia.com/vida/20141230/54422253703/decalogo-decrecimiento.html.
[659] Eduardo Gudynas, 2011. 'Buen vivir: Germinando alternativas al desarrollo.' *America Latina en movimiento,* No. 462, pp. 1-20. Author's translation from Spanish.

distant cosmovisions. Rather, '*Buen Vivir* defines itself as a platform shared with diverse elements, with a vision of the future; it poses a utopian horizon of change.'[660]

Gudynas and those drawing on his work believe, like degrowth activists, that what results from embracing this shared vision of the future is a change in discursive context necessary to properly discuss different options, assign new values, and make novel alliances to begin political projects. It is an ontological view which rejects linear progress and historical stages of development in favor of another idea of the relationship with nature that recognizes it as a subject of rights and thinks about long-term change. It explicitly does not economize social relations or reduce living systems to fungible goods, the way Beckerman so clearly did above.

Like Latour redefining the communities in which people live to include natural entities in both material and spiritual ways, Gudynas claims that *Buen Vivir* can decolonize indigenous forms of knowledge and move past rationalistic domination narratives. *Buen Vivir* is thus envisioned as a rejection of these Western sources and embrace of more local historical narratives rather than inversion of developmental hierarchies themselves. This kind of transition would have important cultural and institutional ramifications, but seems unlikely to do so in the 'developed' context, where a more honestly sacrificial and blunt attempt like degrowth may have more purchase than abstract debates over indigenous worldviews. This is because such an indigenous framing is interesting but not unique in its spirituality, as Pope Francis and Arne Naess prove in different ways.

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[660] Gudynas 2011.

The concept of *buen vivir* is thus consistent with a broader trend in anthropology and management literatures, including the ideas of indigenous cosmovisions, multinaturalism, and spiritual mingling with material struggles. Marisol de la Cadena has claimed that the assertion of indigenous cosmovisions 'may mark epochal changes,' that:

> The appearance of earth-beings in social protests may evince a moment of rupture of modern politics and an emergent indigeneity. I do not mean a new mode of being indigenous. I mean an insurgence of indigenous forces and practices with the capacity to significantly disrupt prevalent political formations, and reshuffle hegemonic antagonisms.[661]

By this she means that the appearance of old gods in political theater has initiated a kind of pluralism which is not indicated by gender, race, or class, but by nonhuman actors conjured to the political level. She believes they now represent 'contentious objects whose mode of presentation is not homogenous with the ordinary mode of existence of the objects thereby identified.'

Bronislaw Szerszynski, echoing the more rambling structure of Latour's Gifford Theology Lectures, begins by citing de la Cadena alongside Rancière and Latour.[662] He claims that the rise of indigenous politics challenged triumphant growth narratives by placing them into their proper Western context rather than extending them as universals to the planet as a whole. This project is identical to the one pursued in post-colonial history, and it is, in this sense, incredibly interesting that theorists like Szerszynski have also connected this idea of 'earth-beings' to Francis' *Laudato Si* encyclical, where he, 'by

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[661] Marisol de la Cadena, 2010. 'Indigenous Cosmopolitics in the Andes: Conceptual Reflections Beyond 'Politics.'' *Cultural Anthropology*, Vol. 25, No. 2, pp. 334-370; p. 336.
[662] Bronislaw Szerszynski, 2016. 'Praise be to you, earth-beings.' *Environmental Humanities: Special Commentary on Laudato Si*, Draft Copy, pp. 1-7; p. 1.

dethroning the human beings as the lord of creation,' made an epistemological shift in 'our attention to non-human nature as a bearer of value.'[663]

Both the Pope and Viveiros de Castro are creating spiritual versions of the epistemological exorcism which Escobar performed on Western ideas of Nature. In his 1992 essay 'Imagining a Post-Development Era?' Escobar claimed that the redefinition of development lay in seed in social movements, i.e. that the cultural task was primary.[664] This was because felt development, in the post-modern register, should be considered as 'a particular set of discursive power relations that construct a representation of the Third World, whose critical analysis lays bare the processes by which Latin America and the rest of the Third World have been produced as 'underdeveloped.''[665] In its stead, he proposes a critical view of modernity, reflection on historicity, more focus on how social norms can be influenced by social movements.

That he calls such alternatives 'anti-development discourses,' based on their call for radical transformation, opens up the possibility of a supervening post- category, post-development, the subject of much of his later work. Importantly, and in line with the degrowth and *buen vivir* approaches which target parallel audience in Europe and the post-colonial world, respectively, this concept of 'post-development' is a kind of distributive politics that includes economic, ecological, and cultural 'goods' and privileges non-economic values, the targets of EPT, political ecology, and social-ecological resilience theories alike.

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[663] Szerszysnki 2016; p. 2.
[664] Escobar 1992.
[665] Escobar 1992; p. 47.

V. The end of a way of life or the end of all life?

> The only parts of humanity not aspiring to economic modernization are a few isolated tribes in the jungles of Brazil or Papua New Guinea, and they don't aspire to it because they don't know about it. – Francis Fukuyama

Given the need for reconnection established across the academic literatures consulted here, the question remains: how shall we reconnect? Importantly, the question is also political—it is about who and what will constitute this we, as Latour's *Politics of Nature* contends. Concepts like the Anthropocene announce the arrival of new ages as a cause for radical break from history. If we have, indeed, entered another new era, a time of 'Great Acceleration,' as the Anthropocene literature suggests we have, Chakrabarty warns that this designation should not separate the world from its history, that it should be seen as part of the unfolding globalization of world social and ecological systems.

Chakrabarty's simultaneity provides a more specific analysis of social-ecological systems than the purely global attempts of Crutzen and others tied to the Anthropocene umbrella. Avoiding such single-scale arguments also potentially avoids drastic global experiments in climate control spurred by a paralyzing sense of catastrophic fatalism. Without denying the global trend critical political ecologists of the Anthropocene must see it simultaneously with cultural and individual images of the human, each of which requires critical reflection and, potentially, active adaptation. Simultaneity inserts the cultural level between the global and individual, which is important, since it goes some way to getting past the largely individualized, conversion rhetoric of catastrophic narratives. It also begins to take under consideration long-accepted norms of social behavior and the tacit images of what it will mean in the future to say a culture lives a 'developed' way of life.

Concentrating on linking dedicated specificity to global themes *via the study of culture* emphasizes rhetoric, habit change, and urgency, the moving targets of collective agency which scientific appeals to a globalized human species have thus far failed to hit. Considering development in such a nested set of cultural, environmental, and economic metaphors reveals different kinds of challenges than the simplistic tradeoff between jobs and conservation still peddled throughout the world with real local consequences in places still recovering from legacies of colonialism, military dictatorship, and a disqualified indigenous history.

Chakrabarty's work is especially interesting in this regard; a Bengali historian trained in Europe and working at a prestigious American university, he insists that the anti-colonial return to nationalism was insufficient, that instead a new kind of hybridity was necessary that embraced both kinds of world-views, Western and non-Western, as keys to unlocking progressive change. Extending his past work, the challenge in the 'Four Theses on the Anthropocene' was to raise the scale of human history to the planetary level and recognize the collapse social and natural concerns into each other. In 2012 he goes further to pluralistically reembed individuals in cultures and states and everything all within a global ecological envelope through the idea of simultaneity.

The prescription this generates is not abandoning the goal of post-materiality, but understanding that it has not actually been attempted yet—rather, anti-material and material discourses have been in dyadic struggle. Results could, instead, be a hybrid or post-material, built out of democratic participation, nested systems of conservation and governance, and respect for the plurality of perspectives on growth and modernity. This normative aspect, in the end, is a call for a new kind of post-material hypothesis (which I

have tried to suggest here may utilize degrowth in ‘developed’ contexts and *buen vivir* in ‘developing’). Such a critical change in perspective and institutions is necessary before old post-material categories, and the imperial and colonial legacies they euphemize, can be overcome and a real appeal can be generated to stop environmental degradation.

I suggested here that because of these particular concerns with critical history, post-colonial history has an important contribution to make to debates over development and ecological crisis, chief amongst them the flattening of cultural hierarchies and preservation of the role of history and context in advancing discussions about Earth System change. This task, to McNeill and Chakrabarty alike, represented something new in history, and thus a challenge to historical reasoning at the heart of collective decision-making. Packaged together with the rejection of the post-material hypothesis, simultaneity suggests that the tradeoff and sequence of community, state, and market challenges in EPT is, like the nested systems of resilience and political ecology, rather a kind of simultaneous image, three coexisting identities that need to be thought together rather than in some zero-sum relationship. I suggested here that such a simultaneous image is both more accurate and interesting for social scientists attempting to understand political systems through the model of nested ecosystems.

Seeing the Anthropocene as a mirror of globalization, Chakrabarty posits that the social and natural worlds could no longer be considered separately, that the pervasiveness of human civilization had collapsed time-honored hierarchies between humans and the natural world. The challenge, for those following his critique, is to reconnect political economy, history, and responsibility to the Anthropocene discourse in order to insist on causal analysis which enables the kind of 'common but differentiated responsibility'

which Chakrabarty advocates. Any ‘critical political ecology’ emerging from the joining of EPT, political ecology, and post-colonial history must remain active in the face of a threat that largely remains unimagined in its full effect, and must do so in a humble way which encourages social learning and flexible adaptation. I have argued here and pursue further in what follows that, in order to engage this project sincerely, it will be necessary to flatten implicit development hierarchies and address the problematic trajectory of world ‘development’ which casts the most consumptive and degrading societies in history as the endpoint of the historical progression of the rest of the world.

10 Green Decentralization: Bioregional Democracy or Neoliberal Fragmentation?

I. The Green State and Local Politics

In this chapter I look across several related debates over the benefits of decentralization through the lenses of environmental political theory and fiscal federalism. In general, these various traditions are linked by their treatment of the problem of 'institutional fit,' a measure of the capacity of political institutions to respond to urgent social and ecological issues at an appropriate scale. Absorbing this debate through a common rejection of survivalist authoritarian politics introduced by 'human ecologists' in the 1970s, theorists of democratic strains of Environmental Political Theory (EPT) and other disciplines organized around insights from common pool resource and complex systems theory. have begun focusing on nested forms of political sovereignty able to climb in scale with the scale of the problem. Many focus on what is perceived to be the most vulnerable scale: the local.

More abstract theoretical arguments have recently been augmented by real world experience. The worldwide embrace of experiments in decentralization, under very different auspices ranging from democratization to market globalization to decolonization, means that understanding the relationship between decentralization and environmental outcomes is both important and, crucially for the argument presented in the next chapter, empirically measurable. As the European Union, national resource management agencies, post-colonial autonomy reforms, and world economic institutions have arrived at a similar set of experiments there is both a rich set case studies to analyze

and a growing importance to generate evidence to match the theoretical arguments around decentralization's potential for delivering social-ecological resilience.

Despite this wealth of empirical research in other disciplines, the commonly expressed preference in environmental political theory (EPT) for democratic decentralism often does not include more complicated arguments about the institutional mechanics of decentralization itself, i.e. the challenges of the actual *process* of decentralization. The argument over the merits of decentralization for achieving positive ecological outcomes thus, unsurprisingly, remains an enduring debate in this literature.[666] As Elinor Ostrom noted, the question of how to live in a more sustainable way carries political implications that are more detailed and complex than the ideological prescriptions of one scale or another of government, and in this way the more quantitative and comparative work in political science and public economics are interesting empirical resources.

Chief among these are fiscal federalism studies descended from the work of Tiebout and Oates.[667] Fiscal federalism, addressing the efficiency of public goods distribution and economic growth, has debated the merits of decentralization of political and economic power in a more empirical register. As in EPT, however, as yet no consensus exists regarding the benefits of decentralization in this literature.[668] Those

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[666] For examples of contrary opinions, see: Michael Shellenberger and Ted Nordhaus, 2004. 'The Death of Environmentalism,' reprinted in *Grist Magazine*, Jan 13, 2005; also: Wilfred Beckerman, 1995. *Small is Stupid: Blowing the Whistle on the Greens*. Duckworth, London.

[667] Charles Tiebout, 1956. 'A Pure Theory of Local Expenditures.' *Journal of Political Economy*, Vol. 64, No. 5, October, pp. 416-424; Wallace Oates, 1973. 'An Essay on Fiscal Federalism.' *Journal of Economic Literature*, Vol. 37, No. 3, September, pp. 1120-1150.

[668] For a snapshot of this disagreement see: Daniel Treisman , 2000. 'Decentralization and Inflation: Commitment, Collective Action, or Continuity.' *American Political Science Review*, Vol. 94, No. 4, December, pp. 837-857; Jean-Paul Faguet, 2013. 'Can Subnational Autonomy Strengthen Democracy in Bolivia?' *Publius: the Journal of Federalism*, May, pp. 1-31; Eliza Willis, Christopher da CB Garman, and Stephan Haggard, 1999. 'The Politics of Decentralization in Latin America.' *Latin American Research Review*, Vol. 34, No. 1, pp. 7-56.

who argue for the effectiveness of decentralized authority in the fiscal federalism literature largely do so also under the aegis of democratic theory, i.e. argue that local institutions have a better ability to hold their leaders accountable, provide a forum for the participation of local residents, and monitor and sanction transgressors.[669] Those who argue against decentralization cite a litany of concerns—corruption, lack of capacity, loss of protected rights, and vulnerability to economic exploitation are all seen as major and often disqualifying factors.

I will attempt to show here that these debates are often misframed by their attempted universal application. My analysis attempts to show that each pole of the literature on decentralization, across different disciplines, establishes the potential paths of decentralization in very different contexts, writing against a perceived consensus for or against decentralization, and often utilizing very different data sources and methods. My argument in this chapter is thus that general claims that local or national levels are more or less sustainable should appear as an interesting but ultimately distracting and unhelpful debates given the need for regional and local forms of adaptation initiated by the entrance into times of planetary ecological change.

Already in calls for strengthening the national level more common in recent times, most EPT scholars do so with the explicit caveat that global and local capacities will also have to be built in a multilevel, nested way. Their argument is, in contrast to past generations of radical democratic green thought, that the state level also has advantages which are worth preserving and potential that is yet untapped, which makes

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[669] Alberto Diaz-Cayeros, Beatriz Magaloni, and Alexander Ruiz-Euler, 2013. 'Traditional Governance, Citizen Engagement, and Local Public Goods: Evidence from Oaxaca.' *World Development*. Vol. 20, pp. 1-14.

its summary dismissal both impractical given its continued relevance and naïve given its role as an intermediary between localities and the global level. These interactions across scales are made increasingly important by global-scale threats like climate change, biodiversity loss, and access to fresh water, all taking place in the context of unevenly-spread vulnerability.

Here I look at how the transition to an era of global ecological crisis has reinvigorated centralization arguments, first through the work of Robyn Eckersley, who I give special attention because her work on the Green State is influential and because she begins her analysis in the 1990s by acknowledging the need for nested systems. Broadening the discussion to other theorists, I conclude the first section by reflecting on the tangle of justifications packaged as decentralization, particularly in the 1990s, and how Val Plumwood's multivalent concept of 'remoteness' can help understand this confusion. I then introduce directly work in fiscal federalism and comparative institutions, and ruminate on the role of decentralization in environmental politics and particular challenges that contemporary crises present to institutional creativity. Arguing that even in better ecological models of nested systems there is a fundamental tension between market and social arguments for decentralization, I conclude by asking if decentralization brings neoliberal fragmentation or ecological democracy.

II. Analyzing the Political Theory of Decentralization

Here, I will use the term decentralization to mean the devolution of meaningful political and fiscal autonomy to subnational officials.[670] In environmental political theory the positive aspects of decentralization are said to include improving efficiency and the deepening or consolidation of democracy through incorporation of democratic virtues (some form of citizen or deliberative ethics) at lower levels of everyday experience.[671] The basic idea is that local systems allow more participation (both decision-making and monitoring after the fact) and simpler accountability chains. This is balanced by a counter-argument which holds that spillovers are better contained by higher scales and that economies of scale exist for many public services, encouraging centralization.

EPT has, throughout its conscious and appropriated lineages, concerned itself fundamentally with the role of the state in environmental politics, producing a wide range of responses ranging from prescriptions of global green Leviathan to autarchic local communes. Radical EPT as a whole, focused on environmental degradation and the cultural habits and political actions that create it, rejects on premise industrial systems of both Marxist and capitalist types as ecologically irrational due to their reliance on economic growth to legitimate their ideological vision and placated redistributive pressures. As these were the two dominant ideals of nation-states and economies in the

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[670] This is still a broad definition depending on the literature consulted. Most in economics and political science use a tripartite breakdown of administrative, fiscal, and political decentralization, and more complicated recent contributions have set these factors in context and examined their timing and sequence. See: Tulia Falleti 2005. 'A Sequential Theory of Decentralization: Latin American Cases in Comparative Perspective.' *American Political Science Review*, Vol. 99, No. 3, August, pp. 327-357; also Kathleen O'Neill, 2003. 'Decentralization as an Electoral Strategy.' *Comparative Political Studies*, Vol. 36, pp. 1068-1094.

[671] This claim exists across academic literatures, related to democratization (accountability mechanisms) and more technical economic concerns with preference matching and efficient goods delivery.

second half of the 20th century, the question of whether the state, *per se*, as a centralized form of hierarchical rule, was inevitably irrational from the point of view of the environment became one of the main debates.

Essentially, radical democratic EPT argued that democratic localism 'works' when it reduces 'remoteness,' i.e. brings the effects of consumption and the power to collectively act 'closer' to citizens who feel alienated from national politics or ambivalent towards international regulation. 'Remoteness,' in Val Plumwood's work, is a complex and protean quality produced through several types of distance. Like Romand Coles and others drawing from Hannah Arendt, her focus is on the relationship between concepts and interests, not on the constitution of these subjects themselves—remoteness is a description of growing physical and ethical separation and of declining dialogue between and within cultures.[672]

Remoteness thus results from the processes which place some at the center and others at the periphery and enables an unjust distribution of costs and benefits by blocking communication between 'developed' and 'developing' regions. Plumwood claims 'remoteness is a rationality feature preventing contemporary liberal-capitalist societies, apparently the most promising candidates for ecologically rational societies, from dealing effectively with ecological problems.'[673] She identifies *spatial remoteness*, or living somewhere geographically removed, alongside *consequential remoteness*, or the systematic displacement of consequences through technological remoteness, global resource extraction, or waste trading.

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[672] See: Romand Coles, 2005. *Beyond Gated Politics: Reflections for the Possibility of Democracy.* University of Minnesota Press, Minneapolis.
[673] Val Plumwood, 2002. *Environmental Culture: The Ecological Crisis of Reason*. Routledge, NY; p. 74.

These more 'external' kinds of remoteness are complemented by forms of *communicative* and *epistemic remoteness*, related to poor feedback, weak knowledge of the conditions of production and consumption, and the reality of human vulnerability. Plumwood also recognizes *temporal remoteness*, or the displacement of costs to the future and shortening of time horizons, and a more amorphous idea of *spiritual remoteness*, or the loss of wonder and awe, broadly attributed to the influence of dominant elements of the Judeo-Christian tradition which results in a severing of individual and collective ties to place.

All these trends, for Plumwood, are augmented by globalized capitalism and neoliberal economic policies. In her theory, neoliberalism represents maximal remoteness, or the operation of power from nowhere, where forms of remoteness like economic inequality and geographic distance create a powerful *epistemic remoteness* embedded in the naturalized assumptions of separated groups. This loss of connection is made more virulent by rapid urbanization and industrialization which creates other forms of distance between humans and nature. Following this complicated diagnosis, Plumwood lays out six conditions for an ecologically rational policy:

1. Robustness
2. Flexibility
3. Resiliency
4. Allows negative feedback
5. Coordinates scales
6. Matches scale of government to scale of problem[674]

Following this breakdown, she claims that future systems may look like indigenous shared rights communities with high accountability, reduced possibility for

[674] Plumwood 2002; p. 72.

transfer or sale of property, more intimate relationships with the land itself, and an institutionalized commitment to community decision-making. She suggests that greater receptivity to warnings 'from below' and decentralization of sovereignty may be able to combat growing feelings of powerlessness produced by epistemic and geographic remoteness, creating a proximity to consequences which empowers decision-makers who have to live with the pollution or degradation produced by political action. This is not a simple panacea—for Plumwood, like many radical environmental political theorists, institutional decentralization has to be matched by educational, economic, and cultural projects that re-embed individuals in their human and natural communities.

Beginning from this broad concept of remoteness, in what follows I want to think about the different arguments made for decentralization across democratic, economic, and environmental literatures. The broad definition is the chief benefit, as it pulls in useful strands of thought that are not usually treated together—it is both a cultural and institutional critique, imagined at nested local and global scales. As a theory, it summarizes the insights of many strands of EPT, and this deep conceptual vocabulary, I will argue, is useful for understanding the extant 'mixed results' of globally-framed debates over decentralization, especially those framed economically and empirically..

Specifically focused on fiscal concerns, the tradition of fiscal federalism addresses public goods distribution and focuses on the merits of decentralization for creating wealth and delivering services. As noted above, however, no consensus exists regarding the benefits of decentralization in this literature either. Those who argue for the efficacy of local governance for delivering public goods argue that local institutions have a better ability to hold their leaders accountable, provide a forum for the participation of

local residents, and monitor and sanction transgressors.[675] Here I will first outline the argument for the green state in EPT and how it has historically developed, then pursue these questions in the explicit vocabulary of fiscal federalism provided by Diaz-Cayeros, Treisman, and Faguet.

The Green State Argument

The embrace of decentralization in Western environmentalism has deep roots. At the birth of the self-conscious environmental movement in the United States and Europe in the 1960s, the embedding of activists in broader movements for social change culminated in experimentation with local politics and focus on changing cultural perspectives. By the 1970s this current was largely reversed in two ways: the establishment of national environmental agencies and the effects of the energy crisis.

The dominance of scientifically-framed authoritarian political arguments in the 1970s gave way to a different kind of decentralization rhetoric in the 1980s based on market and libertarian principles and framed in direct opposition to the state itself, producing both outright rejection of resource scarcity and the hopeful synthesis which became known as 'sustainable development.' By the 1990s, the fall of the USSR meant that a broader package of decentralization rationales were activated, including those related to democratization (important in post-Soviet, post-colonial, and post-military regimes) stressing accountability, economic growth, and mitigation of ethnic conflict.

This ideologically promiscuous advocacy throughout the 1990s is likely the chief reason that studies of decentralization are so profoundly mixed. Depending on the

[675] See: Elinor Ostrom, 2000. 'Collective Action and the Evolution of Social Norms.' *Journal of Economic Perspectives*, Vol. 14, No. 3, Summer, pp. 137-158.

national or local context analyzed, very different outcomes are possible based on the mixture of decentralization strategies (and their underlying logics) pursued. By the 2000s, 9-11 and Hurricane Katrina had radically refocused debates on the global level, producing a marked change in focus of some of the same localist theorists from the early 1990s, many of whom began to reevaluate national institutions as a method for expanding the basic welfare categories guaranteed by modern states to include ecological services and the inherent value of natural systems.

The key for these arguments is still the survivalist premise: the urgency is too great to wait. Radical democratic environmental political theorist Robyn Eckersley's theoretical trajectory is interesting in this respect. From initial critiques of culture and individual connection, she has in more recent work moved to international relations theory, and, specifically, examining the values of an 'ecological state' modeled on the European welfare state. In 1992, Eckersley, in contrast, clearly stressed cultural work to overcome anthropocentrism and transform progressive environmental politics into politics of 'emancipation writ large.'

Addressing survivalist economic historian Robert Heilbroner, Eckersley laid out the radical and emancipatory goals of green politics, effectively accepting the survivalist worst-case scenario as a challenge:

> This theme of cultural malaise and the need for cultural renewal has meant that emancipatory ecopolitical theorists have directed considerable attention toward the revitalization of civil society rather than, or in addition to, the state.[676]

[676] Robyn Eckersley, 1992. *Environmentalism and Political Theory: Toward an Ecocentric Approach*. SUNY Press, Albany; p. 22.

This is far from a total rejection of national politics, which greens know would end protection for endangered species and other hard won victories, but at the same time Eckersley (and much of the literature emerging from the immediate post Cold War era) was primarily focused on critiquing anthropocentric assumptions and imagining an 'ecocentric' culture capable of wielding the democratic process to preserve and expand the gains already made by the national environmental movement.

In this early work Eckersley presented an analytic typology of 'green' political thought based around a normative idea about how the 'critical political ecological perspective' should be constructed. She arrives at a combination of radical participatory democracy at local levels and strengthened state regulation of the market. Importantly, for Eckersley, this was not a rejection of any one level, it meant nesting institutions into different tiers of authority to be accessed based on the scale of the problem. This was especially important given the reality of ecological limits—the urgency of addressing social-ecological crises meant that the progressive gains of the national environmental program could not be thrown aside. She says:

> We face a highly unstable future, and we cannot afford to relinquish the institutional gains of parliamentary democracy and the (however imperfect) checks and balances they provide against the abuse of power—at least not until such time as an ecocentric consciousness has substantially permeated our political culture. Instead, we should be concerned to *revitalize* these institutional gains by strengthening such checks and balances.[677]

The essence of the argument is 'don't start from scratch,' that any localizing effort in the long term must also strengthen what exists at the state level first in order to protect the

[677] Eckersley 1992; p. 182.

local areas from global economic influences and regional competition. While the state is challenged by the same factors, Eckersley thinks it is still necessary.

Eckersley in her earlier work identified a paradox with so-called 'Green State,' that despite the urge to radically decentralize for democratic reasons, ecological problems existed at a multiplicity of scales and were affected by global and national policies, economic flows, and conflict. Because of this multilevel perspective, she takes explicit aim at the institutional naiveté of strict localism, represented at their extreme by the tradition of bioregionalism. Even at the height of her influence from transpersonal and deep ecology, Eckersley explains that ceding full autonomy would not meaningfully dictate the path of economic or social development in the region, nor ensure friendly relationships with neighbors, common rules and measures, or the broad respect for human rights. She calls bioregionalists 'politically naïve,' for not understanding that small was not beautiful when economic forces replace state regulation.

Eckersley is thus far from an optimist. What is interesting for my argument is the modulation of her energy to address state politics after her earlier claims that cultural change was the primary target. Many of these sentiments, expressed by people like social ecologist Murray Bookchin, 'transpersonal ecologist' Warwick Fox, and deep ecologist Arne Naess on whom she initially drew as critical foils to survivalist pessimism, are clearly lost in the appeal for a modified welfare state. Probably for this reason she strikes an apologetic tone:

> I acknowledge the contradictory role of the nation-state in managing ecological problems but suggest we search for ways of amplifying the

> state's role as an environmental protector while dampening its ecologically destructive potential over time.[678]

Reluctantly in the introduction to the edited volume, *The State and the Ecological Crisis,* she admits that 'there are many good reasons to be pessimistic about the ecological potential of states,' but it is fear of urgent crisis that drives her to 'explore some of the more hopeful signs and opportunities for ecological progress on the part of states.'[679]

This re-embrace of the state followed many theorists (Tully, Skocpol, etc) who remained critical of the claims that the globalized, neoliberal, or climate-changed contemporary world had invalidated the state as a governing institution or eliminated its operational power. 'Bringing the state back in' is both a theoretical rethinking of the idealistic market consensus of the early 1990s and a pragmatic response to the threats of natural disasters, deregulation, and terrorism that came to define the post-911 and Hurricane Katrina era.

Engaging this new, pragmatic argument for the Green State, I will argue below, can benefit from a more specific and exact language, as well as the presentation of a variety of empirical evidence and theoretical justifications. I want to think in particular about the contributions of fiscal federalism and comparative institutions, then return to the idea of remoteness to understand what the sum of the different arguments means for how we interpret the ecological potential of political and fiscal decentralization.

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[678] Robyn Eckersley, 2005. 'Greening the Nation State.' In *The State and the Ecological Crisis*, Eds. John Barry and Robyn Eckersley, MIT Press, Cambridge; p. 160.
[679] Robyn Eckersley, 2005. 'Introduction.' In *The State and the Ecological Crisis*, Eds. John Barry and Robyn Eckersley, MIT Press, Cambridge; p. x.

III. Fiscal Federalism and New Institutionalism

Institutionalists analyze when and why decentralization happens, examining the role of bargaining, regional power-sharing, and relative dominance of central and peripheral actors in the process of decentralization. Often, these analyses measure democratization or economic growth as their dependent variable, explaining their particular contextual readings of the appropriate sequence and composition of decentralization reforms in terms of how it accomplishes normative goals of good governance, social development, and economic stability.

That the results are decidedly mixed has a lot to do with the difficulties measuring these outcomes in different contexts present, and the very different path-dependent histories of local institutions and ecosystems which have led to this difference. Gaining empirical rigor is important in this debate because the popularity of decentralization around the world has created a backlash of studies which claim from specific experiments that it increases corruption and may be subject to elite capture. This seems right in some ways, since decentralization means there will be more points of entry for corruption and a localized level of accountability to influence decision-makers.

Many problems have been cited in this literature, such as issues with fiscal restraint,[680] efficiency, and increases in regional inequalities,[681] and these also map onto the kind of concerns brought by critics of green democratic politics. These concerns over the normative claims of decentralization drive commentators like Kathleen O'Neill to

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[680] Alberto Alesina, R. Hausmann, R. Hommes, and E. Stein, 1999. 'Budget institutions and fiscal performance in Latin America.' *Journal of Development Economics*, Vol. 59, No. 2, pp. 253-273.
[681] Remy Prud'homme, 1995. 'The dangers of decentralization.' *The World Bank Research Observer*, Vol. 10, No. 2, pp. 201-220.

examine the strategic environment in which decentralization actually takes place.[682] She finds that decentralization happens where political parties have strong, concentrated regional bases, but low expectations for winning national elections with any consistency. This encourages parties catering to regional groups without a national majority to, upon winning power, restructure the political environment in such a way as to privilege control over regions with fiscal as well as administrative power in an attempt to insulate their interests from the tampering of other groups which may be dominant in the future.

Other scholars have also tried to step back and ask more complicated questions about decentralization as a process rather than evaluate its theoretical vices and virtues. Tulia Falleti's convincing theory of sequential decentralization incorporates territorial interests, bargaining theory, and fiscal transfers together to show that national dominance in the process of decentralization leads to administrative rather than political or fiscal decentralization, explaining why decentralization sometimes, seemingly paradoxically, results in powerless local institutions.[683] The devolution of mandates without funds or accountability mechanisms, for Falleti, explains the comparatively weak results of decentralized regimes dominated by national policy-making objectives.

The useful idea in the institutions literature is that the form that the *process* of decentralization takes is very important. As the experience of many American cities can attest, often the decentralization of what Willis, Garman, and Haggard call 'political' (elsewhere referred to as administrative by Falletti) authority is not matched by a decentralization of fiscal authority which can fund the new layer of bureaucracy.[684] As

[682] O'Neill 2003.
[683] Falletti 2005.
[684] Willis, Garman, and Haggard 1999.

Falletti explores, without some independence from conditional central funding, this 'local autonomy' appears mostly in name and less in action. The effect can be something like the clientelism used by one-party regimes, where necessary funding is contingent on compliance with a central power structure, and can act as a powerful tool for punishing or rewarding local officials.

Institutional results of decentralization may thus depend on the sequence of devolution of authority, as Falletti explores, which essentially comes down to whether or not administrative and political decentralization are matched by fiscal authority. O'Neill claimed that top-down reforms could be used to preserve elite control, a possibility which she sought to explain through a bargaining model pitting territorial interests in conflict within political parties. She sees decentralization as an electoral strategy by regionally powerful parties, an intuition backed by some analyses of Oaxaca.[685] Understanding themselves as outmatched at a national level, such parties are, for O'Neill, interested in political decentralization as a way of building a new, rival kind of constituency, a tactic which can be used in various ways depending on the user. Her central insight is that this political constituency is hard to get rid of, which explains why Falleti privileges it.

Falleti's argument is that the most genuinely empowered subnational institutions come where political decentralization creates a constituency, as O'Neill and others had claimed, then receives adequate fiscal autonomy to accomplish tasks, followed by official mandates to do so and bureaucratic implementation capacity. Falleti here has accepted

[685]Matthew Cleary, 2007. 'Electoral Competition, Participation, and Government Responsiveness in Mexico.' *American Journal of Political Science*, Vol. 51, No. 2, pp 283-299; Alejandra Anaya Muñoz, 2005. 'The emergence and development of the politics of recognition of cultural diversity and indigenous peoples' rights in Mexico: Chiapas and Oaxaca in Comparative Perspective.' *Journal of Latin American Studies*, Vol. 37, No. 3, pp. 585-610.

the general breakdown of terms from Rondinelli and others, separating decentralization into fiscal, administrative, and political elements.[686] This breakdown is not shared across the literature. Many, like O'Neill, opt for simpler dichotomous terms (political and bureaucratic) or use different terms to designate the different types of decentralization (devolution, deconcentration, etc). Rondinelli's tripartite definition is used by several of the authors I treat centrally here, including later in the chapter on Oaxaca, which is why I adopt it explicitly here.

Falleti is contesting the basic assumption of the rest of the institutions literature that decentralization necessarily strengthens subnational actors, following from critiques like Jesse Ribot and others concerning partial decentralization in African and Latin American resource regimes.[687] Her theory, problematizing the connection between decentralization policy and meaningful local autonomy, seeks to explain the divergent outcomes by setting the decentralization model in motion and extending the analytic framework to understand path dependency in a more systematic way. She believes, like Ribot and others diagnosing the problem of partial decentralization, that the best process begins with political decentralization, which opens new spaces for representation, and that without this space (i.e. if national interests prevail in this first stage), administrative duties will follow without the requisite fiscal authority to deal with new social duties, indebting the local level to the state.

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[686] Dennis Rondinelli, John Nellis, and Shabbir Cheema, 1983. 'Decentralization in Developing Countries.' *World Bank Staff Working Paper*, #581.

[687] See: Jesse Ribot, Arun Agrawal, and Anne Larson, 2006. 'Recentralizing While Decentralizing: How National Governments Reappropriate Forest Resources.' *World Development.* Vol. 34, No. 11, pp 1864-1886. They conclude by laying out the need for multi-scalar construction of accountable democratic institutions and preservation of local autonomy in resource decisions.

Decentralization itself is thus clearly a contested term, especially in the post-Cold War milieu that jointly defined the concept of sustainable development and 'Washington Consensus' on free trade in the early 1990s. The literature on comparative institutions largely accepts the tripartite definition, used since the 1980s, which breaks decentralization into three meaningful categories:

- **Administrative** – Also known as 'deconcentration,' administrative decentralization shifts responsibilities to local representatives of the center, delegating responsibility to semi-autonomous units that are still accountable to central government. This includes many forms of 'devolution,' a category which is also used with various definitions, and 'divestment' or privatization, common throughout the 1990s and Washington Consensus.
- **Political** – Political forms of decentralization are concerned with how localities or regions come to influence policy relevant to their region. This involves incorporating greater pluralism, greater representativeness, and greater popular influence the implementation of laws. It can be carried out through constitutional reform or creation of local units with meaningful deliberative and decision-making capacities. This is the category most clearly tied to democratization and common pool resource arguments.
- **Fiscal** – Fiscal decentralization refers to the ability to collect revenue and spend it, and is often concerned primarily with 'vertical imbalances,' or problems in transfers of money to match administrative and political mandates from central government to local levels. The primary influences in this theory privileged local goods distribution for being better able to efficiently match preferences (i.e. better

feedback and accountability), but this preference, known as Oates Decentralization Theorem, is balanced by the assumption that national governments can internalize spillovers between regions in a more just and efficient manner.

Fiscal decentralization is especially important to analyze because of the threat of partial decentralization to weak local governments, in essence it can be used as a weapon where conditional transfers are the norm, or sincerely by distributing funds unconditionally. Others focus on the ability to raise funds as a solution to the problem of partially-funded mandates, which raises questions about preexisting regional inequality. Crucially, this fiscal decentralization process, despite being organized often under the study of 'fiscal federalism,' can take place in unitary regimes, as evidence from post-colonial and EU examples clearly show. Several other major terms, related to different kinds of ideological and institutional arguments, appear throughout the major literatures on decentralization. The three below are the most interesting for the purposes of this chapter, but certainly not exclusive.

- **Devolution** – A term which can cover a wide range of specific decentralization policies depending on the author and field, usually devolution loosely means the delegation of powers to subnational level. In this way, by premising the legitimacy of its political mandate on the legitimacy of the central government, it is often seen as a form of administrative decentralization which is temporary, reversible, not constitutionally protected. Many common usages, including the legal ones in some countries, include constitutional protection and revenue

generation, thus it is crucial to see exactly how the author decides to define it in terms of institutional hierarchies and financial mandates.

- **Ecological decentralization**– Also called 'environmental federalism' and 'ecosystem-based management,' ecological decentralization strategies have largely been pursued by national resource regimes and regional collaborations across scales, including across national borders, as the dramatic case of the European Union has interestingly shown. These arguments, as explored through the EPT arguments above, include both practical co-management systems and more cultural and political versions of decentralization arguments, especially those related to democratic theories calling for enhanced feedback and accountability.
- **Subsidiarity** – The principle of subsidiarity, or idea that power should begin from the lowest level possible, has ancient roots in the Catholic church, which had insisted in official church doctrine that social and political issues should be dealt with at most immediate and local level that was possible. This principle became part of the Christian Democratic parties of Europe, and helped inform corporatist policies in the development of the welfare state. It became a general principle of European Law in the Maastricht Treaty in 1992, but was already a part of the Council of Europe ideas since 1985.

The subsidiarity principle in practice creates the framework for a highly decentralized system, which makes sense because the most powerful regional players integrating into common markets and environmental institutions are states themselves.

The application of this principle is still highly contentious, as it is being used by regions across Europe to argue for autonomy from national states under the umbrella of the EU. The idea of subsidiarity has a broad resonance with anarchist strains of thought, but retains the nested systems metaphor and attention to cross-scale and cross-level interactions on which resilience and more interesting EPT are modeled.

Beyond these terms, there are some basic arguments that are found across all of the debates on decentralization and public goods, economic growth, or environmental protection. These include assumptions that decentralization helps preserve cultural heterogeneity by better matching local preferences and drawing government directly from the population of the region. Democratic arguments usually follow a set of common prescriptions based on mutualistic and consensual principles. Methods like direct democracy, municipalism, anarchism, libertarianism, and autonomy discourse all mix in these arguments, recommending greater pluralism, deliberation, and meaningful participation at the local level as ways of overcoming deficits in representation and trust in collective decision-making.

In complement to this theoretical overlap, I focus here to the debates over public good provision and possibilities of capture and corruption within the literatures narrowly associated with fiscal forms of decentralization, and more generally the political, cultural, and bureaucratic conditions necessary for such fiscal decentralization to be effective.

Contributions of Fiscal Federalism

Fiscal federalism has several important contributions to the debate over decentralization, key amongst them the precise language above and the measurable

quantitative evidence utilized. Perhaps most importantly considering the ecological framing of the analysis here, fiscal federalism is centrally concerned with the matching of goods provision with particular regional preferences, which is often theorized in a constitutive tension with economies of scale and efficient provision possible at the national scale. I argue further below that by understanding the key fiscal component underlying any robust decentralization regime, the inconclusive debates over fiscal federalism provide a theoretical and empirical architecture by which to gauge the debates over the Green State and green decentralization explored above.

The foundational localist text in this tradition is Charles Tiebout's 1956 theory that local sovereignty would allow for competition amongst local governments over rights and wages which would equilibrate the conditions across local levels and allow for institutional experimentation (a form of which is now called 'adaptive management,')[688] This is notable because Tiebout considers moving costless—he presumes a radically uprooted and insulated decision-maker which green theorists are unlikely to accept. Yet his solution, on paper, looks quite the same as radical democratic theory: allow local democratic governments to make more decisions about how to spend money. He claims that mobility across districts initiates a benevolent cycle where localities compete for tax revenue, better matching heterogeneous preferences and allowing people to sort themselves into voluntary association, an idea which has resonance with anarchists and free market liberals alike.

Tiebout was the liberal type, obvious by his assumption of frictionless world of movement and general dismissal of ties to place that might keep people from uprooting

[688] See: Kai Lee, 1999. 'Appraising Adaptive Management.' *Conservation Ecology,* Vol. 3, No. 2, 1-16.

and finding their ideal community. He believed that better matching the preferences of communities would also allow for a new kind of allocative efficiency for government and encourage regions to utilize underused resources. The fundamental element was, as neoliberal arguments later adopted (in addition to Hayek), competition, which presumed greater tax and expenditure authority, as well as freedom from overarching regulations at the federal level that might stifle the creative destruction of municipal competition.

The idea from Tiebout that mobility constrains policymakers was repeated in many forms.[689] So too was the assumption that local levels could better match heterogeneous preferences. This assumption was key for overcoming the simple argument that the national level could better leverage economies of scale in production and distribution of public goods, mirrored in the green literature by the idea that the state is the most efficient and urgent level of government to analyze and potentially utilize.[690] That such a competition of localities, denied protections from the national level, might be prey to a more disturbing kind of cycle, a 'race to the bottom,' came to be an operative concern behind dependency theory and structural economic strategies like Import Substitution Industrialization (ISI), which renationalized industries and raised foreign tariffs in the effort to build local competition before entering world markets.

The second foundational text of fiscal federalism, the 'Decentralization Theorem' of Wallace Oates, begins from the rejection of the centralized-efficiency argument, and

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[689] Paul Courant, Edward Gramlich, and Daniel Rubinfeld, 1979. 'Public Employee Market Power and the Level of Government Spending.' *The American Economic Review*, Vol. 69, No. 5, pp. 806-817; Dennis Epple and Allen Zelenitz, 1981. 'The implications of competition among jurisdictions: does Tiebout need politics?' *Journal of Political Economy*, Vol. 89, No. 6, pp. 1197-1217; Wallace Oates, 1985. 'Searching for Leviathan: An Empirical Study.' *The American Economic Review*, Vol. 75, No. 4, pp. 748-757.
[690] Alberto Alesina and Enrico Spolaore, 1997. 'On the number and size of nations.' *The Quarterly Journal of Economics*, Vol. 112, No. 4, pp. 1027-1056.

becomes a basic tenet of studies that follow, whether to be accepted uncritically, railed against critically, or reformulated for different contexts. This strain emerged in public economics in the 1970s, examining vertical allocations of funds within governments, as well as rights to expenditure and revenue collection. Despite the name, fiscal federalism has been fruitfully applied *in principle* and under the moniker 'multilevel governance' to decentralization experiments in unitary, subnational, and supraregional governments.[691]

The second modern 'father' of fiscal federalism, economist Wallace Oates, had a similar conclusion to Tiebout. In 1973 he coined the influential 'Decentralization Theorem,' which, following Tiebout's assumption of enhanced preference matching at local levels, claimed that in the absence of meaningful externalities the greater allocative efficiency of decentralized systems should be normatively preferred.[692] Thus, in this initial offering, Oates makes a case for a balance between respecting difference and internalizing externalities. These spillovers could be good or bad—drawing on public choice theory and Mancur Olsen, Oates claimed freeriders on positive externalities as well as spillovers of negative externalities were key issues.[693]

Oates' idea, like Tiebout's, was tied to parallel arguments about democratization and liberal markets, essentially adopting a market metaphor for government. Oates initially assumed identical districts as an extreme case where centralization would be preferred, i.e. the relative advantage of heterogeneous preference matching was null.

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[691] For EU and Latin American contexts see Hooghe *et al* and Eaton respectively: Liesbet Hooghe, Gary Marks, Arjan Schakel, 2010. *The Rise of Regional Authority: A comparative study of 42 democracies*. Routledge, NY; Kent Eaton, 2004. 'Designing Subnational Institutions: Regional and Municipal Reforms in Postauthoritarian Chile.' *Comparative Political Studies*, Vol. 37, No. 2, pp. 218-244.
[692] Oates 1973.
[693] Mancur Olson, 1965. *The Logic of Collective Action: Public Goods and the Theory of Groups*. Harvard University Press, Cambridge; William Ophuls, 1977. *Ecology and the Politics of Scarcity: Prologue to a Political Theory of the Steady State.* WH Freeman and Company, San Francisco.

Relaxing this condition, he claimed, made local levels proportionately more efficient in a kind of linear tradeoff. Besley and Coate, amongst others, contest the premises of this initial reduction—they claim that while centralization can potentially balance regional interests, the presence of minimum winning coalitions of regional interests in the legislature can mean that some localities will be excluded no matter what.

This is in contrast to arguments like those of Barry Weingast and others that cooperative legislatures make centralization in federal republics a preferable institutional option.[694] For those contesting Weingast's assumptions, including the electoral dynamics and legislative politics assumed away in Oates' simpler model made any assumption of benign centralized public good provision naïve since in reality there are no uniform subnational entities. By Oates' tradeoff, this would make decentralization preferable no matter what the levels of heterogeneity where externalities are low.

By pluralizing the assumed uniformity of both subnational levels and the national legislature, Besley and Coate and others begin from a base level of heterogeneity that emphasizes allocative efficiency. They add to Tiebout that sharing expenses at higher levels encourages conflicts of interest, following another common assumption in the decentralization literature up and until the consolidation of the neoliberal program in the early 1990s.[695] This idea was that, given meaningful financial power, subnational governments would be tempted for a variety of cynical and altruistic reasons to

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[694] Barry Weingast, 1979. 'A rational choice perspective on congressional norms.' *American Journal of Political Science,* May, pp. 245-262; This is broadly in line with the idea of 'market preserving federalism' as well, which Weingast believes reduces regional disparities. See also: Barry Weingast, 1995. 'The Economic Role of Political Institutions: Market-preserving federalism and economic development.' *Journal of Law, Economics, and Organization*, April, pp. 1-31.

[695] Timothy Besley and Stephen Coate, 2003. 'Centralized versus decentralized provision of local public goods: a political economy approach.' *Journal of Public Economics,* Vol. 87, pp. 2611-2637.

overspend their mandate, knowing that the central government would have an incentive to bail them out to preserve the economies of neighboring communities.[696]

This idea was the operating assumption in world financial institutions and national governments up until the dramatic restructuring of the world economy in the early 1980s. It remains the most common critique across financially-focused rejections of decentralization, maintaining that the national level was the only one which could effectively contain certain types of spillovers, reduce financial disparities across subnational levels, or limit the proliferation of redundant and inefficient governments.[697] Further, even given unconditional transfers to local governments, questions remain about unequal preexisting capacity of different regions, especially the greater capacity of a professional civil service, active civil society, and legitimate political institutions.[698]

It is notable that ecological issues, which are increasingly international externalities, violate the common assumption of Oates and his critics alike, i.e. the fact that national level contains all subnational externalities. This idea is nonsensical in the age of climate change, and was already in communities inhabiting border settlements. In an article 27 years removed from his seminal work, Oates continued to maintain that greater competition and resource mobilization in decentralized systems can make public goods provision more efficient, encourage policy innovation.[699]

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[696] Jonathan Rodden, 2000. 'The dilemma of fiscal federalism: Hard and soft budget constraints around the world. *Massachussets Institute of Technology*, Cambridge; Alesina *et al* 1999.
[697] Jorge Martínez-Vázquez, 2011. 'The Impact of Fiscal Decentralization: Issues in theory and challenges in practice.' *Economics Faculty Publications*, Georgia State University, Paper 23.
[698] Paul Cheshire and Ian Gordon, 1998. 'Territorial competition: some lessons for policy.' *The Annals of Regional Science*, Vol. 32, No. 3, pp. 321-346.
[699] Wallace Oates, 1999. 'An essay on fiscal federalism.' *Journal of Economic Literature*, Vol. 37, No. 3, pp. 1120-1149; Wallace Oates, 2005. 'Toward a Second-Generation Theory of Fiscal Federalism.' *International Tax and Public Finance,* Vol. 12, pp. 349-373.

In work from around the same time, he explicitly addresses the idea of 'environmental federalism,' claiming that despite evidence of a possible 'race to the bottom,' meaningful roles for decentralized regulation remained, alongside a role for the state. This is a direct application of the tradeoffs between economies of scale and preference matching.[700] In a coauthored piece two years later, he looks across the US and Western Europe and finds 'sparse evidence' of a 'race to the bottom' initiated by local resource regulation, instead claiming that there was a discernible trend toward more efficient decision-making as economics comes to its *deserved* place in sustainability studies.[701] That they only look at areas in the 'developed' world means that the argument does not travel to the most important debates within fiscal federalism about state capacity and elite capture.

Corruption and Capture arguments

Many of the arguments against decentralization stem from the analysis of Mancur Olsen and George Tsebelis, each of whom claimed that policy gains were harder to achieve where more interests needed to be accommodated.[702] William Riker and others claimed that this was an aspect of federalism itself, that it would slow change.[703] By opening up more potential veto-gates and diluting the clarity of responsibility for policy decisions, decentralization was seen as both weakening accountability and increasing the opportunities for corruption. The same local shelter that many democratic theorists

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[700] Wallace Oates, 2001. 'A Reconsideration of Environmental Federalism.' *Discussion Paper*, Resource for the Future, November, pp. 1-54.
[701] Wallace Oates and Paul Portney, 2003. 'The Political Economy of Environmental Policy.' *Handbook of Environmental Economics, Volume 1.* Ed. KG Maler and JR Vincent, pp. 325-354.
[702] Olson 1965; Geoge Tsebelis, 2002. *Veto Players: How Political Institutions Work.* Princeton University Press, NJ.
[703] William Riker, 1964. *Federalism: Origin, Operation, Significance*. Little, Brown, and Co, NY.

believed could preserve local character and protect marginalized minorities, in other contexts, was seen as a potentially dramatic loss of democratic agency and overarching national rights, and in some cases a clear impediment to social progress.

The most powerful cases against decentralization in the fiscal federalism and public economics literatures are typically related to the corruption of subnational institutions, whether through financial dominance by the central government or elite capture of key political positions that inhibit economic growth, democratization, or environmental protection (depending on the author's dependent variable). Both relate to the weakness of civil service (especially administrative capacity) and problematic forms of partial decentralization where mandates for important tasks are left unfunded, damaging the credibility of the subnational institution. These kinds of 'vertical imbalances' are said to appear due to corruption, spatial inequality, and a lack of local competency, encouraging a vicious lock-in in certain contexts.[704]

Falleti's institutional sequence theory begins from the acknowledgment that partial mandates (due to central government sabotage, relative regional economic weakness, or lack of local competency) are evident throughout the 'developing' and 'developed' world alike. As economist Pranab Bardhan notes, incomplete decentralization complicates accountability arguments—many subnational governments are given mandates they cannot fulfill without any meaningful fiscal autonomy in revenue generation or unconditional transfers. Bardhan offers the case of the continent of Africa and country of India in a broad stroke—where local governments have no access

[704] Vito Tanzi, 1994. *Corruption, Governmental Activities, and Markets*. International Monetary Fund No. 94-99; Prud-homme 1995.

to their own tax base, Bardhan claims, corruption and capture are incentivized, which in turn dilutes citizen incentives to pursue accountability, already reduced by the existing lack of capacity.[705]

Focusing on partial decentralization complicates the more simplistic arguments for or against decentralization, arguing that the results are not really known in many cases because decentralization is a process and not just an outcome. Some have interpreted this possibility related to partial decentralization as a blanket condemnation of decentralization theory, claiming that because weak, corrupt institutions make local efficiency problematic, underdeveloped regions are consistently left behind. This is a problem made even more problematic in developing world which starts with a lower basic level of institutional capacity and economic flexibility.[706]

Beramendi and others have thus argued that decentralization encourages a less developed welfare state with greater regional inequalities.[707] This follows directly from the perceived tension between national equality and local choice assumed by Oates.[708] In the most cited of these critical articles, Remy Prud-homme argues that by undermining the central state redistributive policies decentralization transfers development from peripheries back to cores, a trend which is exacerbated over time by the greater capacity for growth and complexity enabled through efficient utilization of resources on education

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[705] Pranab Bardhan, 2006. 'The economist's approach to the problem of corruption.' *World Development*, Vol. 34, No. 2, pp. 341-348; Pranab Bardhan and Dilip Mookherjee, 2006. 'Decentralization and Accountability in Infrastructure Delivery in Developing Countries.' *The Economic Journal*, Vol. 116, January, pp. 101-127.

[706] Jaime Bonet, 2006. 'Fiscal decentralization and regional income disparities: evidence from the Colombian experience.' *The Annals of Regional Science*, Vol. 40, No. 3, pp. 661-676.

[707] Pablo Beramendi, 2007. 'Inequality and the territorial fragmentation of solidarity.' *International Organization*, Vol. 61, No. 4, pp. 783-820.

[708] Timothy Besley and Maitreesh Ghatak, 2003. 'Incentives, choice, and accountability in the provision of public services.' *Oxford Review of Economic Policy*, Vol. 19, No. 2, pp. 235-249.

and other types of social capital rather than basic needs or debt payment. Prud'homme's argument, like other critics', is based on the economy of scale assumption.[709]

A more nuanced of almost the same argument comes from more radical sources, in this case from the work of Andrés Rodríguez-Pose.[710] In a piece with Sandall in 2008 he makes the case that the newest forms of global decentralization discourse are distinctly neoliberal, i.e. framed as non-political in a way which damages their democratic potential. Conducting a cross-national panel of 26 countries over a 7 year span, they find no relation between decentralization and oft-predicted exacerbated regional disparities, finding instead that economic gains were mitigated by spatially clustered economic inequality and the fiscal capacity of the state for redistribution.[711] Essentially, Rodríguez-Pose makes the case that neoliberal decentralization schemes are good for high income places with high state capacity, producing better and more equitable distributions of regional inequalities. In contexts of societies with low or medium income, and thus weaker state capacity, however, they find regional disparities in fact increased.

I think it is possible that Rodríguez-Pose, writing against what he perceived as a dominant and unreflective narrative prescribing neoliberal decentralization in the 'developing' world. is talking about partial decentralization as a strategy, not decentralization itself.. This confusion enhances the need for a concept like 'remoteness,' which, as explored earlier, differentiates neoliberal economic decentralization logics based on Hayekian competition theories from radical cultural arguments like bioregionalism or indigenous rights. That things like resilience theory can be seen as

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[709] Prud-homme 1995.
[710] Andrés Rodríguez-Pose and Nicholas Gill, 2004. 'Is there a global link between regional disparities and devolution?' *Environment and Planning A*, Vol. 36, No. 12, pp. 2097-2117.
[711] Rodríguez-Posé and Ezcurra 2010.

potentially Hayekian should be a warning to radical theorists that there are some very mixed and at times misleading vocabularies mixing and often talking past each other.[712]

Three important responses to the critiques of decentralization are interesting here. The first is from economists Thorsten Persson and Guido Tabellini, who have made the case in articles from the early 1990s that such fiscal federalism debates chronically ignore the role of competitive elections in arguments over efficiency and public sector redundancy.[713] They note how tradeoffs appear between incentives to insure and share risk through centralization and the kinds of moral hazard such insurance might cause in regions willing to take on more debt to address urgent needs. Persson and Tabellini focus on this tradeoff, looking at the shape of regional transfers in different kinds of constitutions and weighing their suitability.[714] What this means is that the process of decentralization could take many different, highly path-dependent forms and timings.

Acknowledging such path dependency means that the uniformity assumption at the heart of positive public economics accounts of centralization is untenable in theory. Lockwood moves further and problematizes the benevolent legislature of Weingast and others.[715] Later, Lockwood claimed that the standard approach using benevolent governments and policy uniformity was unfit for analyzing decentralization.[716] Lockwood, instead, wants to seat the analysis in a more complicated political economy

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[712] See the controversial argument in: Jeremy Walker and Melinda Cooper, 2011. 'Genealogies of Resilience: from systems ecology to the political economy of crisis adaptation.' *Security Dialogues*, Vol. 14, No. 2, Advanced Draft.
[713] Torsten Persson and Guido Tabellini, 1994. 'Is inequality harmful for growth?' *The American Economic Review*, June, pp. 600-621; also Torsten Persson and Guido Tabellini, 1996. 'Federal fiscal constitutions: Risk sharing and moral hazard.' *Econometrica: Journal of the Econometric Society*, May, pp. 623-646.
[714] Persson and Tabellini 1996
[715] Ben Lockwood, 2002. 'Distributive politics and the costs of centralization.' *The Review of Economic Studies*, Vol. 69, No. 2, pp. 313-337.
[716] Ben Lockwood , E. Ahmad, G. Brosio, 2006. *The Political Economy of Decentralization*. Edward Elgar Publishing, Northampton, MA.

framework which amalgamates many of the insights from the institutionally-centered and democratically-based arguments in fiscal federalism and environmental political theory.

This framing shows that, given the strategic incentives for policy makers, the homogeneity of the unit considered is vitally important, with decentralization dominating even with spillovers in homogenous regions, and centralized control dominating, even with spillovers, in heterogeneous regions. This, again, points to the need for further context to understand the claims made in the literature in more abstract and universal terms than the practical democratic and ecological resistance projects now currently endorsing municipal autonomy. In one such study, Fisman and Gatti find that the major arguments about corruption and decentralization, including the creation of more possible rents and inefficiency of redundant and ill-funded government, are not supported generally.[717] These potential outcomes are not doubted or denied, it is their *potentiality* which is forgotten. For instance, would it matter if more veto-players were introduced if each was subject to rigorous forms of accountability?

Fisman and Gatti saw that although more potential rents were created, there was actually lower corruption indicators in fiscally decentralized areas, a result which is statistically significant but also more complicated in contextual application than makes many people comfortable. These more contextual details are important to acknowledge, especially where we intend to add natural systems as an interpenetrating partner to social and economic ones. Broadening the possible sources of path dependence, such an insight into historical determination begs studies like Jared Diamond's vaguely racist

[717] Raymond Fisman and Roberta Gatti, 2002. 'Decentralization and Corruption: Evidence from US Federal Transfer Programs.' *Public Choice*, Vol. 113, pp. 25-35.

development hierarchies, or Acemoglu and Robinson's factor endowments or settler mortality rate theories.[718] As natural systems are the source of such environmental factors, carried to a determinist extreme at times by Diamond and some historical geographers, they also serve as the crucial translation between local natural capital and global economic pressures.

The authors consulted above, while disagreeing on their final assessments of decentralization, all agree that partial mandates and lack of meaningful political and fiscal authority to match newly decentralized 'powers' create impossible traps for local governments. What they disagree about is the relative likelihood of falling into such traps, especially given that many already vulnerable groups will experience a highly uncertain set of global changes for which they bear little responsibility.

IV. Decentralization and the Environment

Usually when we consider the relationship between decentralization and ecological outcomes in political theory there are two ideal reactions. The first follows Garrett Hardin's 'tragedy of the commons' metaphor, predicting serial collapse without the intervention of state power to assert property rights or even take temporary military control. The second rejects these premises, often claiming that new movements and local accountability were key. This opposition is symbolic at some level—most of the survivalists like Hardin were actually avowed decentralists in ethical and ideological terms. What they doubted was the ability of such local, democratic institutions to

[718] Jared Diamond, 1997. *Guns, Germs, and Steel: The Fates of Human Societies*. WW Norton and Co, NY; Daron Acemoglu, Simon Johnson, and James Robinson, 2000. 'The colonial origins of comparative development: an empirical investigation.' *National Bureau of Economic Research*, No. w 7771.

respond to more rapid kinds of change, based their need for time-consuming deliberation and collective decision-making.

In the new survivalist era of climate change and the Anthropocene, the old autarchic strain of political theory, with its romantic cultural themes matched by pragmatic institutional efficiency arguments has to be urgently updated with multilevel and cross-scale metaphors that make planetary change legible and collective action possible.[719] The problem of the urgency introduced by global crisis is that it makes the institutional and cultural tasks amalgamated in green theories, like Plumwood's remoteness explored above, appear to be a zero-sum decision about on what front to deploy limited resources. The increasing webs of economic and communication networks make such anarchist back to the land dreams both appealing and on their face insufficient in practice if done without support from other scales of collective organization.

What's worse, their connection to areas in the developing world, with potentially different kinds of ethics based on their particular history, is tenuous, using the developing world more often as a test site than a place of inspiration or coauthorship. The difference in the findings for areas with weak state capacity, insufficient fiscal resources, and rapidly industrializing economies constitutive of the category of 'developing' should be sobering for environmental theorists, since 'developing' countries continue to hold the bulk of the remaining vital ecosystems and natural capital on earth. The problem of global urgency may ironically overwhelm the even more urgent need to build local and

[719] It is for this reason that Dryzek classifies bioregionalists as both romantics and pragmatists. See: Dryzek 1997.

regional capacities to both deal with change and begin actively debating the shape and rhythm of the future still to come.

Subsidiarity and Cross-Scale Interactions

Theorists rejecting survivalist authoritarian premises, like those debating the Green State in the 1990s and 2000s, have largely moved from old natural metaphors of unique equilibrium systems in developed or immature states of secession. Evolving from common pool resource theory and resilience thinking, the concepts of panarchy and co-management have come into serious discussion, whether through the search for an active and learning policy process or in the resigned sense that localization, regardless of futile efforts at other levels, is the inevitable scale of politics in a climate changed world. As Garry Peterson notes, these metaphors directly translate key aspects of resilience thinking typically applied to natural systems, including the need for redundancy and diversity.

This ecological metaphor is common to Ostrom's polycentricity theories, as well, which advised the creation of authorities at different scales and with different but overlapping mandates. Because Ostrom stresses the importance of accountability, trust, monitoring, and enforcement, the local level remains of primary importance. Reproducing a combination of the arguments from democratic theory and Oates' decentralization theorem in public economics, Ostrom famously showed with empirical examples that the assumptions of authoritarians like Hardin that local areas were doomed to serial failure of commonly managed resources were not universal. She remains practical, privileging a learning process at the heart of trust solutions to Hardin's famous commons dilemma. This is because she recognizes that no one institutional solution is

right for every place or even every time in the same place, as her work on the selective centralization of water and other kinds of vital resources in times of scarcity details.

The section on fiscal federalism stressed that decentralization was neither precise as a concept nor perfectly applied in any real context. In particular, the role of strategic sabotage of the process and the varying preexisting strength of civil society and community identity in the regions empowered will have a large role to play in how the resources unleashed by decentralization reforms will be utilized, i.e. whether or not they can be turned into the kinds of gains which economists and environmental political theorists can recognize as part of their own debates. Understanding that context matters, that we look for 'good enough governance,'[720] i.e. understand that such a concept is a process and not a final outcome, the possibility of capture, unfunded mandates, and lack of subnational capacity may create obstacles and turn the course of decentralization in a particular context in a path dependent and historically contingent way.

Inevitable ecological change like sea level rise and climate change mean measures for adaptation need to be developed to lower the vulnerability of precarious localities and regions. Given recent advances in the understanding of nonlinear change, this task becomes more than building sea walls and water storage—the uncertainty and local variability built into the slower processes of global change stress managing shocks and hazards, but do not always privilege longer-term adaptation processes with political or ethical implications. Instead, lacking transformative potential, such bureaucratic forms of preparedness measure only vulnerability and ability to return to form after shock, and

[720] Merilee Grindle, 2007. 'Good Enough Governance Revisited.' *Development Policy Review*, Vol. 25, No. 5, pp. 553-574.

encourage, at their extreme, the development of drastic, large-scale technological efforts like climate geoengineering that entail novel forms of planetary risk.

Adaptive policy regimes are designed with a similar set of ecological metaphors in mind, including nested systems and local capacity building. The subsidiarity principle is based off the intuition from Oates and elsewhere that the most efficient preference matching can be done at the local level. Added to the bonuses of enabling deliberation and, in the best case for building trust, face to face interactions over time, the local level is again a major priority. This is given extra impetus by hostile central governments, not a privilege to the 'developing' world. In the case of a national government which, despite the apparent progress towards an emancipatory, green state, completely reneges on these new responsibilities and actively dismantles the hard-won institutions of past eras, this need to build local resilience and collective capacity at a variety of subnational and global levels can be dizzying. This is because the question of the effective scale to address a problem depends on so many contextual factors, both the specific ecological challenge confronted and the particular history of the human community experiencing it.

From these more direct translation of new ecological metaphors incorporating complexity theory, there is also an evolving current of particularly 'social' social-ecological systems theory, usually the work of interdisciplinary scholars from the humanities and social sciences. Social-ecological resilience, as posited by Holling and coauthors, places human systems into adaptive cycles of renewal, reorganization, conservation, and collapse, but adds social memory and collective action as potential feedback mechanisms to prevent state shift. This resilience, they are at pains to stress, can be better or worse for human life. Instead, they recommend allowing small

disturbances and maintaining institutional diversity, 'letting small fires burn' to prevent the fires of the century.

The resulting institutional ideal of resilience thinking, adaptive governance, allows that disturbances are inevitable and seeks flexibility above all, i.e. the ability to deal with disturbances from lower and higher levels without creating greater risks. Where such local institutions can do better than a coin flip, they are already better prepared than the industrial ideologies which saw nature only as material and therefore infinite due to human ingenuity. Instead, such systems are designed to learn systematically from experience, proposing policy as a kind of first experiment in many towards lessening the risk of catastrophic shock and state shift to conditions which, like the climate changed future predicted today, are less welcoming and recognizable to human life, and greatly impoverished of its biodiversity.

The empirical evidence to draw upon in these debates is growing as different academic disciplines arrive at the study of subnational politics and local adaptive capacity, if for radically different reasons and with different ethical and political interpretations of its meaning. The European Union and many post-military or post-colonial states continue to experiment with various forms and sincerities of fiscal, political, and administrative decentralization, whether in natural resource management or more expansively as part of democratization and decolonization projects.[721]

The textbook case in the expansion of traditional 'federal' themes is the supra-national project underway in the EU. Reorganizing natural resource management to

[721] Kent Eaton, 2006. 'Decentralization's Nondemocratic Roots: Authoritarianism and Subational Reform in Latin America.' *Latin American Politics and Society*, Vol. 48, No. 1, pp. 1-26.

cross borders as well as creating the continental currency, the EU has also activated old movements for autonomy in multi-ethnic nations like Spain and national backlash infamously now in the Brexit vote taking Britain out of the Continental government. Again, complicated mixtures of democratization, autonomy, cultural preservation, and environmental fit flow through the EU debates, buffered by the continued presence and importance of the national bureaucracies and their pushback against their dismembering into constitutive parts.

Following the original logic of decentralization theory in Oates' first fiscal federalism articles, those resources with large spillovers, including air, water, waste, and now carbon are regulated at a higher level.[722] At once, the EU is pulling meaningful sovereignty horizontally to regions traditionally subordinated to centralized national states, and also vertically to the European capitol and into deals like the Paris accords on climate change in 2015 as a unified block. The European constitution privileges local regions with the subsidiarity principle, mimicking Oates' decentralization theorem. This formulation, however, is complicated in the environmental case for two reasons. One, spill-overs are high on certain environmental factors which regional neighbors share (water, air, etc). Two, there are *global* spillovers not captured at the EU scale of governance, which means that the simplifying assumption that subnational spillovers are or even *can be* captured by the national level is untenable in the case of things like climate change, sea-level rise, biodiversity loss, and other global environmental crises.

[722] For example see Jean-Gabriel Wasson, André Chandesris, Ana Garcia-Bautista, Hervé Pella, Bertrand Villaneuve 2007. 'European Hydro-Ecoregions.' European Union *REBECCA Project: Relationships between ecological and Chemical Status of Surface Waters*, CEMAGRAF, April.

It is key to stress again that fiscal federalism is not just about federal systems, but rather can draw expanded resources in case of EU and post-authoritarian states to other kinds of governments making large transfers to regions or states and delegating decision-making and tax generating authority to lower levels. As Liesbet *et al* claim:

> MLG refers to a multilevel and multi-actor paradigm. It does not challenge the sovereignty of states directly, but describes how a multilevel structure is being created by various actors at various levels.[723]

Unlike the American focus on federalism, the EU focus on many types of government and supranational pull of continental institutions, balanced with regional autonomy concerns, requires common language about multilevel government, which matches better with the more ecological models in adaptive governance theory and nested systems, with their focus on cross-scale interactions and nonlinear change.[724] Their insistence there is that national measures of how much revenue governments share do not tell an adequate story about what *kind* of regional government is in place, nor how it interacts with other levels. Multi-level governance is designed to refocus on the subnational arena to gain precision in language and measurement.

Contesting the claim that decentralization weakened the welfare state, Sellers and Lidstrom have argued that in fact decentralization was *precondition* for welfare state in Scandinavia. They think this is interesting because social democracy is usually considered to be unitary and fully centralized, yet they point out that the most successful have vigorous local politics and strong regional capacity for implementation. These strong local governments command national agenda time and greater unconditional

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[723] Liesbet *et al* 2010; p. 42.
[724] See Kai Lee 1997 on adaptive management and policy-learning cycles in the Columbia River Basin.

financial resources to carry out social welfare mandates like education, health care, and food. Thus, for them, strong local governments 1) help implementation in diverse contexts, and 2) provide political resources for civil society.

Hooghe *et al* 2008 note that Austria, Germany, and Switzerland are federal systems, and that subnational autonomy deals in Belgium, Italy, and Spain, along with asymmetrical devolution regional power sharing in France, Poland, the UK, and Portugal mean that Europe in the second generation of EU reforms is an experiment in decentralization processes and source of insight into possible outcomes.[725] Their idea of nested institutions closely matches evolving ecological political models like adaptive management and governance schemes. They say in the introduction: 'Individuals are encompassed in multiple jurisdictions operating at diverse territorial scales from the local to the global […] Government—the exercise of legitimate authority—is structured across multiple levels of non-intersecting jurisdictions. The number of such levels for most people living today is between three and seven, of which between one and five exist within their nation state'

Experiments with natural resource governance have gone further, reflecting a broad shift in industrialized nations to ecosystem-based management, collaborative use mapping, and even the redrawing of political districts along watershed lines, as has been experimented in the catchments of Australia.[726] This more ecological focus has been

[725] Liesbet Hooghe, Gary Marks, and Arjan Schakel, 2008. 'Operationalizing Regional Authority: A coding scheme for 42 countries 1950-2006.' *Regional and Federal Studies*, Vol. 18, No. 2-3, pp. 123-142.
[726] Graham Marshall, 2008. 'Nesting, subsidiarity, and community-based environmental governance beyond the local level.' *International Journal of the Commons*, Vol. 2, No. 1, January, pp. 75-97; Graham Marshall, 2013. 'Adaptive governance of cross-border river basins: institutionalizing sophisticated subsidiarity.' *Reflections on water reform in the Colorado and Murray-Darling Basins*, Global Water Forum, Canberra, Australia.

overwhelmed in practice, however, by reforms undertaken as part of structural adjustment and debt restructuring packages which broke up closed economies starting in the early 1980s. The stress from the European example, somewhat complicated by Brexit now, was importantly on the principle of subsidiarity, a concept which began as Catholic theology and is now enshrined in the EU treaties at Maastricht and Lisbon.

Bioregional Democracy or Neoliberal Fragmentation?

I argued in other places that bringing history back into environmental politics is imperative in the era of the Anthropocene, where the intoxicating newness of the global epoch of human control bears optimistic and dystopic visions of the future but rarely turns a critical eye on contemporary conditions in which the majority of the world lives. The conflicts over historical responsibility at climate meetings and the controversial redistributive concept of an 'ecological debt' owed to exploited producers in export-led economies give some hint at the kind of resentment and indignance that such conversations can inspire where the guilty party refuses, under the guise of great planetary urgency, to acknowledge their responsibility for the arriving changes.

The theoretical and empirical analyses collected together above point to an active task for 'developed' and 'developing' contexts alike—the construction of new constituencies where they do not exist, following the lines of natural systems and vital resources. This serves as a kind of answer to the sense of resignation and bad faith 'organized irresponsibility' currently rising to prominence in our new survivalist epoch. Following Plumwood, Folke, and many others, this renewal must be more than just institutional, but also cultural, reconnecting individuals to secure attachments with nature

and with each other. It must supplement theoretical debate with an eye for experimentation and ensuring change through actual implementation, bypassing all the strategic impediments of the distending of state power.

Rather than disqualified by the global nature of contemporary environmental crises, bioregionalism, with its stress on community with the land, reinhabitation, and local knowledge could provide a new kind of glue for heterogeneous societies, the archetypical case being cross-border, unequally developed contexts like San Diego and Tijuana, as I explore later in this project. The empirical analysis in common pool economics and fiscal federalism literatures stresses that such local institutions are at a relative advantage *vis a vis* centralized forms where they can create new and meaningful lines of accountability and participation in implementation, monitoring, and enforcement, as noted by common pool resource theories. At the same time, these local institutions need to pay attention to *cross-scale* interactions as well in order be resilient against shocks generated at higher levels, the greatest of which is the planetary scale at which climate change, sea level rise, and water scarcity are already happening.

The basic intuition in the institutional literature is that the more important regional interests are to the continued survival of central politicians, the more decentralized the resulting system should be. This carries trade-offs. Even assuming common measures and language, many worry that decentralization in systems where there are weak institutions, a lack of resources, or existing inequalities across regions may lead to higher costs for monitoring and enforcement, loss of possible economies of scale in production and public goods provision, moral hazard in state spending policy, and the corruption or

capture of local institutions by regional elites. Worse, it may inhibit risk sharing on regional disasters and make emergency response impossible.

The key for arguments based on accountability and monitoring is the importance of accountability lines within parties to make the link between scales, which seems to reproduce the argument for the emergence of strong federal regimes, i.e. there exist strong regional powers which cannot necessarily be overtaken by force or economics and thus must be incorporated in a more equal way. This would bear out in the differences between the case of Brazil, where militarily powerful states and fragmented national parties kept the central state from centralizing authority, as opposed to places like Venezuela, where the discovery of oil strengthened the fiscal power of the central government, or México, where fiscal authority remained a tool in the hands of the governing PRI for disciplining local authorities.[727]

This strategic environment has emphasized regional bargaining, revenue authority, and problems of local capture, debt, and regional inequality. In its less purely social choice-influenced manifestations, however, it has also productively examined the effect of pre-existing inequality, the importance of the sequence of reforms, effects on civic participation, and ability to deliver targeted public goods that grow local and regional capacity. The decentralization process, however, has also proceeded in practice at an administrative level through natural resource regimes and other forms of environmental management throughout the world, reflecting a scientific transition to more holistic forms of ecosystem-based management. The literature on political decentralization, however, predicts what many in environmental politics already know—

[727] See Diaz-Cayeros 2006 and Eaton 2008.

pure administrative decentralization without political or fiscal decentralization to match often results in underfunded mandates.

This idea is similar to the critiques of Oates' theorem from Besley and Coate, where they question the assumptions of identical communities in centralized scenarios, the source of a common assume trade-off between efficiency of local good provision in decentralized systems and the efficient redistribution of risk and resources in centralized systems. This tradeoff between diversity and equality is also present within the democratization and development literatures. Although none of these condemn decentralization outright, writers in recent times have been living in the dramatic expansion of decentralization reforms throughout the world. In this sense, mixed results, to many, implies a negative or critical view of those globalizing narratives.

Gaining some sort of empirical foothold on this debate is crucial, which is why I have taken the time to explain fiscal federalism. Fiscal federalism creates a kind of two dimensional policy space, consisting of horizontal relations between regions and vertical relations between levels of government. This space is, essentially, an ecology of collective social actors, as interpreted by resilience theories of panarchy utilized in adaptive governance schemes as well as the more well-known 'polycentricity' made popular by Elinor Ostrom and her students in common pool resource theory. The concern with multi-level government and cross-scale interactions common to both institutional and ecological sources has coevolved in the European context especially, with the practical spur of European economic, political, and bureaucratic integration.

The analysis from this perspective, however, is profoundly mixed. Often depending on the regional or national context analyzed and the perceived theoretical

opposition of the author to reductionist arguments for or against decentralization, many of the studies of economic growth and public good provision in decentralized systems have concluded, contrary to the expectations of democratic theorists and common pool resource theorists, that decentralized systems produce inefficient government redundancies, bloated administrative sectors, more opportunities for corruption, and an incentive for subnational governments to overspend and need bail outs. These arguments are particularly obvious in debates over the impact of decentralization on economic growth. Others have claimed that decentralization in unequal contexts can reinforce regional disparities, invalidate constitutional protections of human rights, and even be captured by local economic or political elites in some situations.

Alberto Diaz-Cayeros, writing about Mexico, and Jean-Paul Faguet, writing about Bolivia, have made convincing arguments that in their particular cases local governments with meaningful resources deliver more urgently-needed social goods like health care, education, and lighting. Diaz-Cayeros argued that political and fiscal authority were both necessary, that there could be no real political power without a proportional power to generate revenue and spend it. In the case of Southern Mexico, meaningful fiscal decentralization to the municipal level in Oaxaca fulfills three specific channels he outlines for affecting local public good provision:1) the social embeddedness of municipal presidents (mayors), 2) the broader access trends for civic engagement in collective-decision making, and 3) some credible social sanctions.

To qualify for all these benefits, for Diaz-Cayeros and coauthors meant the need for direct participatory practices, and the overarching obligation to provide services, including local parallel justice systems. They believe these factors ‘allow poor

communities to better hold their political leaders accountable, prevent elite capture, and monitor and sanction non-cooperative behavior.'[728] That these conditions did not easily attain in urban or 'modern' contexts, where direct participation and deliberation would be time-consuming and even impossible in some situations, does not lessen for Diaz-Cayeros that 'there are lessons to be extracted from the fact that, with regard to the provision of some basic services, a non-partisan political arrangement presented some advantages over the widespread electoral and party-based democratic organization.'[729] This is important because collective monitoring of authority and each other is necessary to 'maximize collective well-being.' Further, Diaz-Cayeros and coauthors find no evidence of elite capture or strategic party strongholds in Oaxaca, blaming contrary results in the literature on a sampling process which did not understand the endogeneity of local autonomy institutions and their political choice after the 1995 referenda.

Jean-Paul Faguet, writing about decentralization in the similarly indigenous and decolonizing regions of Bolivia, comes to a similar set of conclusions about the higher information environment, better monitoring, and structured community involvement identified as benefits by Diaz-Cayeros and coauthors. Faguet, a political economist from London School of Economics, studies the quality and character of provision of public goods in decentralized municipalities in Bolivia. Utilizing data from before and after the 1994 municipalization scheme decentralized disbursements from the central government away from the traditional powers in the big cities and to the over 300 *municipios*, many of them created by the law itself. This shows, he argues, that local governments spend

[728] Diaz-Cayeros *et al* 2013; p. 3.
[729] Diaz-Cayeros *et al* 2013; p. 11.

proportionately more on education and health (vs. infrastructure and production) than central governments.[730]

Faguet draws on a similar time period to the studies in Oaxaca by Diaz Cayeros—in 1994 the liberal government of Sanchez de Lozada in Bolivia passed decentralization reforms aimed to rationalize the municipal tier of government, creating many municipalities and re-dividing the national expenditure to accommodate the rural majority rather than fund the big cities, which had traditionally received the bulk of the assistance from the central government. He claims that Bolivian decentralization, first through the 1994 Law of Popular Participation and later in the 2009 Plurinational Constitution, is radically 'sincere' in the same way which Diaz-Cayeros finds Oaxaca.

For Faguet, Bolivia represents the proof of the best possible outcomes of the democratization rationales for decentralization, i.e. the channeling of public investment to needy sectors, deepening mechanisms of political accountability, and making improvements in participative processes. Faguet, like Diaz-Cayeros, sees autonomy as the goal, explicitly defined in Bolivian law as the power to create, administer, and collect taxes; to enact local resolutions and regulations; to design and implement policies; and use coercive powers when necessary to compel respect for legal norms. Where local funding matches growing federal revenues, as it did during the commodities boom in Bolivia, greater stability is produced, leading to a virtuous cycle which acculturates citizens into repeated deliberation and interaction with leaders enforcing accountability through participation in the political process.[731]

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[730] Jean-Paul Faguet, 2012. *Decentralization and Popular Democracy: Governance from Below in Bolivia.* University of Michigan Press, Ann Arbor.
[731] Faguet 2013.

The decentralization which Rodriguez-Pose and others opposed as a form of the Washington Consensus, in such 'sincere' conditions, provides proof of both extremes of the decentralization literature because they are describing different processes. The neoliberal push for individual standing and rights pushed back at this regional autonomy, breaking apart what it saw as antiquated ways of life and power structures, at times profitably (such as situations where women were traditionally held down), and at times not so profitably (as with the decline in social protections of standards of living). These neoliberal reforms were often packaged with a liberalization of agricultural prices, elimination of agricultural subsidies, diminished credit programs, and a privatization of land rights, all of which served to break up regional power structures.[732]

The lesson is that the decentralization of national power is occurring around the world in varied forms and speeds, and this contextual difference gives the concept a critical ambiguity, the dual face of neoliberal fragmentation and meaningful local autonomy. In Bolivia, decentralization was followed by both intense conflict and eventual disruption and radical change of the national and local systems with the election of Evo Morales in 2006 and the passing of the new constitution in 2009. A lesson learned and taught in great misery, the privatization of basic services saw the dominance of wealthy regions reinforced. Often, lacking protection from the neoliberal regime of the 1990s and early 2000s, regions were played against each other, with little real input into national development schemes, competing for jobs and livelihood with other regions both within their country and abroad. That such a race to the bottom was not the end of

[732] Deborah Yashar, 1999. 'Democracy, Indigenous Movements, and Postliberal Challenge in Latin America.' *World Politics*, Vol. 52, No. 1, pp. 76-104.

the Bolivian decentralization experiment, but the impetus through the Water and Gas Wars and a fierce resource nationalism to a far greater and more pluralizing change in national institutions in 2009.

The potential cooptation of this decentralization rhetoric is evident throughout the developing world, where structural adjustment and international debt has been accompanied by the further consolidation of local governance, *vis a vis* the auspices of the state. Bolivia remains a difficult question for this kind of research for similar reasons. Despite heavy rhetoric about Pachamama and the indigenous *cosmovisión*, including support (at first at least) for indigenous, municipal, and departmental autonomy schemes and the '*vivir bien*' model of indigenous development, Morales' MAS government has actually expanded state dependency on extractivist enterprises in mines, hydroelectric, and natural gas, which Bolivia has in abundance.

There is a continued battle between local indigenous communities and the progressivist vision of the MAS party and Evo Morales (but especially traditional Marxists in the power structure, like Vice President Alvaro Garcia-Linera). Seen internationally as allies, many indigenous groups have been displaced or affected by dam projects, mining waste, road building, and natural gas extraction. The construction of a road linking the Intercontinental Freeways project from Cochabamba to the Brazilian border has sparked outrage among the indigenous communities of the area, who were supporters of Morales and now are increasingly disappointed with the realization that they needed to remain collectivized to oppose the growth policies of a regime focused on increasing welfare at the cost of its environment and ancient cultures.

The road through Isoboro Securé (TIPNIS), one of the largest co-managed parks in Bolivia, is at the heart of a continued contest over the definition of growth, as one half of the alliance which overtook neoliberalism attempts to make Bolivia the pumping heart of regional modernity and others seek a return to older, simpler ways of life. Each has its own logic, but the decision between concepts of living well versus living more is increasingly a primary fracture in politics in Bolivia. Faguet claims that 'when implemented correctly and sincerely' the autonomy regimes should increase participation, improving accountability and responsiveness. This is complicated in the lowland and forested parts of Bolivia, where status as local minorities did not make the same takeover of local institutions that took place in the highlands, where indigenous groups outnumber mestizo and therefore were able use local government once created.

Faguet's findings in Bolivia are thus explicitly, and self-admittedly, only one perspective, which he acknowledges with the term 'sincere' decentralization. Faguet thinks this means both that more context is needed to evaluate decentralization's expected effects and that in certain circumstances ('sincere') a host of positive effects are produced, chief among them a shift in public investment to be more responsive to real local needs than possible in centralized regimes, a finding which 'contradicts common claims that local government is too ignorant, corrupt, or prone to capture by local interests to improve upon the actions of central government.' He contends, like Diaz-Cayeros in Oaxaca, that 'Bolivia's local governments did just that.'[733]

By contrast, Daniel Treisman, an expert on Eastern Europe and especially post-Soviet policy, is much more pessimistic, and frames his analysis as a rebuttal of the

[733] Faguet 2013; p. 4.

simple and often hollow embrace of decentralization by the World Bank and other major development players.[734] He does so to oppose what he saw as a dangerously broad definition of decentralization promulgated throughout the world by development and financial institutions in the 1990s.[735] Reading his work, however, this seeming opposition is always qualified. He acknowledges in his paper from 2000 that 'the dangers created by strengthening intermediate units may be reduced if authority is decentralized *even further, to the municipal level*.'[736]

Although pitched against the prevailing panacea arguments for decentralization, again Treisman's conclusions in this paper are more cautious—examining the claim that decentralization lowers inflation rates (again assuming the need to counter to what he sees as an overwhelming consensus for decentralization) he finds instead that decentralization produces a slower policy reaction due to the multiplication of veto-players in the bargaining game, a slowing which produces lock-in rather than change, i.e. the accentuation of current trends. This adds to his analysis of the corruption of post-Soviet Eastern Europe, decentralizing from the USSR back to nation states.

Latin American experiences are particularly emphasized by Treisman, as well, noting that 'in various Latin American countries, political decentralization seems to encourage higher public spending,' and that 'political decentralization seems to encourage high public spending, foster excessive public sector borrowing, and weaken

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[734] Daniel Treisman, 1999. 'Political decentralization and economic reform: a game-theoretic analysis.' *American Journal of Political Science,* Vol. 43, No. 2, April, pp. 488-517; Daniel Treisman,2000a. 'The causes of corruption: a cross-national study.' *Journal of Public Economics*, Vol. 76, pp. 399-457.
[735] Daniel Treisman, 2007. 'What have we learned about the causes of corruption from ten years of cross-national empirical research?' *Annual Review of Political Science*, Vol. 10, pp. 211-244.
[736] Treisman 2000; p. 854; My emphasis.

the one actor with an encompassing interest in price stability, the central government.'[737] The shift in context is important, as different examples are often debated in a cross-sectional kind of way. Béland and Lecours, writing about Quebec, saw the opposite of Prud-homme's oft-cited vicious cycle argument, itself based in Africa.[738] This meant that regional progress pushed other regions to join, rather than enter into competition with each other.

I want to suggest that this contextual difference means that the analyses considered here as a debate are not really that far apart—they note the rival bad and good tendencies of particular cases of decentralization, each warns that it is not a panacea, but each reacts against a perceived consensus that decentralization is *always* good or bad. It is notable, despite this overlap, that Treisman is scared of the same things which many celebrate decentralization, and appropriately reverses the order which Falleti and O'Neill saw as best-case scenarios for increasing subnational capacity. Recall for the institutionalists that political decentralization 'built constituencies' which could become challengers to state power. This results in conditions which Treisman believes will initiate economic instability and growing redistributive demands on state funds, placing regions in direct conflict for dwindling resources. Taking partial decentralization as the empirically existing form, Treisman thus rejects decentralization.

Unlike the rest of the commentators here, Treisman thinks that partial forms of decentralization produce more disciplining power for central governments, which he

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[737] Treisman 2000; p. 837.
[738] Daniel Béland and André Lecours, 2010. 'Does nationalism trigger welfare-state disintegration? Social policy and territorial mobilization in Belgium and Canada.' *Environment and Planning C: Government and Policy*, Vol. 28, No. 3, pp. 420-434.

posits as fundamentally necessary in stabilizing currency. His odd recommendation, given the rest of the analyses addressed here, reads:

> Political decentralization followed by an increase in the center's rate of public good provision can prompt a vicious cycle of fiscal redistribution, regional challenges, and increasing deficits, whereas the same reforms in reverse order can leave the state as fiscally solvent and peaceful as when they started.[739]

His conclusions, despite this seemingly thorough rejection of the rest of the literature, remain cautious. He claims that, on the whole, when considering the project of decentralization one should show 'at least caution in recommending it to developing countries that face major macroeconomic stresses,' i.e. following his earlier claim about inflation—it is a lock-in argument. This argument, however, is tracking both democratization and economic arguments as a single bloc. Again, the Janus face of decentralization appears, one side decolonization and autonomy, the other corruption and vicious competition..

Given this dual nature of existing decentralization reforms, 'developing' world experiences of neoliberalism suggest that decentralization of the autarchic, municipal sort recommended in Environmental Political Theory would have to happen in a perfect world with no inequality, or risk the production of grave regional inequalities and, potentially, disruptive exploitation of local resources to continue to survive the challenges of global economics and declining rural life. I think this is why people like Robyn Eckersley, once ardent localists, have become focused on the state level once again. She is not wrong, and her 'critical political ecology' is a rare contribution from political theory to the emerging interdisciplinary debates. This commitment to the national level preserves the

[739] Treisman 2000; p. 837.

appeal of the social movement progress discourse, associating itself with civil rights and anti-war movements. It also makes it clear that the kinds of gains which have been made in the national policy sphere, things like NEPA's assessment system, the Endangered Species, Clean Water, and Clean Air Acts, as well as national parks are too important to abandon, that they represent achievements which must be preserved.

This difference in case studies above can be read in a vulgar way as a basic disagreement about the general concept of decentralization, but should instead be read in context as detailing the conditions in their *particular* regional specialization for decentralization that improves their *particular* indicators of interest. The dependent variable here fluctuates: it could be a 'deepening' of democratic institutions, preservation of cultural diversity, encouragement of economic growth, efficient provision of public goods, or, in the case of this analysis, ecological resilience. The lesson can be accessed from another perspective by expanding the kinds of public goods that are considered, as I seek to do in the following chapter through broadening the scope of fiscal federalism studies of Oaxaca, Mexico.

EPT at the Edge of Time

Surrendering the chance to postulate an ideal form of the national level, Eckersley feels, leaves the state as a fundamentally regressive entity only, and minimizes the potential legitimate and efficient power which it could leverage for good things, as it had in the past through national bureaucracies and regulation of natural resources. That such landmarks of national environmental regulation are today under threat, alongside global efforts to combat climate change, for Eckersley is not proof that such institutions

introduced greater risks but rather that their loss would be a huge setback for the environmental movement as a whole, which means rethinking a new role and legitimacy for the state which can be pursued politically. She claims: 'Actively defending and cultivating such an ideal would seem to be politically and strategically necessary if the green movement is to avoid unwitting, ad hoc reinforcement of the destructive or oppressive tendencies of states in the course of pursuing its green public policy goals.'[740] This, for her, represented the true foots of a 'critical political ecology.'

Barry and Eckersley in the same year play on the Marxist 'withering of the state' idea to ask 'W(h)ither the Green State?' They argue there that it cannot be bypassed or rejected, but must be a part of progressive green strategy that can act at an appropriate scale to prevent economic exploitation and corporate power grown to global proportions in the neoliberal era. They claims that:

> Something like the state would also have to be reinvented at the regional level to maintain minimum welfare conditions in all localities via transfer payments, uphold basic civil and political rights, maintain corporate accountability across all communities in the federation, and represent the broader interests of the federation on the international stage.[741]

What remains for critical thought, then, is not the thorough reevaluation of the state itself, which threatens to disrupt regulations that protect people from exploitation, but rather the bring more voices into the state itself through inclusion, openness, and reflexive institutions. The state level, however, remains the only way to combat neoliberal globalization, and thus remains necessary despite the tension with expanding participation and deliberation.

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[740] Eckersley 2005; p. 160.
[741] John Barry and Robyn Eckersley, 2005. 'W(h)ither the green state?' In *The State and the Ecological Crisis*, Eds. John Barry and Robyn Eckersley, MIT Press, Cambridge; p. 259.

Eckersley in 2005 argued neoliberal economics were driving global competition and comparative advantage in subsidized monocultures based on the reorganized incentives of the developmental state, i.e. attracting foreign investment and making the state more economically competitive. It is in response to this side of the experience of decentralization that she insists on the continued relevance of the state—understanding that neoliberal economics also seeks decentralization, Eckersley's fear is that the scale of analysis and conflict is being reduced too much to be effective, pointing to the suite of powers the state has gained over the environment since the 1960s to demonstrate the potential for change within democratic institutions and slow transition of ecological services to concern as public goods.

Thus for Eckersley, like many others, neoliberalism is a countervailing force to the development of the 'ecological state,' creating a competition of local units which drives higher rates of exploitation and encourages elite capture. To strengthen these units, she believes, requires a new kind of role for the state as a monitor, assessor of risk, financer, and international representative, and expanded regional autonomy to experiment with policy. Eckersley sees the final form of such states as dependent on a series of criteria, including balance between public and private policy-making, deciding on hard tradeoffs of conflicting claims by communities, and relative concern for nonhumans in these processes. Eckersley's lesson is to lengthen time horizons and maintain all the tools of political change in activity, that development will be sporadic and will differ by national character/process. Not being unified into a single processes, it will be subject to different interpretations, but in the end the ecostate will be unstable but necessary.

The Green State argument in 2005, of course, is already contained in her nested systems metaphor from 1991. What has changed is the emphasis on national-level institutions. Seeing the continued inadequacy of international regulation and increasing local vulnerability, Eckersley and others have made the case for moving environmental politics to the national arena in order to act in a coordinated and efficient way and begin constructing international institutions with meaningful powers and invest in local adaptation to now-inevitable change. Rather than start completely anew, as the anarchists and Deep Ecologists she began her work analyzing wanted, she wants to preserve the market in order to continue to use the price system and consumer choice as a basis of resource allocation, but set the bounds of this market in a new normative framework.

This new goal would guide instrumental reason rather than abandon it, and use the institutional infrastructure in place to try and negotiate an immediate reorienting of institutional goals to complement the (also necessary) cultural transfiguration of values. Despite an explication of Marcuse on the environment, Eckersley perhaps forgets an essential element of Marcuse's thought, which is that the economic and social systems of capitalism will be very good at co-opting dangerous ideas, perhaps the most dangerous amongst them the idea of Green State, with the authoritarian echoes the term recalls. The hollowing out of the 'sustainable development' rhetoric by 'green' corporations is one example of the problems of leaving choices in consumer hands.

In the gap created by obstructionist forces at the national level, it has largely been mayors and governors who have stepped up to the more local task of preparing to change and experimenting with regulation. What this suggests, to me, is not that political institutions are worthless and we should begin stockpiling for the coming apocalypse, but

rather that they need to be seen as nested and at times overlapping or polycentric, and used actively with experimentation at many levels which is intended both to confront ecological crises at an appropriate scale and also to learn from the diverse experiences of other places.

The idea is that if there is an important question about locating the appropriate scale for sovereignty in an age defined by the uncertainty of global earth system change experimentation may be necessary to improve the randomness of policy-results in such uncertain environments and maintain their participative and democratic nature. These decisions will be inevitably political, economic, and ethical—where one draws the boundaries of one's community is a profoundly difficult question, even in strict geographic rather than social terms. It involves empirical questions about the level of appropriate and effective governance concerning different problems occurring on diverse temporal and geographical scales, about who should make final decisions when hard choices have to be made and vital resources are involved. It also involves ethical questions, like those raised by Eckersley regarding existing national environmental regulation, about how civil rights, equality, and effective enforcement can be secured without the involvement of the state.

While confronting one type of 'remoteness,' these strategies can fail to account for others, in this case approaching the problem of physical remoteness of institutions from the environments they represent potentially enhances epistemic forms which subordinate difference. This more complicated diagnosis of 'lack of closeness,' as explored above, is not a panacea, but rather a bundle or related problems and the particular institutions that those challenges recommend. Plumwood thinks that the effects

of these different kinds of distances are multiple and varied, negating individual responsibility via lack of knowledge by impeding learning, feedback, and group solidarity. [742] It also allows the shift of health effects to the underprivileged (in and outside the community) and to the land itself. The San Diego/Tijuana border region provides ample evidence of this displacement, and provides tangible and empirical ways to link justice, 'ecojustice,' ecological rationality, prudence, and ethics.

Remoteness plays a key role for Plumwood's theory because it negates responsibility. The goal of hegemonic systems is disengagement as a way of avoiding collective responsibility, so having the most privileged idea be 'universal' makes sense. This is the essence of her critique of bioregionalism, which she claims parallels liberalism too closely in creating hyper-autonomous actors at an individual level rather than as communities. The lesson here is complicated—she is again diagnosing the Janus face of decentralization in practice and theory. At once, she believes that bioregionalists are right that decentralization of institutions by itself is not a good thing, that the character of ecological democracy will depend on the character of the people who hold such power and the ability of those institutions to absorb feedback and create accountability.

For both bioregionalists and Deep Ecologists, this cultural task was primary and important to begin before the more narrowly political institutional task of taking on the role of governance. This institutional naivete has been roundly criticized throughout different literatures, but I think it also serves as a reminder. The decentralization of power will not be a panacea, as Ostrom warns, it requires also a renewal of the political at

[742] 'Displacements' might be a better word: meaning 1. negating responsibility, 2. allowing the shift of externalities, and 3. the naturalization of radical inequality.

local scale. This local scale, though, is not some autarchic entity floating in space. The ecological systems metaphor is often mobilized to expand this focus to include nested institutions and multi-level governance, from the regional up to global scales of emphasis through the logic of interconnection, and it is this hint, powerfully translated into social terms by Dipesh Chakrabarty's concept of simultaneity and ecological by the concepts of panarchy and polycentricity from Holling and Ostrom respectively.

V. Small and Large are Beautiful (and Stupid)

An intended insight of the analysis pursued here is that arguments dominating the debate over decentralization are actually unfocused and self-defeating, fixated as they are on global prescriptions and fuzzy contextual differences. The real project in such nested and interconnected, rather than parallel or competing, systems is to activate all of the fiscal, administrative, and political components simultaneously, and to do so in a way that understands decentralization as a process, not a panacea or an outcome. It also means recognizing the other face of such reforms, the depoliticizing market globalization of the Washington Consensus, which requires maintaining the state to defend local communities against larger and cross-scale economic and political powers.

The result of seeking a new global pluralism in both historical and geographical terms likely requires state protection from markets and hostile actors, laid over meaningful local political and fiscal capacities, 'filling up new spaces' and bridging a sense of co-responsibility for local environment. The challenges presented by the local instantiations of global change require thinking about politics as nested system, in order to both ascend to global level and to make decisions collectively, as individuals and

cultures with histories, responsibilities, and opportunities To do so democratically and simultaneously renew cultural connections to the land requires seeking out meaningful language for interpreting global trends and engaging regions in meaningful debate and decision-making in order to strengthen implementation, monitoring, and feedback, i.e. the 'sincere' elements of democratization underlining the ideal forms of decentralization. Subsidiarity, as a term, may be able to do this in Europe and areas with Catholic roots, especially in areas where decolonization and local autonomy go hand in hand as ideal destinations for political change.

As noted above, decolonization and autonomy movements in the global South are conditioned by experiments with economic and social reforms, packaged together messily in democratic and green packaging by the Washington Consensus. Arguments for strengthening local accountability, preference matching, creation of dialogue and deliberation, efficient monitoring and enforcement, and concerns with legitimacy of government all combined around the institutional package of decentralization. That many states with weak subnational and national capacities exposed their regions to global competition and even at times a 'race to the bottom' is evidence of the kinds of contributions that fiscal federalism can make—in their terms, the partial devolution of administrative control over regulating economic deals with foreign companies, coupled with the withdrawal of federal support (often to pay back foreign debts), meant that regions with weak institutions, civil society, or high levels of existing inequality were in direct competition in a global market place privileging lax environmental and labor regulations and heavy foreign investment.

The different contexts which fiscal federalism studies begin from are each, in this way, different possibilities presented by understanding decentralization as a path dependent process and a contested idea consisting of several distinct rationales, ideological preferences, and economic strategies. One of the chief contributions of adding comparative institutions and in particular the study of fiscal federalism and multilevel institutions to the discussion about the green potential of decentralization is the highly specific and technical language in which the discussions are conducted. This language allows very diverse kinds of perspectives access to the same debate, and encourages an exactness that is not observed in the EPT debates, many of which are dominated by the preexisting specialty of the author or widely different definitions of similar concepts.

This exactness can still hide varying definitions and assumptions, particularly when discussion more amorphous and harder to measure concepts like 'development,' 'democratization,' and 'sustainability.' How one operationalizes these measures affects the kinds of evidence one can draw upon, which means that many of the studies which appear to be in direct conversation and even mortal disagreement are really describing different facets of the same process. Adding to this diversity is the wide-ranging geographic application of the analyses, which, when applied with a universal brush, often reveal 'mixed results' encountering the particular path dependent histories and contemporary contexts of very different societies and natural systems.

These results cannot be reliably disentangled without a common language to aggregate the different insights across disciplines, which is why I explicitly adopted some of the key terminology of fiscal federalism and multilevel governance. Using the work

done above in the language of EPT, I tried to use these terms to enter the debates over fiscal federalism with a new set of public goods to analyze, namely ecological public goods. Because 'remoteness' identified indigenous and local institutions as possible sources of lessons for future localization of politics in conditions of environmental crisis, in the next chapter I will try to operationalize this ecological public good in a specific place which fulfills many of the shared indicators of trust, deliberative institutions, and indigenous autonomy identified across common pool resource and environmental political theories.

For radical forms of democratic EPT like those discussed above, the assumption was that local and regional institutions needed strengthening alongside adding regulatory mandates for the nation state will create greater cross-level interactions in governance institutions and greater participation from civil society. It was also that this localization may happen no matter what in response to changes in the availability of ecological services. Eckersley outlines the skeleton of such a nested ecological democracy as democratic legislation, the dispersal of concentrated power, redistribution of wealth, national regulation, and cultural renewal, no small task. This means, for her, decentralization efforts must proceed in step with higher level institutions ensuring regularity and rule of law and more localized forms of alliances between local government and civil society.

Eckersley, like many in the radical democratic wing of EPT, is obviously sympathetic with eco-anarchist claims, but cannot seem to actually imagine how they would work. She insists that the scale and urgency of ecological degradation requires that there be a series of effective levels of administration, both vertically and

horizontally. This entails a drastic revision of sovereignty, divided between local, regional, national, and inter-national authorities depending on the scale of the problem considered. She ignores the political element in this idea, however, since she does not (and philosophically cannot) have a centralized decision-making body with the final say. Instead, sovereignty is splintered amongst regions and levels of government, with no real idea of where enforcement responsibilities would lie.

The insistence of bioregionalists and others was that local democracy would create a bond between the individuals and their natural environment, by reducing supply and waste chains and forcing decision-makers to live in the area where their decisions are carried out (an old theme from at least as far back as John Stuart Mill). Insisting on cultural transformation, bioregionalism and other radical green theories rarely discussed the methods of the institutional change, focusing instead on individual conversion and setting examples.

The bioregionalists may indeed have been naïve to dismiss the need for a national level of regulation, but their focus was the same this chapter began with: the problem of fit. In a coauthored piece with Ostrom, Peterson, and Rockstrom, Carl Folke claims:

> This is a new situation and it calls for new perspectives and paradigms on human development and progress—reconnecting to the biosphere and becoming active stewards of the Earth System as a whole. Governance challenges include a highly interconnected and faster world, cascading social–ecological interactions and planetary boundaries that create vulnerabilities but also opportunities for social–ecological change transformation.[743]

[743] Carl Folke, A. Jansson, J. Rockstrom, P. Olsson, S. Carpenter, FS Chapin, AS Crépin, G. Daily, K. Danell, J. Ebbesson, T. Elmquvist, V. Galaz, F. Moberg, M. Nilsson, H. Osterblom, E. Ostrom, A. Persson, G. Peterson, S. Polasky, W. Steffen, B. Walker, F. Westley, 2011. 'Reconnecting the Biosphere.' *Ambio*, Vol. 40, pp. 719-738; p. 719.

Ostrom, the coauthor, comes through here clearly in the claim that there are no institutional panaceas, adding that the proof was revealed in tipping points in Earth Systems, and that this lack was predicated on the differing contexts from local to global levels of organization. This is both a challenge and an opportunity, as my analysis here has shown.

Decentralization offers the possibility of neoliberal fragmentation or bioregional forms of nested adaptive governance. The difference for Folke was predicated on how social learning could be leveraged to adapt to changing conditions. The 'polycentric' theories of Ostrom's late career are thus broadly in line with resilience theories of 'panarchy' and prescriptions of institutional diversity contained in the adaptive governance and co-management platforms of Folke and Fikret Berkes respectively.[744] Many of the theories pursued by Ostrom and her colleagues relied on local case studies as proof that the authoritarian assumptions of the survivalists were over-general and overly-pessimistic. Despite outlining key traits of 'robust' systems, Ostrom remained adamant that there was no one single institutional answer given the diversity of contexts in local resource governance, that there is no 'panacea.'[745]

While polycentricity in practice may overlap with many of the idealized tenets of decentralized environmental politics, there is a real question of specific political context and empirical evidence on which the debates are based. This is key because to make the

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[744] Elinor Ostrom , 2010. 'Beyond Markets and States: Polycentric Governance of Complex Economic Systems.' *The American Economic* Review, Vol. 100, No. 3, June, pp. 641-672; Fikret Berkes, 2010. 'Devolution of environment and resources governance: trends and future.' *Environmental Conservation*, Vol. 37, No. 4, pp. 489-500; also, with reference to bioregionalism, Michael McGinnis (ed.), 1999. *Polycentric Governance and Development: Readings from the workshop in political theory and policy analysis.* University of Michigan Press, Ann Arbor.

[745] Elinor Ostrom, Marco Janssen, and JohnAnderies, 2007. 'Going beyond panaceas.' *Proceedings of the National Academy of Sciences*, Vol. 104, No. 39, pp. 15176-15178.

case for something like 'subsidiarity,' can be either a technical (i.e. efficiency of provision or accountability mechanisms) or normative (i.e. regarding decolonization, cultural survival, or democratization) argument. While the ultimate decision may be a normative one, as in the EU's decision to enshrine the subsidiarity principle into the Maastricht Treaty, the diversity of experiences of decentralization mean that it is important for the debate to be informed by some amount of empirical evidence.

This is especially true of the idealized democratic, participative kinds detailed by Ostrom and idealized by Environmental Political Theory. Democratic political theorist John Dryzek, considering the global-scale challenge of contemporary crises like climate change, thinks reflexive or critical work is 'the antidote'[746] for problematic forms of historical path dependency, that reflexivity offers a 'capacity to *be* something different rather than just *do* something different.' [747] His ideal reflexive institutions would be able to learn over time, and potentially transform where path dependence creates dead ends. This means reflexivity, not adaptiveness is the key trait, since it can critically interrogate and move past problematic and path dependent social inheritances.

This is important because accepting the Anthropocene means there is no going back to a prior state, the world is already fundamentally changed. As Dryzek and Stevenson claim:

> The rise to political pre-eminence of the climate change issue creates new challenges because the issue is so clearly global, and so clearly one that has eluded existing governments of all sorts, as well as existing transnational and global political processes.[748]

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[746] John Dryzek, 2016. 'Institutions for the Anthropocene: Governance in a Changing Earth System.' *British Journal of Political Science,* April, pp. 1-20.
[747] Dryzek 2016; p. 6.
[748] John Dryzek and Hayley Stevenson, 2011. 'Global democracy and earth system governance.' *Ecological Economics*, Vol. 70, pp. 1865-1874; p. 1866.

The politics of that changed world, however, remain hard to predict. Dryzek sees the state, as an institution, intimately tied to economic growth in a way that systematically subordinates ecological concerns, and believes that nationalistic sovereignty concerns often obscure the more critical task of constructing meaningful international institutions. This scalar wrinkle, in EPT, is always layered into a political argument, often related to the author's non-environmentally-framed work. Dryzek, for instance, argues that consensual democracies integrate conflicting values better and involve greater communicative processes relative to strategic actions in adversarial democracies.[749]

The small spatial nature of the states which Dryzek's model is adapted from (Scandinavian countries and European welfare states) and the assumed decentralized nature of the political solution he envisions gives an idea of the tension between action and deliberation which he identifies. He says:

> *Radical decentralization*, 'small is beautiful,' identifies the structural cause of climate change in a model of development that privileges industrial-scale production, which therefore needs replacing by small and local scale production […] Community-level development, mitigation, and adaptation can better respond to human needs and the environment. […] Decision-making processes also need to be de-centralized to allow for genuine participation by marginalized and affected peoples.[750]

What this means is that there is an added value to decentralized communities gained through increased democratic participation that adds legitimacy to other state functions by incorporating input and making the local political arena a site of meaningful contestation. The great scale of the issues and growing acceptance of limits to growth,

[749] Broadly consonant with his well-cited work on deliberative democracy.
[750] Dryzek and Stevenson 2011; p.1869.

for Dryzek and Stevenson, re-legitimizes the local and regional levels as focal points of political effort.

The task produced is distinctly democratic in nature: expanding perspectives and eliminating marginality through incorporation in the larger process in a meaningful way. In the end, Dryzek is still searching for ideal democratic theory, looking for broader participation, face to face communication, and trust to begin bringing scientific evidence into politics in a way that encourages deliberation that considers both people and nature as subjects of justice. This deliberation, he believes, is the key mechanism behind enhanced outcomes. That it is paradoxically slow and regional in nature is fundamentally in tension with the acknowledgement of the new age which the article is premised on.

The anxiety underlying slower, more democratic political approaches like Dryzek's is a product of the urgency produced by acknowledgment of a new age. Andrew Dobson, a democratic socialist and more radical environmental political theorist than Eckersley or Dryzek, recognized already in 1991 that, 'to the extent that there is still a strong tendency towards localization in green politics, the decentralist impulse survives, but it has been drastically tempered by a realism that has brought the state as a key social and political formation and instrument back into environmental political theory.'[751] The assumed task in the bulk of the green literature since the rejection of the survivalist authoritarian tenets of the 1970s follows this pattern—describing and advocating for a kind of 'ecological democracy,' predicated on a politics of interconnection, in the effort

[751] Andrew Dobson, 1991. *Green Political Thought*, 2nd edition, Routledge, NY; p.321.

'to revise and incorporate the principles of individual and community autonomy into a broader, ecological framework.'[752]

For Eckersley and Plumwood, however, institutional change would have to correspond with a cultural renewal to create a greater feeling of individual embeddedness within nature and reinterpret the idea of progress to mean greater integration and satisfaction, rather than economic accumulation and growth. In the early 1990s it was common understanding in the green movement and associated academic literatures that cultivating an ecologically conscious civil society was the main goal, and that this revolutionary or emancipatory wave would come to affect democratic institutions. This was in many ways a direct response to the survivalist neglect of politics in the 1970s which had prescribed authoritarian and technocratic solutions to the inevitability of the destabilizing local manifestations of the global population crisis.

As Dryzek claimed in his well-cited handbook on environmental politics, 'survivalism provides the apocalyptic horizon of environmental concern, raising the stakes in environmental affairs. In these terms, its effects may be profound, while hard to trace directly into any particular politics, policies, or environmental outcomes.'[753] Dryzek suggests in his recent work 'an evolving institutionalism joining inquiry and practice, in the face of existing dominant institutions that fall so far short of the requirements of this emerging epoch.'[754] He, like Eckersley, acknowledges that the idea that humans had entered a planetary age of influence eliminates fixed reference points, and is poisoned by a sense of nostalgia for the Holocene which will never return, that

[752] Eckersley 1992; p. 11.
[753] Dryzek 1997; p. 37.
[754] John Dryzek, 2016. 'Institutions for the Anthropocene: Governance in a Changing Earth System.' *British Journal of Political Science,* April 2016, FirstView Article, pp. 1-20; p. 17.

'recognition of the Anthropocene means that ecological limits or even boundaries no longer provide a sufficient frame for thinking about global environmental affairs.'[755]

This shift from survivalist emphasis on limits encouraged Eckersley, Andrew Dobson, Val Plumwood, and other environmental political theorists writing at the end of the Cold War to begin their work on culture and lifestyle through an institutional politics of communicative and deliberative democracy which sought to expand its concern for and protection of the environment. The distance between this early focus on applying deliberative, ideal speech, and other ideals to the shaping of the democratic public and many current campaigns, which assume such types of democratic change are fatally slow, reflects the shift in urgency presented by the escalation to the planetary scale. Crisis-justified techniques like geoengineering and transition fuels are surely not qualified by Eckersley's definition as 'ecocentric' theories. Her green rationale for the state, however, does rationalize national government power to protect the biosphere.

This does not necessarily mean she is arguing *only* for centralization. The breakdown to regional authority, she thinks, must move in parallel with breakdowns of excessive concentrations of political and economic power, i.e.:

> Both 'up' (i.e., to interregional and international democratic decision making bodies) and 'down' (i.e., to local decision making bodies such as municipal governments). A multileveled decision making structure of this kind is more theoretically compatible with an ecocentric perspective than the kind of complete local sovereignty defended by ecoanarchism, because it provides a far greater institutional recognition of the different levels of social and ecological community in the world.[756]

[755] Dryzek 2016; p. 4.
[756] Eckersley 1992; p. 183.

The kind of nested sovereignty and multi-level governance she theorizes here overlaps productively with several other traditions of thought which can give this conversation more empirical rigor, as I explore below.

In much of the radical EPT literature, however, there is no real discussion of why decentralized, democratic socialism would be the best form of government—the connection between local democracy and sustainable provision of local environmental goods is assumed. Thus, bigger questions about the mechanics of this networked power remain. Some of them include: What happens to democratic decentralization if vast regional disparities exist in economic means or environmental consciousness? How can the decentralization of sovereignty cope with planetary-scale problems? Who decides when decentralization has gone far enough? Too far? How does government decide on the appropriate level to address specific problems?

Beyond these more abstract questions is an empirical one: *At what scale of political organization are educational, health, and ecological public goods provided best?* This is the subject of a huge list of political economists working on fiscal federalism, charting the restructuring of world governments in response to decolonization, regional pressures, and economic globalization. The lack of consensus in these disciplines mimics the lack of agreement in EPT. Turning local out of blind reflex to the abstractness and perceived unimaginability of global crises, these theories will not be able to debate the kinds of collective challenges involved with taking responsibility for historical degradation and acting urgently to mitigate the worst vulnerabilities.

Confronting the prospect of an *emergency* relocalization is more sobering, and not usually the stuff of optimistic or reformist outreach programs, instead stocked with

dreams of technological deliverance from apocalyptic endings. The current US administration is a kind of unintentional stress test on the civil society, inequality, and administrative capacity of subnational regions and local governments—the withdrawal of the state in the US, at least, reveals political institutions at many other levels, who have their own constituencies if not funding, thus the first steps towards a more meaningful local and regional adaptive political capacity.

The same cannot be said in many places in the 'developing' world, which makes the priority of local capacity building even more urgent and necessary. As the institutions and fiscal federalism literatures showed, societies with major inequality and relative vulnerability to changing conditions are more prone to partial mandates, elite capture, and corruption. Read into the future as a roadmap rather than back into the past as an explanation, the challenge becomes to build meaningful political institutions at various levels and reshuffle fiscal priorities (whether through unconditional transfers from the center or enhanced regional tax revenues) to route resources most efficiently to their target public goods distribution.

Such schemes have clear global challenges across types of institutions and ideologies which could potentially advocate for decentralization. These include lack of trust and the disruption produced by planning across separate national governments and unmatched political election cycles or legal systems. Fiscal federalism warns that civil service must be strengthened to implement and maintain reforms, and that central dominance in the process of decentralization often leads to unfunded administrative mandates that the subnational region cannot reasonably afford to execute. In situations characterized by parochialism rather than pluralism, competition rather than cooperation,

and corruption rather than accountability, few prospects for any kind of institutional theory exist, let alone for decentralized systems that create more veto points and have questionable sources of local administrative and civil society capacity modulated by broader trends of inequality and position in global economic networks.

My argument here has been that the baseline conditions of Folke's answer to the problem of fit, the concept of adaptive governance, can be fruitfully complicated by the arguments in environmental political theory about the green state and the more technical analyses in fiscal federalism, expanding to directly include more focus on building local identity with the land community and the mechanics of how responsibilities will be distributed vertically and horizontally in a more complex policy space characterized by many levels and kinds of governance interacting across scales and simultaneously in natural and social systems.

11 Decentralization, Indigenous Governance, and Forest Outcomes in Oaxaca

I. Introduction: The Green Call for Decentralization

> If industrialization and the introduction of technology in the backward countries encounter strong resistance from the indigenous and traditional modes of life and labor—a resistance which is not abandoned even at the very tangible prospect of a better and easier life—could this pre-technological tradition itself become the source of progress and industrialization? – Herbert Marcuse

The idea that 'pre-modern,' decentralized political systems might hold answers to intractable problems in the 'developed' world is not limited to radical strains of environmental theory, as the epigraph from critical theorist Herbert Marcuse should signal. The paper that follows attempts to provide theoretical and empirical insights into several related debates over the political ramifications of global ecological change. The purpose of the broader project which includes this section is to critically assess the prospects of political decentralization for adaptive management of social-ecological systems, a task which grows more important in our era of global ecological crisis.[757]

If the idealized narrative of radical green theory is correct, places with localized political control that also have cultural, historical, and spiritual ties to the land should maintain the environment in a more resilient manner. To try and understand this claim I want to bring in new evidence and a more rigorous framework of analysis. This is because the abstract form of such localizing strategies is not very interesting since the move to local systems of authority is conditioned by context and historically path

[757]Hallie Eakin, 2005. 'Institutional change, climate risk, and rural vulnerability: cases from central Mexico.' *World Development*, Vol. 33, No. 11, pp 1923-1938.

dependent. It is also because 'decentralization,' as a term, often means many things depending on one's academic training and personal assumptions.[758]

My analysis here begins fashioning empirical evidence for the claim that ecological public good provision is improved through repeated interaction and dependent on trust for long-enduring success in a way that gives local systems of governance a discernible advantage. It attempts to address the endorsement across academic literatures of decentralization of political authority by offering empirical evidence from the Mexican state of Oaxaca, a state which is often offered by radical and romantic green political theorists as a kind of cultural alternative to globalized, neoliberal, or (neo)colonial influences.[759] Here I work through these theoretical arguments across disciplines, before generating a series of empirical tests of my own.

For these tests, I have constructed a dataset of social and ecological factors related to forest stewardship and local governance, placing my analysis in the context of the highly-touted forest governance and municipal autonomy regimes of the Mexican state of Oaxaca, the site of my field research in 2013. With extensive cultural and biological diversity, meaningful local sovereignty, and long residence in particular places, Oaxacan local politics are seen by many as an extant example of the possibilities of local democracy, regional resource institutions, and a reterritorialized worldview.[760] Remoteness, as analyzed in the preceding chapter, helps us to disentangle the mixed results across disciplines by disarticulating more general definitions of decentralization

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[758] I explore these distinctions in detail in another chapter.
[759] Depending on the theoretical perspective of the author.
[760] See especially: David Bray, L. Merino-Pérez, P. Negreros-Castillo, G. Segura-Warnholtz, JM Torres-Rojo, and HFM Vester, 2002. 'Mexico's Community-Managed Forests as a Global Model for Sustainable Landscapes.' *Conservation Biology*, Vol. 17, No. 3, June, pp. 672-677.

into neoliberal economic policies and radical democratic experiments. It also locates Oaxaca in particular as a best case context for local-scale ecological democracy, given its cultural and institutional 'closeness' to the local environment, and municipal autonomy.

In continuance of the preceding chapter, I'm arguing here in parallel that intractable EPT debates can be sharpened by the methodological and empirical rigor of fiscal federalism, but also that debates in fiscal federalism over effective levels of revenue expenditure and generation can be enhanced by adding an set of environmental measures to the usual suite of public goods considered, and can benefit from the theoretical disarticulation of neoliberal economic doctrine and post-colonial- and democratization-justified decentralization projects.

In order to exploit this potentially fruitful overlap, I generate forest loss values by municipality using a set of detailed maps of forest cover and loss between 2000 and 2013 to examine their relationship to institutional and demographic variables in Oaxaca.[761] Narrowing the question posed by debates over decentralization and the environment from their more abstract register, I want to ask: *Does decentralized indigenous political decision-making at the municipal level affect forest loss in Oaxaca, Mexico?*

In the first test I conduct I find a statistically-significant relationship between local governance and reduced forest loss, indicating a meaningful effect but much

[761] MC Hansen, PV Potapov, R. Moore, M. Hancher, SA Turubanova, A. Tyukavina, D. Thau, SV Stehman, SJ Goetz, TR Loveland, A. Kommareddy, A. Egorov, L. Chini, CO Justice, and JRG Townshend, 2013. "High-Resolution Global Maps of 21st-Century Forest Cover Change." *Science,* Vol. 342 (15 November): 850–53. Data available on-line from: http://earthenginepartners.appspot.com/science-2013-global-forest ; The years are chosen here by Hansen et al to reflect the availability of cloud-piercing satellite techniques generating data which gives a continuous account of forest loss and does not have to be adjusted for cloud coverage. A newer, more detailed version of some of these measures has been made available, but for this study only the original, 1.0 version covering 2000-2013 has been used, since some methodologies in the mapping process changed between 2013 and 2014 and an integrated time series was not available at the time of writing this paper.

unexplained variance. In the second tests I look at *only* indigenous-governed municipalities and look for relationships between forest loss and several social and ecological indicators. I do so using an original data set of driving times from municipal *cabeceras* (main localities in the larger municipality)[762] to the *cabeceras* of municipalities with 50,000 residents or more, a buffered indicator of federal road infrastructure and aggregate social marginality scores from INEGI, along with the forest loss statistics generated in the first test. These tests, intriguingly, show no significant relationships, potentially eliminating one possible omitted variable from the package of collinear social and ecological factors that make testing local indigenous governance for causal significance perilous.[763]

Finally, in the third set of tests I score each municipality by its Freshwater Ecosystem and Terrestrial Ecoregion (TNC) and conduct tests within a watershed sample, showing that indigenous local governance has varied but significant effects based on both the watershed (defined by rivers and fish species) and vegetation types (aggregated up from Terrestrial Ecoregions). These tests show broad regional differences in forest regime change, a variation which also modulates the discernible effect of indigenous governance. They also suggest further research expanding the observations available within the ecoregions with more observations historically and geographically across state borders to municipalities that share ecoregions. Finally, it also presents more

[762] Mexican *municipios* are the most local level of the three levels in Mexican federalism (National, State, Municipal). Unlike cities, they include rural areas and wilderness, and are usually closer to the size of a county in the United States. Oaxacan municipalities are smaller, but still characterized by one or sometimes more than one *locality* or settlement. The oldest and largest of these localities (sometimes the only settlement) is the *cabecera* or 'head' settlement where government offices are located.

[763] For an explanation of the kinds of issues presented by this collinearity, see Diaz-Cayeros, Magaloni, and Ruiz-Euler, 2013. 'Traditional Governance, Citizen Engagement, and Local Public Goods: Evidence from Oaxaca.' *World Development*. Vol. 20, pp. 1-14.

complicated questions about the role of social factors like outmigration and remittances, and also more ecological factors like wildfires and more global changes affecting forests.

The evidence produced in these tests broadly supports the conclusions of many arguing that deliberative, local institutions can deliver better environmental outcomes. This finding is, however, limited to the very unique context of Oaxaca, and should serve only as a small piece of a much larger conversation about decentralization, indigenous autonomy, and adaptive governance. This evidence also points to the usefulness of ecological services as public goods in the fiscal federalism and multilevel governance literatures, and, rather than insist on a universalized model, may help disentangle the mixed results in democratization and development literatures.

Future research will try to understand the different trends in different watersheds, lowering the scale of the analysis further from the state level, and also raising it from the municipal to the regional level. The ecoregion sampling technique explored in the third tests opens up opportunities to exploit differences at state borders in particular, where ecosystems and often ethnic groups straddle institutional boundaries. Lastly, such a regionally-focused analysis promises a better translation from local evidence to global themes by classifying the kind of forest lost in a way that can be more accurately calculated by forest type. By differentiating between vegetation types and ecosystems, this ecoregion sampling strategy can help quantify ecological services like carbon capture as well as identify social-ecological vulnerabilities to changing conditions at a more specific and granular level, as well as expand the kinds of cross-regional and cross-national comparisons which are often problematic given the diversity of decentralization experiments in the world.

II. Oaxaca and Global Forests

This analysis is intended to contribute to two principal literatures. First, it addresses the debate above in green political theory regarding the decentralization of political authority, and second, it offers empirical evidence from a region which is often offered by radical and romantic green political theorists as a kind of cultural alternative to globalized, neoliberal, or (neo)colonial influences (depending on the theoretical perspective of the author). Oaxaca is a good candidate for this analysis because it is one of the most ethnically- and bio-diverse regions in Mexico. As such, it is often offered as proof of the efficacy of local forest stewardship in several parallel academic literatures, both because it is a recognized center for indigenous culture and also an active experiment in local sovereignty.[764]

The sincerity of the decentralizing process has made Oaxaca a magnet for fiscal federalism studies concerned with the appropriate scale of spending for achieving positive public goods and economic growth results.[765] The extension of these concerns to include the environment is particularly interesting because these institutions fulfill several of the basic conditions for sustainable democratic politics set out by Ostrom, Berkes, and bioregional theorists like Snyder and Schumacher.[766] It is also because the extension of decentralized authority is often interpreted as proof of democratic consolidation.

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[764] See: David Bray, Leticia Merino-Pérez, and Deborah Barry (eds), 2005. *The Community Managed Forests of Mexico: Managing for Sustainable Landscapes*. University of Texas Press, Austin.
[765] Díaz-Cayeros *et al* 2013; also Alberto Díaz-Cayeros, Kristen Parks, and Justin Levitt, 2011. 'The Territoriality of Public Health Governance in Mexico.' *Annual Meeting of the American Political Science*.
[766] Victor Toledo, Benjamin Ortiz-Espejel, Leni Cortés, Patricia Moguel, and Maria de Jesus Ordoñez, 2003. 'The multiple use of tropical forests by indigenous peoples in Mexico: a case of adaptive management.' *Conservation Ecology*, Vol. 7, No. 3; p. 9.

In an influential set of studies in 1995 and 2003, David Bray and economists from the World Bank claimed that 'today, Mexico's common-property, community-managed forests, in both temperate and tropical areas, appear to be at a scale and level of maturity unmatched anywhere in the world,' suggesting that the common pool holdings of Mexican *ejidos* and autonomous local communities acting in regional partnerships (as formalized through the Forest Stewardship Council) empirically take better care of forests.[767] Depending on the orientation of the critic, this been read as a kind of divine inspiration, a romantic prejudice, and a more complicated argument about the kinds of mentalities which subsistence living produces.[768]

Forests are important to consider in this analysis for a series of reasons, brought into sharp focus by recent global negotiations over climate change. This is because poor forest management leads to 17% of global greenhouse gases annually. Accordingly, forestry programs, as potential carbon sinks, attract international support.[769] A slow in Mexican forest loss has been highly lauded in recent years,[770] and this success has led some to theorize that decentralized and traditional forms of management are superior for delivering positive forest outcomes, an opinion which now informs many debates in international aid organizations and multilateral environmental treaties over the

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[767] Also supported by Antinori and Rausser 2003, who claim that empirical results show workers and officials working in higher scale forums improve performance indicators and rule conformance. Camille Antinori and Gordon Rausser, 2003. 'Does Community Involvement Matter? How collective choice affects forests in Mexico.' *CUDARE Working Papers*, No. 939, Department of Agricultural and Resource Economics, UC Berkeley.

[768] For the last see James Scott's work on the subsistence ethic. James Scott, 1976. *The Moral Economy of the Peasant*, Yale University Press, New Haven.

[769] See United Nations Food and Agriculture Organization, 2012. *La tenencia de los territorios indígenas y REDD+ como un incentivo de manejo forestal: el caso de los países mesoamericanos*. Programa ONU-REDD, NY.

[770] For an accessible look, see the UN REDD+ program's Mexico evaluation: http://theredddesk.org/countries/mexico .

appropriate scale for funding and investment.[771] This finding is in line with many romantic and critical perspectives in green political theory, common pool resource theory, and political ecology, and this overlap should inspire both interest and caution. This caution is necessary because it is possible that the enthusiasm for local institutions as a panacea obscures, at times, the global nature of the economic and ecological crises they purportedly confront.

This analysis looks at Oaxaca in a series of statistical tests to try and generate an empirical baseline for such theories at the scale of the municipality, the smallest administrative unit in the Mexican system, usually about the size of a US county and containing one major locality or *cabecera* and potentially one or more smaller settlements. In general, this analysis is meant to expand the overly economic focus of much of the literature emerging from political ecology as well as interrogate a common argument for local and indigenous institutions. It is also in embrace of the traditional focus of political ecology on scale.

This problem of scale is important to many different kinds of discussions, including those surrounding controversial global reforestation programs and how to deliver resources for conservation at the proper level of government to fund to see better environmental outcomes. Programs like the UN's REDD+ (Reduce Emissions, Deforestation, and Degradation) and other global payment for ecosystem services schemes have strongly insisted that incentivizing good forest management is tied up

[771] Bray *et al* 2004; Duncan MacQueen, 2009. 'Building Profitable and Sustainable Community Forest Enterprises: Enabling conditions.' Natural Resources Group, International Institute for Environment and Development (IIED), Edinburgh, Scotland; Markus Lederer, 2012. 'REDD+ Governance.' WIREs Climate Change, Vol. 3, pp. 107-113.

inseparably with indigenous territorial rights.[772] By creating markets for distant ecosystems services, such programs see tree farming as strengthening conservation, food movements, and poverty reduction. They are also explicitly targeted at indigenous areas, reflecting both shifting international consensus on the rights of indigenous peoples, formalized by the International Labor Organization (1989) and UN Declaration on the Rights of Indigenous Peoples (2007), and the shift in understandings of small-scale management, as pushed by the Food and Agriculture Organization's (2012) World Food Security Forum, which sought to protect small-producers from climate change through ejido titling and 'multi-community planning'.[773] These studies have focused on indigenous areas as sources of needed forms of adaptive local management techniques connected by culture and collective memory to specific territories.

Oaxaca has served already as a source of best practices, including the beginning of the Forest Stewardship Council, early experiments in 'eco-tourism', and pilot REDD+ programs focused on payment for ecosystem services.[774] Crossed by two parallel sets of mountains, Oaxaca has an extraordinarily diverse set of ecosystems, as well as a large percentage of the biological and natural capital of Mexico and North America. It contains, principally, five different vegetation regimes, from limited desert habitat near the Puebla border, temperate Pine and Oak forests in the Central Valleys and mountains,

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[772] Christopher Boyer, 2015. *Political Landscapes: Forests, Conservation, and Community in Mexico*. Duke University Press, Durham.

[773] International Labor Organization, 1989. 'Indigenous and Tribal People's Convention.' *ILO 169.* June; 45; United Nations General Assembly, 2007. 'Declaration on the Rights of Indigenous Peoples.' Sept 13. The US, Canada, Australia, and New Zealand are the only nations to vote against it.; United Nations Food and Agriculture Organization, 2012. *The State of Food Insecurity in the World*. Rome.

[774] Daniel Klooster, 2003. 'Forest Transitions in Mexico: Institutions and Forests in a Globalized Countryside.' *The Professional Geographer*, Vol. 55, No. 2, pp. 227-237; also Mitchell, Ross 2006 'Environmental Governance in Mexico: Two Case Studies of Oaxaca's Community Forest Sector.' *Journal of Latin American Studies*, Vol. 38, No. 3, 519-548.

stands of mangroves on the southern coast, Dry Broadleaf forests throughout the coastal region and Central Valleys, and wet cloud and rain forests in the northern reaches of the Sierra Norte and border region with Veracruz. Both biologically rich (and specifically, rich in forests which can be measured remotely) and culturally rich, Oaxaca represents to many political ecologists an alternative epistemic community and source of important lessons for global debates.[775]

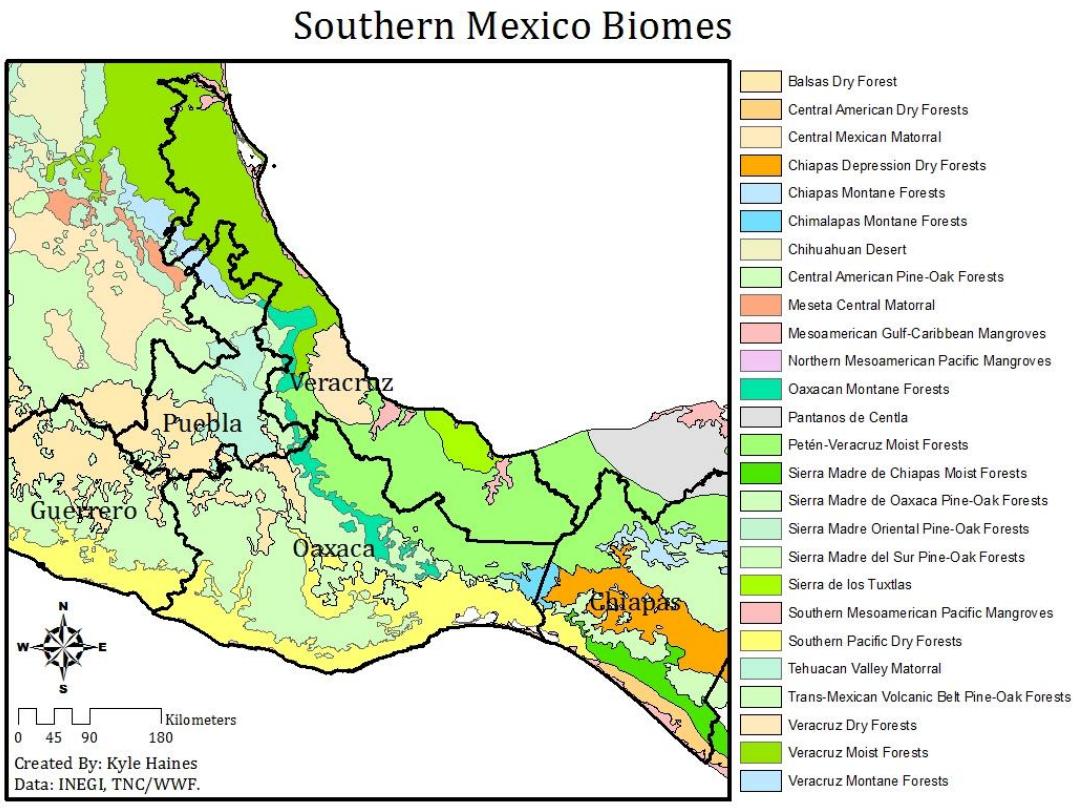

Figure 6: Biomes of Southern Mexico.

Oaxaca is also the Mexican state with the highest measures of cultural and linguistic diversity. The same rugged geography that maintains and differentiates

[775] Piers Blaikie, 2006. 'Is Small Really Beautiful? Community-based Natural Resource Management in Malawi and Botswana.' *World Development*, Vol. 34, No. 11, pp. 1942-1957; also, in ecological economics: Joan Martinez-Alier, 2002. *The Environmentalism of the Poor: A study in ecological conflicts and valuation*. Edward Elgar Publishers, Northampton MA.

ecosystems and animals also has worked to preserve unique cultural norms and forms of organization. Home to close to four million people, the largest city is only about 250,000. The rest of the population is spread over 10 thousand localities, over 98% of which have under 2500 inhabitants. These mostly rural localities are dispersed over 9 million hectares, close to 70% of which is covered by forests, and 95% of which are held in communal landholdings or *ejidos.*[776] Oaxaca is the poorest state in Mexico, with significant gaps in education, health care, and housing quality relative to other areas. This disadvantage has not destroyed local democracy or movements for autonomy.

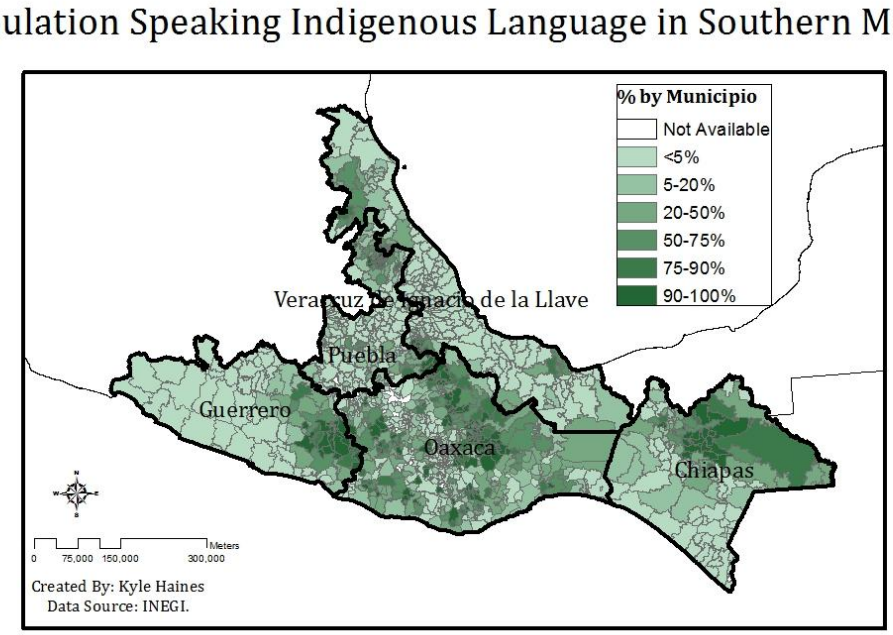

Figure 7: Municipal Indigenous Language Spoken.

[776] Secretario de Medio Ambiente y Recursos Naturales (SEMARNAT) y La Comisión Nacional Forestal (CONAFOR), 2014. 'Inventario Estatal Forestal y de Suelos – Oaxaca.'. Mexico City, MX. See also:

Oaxaca is the Mexican state with the highest rate of self-identification as indigenous, recognizing many major indigenous groups officially, along with other smaller regional dialects and traditions. Around 1/3 of Oaxacans speak an indigenous language, and half of this 1/3 do not speak Spanish at all.[777] Together, they make up over 50% of indigenous speaking population of Mexico, and comprise 16 recognized groups, the most populous of which number in the hundreds of thousands.[778] Oaxacan indigenous groups are known for maintaining a robust identification with their ancestral roots, a concept which includes the land itself in a way which is foreign to much of European thought.[779] In reality, this relationship is widely varied and not as essentially opposed to European thought as it is often posed. Nonetheless, Oaxacan groups have served as a rallying call for an affirmed, educated, and modern indigeneity, and their achievements in sustainable forestry are now formalized into global policymaking.

The diversity contained in the term indigenous is reflected in the different unique types of *usos y costumbres* bundled together under the single concept and formalized by the Oaxacan Electoral Institute. This inter-*usos* diversity is the reason for the second and third sets of tests here. The second looks at average time from major cities and road infrastructure as a possible proxy for access to markets and shifting patterns of mobility, staples of the political ecology literature. The third looks instead at natural regions as organizing units at the regional level, of which Oaxaca has four principal watersheds and

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[777] INEGI, 2010 Census.

[778] There are roughly 350,000 indigenous people of Zapotec descent (themselves divided into four regional dialects, 240,000 of Mixtec or 'Ñuu Savi' descent in the northwest, 165,000 Mazatecos or 'Ha shuta enina' in the upper Sierra Madre Oriental, 100,000 Chinantecos in north-central Oaxaca near the Veracruz border, and 100,000 Mixe or 'Ayuuk,' by all reports the proudest and most monolinguistic group at this time.

[779] Gabriela Canedo Vásquez, 2008. 'Una conquista indígena. Reconocimiento de municipios por úsos y costumbres' en Oaxaca (México)' in *La economía política de la Pobreza*, ed. Alberto Cimadamore, Buenos Aires, March.

five major vegetation types. These are interesting in their variation, as I explore below, and this is linked both to Oaxaca's cultural and ecological diversity.

Usos y Costumbres y Resultados Forestales

Paradoxically, perhaps, my argument here is that chief amongst these contributions to the global conversation is the most local and perhaps fundamental change: *usos y costumbres*, or formalized indigenous municipal autonomy.[780] The concept of *usos and costumbres*, or customary rule, began in the mid 1500s under Spanish rule. Sets of laws dating from 1542, the Spanish ordered that indigenous peoples should be governed, whenever, possible, by their own customary laws.

In the 20th century, benign neglect became an unspoken rule, allowing towns in Oaxaca and other states with indigenous populations to govern themselves as long as their leaders remained nominally PRI party members. This allowed the PRI to maintain a stranglehold on representation in Oaxaca, and is one source of cautionary accounts, many of which focus on the entrenchment of local bosses.[781] This sense that localization can strengthen anti-democratic forces, especially in socially conservative areas like Oaxaca, is perhaps most concerning for those arguing based in deliberative or communicative

[780] One could also make the case for *ejidos* and common property, but this analysis is squarely focused on indigenous forms of political institutions in conversation with the traditional party system in Oaxaca, whereas *ejidos* exist throughout Mexico. For background see:, Gustavo Esteva and Carlos Pérez, 2001. 'The Meaning and Scope of the Struggle for Autonomy' *Latin American Perspectives*, Vol. 28, p. 120. For an earlier perspective, see: Héctor Díaz-Polanco, 1992. 'Autonomía y cuestión territorial,' *Estudios Sociologicos*, Vol. 10, No. 28, pp. 77-101.

[781] See,: Mark Carey, 2009. 'Latin American Environmental History: Current Trends, Interdisciplinary Insights, and Future Directions,' *Environmental History*, Vol. 14, April, pp. 221-252.

democratic theory because these kinds of arguments, when using Oaxaca as an ideal type, can overlook the disenfranchisement of women in some communities.[782]

In the early 1990s, for a variety of factors too broad to engage fully here, the idea of local autonomy was again activated by local indigenous groups in Oaxaca. Accompanying the debate and passage of the North American Free Trade Act (NAFTA) with the US and Canada in 1994 and the growing international movement for recognition of rights to self government in indigenous areas, groups spearheaded by Mixe and Zapotec leaders pushed for local autonomy explicitly through the language of *usos y costumbres*. This movement, in Mexico, was catalyzed by the 1994 Zapatista revolt in Chiapas, which ended with the San Andres Accords in 1996.

Less noticed by the international community, a parallel change that occurred in Oaxaca, with some very different results.[783] Unlike the similarly indigenous and poor southern state of Chiapas, whose traditional local governments operate in parallel and without recognition, Oaxacan municipalities gained the constitutional right to choose governance by indigenous customs, a choice which they overwhelming took (today there are 418/570 municipalities with *usos* systems). This reflects rival state government strategies, the unequal recognition of autonomy and indigenous rights between states, and the role of political factors like strategic bargaining, access, and alliances, Alejandra Anaya Munoz and Michael Cleary stress that the ruling PRI was already losing its

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[782] Todd Eisenstadt, 2006. 'Elections by Customary Law in Oaxaca, Mexico: Expression of Cultural Rights or Violation of Democratic Electoral Norms?' *Center for Democracy and Election Management Case Study #1.*

[783] Alejandra Anaya Muñoz, 2005. 'The emergence and development of the politics of recognition of cultural diversity and indigenous peoples' rights in Mexico: Chiapas and Oaxaca in Comparative Perspective.' *Journal of Latin American Studies*, Vol. 37, No. 3, pp. 585-610.

dominance in Oaxaca, and feared contagion effects of violence and uprising in Chiapas spreading. Thus, in their analyses, the ruling party made a kind of gamble to take party elections off the table entirely in order to insulate the party's territory in rural and impoverished areas.[784] True or not, the intended and unintended results of this experiment are interesting.

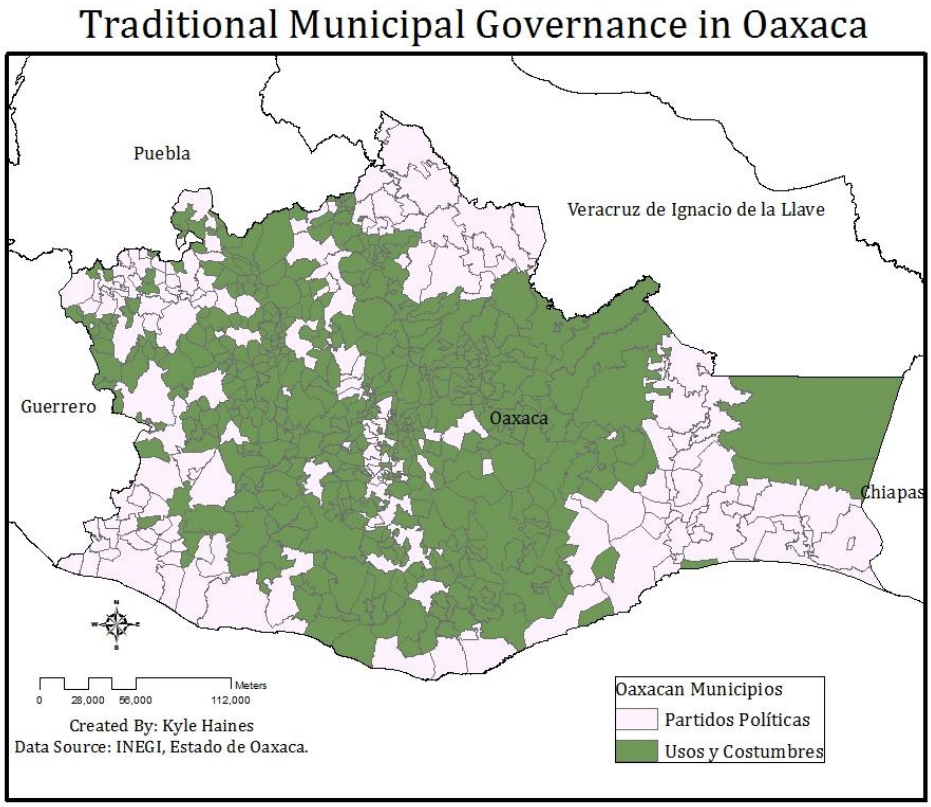

Figure 8: *Usos y costumbres* vs. *Partidos Políticos*

All municipalities in Oaxaca have the same formal structure, but *usos* communities have a parallel government (usually an assembly of local leaders and families), nominate and select their leaders by their own customary rules, and ban the

[784] Michael Cleary, 2000. 'Democracy and indigenous rebellion in Latin America.' *Comparative Political Studies*, Vol. 33, No. 9, pp. 1123-1153.

participation of political parties altogether.[785] They have the same relationship with state and federal levels, but, unlike areas on the parties system, residents of an *usos* community must fill *cargos*, or communal roles, prior to their assuming a leadership position. These roles begin as unskilled work for the community, including community policing, and eventually rise in scale of responsibilities and prestige based on reputation. *Usos* voting is not uniform or consistent with higher scale institutions. They could range from votes on a chalk board, voting by show of hands, and other forms of 'direct democracy.'

The most important effects of the transition to *usos* may be how it affects property rights, alongside the participatory roles necessary to advance in local government and the different rules for electing officials. By limiting who could move to an area, changing the ways people vote to more public forms, and requiring locally specific jobs performed for the community before leadership positions, local Oaxacan communities fulfill many of the social parameters sought by Ostrom, Berkes, and Folke.[786] At the same time, the concept of *usos y costumbres* is broader and more abstract than any one version of indigenous customs can account for. In general, most share only a few central aspects, from a fiesta to group work, with different timings, cultural traditions, and languages.[787]

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[785] Michael Cleary and others have argued this was a purely strategic move by the ruling PRI to keep their local bosses in power by eliminating party competition. Diaz Cayeros *et al* 2013 find no evidence of local retrenchment in their study. The strategic origins of party-free local elections may be true, but the long-term (sometimes unintended) effects are interesting regardless.

[786] Consider Ostrom's 'design principles' for robust social-ecological systems, of which municipal autonomies have a) well-defined borders, b) rules are perceived as legitimate, c) residents can participate and modify rules when necessary, d) monitoring buttresses trust and reciprocity, e) employ types of graduated sanctions, and f) have mechanisms for conflict resolution. See: Elinor Ostrom, 2009. 'Design Principles of Robust Property-Rights Institutions: What we have learned.' *Property Rights and Land Policies*, ed. K. Gregory Ingram and Yu Hung Hong, Lincoln Institute of Land Policy, Cambridge, MA.

[787] One clear way to see this wide diversity is to consider the many ways that *usos* communities select leaders, from public hand-raising to secret votes.

Despite this diversity, Oaxacan forests are often seen as major proof of common pool theories, concepts of 'co-management,' and the development of 'adaptive governance' from theories of ecological resilience.[788] Each makes broad claims about the potential of indigenous systems, the rationale for which mixed with other normative claims about 'deeper' democracy, fit between human political boundaries and ecosystems, and the reevaluation of dominated systems of knowledge and production in the light of growing scientific evidence of global ecological change. Because of this centrality, it is important to empirically investigate the evidence.

III. Empirical Tests

In the rest of this effort I will test these parallel intuitions using an original data set combining social and ecological factors. Using ArcGIS 10.4.1 (ESRI), I conducted tests to expand the fiscal federalism literature to include benefits of local governance for environmental outcomes and provide empirical evidence in debates in green political theory. Building a data set of relevant demographic factors (migration, population, marginality, and indigenous languages), I used ArcGIS to construct forest loss tables both within Oaxaca using zonal statistics from detailed maps provided publically by Hansen *et al* at the University of Maryland. I then use zonal statistics to calculate forest loss and gain by municipality and regress against traditional governance (as well as several other social and environmental covariates) to test the following hypothesis:

Test 1: *If traditional governance then less average loss.*

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[788] Fikret Berkes, 2007. 'Community-based conservation in a globalized world.' *Proceedings of the National Academy of Sciences*, Vol. 104, No. 39, pp. 15188-15193; Carl Folke, L, Pritchard Jr, F. Berkes, J. Colding, U. Svedin, 2007. 'The Problem of Fit between Ecosystems and Institutions: Ten Years Later.' *Ecology and Society*, Vol. 12, No. 1, p. 30.

In the second test I incorporate more social indicators from the 2000 and 2010 Mexican Censuses accessed directly from INEGI, except for the dummy 0-1 for *usos y costumbres*, which was added manually from information published by the state electoral commission of Oaxaca accessed from their archives. Additional data has been added by using a batch program through GoogleSheets, which automatically computes drive times between municipalities through GoogleMaps. I use these 'remoteness' measures with the forest loss data to test the following:

Test 2: *If remote then less average loss (within* usos *systems)*

Finally, these largely social variables have been paired with information from the Nature Conservancy ecoregions projects, comprising both freshwater and terrestrial regions. Using ArcGIS I label each municipality in Oaxaca with a dominant ecoregion and vegetation type. I then create separate samples for each freshwater ecoregion (watershed) and do two tests: first I repeat the *usos* dummy test from Test 1, reporting regional scores together; and second I factor the results by vegetation type to examine relative loss rates in more specific ways. There I test:

Test 3: *If* usos *less loss (by ecoregion)*

Data

I begin the process of analysis by generating detailed maps of the 20N-100W to 10N-90W square, containing entirely the state of Oaxaca, and partially containing municipalities in the Mexican states of Veracruz, Chiapas, Puebla, and Guerrero. I run zonal statistics on these maps to give measurements of original forest cover in 2000, defined as canopy closure for all vegetation taller than 5m coded as a 0-100 percentage

by pixel. These maps also provide loss and gain statistics by year from 2000-2013, delivered in unsigned 8-bit values at a spatial resolution of 1arc-second per pixel. They define forest loss as 'stand-replacement disturbance or the complete removal of tree cover canopy' using the Landsat pixel scale (1 arc-second in WGS1984). Forest gain, in contrast was defined as 'the inverse of loss, or establishment of tree canopy from a nonforest state.' All files were projected for area analysis in Southern Mexico into the North American Equal Albers Projection.

I follow Hansen *et al*'s seventh and eighth recommendations in their 2013 paper in *Nature* for the uses of their map files, both attempting to analyze relationships between social and ecological trends and focusing on the dynamics associated with governance. To do this, I have 3 data needs to generate with Zonal Stats: 1) original forest cover as percent of total area, 2) gross loss as percent of original forest cover, and 3) gross gain as a percent of original forest cover. Original forest cover was reclassified from 0-100 to 0-1 at a threshold of 25% average forest cover.[789] Social indicators were imported from the national and state statistics bureaus of Mexico and Oaxaca, respectively. This includes boundary files, major federal roads, and demographic data from the 2000, 2010 national censuses and 2015 intercensal surveys, downloaded through INEGI's Digital Desktop (SCINCE). I also utilize data on types of municipal governance from the *Instituto Estatal Electoral* of Oaxaca from 2015.[790] Demographic indicators were joined to municipal

[789] For a justification of the 25% threshold, see Matthew Hansen, Stephen Stehman, and Peter Potapov, 2012. 'Quantification of global gross forest cover loss.' *Proceedings of the National Academy of Science*, Vol. 107, No. 19, May, pp. 8650-8655. 'For this study, forest cover is defined as 25% or greater canopy closure at the Landsat pixel scale (30-m × 30-m spatial resolution) for trees >5 m in height.'
[790] Instituto Estatal Electoral y de participación ciudadana de Oaxaca, 2015. 'Relación de Municipios por Distrito 2015 Sistemas Normativos Internos.'

shape files, including measures of indigenous language, social marginality, population, and median age.

Again, using tables from the Oaxacan Electoral Institute, I programmed all municipalities in Oaxaca as either 0, for traditional liberal systems or *Partidos*, and 1, for *Usos y Costumbres* or recognized traditional governance. This serves as both a dummy variable in causal testing and a preliminary descriptive display of the forest loss by initial cover statistics. Although the initial number of municipalities in Oaxaca is quite high (around 1/5 of all the municipalities in Mexico), the number of municipalities on party system of comparable population is small as 418 of 570 municipalities chose traditional governance. Spatial Autocorrelation Report run with Moran's I shows a z-score of 3.92, or high clustering of *usos* communities, with distinct corridors for major roads and urban centers.

The greatest regional clusters of municipalities on the *partidos* system are in areas with high population and especially in the Isthmus area in the Southeast of the state, where topography is flat and several major roads link oil production from the coast to the rest of Mexico. These patterns reinforce the need for creative sampling, showing clustered regional variation influenced by topography and population which challenge the assumption of like groups. Because the dependent variable is the percentage of net forest loss in a municipality, sampling eliminated all large municipalities over 50,000 residents[791] and any municipality falling below 10% of municipal area in initial forest

[791] This eliminates only seven municipalities, two of which are suburbs of others. These are arguably qualitatively different kinds of settlements than the mostly rural, small municipalities that make up the bulk of the sample, and serve as anchors for the driving time ('remoteness') measurements in the second test.

cover.[792] This captures 481/570 municipalities, 282 of which are *usos y costumbres* and 126 of which are governed on the *partidos* system.

This procedure eliminates outliers and compares more like municipalities while retaining a large number of observations within the sample, but still, admittedly, compares a wide variety groups. This means the sampling procedure can inevitably be improved with the inclusion of time series data which boosts observations and a broader suite of environmental and social covariates. The broadness of the sample, however, is also in part by design, as the second test will look for variability within *usos* communities based on driving times and aggregate marginality scores from the Mexican government, and the smaller numbers of municipalities to draw from the ecoregions in the third tests requires leaving as many observations intact as possible.

Tests and Results

First, please note that that the following map is of Oaxaca as a whole, not the reduced sample produced for the statistical tests that follow. Looking at the percentage of forest cover lost visually, several trends are clear without sophisticated statistical study. The first is that the largest percentages of initial coverage lost are along the edges of the state, in particular the wet forests in the northeast and the coastal and mangrove ecosystems of the southwest. The second are the several red outliers that show up in the center of the map, all of which are tracking areas where initial cover was extremely limited (below 25%) and any loss represents a large percentage, validating my sampling choice to eliminate percentage loss outliers based on their actual net loss.

[792] Municipalities without significant forest cover were excluded from sampling to eliminate outliers where small losses register as enormous percentages. This cut-off was generated by examining the data for forest loss against net m2 lost, and controls for the major outliers with low gross loss and high percentage loss.

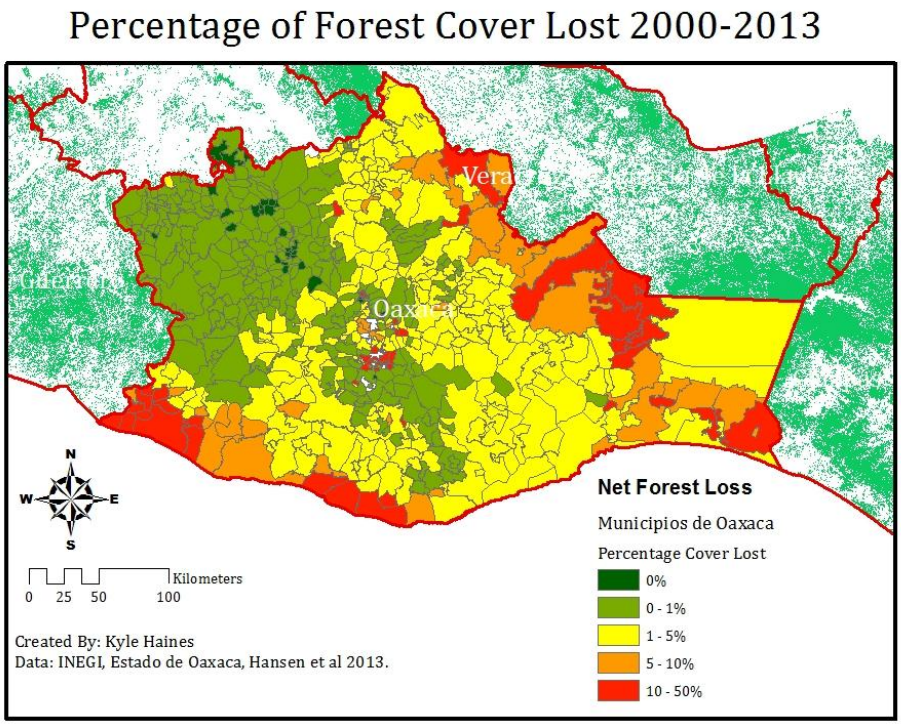

Figure 9: Oaxacan Forest Loss by Municipality, 2000-2013.

The clustered nature of the results suggests distinct regional differences, further validating the effort to construct regional samples and look at variability within *usos* communities. The regional differences, viewed on the map purely in terms of percentage forest loss, with its own imperfections as a graphic measure, appear stark: the Central Valleys and higher areas of the Northwest are even seeing some regrowth, while areas along the coastal municipalities and in the isthmus are largely losing forests. The milder loss statistics in the two sets of mountains crossing Oaxaca in parallel likely reflect the vegetation types, an observation which I follow in the factored analysis using the freshwater ecoregion samples. It also raises the possibility of wildfires as a source of loss

in drier forests, an insight which requires further and more specific regional analysis to understand and account for—a task which can be facilitated by ecoregional frameworks.

Test 1: Usos and Forest Loss

After sampling to reduce population outliers, eliminate unforested and completely urban areas, and establish thresholds for starting forest cover (as percentage of municipal area), I compared the forest loss rate in areas which have their own local decision-making processes with areas ruled under the system of political parties which governs most of the Mexican political system. In the simplest version of this test, I run a linear regression with the independent variable as the *usos* dummy and the dependent variable as the percent of forest loss between 2000 and 2013 within the municipality.

The results of the first test shows there is a discernible relationship between traditional governance (conceived here initially as a dummy variable for the monolithic institution '*usos y costumbres*') and better forest stewardship at the municipal scale. The sign on the coefficient points the right way (i.e. arresting rather than accelerating forest loss), and indicates 2.5% less forest loss in communities with *usos y costumbres*. This result is significant at .01 (or 99% confidence), and explains about 11% of the variance based on the r^2 score. While the effect size may be low, average forest loss in Oaxaca is less than 4%, meaning that a 2.5% change is a meaningful effect. Population was included in this first simple linear tests and showed no significant relationship.

Table 2: Test 1 Local Governance and Percentage of Forest Lost Regression Results.

Test 1 Regression Results

	Municipal Forests In Oaxaca
	Percentage Lost 2000-2013
Usos y Costumbres	-2.491***
	(0.319)
Constant	3.785***
	(0.274)
Observations	481
R^2	0.113
Adjusted R^2	0.111
Residual Std. Error	3.073 (df = 479)
F Statistic	61.133*** (df = 1; 479)
Note:	*p<0.1; **p<0.05; ***p<0.01

Despite the significance of *usos* the variance explained remains only around 11%, which indicates unobserved explanatory factors. Some of this, inevitably, is due to the fact that forest growth, in large part, is driven by ecological factors like temperature, slope, and altitude, as well as higher-level and even planetary shifts in Earth Systems.[793] Even after adding demographic variables like population, percent indigenous language spoken, percent of residents who were born in the municipality, illiteracy rates, and median age in a stepwise regression (see Table 2 below), the model only accounts for ~18% of the variance. That the *usos* dummy remains significant with the addition of these extra variables suggests that indigenous governance is important, but also that there is still variation that may be explained by another major variable.

[793] Some studies have claimed that these environmental factors account for more than half, and even up to 80% of loss.

One way to address this remaining 82% variation, and especially those parts not determined by environmental factors, will be to consider other social variables, such as time driving from a major city (considered as the second test here), the specific mechanics of *usos* procedures and institutions, and more abstract effects of official 'recognition' across the Oaxacan border between like indigenous groups, a task which I will take up in future research extending the ecoregion focus in the third test here across borders to Oaxaca's neighboring states.

Table 3: Test 1 Usos versus Partidos with Covariates in Stepwise Regression.

Stepwise Regression with Social Variables

	Municipal Forests In Oaxaca
	Percentage Lost 2000-2013
Usos y Costumbres	-1.781***
	(0.358)
Population	0.0001**
	(0.00002)
Born in Muni	-0.111***
	(0.032)
Median Age	-0.071***
	(0.024)
Initial Forest Cover	1.602***
	(0.539)
Constant	14.458***
	(3.157)
Observations	481
R^2	0.183
Adjusted R^2	0.175
Residual Std. Error	2.961 (df = 475)
F Statistic	21.306*** (df = 5; 475)
Note:	*p<0.1; **p<0.05; ***p<0.01

It is interesting to note in this first test the effect sizes for the non-*usos* variables, even where significant, are miniscule, with under 1/10 of one percent effect of median age, population, and percentage of residents born in the municipality. Other social variables like percentage of indigenous language speakers all wash out of the stepwise and AICc results, which are designed to eliminate variables which do not significantly add to the explanatory power of a model. The *usos* dummy, however, remains significant with a reduced effect size of just under 2% less loss. Adding more social variables improved the model only marginally in fit and not at all in explanatory power.

Test 2: Driving Times and Roads Within *Usos* Communities

A rival kind of hypothesis emanates from the political ecology literature, which points out the role of higher scale economic factors.[794] Scholars like Susanna Hecht and others have shown that density of roads, along with forest dependency and public policy, is a major driver of forest loss.[795] This has been interpreted by some to be a kind of proxy for connection to global markets. Thus, one way of measuring access to markets is to measure differences between areas with and without easy access to major roads or an urban center. To test this idea, I use ArcGIS to create a dummy variable for municipalities with a major federal highway passing through or within 500m of the municipality and utilize data gained from a small automated program in GoogleSheets

[794] Paul Robbins, 2003. *Political Ecology: A Critical Introduction*. Blackwell, NY.; also see Richard Peet and Michael Watts, 1993. 'Development Theory and Environment in an Age of Market Triumphalism.' *Economic Geography*, Vol. 69, No. 3, pp. 227-253.
[795] Susanna Hecht, 2005. 'Soybeans, Development, and Conservation on the Amazon Frontier.' *Development and Change*, Vol. 36, No. 2, pp. 375-404; Susanna Hecht and Alexander Cockburn, 2010. *The Fate of the Forest: Developers, Destroyers, and Defenders of the Amazon*. University of Chicago Press, Chicago.

which automatically calls driving times from GoogleMaps. These driving times are different from the normal measures of distance, which when measuring as the crow flies often underestimate the amount of time necessary to travel in rural or mountainous areas, exactly the kinds of areas under analysis here.

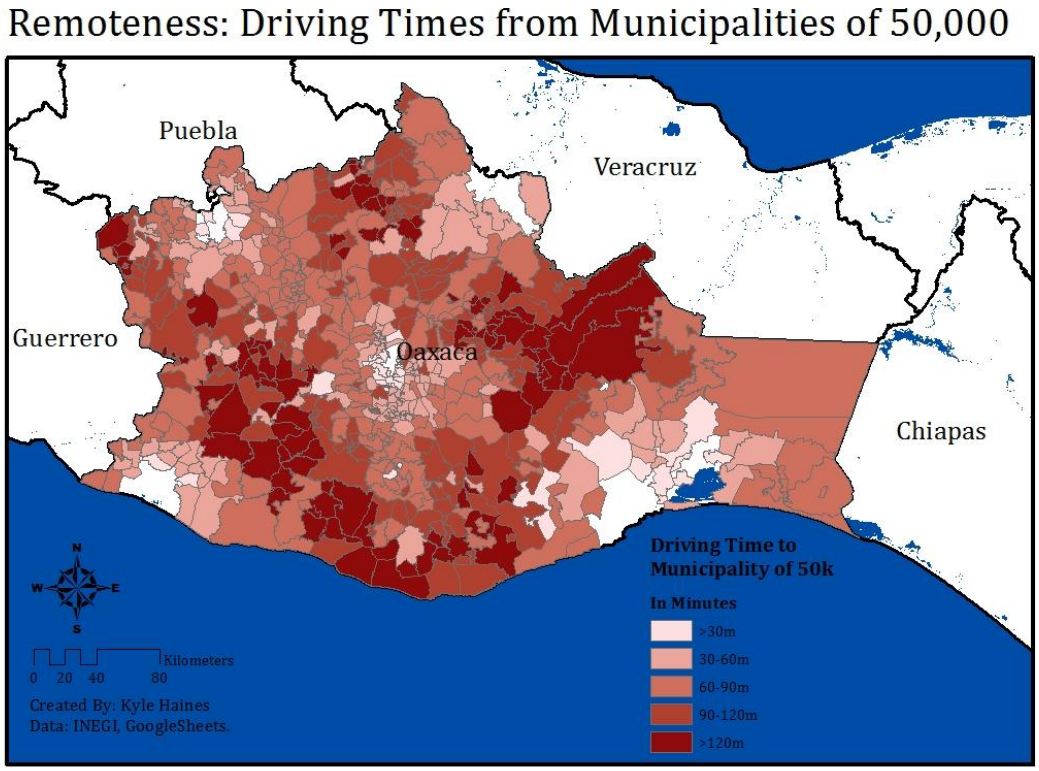

Figure 10: Driving time to a municipality of 50,000 residents.

I constructed a matrix with all 570 of Oaxaca's municipalities and their driving times to all seven Oaxacan municipalities with more than 50,000 residents. From these times the shortest was selected as an indicator of Nearest Large City, and an aggregate 'centrality' score composed of the total minutes driving to all of the cities combined. Considering the possibility that we may expect more loss in areas that are remote from

cities, but that are accessible by major roads, I also include a dummy indicator for the presence of a free federal highway within 500 meters or inside of the municipal border.

Working within the municipalities coded 1 for *usos*, in this second test I look for relationships between the presence of federal free highways and the driving time to a major city of at least 50,000 people, again adding social variables to analyze the model fit, including population, population rate, percent indigenous speakers, percent born in municipality, median age, percent initial forest cover, and the municipal area. Finally, I append two composite indicators of social marginality from CONAPO and CONEVAL respectively as factored variables.

Table 4: Test 2 Within-Usos Remoteness (plus social variables)

Test 2: Within Usos Variability

	Municipal Forests In Oaxaca
	Percentage Lost 2000-2013
Federal Road	0.454**
	(0.210)
Minutes to City of 50k	0.003***
	(0.001)
Low Marginality	0.747***
	(0.172)
Observations	355
R^2	0.039
Adjusted R^2	0.034
Residual Std. Error	1.757 (df = 352)
F Statistic	7.225*** (df = 2; 352)
Note:	*p<0.1; **p<0.05; ***p<0.01

In a stepwise regression investigating these relationships, only the Federal Road, defined with a margin of 500m, the minutes to a major city (computed with a short program in GoogleMaps), and the lowest marginality score came up significant, and all

these together explaining only 3% of the variance. The ill fit of this model says something interesting about the problem of forest loss in Oaxaca, as the remoteness from cities, presence of major roads, and major measures of social marginality appear to have little relationship with forest loss between 2000 and 2013. This includes a factored categorical variable for Marginality (a synthetic score from the Mexican government), population, the population growth rate, illiteracy rate, percentage of indigenous language speakers, median age, and the percentage of residents born in the municipality. In this iteration, I also added spatial variables like municipal area and initial forest cover in 2000 as more objective tests. All of these variables disappear in stepwise regressions, and report effect sizes of under 1% even where significant.

Remembering the initial forest loss map is interesting in this context. The maps produced appear to show that more populous areas have more loss, as many of the larger municipalities are in the lowlands and isthmus areas of Oaxaca. The cluster of red municipalities near the Veracruz border are municipalities with relatively higher population with younger, less-established populations. These areas are also crossed by major roads. As the analysis points out, however, both of these intuitions are not supported by the tests. This may be because, within *usos* communities, the distance to the city or presence of a road matters less than the fact that they have local control of municipal institutions. The insignificance of the marginality scores are interesting as well, since both post-material development theories like Inglehart's and their rejoinder posit a major relationship between social marginality and environmental degradation, although for radically different reasons.

Test 3: Usos and Forest Loss by Ecoregion

The failure of the remoteness tests and seeming relative insignificance of other social variables tested on this dataset, I believe, points to the relevance of natural factors noted by others in the forest change literature, as well as likely offsetting effects of leaving major urban areas out of the sample, and thus losing the most dramatic effects of urbanization. It could also be due to the relative exploitability of more remote tracts of forest, or, as noted above, may be unbalanced by the presence of wildfires, which effect different regions in different ways.

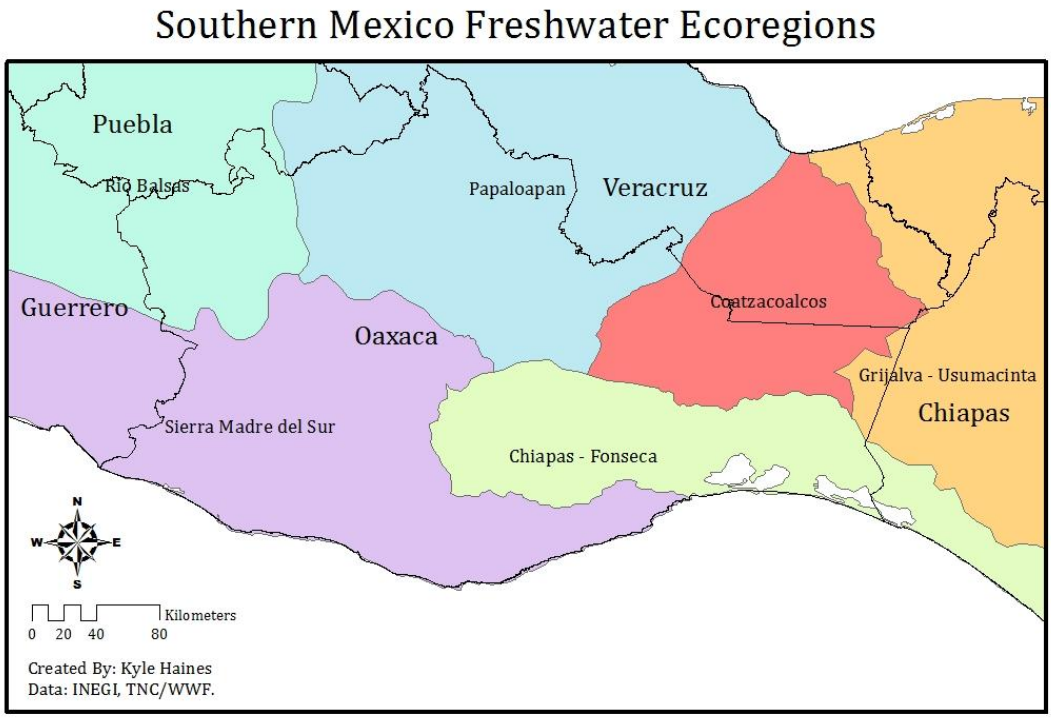

Figure 11: Freshwater Ecoregions (larger watersheds) of Southern Mexico.

As an initial attempt to try and understand these relations, in the third test I use the Freshwater and Terrestrial Ecoregions maps provided by The Nature Conservancy to

code Oaxacan municipalities by their dominant vegetation type (aggregated up from the more granular Terrestrial Ecoregions) and by their freshwater ecosystems (in this case, broadly construed watersheds defined by fish species). I used these designations to construct samples based broadly on watersheds as well as interpret the regional differences within the larger analysis of Oaxaca.

Thinking about other ways to gain specificity and explain more variance in the model, the third test has two chief benefits: 1) as the initial r^2 scores indicated much variance remained unexplained this allows a more fine-grained regional lens to direct further research and show the variability between areas and ethnicities contained within the shell of *usos y costumbres* ; and 2) different types of vegetation have different potential as carbon sinks, are affected by stressors in different ways, and require different kinds of political and conservation strategies. The difference in uptake of carbon, in particular, means that recognizing differences between desert chaparral and tropical rain forests is necessary to understand links to payment for ecosystem services plans, especially given the ascendancy of remote sensing in the field.

Coding the municipalities by where their centroid falls, I create subsamples of the original sample of 481 municipalities for each of the major watershed regions. This sampling makes sense for a couple of reasons. The first is in response to the lack of variance explained in the first model. Some of this is expected, since other studies have constructed more robust 'environmental' indicators, including average slope, altitude, precipitation, temperature, and other indicators, which their data-mining indicates

account for over half of the variation.[796] The social indicators can be buried in such reports, requiring authors to make extra effort to reassert the importance relative to environmental indicators. Sampling by the watershed aggregates many kinds of ecological indicators not captured by slope and temperature, and should explain more variance or diminish the effect of *usos y costumbres* measured in the first tests.

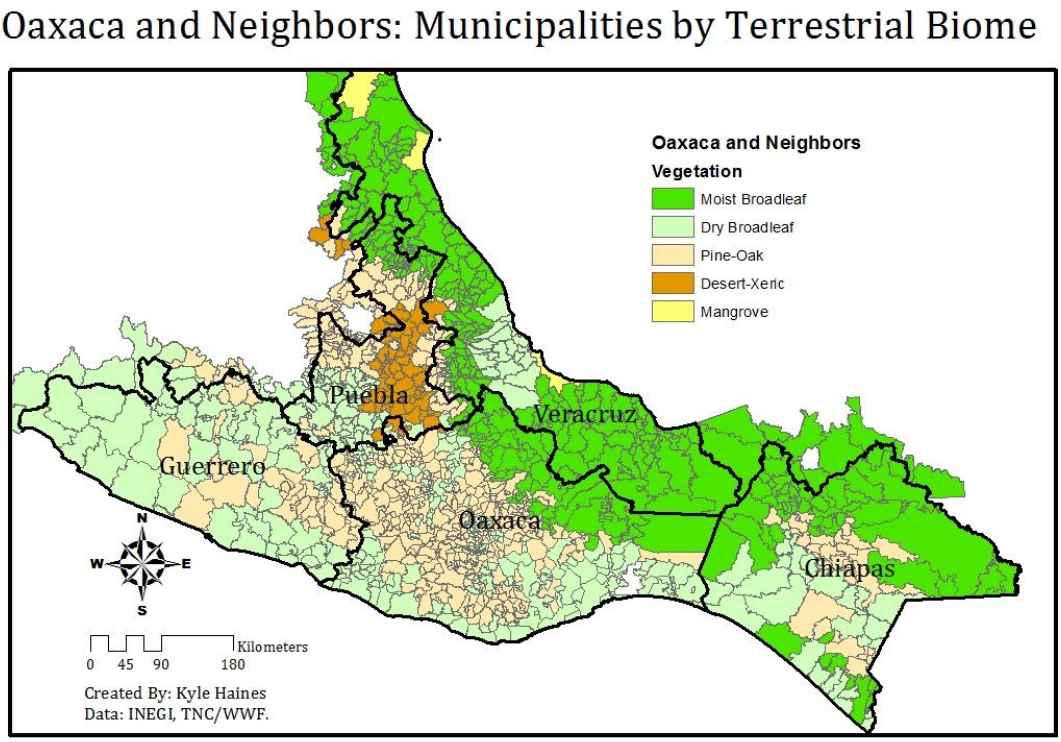

Figure 12: Southern Mexican municipalities classified by dominant vegetation type

The second and more interesting reason why ecoregion sampling is important is that entangling social and environmental variables in this more specific, regional way adds detail and uncovers the regional variability concealed in the state-wide statistics and

[796] See: Daniel Ervin and David López-Carr, 2015. 'Agricultural Inputs, outputs, and Population Densit at the Country-Level in Latin America: Decadal Changes Augur Challenges for Sustained Food Production and Forest Conservation.' *Interdisciplinary Environmental Review,* Vol. 16, No. 1, pp. 63-76.

the larger sample used earlier. This finer grain is useful—it can both point to differences in regional trends and also help translate the coverage measurements into the vocabulary of carbon capture and storage by understanding better the ecological make up of the forests themselves. These ecoregions reach beyond the borders of Oaxaca in provocative ways which I plan to examine in future research.

Table 5*:* Usos y Costumbres, Population, and Forest Loss by Ecoregion.

Test 3 Ecoregion Regression Results

	Percent Forest Loss				
	Freshwater Ecoregions				
	Coatzacoalcos	Chiapas-Fonseca	Rio Balsas	Sierra Madre del Sur	Papaloapan
	(1)	(2)	(3)	(4)	(5)
Usos y Costumbres	-5.493**	-2.571***	-0.117**	-4.779***	-1.113***
	(2.102)	(0.686)	(0.054)	(0.646)	(0.381)
Population 2000	10.281***	3.870***	0.169***	6.065***	2.710***
	(1.553)	(0.540)	(0.042)	(0.570)	(0.343)
Observations	11	63	73	189	145
Adjusted R^2	0.368	0.174	0.049	0.222	0.050
Residual Std. Error	3.472	2.645	0.225	3.691	1.785
Note:					*p<0.1; **p<0.05; ***p<0.01

Conducting a simple linear analysis, I followed Test 1 and placed only the *usos* dummy and 2000 population numbers into a regression in each ecoregion samples, the initially promising results of which are reproduced below. The initial results appear to show that both *usos* and population have significant effects. *Usos* appears to have a powerful counter-weighting influence on the effects of population size, partially expected

because *usos* communities on average are about 3000 residents, whereas *partidos* municipalities average close to 10,000. The relatively large effect size, nearly 6% less loss, in Coatzacoalcos is significant at 95% confidence, but also statistically meaningless, as the 99% r2 shows.[797] Equally interesting is the effect observed in Rio Balsas—only a tenth of one percentage point less loss in *usos* municipalities relative to *partidos*.

This result is confusing in some ways, since population consistently washed out of all other regressions performed as a part of the other tests. Placed in a larger regression with other social variables, however, *usos* remains significant in the Sierra Madre del Sur and maintains a consistently negative sign and meaningful effect-size in Chiapas-Fonseca. Population, on the other hand, becomes entirely washed out. Even where significant, other effect sizes remain below 1%. Interestingly, in Coatzacoalcos the major effects of *usos* are also washed out, with major significant effects of federal roads indicated, a finding concealed even in the within *usos* sample above and complicated by the low number of observations in that ecoregion.

[797] The rule in regression studies is usually to work with a sample of at least 33 observations to overcome issues with degrees of freedom. This sample can be extended in future research to include municipalities in Veracruz and Tobasco and raise the observations. At the moment, what it tells you is that one major municipality is driving the results (in a very good way) and that it is large in area, well forested, and low in population, as well as lacking roads. In the initial forest loss maps this municipality, at the border with Chiapas and Veracruz, is obvious.

Table 6: Usos with Social Indicators by Ecoregion.

Test 3 Ecoregion Regression Results

	Percent Forest Loss				
	Freshwater Ecoregions				
	Coatzacoalcos	Chiapas-Fonseca	Rio Balsas	Sierra Madre del Sur	Papaloapan
	(1)	(2)	(3)	(4)	(5)
Usos y Costumbres	-0.363	-1.372	-0.065	-2.756***	-0.255
	(0.222)	(1.075)	(0.055)	(0.707)	(0.466)
Population 2000	0.0001***	0.0001	0.00001	0.00002	0.0001**
	(0.00001)	(0.0001)	(0.00001)	(0.00004)	(0.00003)
Pop. Rate 2000-2010	-0.027*	-0.001	0.001	-0.038***	0.026**
	(0.007)	(0.038)	(0.002)	(0.014)	(0.013)
Born in Municipality	0.007	-0.139	-0.025***	-0.447***	0.067**
	(0.009)	(0.108)	(0.007)	(0.066)	(0.029)
Illiteracy Rate	0.011	0.001	0.010***	0.056*	-0.006
	(0.009)	(0.046)	(0.003)	(0.031)	(0.012)
Federal Road	4.231***	-0.648	-0.035	0.197	-0.310
	(0.198)	(0.814)	(0.058)	(0.587)	(0.300)
Minutes to City of 50k	-0.003	0.006	-0.0004	-0.005	0.0004
	(0.001)	(0.008)	(0.001)	(0.004)	(0.001)
Median Age	0.304**	0.105	-0.004	-0.256***	-0.070**
	(0.034)	(0.108)	(0.004)	(0.054)	(0.030)
Constant	-3.817	12.734	2.386***	52.808***	-2.670
	(1.365)	(11.318)	(0.680)	(6.673)	(3.087)
Observations	11	63	73	189	145
Adjusted R^2	0.999	0.172	0.349	0.389	0.226
Residual Std. Error	0.169	2.647	0.186	3.272	1.611
Note:					*p<0.1; **p<0.05; ***p<0.01

In the final variation of this test I conduct a factored analysis of a categorical variable for vegetation type, aggregated up from the TNC terrestrial ecoregions data. These ecoregions cut across the Freshwater Ecoregions used to construct the watershed samples. They give extra information about the kinds of forests under threat, organized here under the regional watershed scale. Each watershed does not contain all five of vegetation types, which means the factored analysis of the categorical variable will shift in its comparison, making the chart below more complicated to read, i.e. the scores will be relative to the category that has consistently been shown to have the most loss in other studies, the moist broadleaf category, encompassing cloud forests and tropical rainforests, which in Oaxaca are found along the northeastern border with Veracruz.

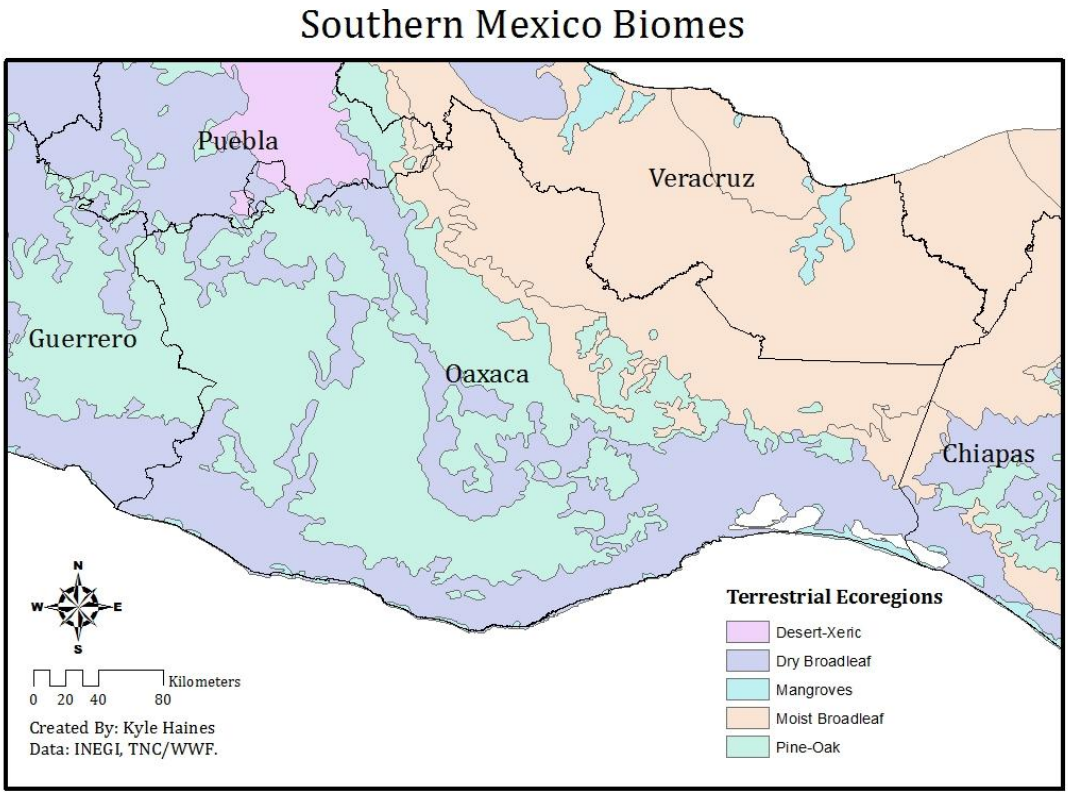

Figure 13: Southern Mexico biomes organized by vegetation type.

Here, I retain the *usos* dummy but add factored covariates for the major vegetation types to get a more complex idea of the differences between and robustness of the *usos* dummy across regions. What is interesting about this chart is the *usos* dummy remains significant across all five watershed units, but with variation. *Usos* communities in Chiapas-Fonseca and Sierra Madre del Sur register at 2% and 3% less loss respectively, with Pine-Oak regions showing the least loss. In Papaloapan the effect sizes were smaller, but both Dry Broadleaf and Pine-Oak regimes experienced less loss.

Table 7: Ecoregion Sample with Usos and Vegetation Type.

Test 3: Ecoregion Regressions

	Percent Forest Loss				
	Freshwater Ecoregions				
	Coatzacoalcos	Chiapas-Fonseca	Rio Balsas	Sierra Madre del Sur	Papaloapan
	(1)	(2)	(3)	(4)	(5)
Usos y Costumbres	-4.686**	-2.173**	-0.104*	-3.136***	-0.818**
	(1.704)	(0.872)	(0.062)	(0.689)	(0.410)
Dry Broadleaf (vs. Moist)	0.538				-1.796***
	(2.974)				(0.527)
Pine-Oak (vs. Moist)	-5.248**	-0.636	-0.046	-3.137***	-0.740**
	(1.821)	(0.856)	(0.070)	(0.621)	(0.335)
Desert (vs. Moist)			-0.157		
			(0.234)		
Constant	11.223***	3.896***	0.197***	6.962***	3.004***
	(1.391)	(0.543)	(0.057)	(0.564)	(0.341)
Observations	11	63	73	189	145
Adjusted R^2	0.638	0.168	0.032	0.312	0.118
Residual Std. Error	2.629	2.654	0.227	3.471	1.719
Note:					*p<0.1; **p<0.05; ***p<0.01

IV. Discussion

> A healthy environment is a luxury best afforded by those with wealth and economic dynamism; the worst environmental offenders, whether in the disposal of toxic wastes or deforestation of tropical rain forests, are developing countries that feel their relative poverty does not give them any option but to exploit their own natural resources, or that do not have the social discipline to enforce environmental laws. – Francis Fukuyama

For many environmental political theorists since the 1960s small-scale systems were often seen as 'pre-' modern in a way that is useful if environmental crisis is fundamentally driven by 'modern' conditions, whether economic, political, cultural, or some mixture of these factors. Ostrom and her students have established, in response to claims that small-scale solutions are inevitably doomed to 'Tragedy,' detailed parameters for 'robust' socio-ecological systems derived from specific studies of communities adjusting over time to manage common resources.[798] Many of these parameters seem to be attained by small-scale rural producers and indigenous peoples, a fit produced by closeness to natural systems and reciprocal vulnerability to changes in ecological conditions.[799]

This observation runs counter to the smug, 'End of History' narratives of modernists like Fukuyama above, and their instantiation in neoliberal economic policies spread as the Washington Consensus.[800] Today, hybrid academic research programs like political ecology and adaptive governance have adapted common pool resource theories which showed that many of these small-scale communities have resilient political arrangements for managing resources to include consideration of larger scale economic

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[798] Elinor Ostrom, 1999. 'Coping with Tragedies of the Commons.' *Annual Review of Political Science*, Vol. 2, pp. 493-535.
[799] Robbins 2003; Berkes 2010.
[800] Francis Fukuyama, 1995. 'Reflections on the end of history, five years later.' History and Theory, vol. 34 no. 2, May, pp. 27-43.

and ecological systems. Evolved from cultural anthropology and radical geography, political ecology's focus on hybridity and other boundary objects is permeated with the struggles of indigenous and rural peoples to validate their own types of knowledge in the face of Western development schemes.

These studies have focused on indigenous areas as sources of adaptive local management techniques connected by culture and collective memory to specific territories. By these categories, Oaxacan forests are often seen as major proof of common pool theories like Ostrom's, as well as contemporary ideas like Fikret Berkes' concept of 'co-management' and Carl Folke's development of the concept of 'adaptive governance' from theories of ecological resilience.[801] Each makes broad claims about the potential of indigenous systems, the rationale for which mixed with other normative claims about 'deeper' democracy, fit between human political boundaries and ecosystems, and the reevaluation of dominated systems of knowledge and production in the light of growing scientific evidence of global ecological change.

The term 'indigenous' is thus often used as an afterimage of the diagnosed problem in environmental political theory and political ecology—the 'great acceleration' of industrial modernity. Indigenous systems are often portrayed as a valuable other, in this sense, for their supposed sense of identity with territory, receptivity to signals from seasons, land, etc, and their marginality in terms of the global market. In some ways this is surely right—the way of life in such places is at times very different, mediated by traditional norms phrased in terms of local territory and continuous inhabitance.

[801]Berkes 2007; Folke *et al* 2007.

If the cultural question is relevant, however, it needs further tuning—indigenous peoples often live 'Western' lives, even in the west for long periods.[802] In Oaxaca, where indigenous languages are in places disappearing and migration to the city, including the US or Europe, has become a rite of passage for young people, such hybrid flows—the trip away and return from the US or DF, the family members that stay behind, and the webs of money, communication, and travel that link them together—are much more complicated than the simple hopes of critical theorists of industrialized economies seeking a radical other as proof that there are alternatives to Western modernity.

I have presented evidence here that while these romantic ideas are at times over-general and even patronizing, the idea that local indigenous systems might lead to better environmental outcomes does have some limited support. This means that such romantic theorists are not wrong about the need for radical change, but they posit such 'distant' systems as ideal, ignoring radically different histories and the reality of cultural hybridization produced by globalization and migration. This is both patronizing to the cultures it idealizes and less than helpful for stimulating the kinds of active policy experimentation and iterative trust building called for in most theories of decentralized green governance. With this caveat explicitly in mind, that such systems might be different in degree rather than in kind, and thus offer insights regardless of being constitutively opposite Western industrialism, is worth considering.

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[802] Folke and others clearly see this paradox and the way that the reaction against naïve romanticism might obscure the potential of subaltern systems. He says in 2007: 'We do not subscribe to belief in the 'ecologically noble savage'... We do make the argument that in many cases proximity and direct dependence on the resource base make it easier to filter out and discard practices that are clearly unsustainable, and this close connection to nature is a property of many indigenous traditional systems' (8). See: Folke *et al* 2007; p. 30.

At this stage, this analysis shows that biases towards local politics and indigenous cultural norms within green political theory are both justified and over-general, a finding which I interpret as broadly (and perhaps paradoxically given their seeming opposition) in line with the both romantic elements within green theory and their critique in more materialistic disciplines like political ecology, common pool resource theory, and ecological economics. This is because, while indigenous systems should not be deified in abstract, many of the possible components of such indigenous local rule fulfill the stipulations for sustainable governance of natural resources and ecological democracy.

This debate is not simply between indigenous or modern, but rather about the composition of effective types of local governance, a topic which needs to be teased out better in the associated literatures, and one which I suggest can be more relevant and interesting if it considers how the variation within the term indigenous is hidden by the more overarching narrative of global indigenous rights and green political theory. The results of the first step of this research performed here suggest that traditional governance tended to reduce forest cover loss by about 2.5% over the period of 2000-2013, a finding which is significant and accounts for about 11% of the variance. This finding remains significant with a 1.7% effect size when including a suite of social and environmental variables.

In the second step, I investigated variance within communities governed by *usos y costumbres*. Results there showed that there was little relationship between driving times to cities, the presence of major roads, social marginality, and the dependent variable, net forest loss rate between 2000-2013. While, on their own, Federal Road and Minutes to City indicators appeared significant, and with counter-intuitive signs (the presence of

roads seemed to lower loss and distance increase it), these coefficients completely wash out when other social and environmental variables are introduced. This finding is counter-intuitive, and will require further research to understand in better detail. I speculated above that excluding major cities (and thus the worst urbanization and resource stress) and the relative abundance of forests and lack of monitoring in remote areas may explain the lack of significant findings, an intuition which can be pursued in further research, along with expanding the environmental variables (slope, altitude, etc) and calculating percentage of municipal area covered in roads or impermeable surfaces.

Finally, in the third step I demonstrated the utility of sampling by ecological boundaries to tease out regional differences local governance and forest loss. This sample allows for a more granular lens and begins translating the more abstract public good framework into something that can be more rigorously studied and quantified. One extension of this process particularly related to forest loss is to analyze the trends in different kinds of vegetation regimes. This is important to extend the findings here, which are handicapped in a heavily forested region by lack of observations. Because these ecoregions span multiple states and even national boundaries, this technique could be interesting to pursue as a tool of assessing institutional difference, such as in places like the shared Lacandon forest of Mexico and Guatemala, or border regions in other sites like Tijuana-San Diego or Bolivia and its neighbors.

Limitations

Testing decentralization theories in Oaxaca presents great opportunities, for the reasons outlined above, but also has some interesting and problematic issues. The

foremost of these is that traditional governance was not randomly assigned, but instead chosen by those who practice it. It is also correlated with remoteness from roads, indigenous languages, smaller populations, and other demographic indicators.[803] The data on the whole contains many outliers, both extremely small, rural and large, urbanized municipalities, which a creative sampling technique is necessary to draw together observations like enough to compare. It also means drawing a causal argument beyond the relationships identified here is difficult since the sorting was self-selected. Here, I show only correlations, a stronger causal argument will require more observations over time and propensity score matching on more variables than considered here.

This endogeneity problem has been overcome, of sorts, in other studies of decentralized goods provision, but these authors have not included ecological indicators as part of their portfolio of public goods.[804] These studies analyzed observations in time series, and retain greater statistical power analyzing fewer municipalities. This shift to more historical observations of less (i.e. better matched) municipalities inevitably, however, limits the diversity of the sample in important ways. For instance, following Díaz-Cayeros, when selecting from my data set only municipalities which he and coauthors deem were equally likely to choose *partidos* or *usos* systems (a number which they put at between 2 and 2.5 thousand residents) only 29 municipalities remained in the sample, with an average net loss rate over only 1.5% and maximum loss of about 5.5%. In this sample, unsurprisingly, no variables, including the *usos* dummy, are significant, and those numbers themselves inspire no trust below the n of 30.

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[803] Alberto Díaz-Cayeros, Kristen Parks, and Justin Levitt, 2011. 'The Territoriality of Public Health Governance in Mexico.' *Annual Meeting of the American Political Science Association*.

[804] For instance, Faguet and Díaz-Cayeros both focus on funding for health, education, housing, water, and sanitation, several of which are obliquely ecological, but none as directly as forest loss.

While historical observations raise the observations to a level that makes statistical significance demonstrable, the reality is that only about 10 *partidos* municipalities will be driving the variance in the model. This number is better than individual case studies in some ways, but also obscures the particularity of the cases sampled by making claims about their representativeness at the state level. To increase observations across the more diverse municipalities captured in the data here, information could be expanded with indicators from the Mexican Economic Activity Census and matching economic indicators (including GDP, major industries, and unemployment) with longer trends of forest loss, population growth, and marginality. By looking at 2000, 2005, 2010, and 2015 census information, the sampling procedure can gain observations and perhaps jettison mid-level cities and tiny enclaves entirely as Diaz-Cayeros *et al* did, comparing urban against urban and rural against rural.

This growing specificity can be enhanced by continuing to narrow the sampling within watersheds for like groups and shared ecosystems. Future research will also need to deepen the environmental and social data in the models, as well as utilize more qualitative methods (travel and case studies) to target the reasons for regional differences by watershed and vegetation regime. Because watershed and terrestrial ecoregion boundaries extend across state and national lines, this sampling technique may be useful for disentangling institutional effects where political boundaries cross cultural and environmental communities.

This analysis thus suggests a more regional lens, in part because municipalities are smaller than forests and in part because effective forest management depends on more than a single municipal set of actors. There may be more variation explainable with

institutional factors, since even within these municipalities decisions may be influenced by parallel common property institutions, in Mexican *ejidos*.[805] This, above all, calls for greater detail and qualitative assessment, alongside the further refinement of remote sensing and econometric tests.

The long-term arc of this research project is both to test theories of decentralized, indigenous governance in green political theory, and to expand the indicators used to evaluate fiscal federalism schemes to include ecological public goods. This should expand the reach of federalism studies to include topics not usually considered by economists, chief amongst them the environment, and hopefully will encourage political theorists to seek out evidence for the choice of their institutional preferences. It also aims to contribute to debates in green political theory which are often heavy on normative injunctions, tragic pragmatism, or some other intervening political or philosophical agenda. The results shown here indicate that this is a fruitful research program, and point to the continued relevance of themes of decentralization and indigenous governance to the study of environmental politics.

[805] Grenville Barnes, 2009. 'The Evolution and Resilience of Community-Based Land Tenure in Rural Mexico.' *Land Use Policy*, Vol. 26, pp. 393-400.

12 Justicia Ambiental al Límite: Four Puzzles from the US-Mexico Border

I. Environmental Justice and Regional Complexity

The concept of environmental justice has been traditionally applied in the United States to the analysis of industrial siting decisions and unequal exposure to harmful pollution in underprivileged areas.[806] It emerged first as a self-conscious movement in the 1980s and field of scholarship in the early 1990s, and is remarkable in the history of the environmental movement in the US in that it has been particularly focused on urban areas rather than pristine natural places, where political decisions have left highways, heavy metals, and other hazards in neighborhoods with fewer affluent, politically incorporated, and white people.[807]

Environmental justice scholarship and activism made the case for enforcement of existing laws and put pressure on new national legislation and court decisions to change the rules where they were dangerous to human health. Often, these were local struggles which came to prominence through growing networks of activists, organizations, and scholars to become part of a progressive national narrative of social change, including civil rights.[808] Most practitioners cite early advocacy and the emergence of a full-fledged

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[806] For a more detailed summary see: Andrew Szasz and Micheal Meuser, 1997. 'Environmental Inequalities: Literature Review and Proposals for New Directions in research and Theory.' *Current Sociology*, July, Vol. 45, No. 3, pp. 99-120.

[807] United Church of Christ. Commission for Racial Justice, 1987. *Toxic wastes and race in the United States: A national report on the racial and socio-economic characteristics of communities with hazardous waste sites*. Public Data Access; Robert Bullard, 1990. *Dumping in Dixie: Race, class, and environmental quality*. Vol. 3, Westview Press, Boulder; Bullard, Robert D., 1993. 'Race and environmental justice in the United States." *Yale Journal of International Law,* Vol. 18, p. 319.

[808] The case of Warren County, North Carolina in 1982 is usually regarded an initial and archetypical example. Also: First National People of Color Environmental Leadership Summit 1991, Michigan Conference on Race and the Incidence of Environmental Hazards 1990. See: Ben Chavis, 1993. 'Environmental racism.' *Confronting Environmental Racism: Voices from the Grassroots*, pp. 1-8.

research program as the culmination of social and environmental movements rising to prominence in the 1960s in the US. [809] Some claimed that race was a defining factor.[810] I argue here that some of the priorities in the traditional narrative of environmental justice are bound up with the history of the US in a way that can be confusing when applied to different contexts, especially in the 'developing' world.

This is interesting to consider today because the rise in scale of social-ecological crises like climate change has prompted a radical extension of environmental justice as a rhetorical trope in global discourse.[811] This is important in the specific context of the US-Mexico border region, since environmental justice movements work by increasing transparency between groups and, usually, working toward national policy to override maldistribution of ecological externalities. This strategy succeeds where information is shared through networks of local partnerships between community actors, non-governmental organizations, and relevant levels of policy-making and enhanced where disparate actors can travel, network, and aggregate into community alliances for equality locally and constellations of national and international groups pursuing larger scale institutional change at higher levels.[812]

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[809] Paul Mohai, David Pellow, and J. Timmons Roberts. "Environmental justice." *Annual Review of Environment and Resources* 34 (2009): 405-430; Robert Bullard, 1999. 'Dismantling Environmental Racism in the USA.' *Local Environment.* Vol. 4, No. 1.pp 5 -21.

[810] Bryant and Mohai, 1992; Cole, L. W. & Foster, S. R. (2001) *From the Ground Up: Environmental Racism and the Rise of the Environmental Justice Movement* (New York: New York University Press).

[811] There is a growing literature on global justice and the environment across disciplines and scales. See: Iris Marion Young, 2006. "Responsibility and global justice: A social connection model." *Social Philosophy and Policy* 23.01, pp. 102-130; Tracey Skillington, 2015. 'Climate Justice Without Freedom: Assessing legal and political responses to climate change and forced migration.' Vol. 18, No. 3, pp. 288-307.

[812] Robert J. Brulle, 2010. 'From environmental campaigns to advancing the public dialogue: Environmental communication for civic engagement.' *Environmental Communication,* Vol. 4, No. 1, March, pp. 82-98.

Many of these central goals and the kinds of assumptions underlying them are uncomfortable at best from the perspective of those living on the US-Mexico border. In what follows I identify four puzzles generated by generic application of traditional US environmental justice narratives in San Diego and Tijuana and later identify some potential adjustments for thinking about environmental justice in divided national and developmental context. These are issues related to: 1) Information, 2) Identification, 3) Aggregation, and 4) Displacement, categories which I elaborate below. These challenges are complicated for traditional environmental justice narratives because the reliance on national policy to which it normally appeals needs to be complemented with a meaningful commitment to deliberation and shared institutions of governance at the regional scale in Tijuana and San Diego.

It is also difficult because, while suffused with local detail, such collaboration may result in uncomfortable transparency over the effects of material and mental displacement at the periphery of national sovereignty, initiating uncomfortable conversations about historical responsibility, technology transfer, and the conditions of life between national communities. This is important because the just application of the 'common but differentiated responsibility' called for in UN treaties will be centered in 'developed' San Diego, and may create resentment and protective behavior. Such protective reactions can find powerful articulation in national narratives on immigration in the US, which I explore with reference to Wendy Brown's work on the border wall.

In the final section of this article I consider the issues presented to traditional environmental justice narratives by the four puzzles at the border, and offer suggestions for increasing the potential of such discourses for positive political action in the face of

social-ecological change. Understanding the global challenge of ecological crisis as instantiated in real places, the experience of regions containing a true pluralism of perspectives, like those living side by side in the Tijuana-San Diego bioregion, may be key for overcoming the urge for parochialism, regional elite capture, and radical recentralization in the case of natural disaster.[813] I argue here that the building of solidarity central to environmental justice strategies, in such a context, can be augmented by meaningful institutions for shared decision-making,[814] and the emergence of the concept of the binational citizen.[815]

This paper is intended as both a regional analysis and a gesture at the many global problematics that are embedded and instantiated in specific regional social-ecological systems like the binational Tijuana-San Diego region. I understand the lessons generated at the border as part of an ongoing dialogue that begins to locate the terms of environmental justice in debates over development and adaptation of global-scale ecological change. Pursuing a research and activist program based on environmental justice, in this context, can be powerful, and calibrating it to regional specificity can help focus its analysis on shared problems to capitalize on a growing sense of regional identity, in contrast to national narratives now dominating political rhetoric in the US.

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[813] For the corruption/capture argument see: Simon Fan, Chen Lin, and Daniel Treisman, 2009. 'Political decentralization and corruption: Evidence from around the world.' *Journal of Public Economics*, Vol. 98, pp. 14-34. For the dramatic recentralization, see William Ophuls, 1973. 'Leviathan or Oblivion?' in *Toward a Steady-State Economy*, ed. Herman Daly, WH Freeman Publishing Co., San Francisco.

[814] See: Christian Hunold and Iris Marion Young, 1998. 'Justice, Democracy, and Hazardous Siting.' *Political Studies*, XLVI, pp. 82-95. Also: Sergio Peña, 2007. 'Cross-border planning at the US-Mexico border: An institutional approach.' *Journal of Borderlands Studies.* Vol. 22, No. 1, pp. 1-18.

[815] Lawrence Herzog and Christophe Sohne, 2014. 'The Cross-border metropolis in a global age: a conceptual model and empirical evidence from the US-Mexico and European Border Regions.' *Global Society*, Vol. 28, No. 4, pp. 441-461; Also: Jonathan Fox, 2005. 'Unpacking transnational citizenship.' *Annual review of political science*, Vol. 8.

Figure 14: Crossing memorial, Colonía Libertad, Tijuana. Author's Picture 2014.

II. Justicia Ambiental en Territorio Dividido

> A collective memory of experiences with resource and ecosystem management provides context for social responses and helps the social-ecological system prepare for change. If experience embedded in institutions and organizations provides a context for the modification of management policy and rules, people can act adaptively in the face of surprise. – Carl Folke

The simultaneous binational and regional context of San Diego and Tijuana highlights the need for meaningful translation of information both between languages and between global and local levels of analysis. Witness to the inadequacy of national policy to solve binational ecological issues, the search for shared governance in Tijuana-San Diego is predicated on recognizing both cities and their citizens as subjects of justice, a

process which will require San Diegans meeting head on the stark inequality and uneven ecological outcomes now hidden behind the border wall.

Environmental justice activism and scholarship, traditionally concerned with racial disparities and national legislation, is both powerful and also, at times, appears radically unsuited to such a context. It potentially powerful because it can be a bridging discourse between US and Mexican civil society, a method for opening channels for resources, energy, and press, and a tool for laying local environmental struggles into a transnational context which is often lacking in more common local scholarship.[816] Such environmental justice actors seeking to identify cross-border allies will need to overcome physical barriers to travel, linguistic difference, and different ideas of what constitutes an 'environmental' justice movement or actor.[817] Seeing environmental justice narratives as both potentially powerful and problematic in divided territory, I explore in what follows four specific puzzles introduced by ecological crisis in the cross-border metropolis, and attempt to extrapolate the adjustments in both specific and general registers.

1. The Information Challenge

To understand San Diego and Tijuana as a single community is both self-evident ecologically and almost impossibly hard politically, legally, and linguistically. The increased freedom of economic flows lacing together the border region stand in stark

[816] In this task several contributions are noteworthy: David Carruthers, 2008. 'The globalization of environmental justice: Lessons from the US-Mexico border.' *Society and natural resources* Vol. 21, No. 7, pp. 556-568. See also: JM Fritz, 1999. 'Searching for environmental justice: national stories, global possibilities.' *Social Justice.* Vol. 26 No. 3, pp. 174–90; Sara Grineski and Timothy Collins, 2008. 'Exploring patterns of environmental injustice in the Global South: Maquiladoras in Ciudad Juárez, Mexico.' *Population and Environment.* Vol. 29, No. 6, pp. 247-270; Josiah Heyman, 2012. 'Political economy and social justice in the US-Mexico border region.' *Social justice in the US-Mexico border region*. Springer Netherlands, pp. 41-59.

[817] Emily Wakild, 2013. 'Environmental Justice, Environmentalism, and Environmental History in Twentieth-Century Latin America.' *History Compass.* Vol. 11, No. 2, pp. 163-176.

contrast to the national debate, centered as it is on security, illegal immigration, and the ultimate stupidity of a continent-wide border wall. Such national issues appear curious looking inward from their edges, where the dermis of the nation is shown as radically changeable and thoroughly permeable in areas like the US-Mexico border region. While functionally part of the same border economy (itself linked to the span of the globe by the flows of people, money, and materials concentrated briefly here), an obvious and high degree of differentiation exists between San Diego and Tijuana, both in what they 'produce' and what they guarantee to workers as far as money, benefits, and environmental conditions.

Focus on information and transparency is key to both environmental justice movements and scholarship. This effort grounds all that follows, it provides a core network in which to spread and grow. This is a particularly problematic goal in san Diego and Tijuana, where the official languages and different institutional and cultural histories draw on rival understandings of membership, collective purpose, and goal-setting. While there is a lot of data and information on the San Diego side, access is severely limited in Tijuana, both for language differences and more structural aspects like access to the internet, libraries, and the ability to freely travel.

The obvious problems of equal access and travel are further compounded by gross socio-economic inequality between the two communities. With access and relative wealth, many San Diegans rarely look beyond the border except for fun or fear. Lacking access and relatively poor, many Tijuanense watch American satellite TV but do not always understand basic ecological health challenges, such as burning plastic. Two sides of one economic coin, the unskilled developing majority in Tijuana supplies the material

basis for knowledge and service economies in San Diego, the so-called post-industrial, post-material endpoint of unreflective American national development enshrined in many environmental theories based on the Kuznets Curve, or the idea that environmental concern increases after conditions for basic material life are fulfilled.

Above I claimed that such environmental justice scholarship and activism will find challenges in the border region, especially in seeking the expansion of information to increase regional transparency and enabling shared governance. The task of increasing information in such a context must be concerned that it too unreflectively projects American assumptions and strategies on the 'developing' world in a patronizing way that does not understand local context in Tijuana in particular (and in this way serving as a microcosm of many debates between 'developed' and 'developing' nations over environmental crisis).[818]

In some situations environmental justice narratives clearly resonate with specific histories and movements in Mexico, and thus need less adaptation, such as in liberation theology and indigenous movements which can fill the special place of race in environmental justice narratives and which pit individuals and local groups against elites in a contest for changes in national legislation. In others, especially regions characterized by binational economic and ecological systems and fragmented political agency (Tijuana-San Diego is perhaps archetypical in this sense, but surely not alone) such direct translations to the national narratives common in the US can actually cause confusion,

[818] David Carruthers, 2007. Environmental justice and the politics of energy on the US-Mexico border.' *Environmental Politics*, Vol. 16, No. 3, pp. 394-413; M. Alfie Cohen, 2003. 'The rise and fall of environmental NGOs along the US–Mexico border.' *Cross-border activism and its limit: Mexican environmental organizations and the United States*. Vol. 13. Center for Latin American Research and Documentation, pp. 39–59.

and, perhaps, the dismissal of the narrative itself and its potential for transforming awareness and cultivating political activism.

The information problem is more than simply language barriers. Ecological crisis is raising the scope of environmental justice analysis beyond the scale of national policy to the global level, which presents a clear challenge in retaining meaningful local language and understandings.[819] This goes beyond the fractious nature of the United Nations and international diplomacy. At its heart, the challenge is one of imagination. The rise in scale to discourses of 'global justice' can become problematically abstract, a characteristic which is amplified by reliance in many disciplines on John Rawls' work demanding thought experiments which place history-less people behind a veil of ignorance to decide the world's rules before being randomly distributed into the different possibilities. This problem, a lack of critical purchase and meaningful cultural shared language for deliberation, is common to global ecological crisis literatures as well, which, focused on global averages and decadal timelines, often lack intelligibility for the local audiences they seek to motivate.[820]

Tijuana and San Diego are poised at the overlap of the global and local, at a locus point of global economic, migrant, clandestine, and military systems, yet also a story about a local economy, shared ecological services, and the opacity of conditions of life across the binational community.[821] The problem of environmental justice in such a

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[819] Chukwumerije Okereke, Harriet Bulkeley, and Heike Schroeder, 2009. 'Conceptualizing climate governance beyond the international regime.' *Global environmental politics,* Vol. 9, No. 1, pp. 58-78.
[820] Susanne Moser, 2010. 'Communicating Climate Change: history, challenges, process and future directions.' *WIREs Climate Change*, Vol. 1, January/February.
[821] See: Lawrence Herzog, 2006. 'Rethinking Urban Ecologies: Cultural Barriers to Sustainable Development?' *Equity And Sustainable Development: Reflections from the US-Mexico Border*, Ed. Jane Clough-Riquelme, Center for US-Mexican Studies, UCSD; Paul Ganster, 2009. 'Sustainable Development

divided context is thus one of the two translations. The first is between identities, languages, and socio-economic contexts in which scholars and activists must operate. The other translation is in understanding the effects of local factors on national and global processes, and being able to locate global processes in the local. Each provides a potent and primary challenge to environmental justice in divided territory.

2. Problems in the Identification of Partners

The lack of free information and common institutional forums for addressing shared social-ecological issues culminates in a problem of identification. By identification I mean that reliable partners are hard to find and public exposure to activist and scholarly networks is rare across national lines.[822] While the potential for horizontal identification of partners is greatly enabled by the internet and social networking, the differences in language and access in the information puzzle minimize this potential.

Adding to this puzzle is the importation of US narratives onto developing contexts. Seen as something to be protected, the environment today has become a kind of special interests in the US, a field of activism and scholarship, in a way that does not overlay well onto movements in the developing world. As Szasz and Meuser summarize, 'the horizons of the environmental inequality literature are largely contemporary and American,' which is problematic despite its seeming success. They claim:

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and the US-Mexico Border Region: Review of *Equity and Sustainable Development, Reflections from the US-Mexico Border*.' *Public Administration Review*, Vol. 69, No. 1, pp. 153-155; Serge Dedina, 1995. 'The Political Ecology of Transboundary Development: Land Use, Flood Control and Politics in the Tijuana River Valley.' *Journal of Borderlands Studies*, Vol. 10, No. 1, pp. 89-110.

[822] There are notable exceptions to this, but they are few relative to the potential connections. See previous footnote and: Jonathan Fox, 2003. 'Lessons from Mexico–US civil society coalitions.' *Global Civil Society and Its Limits*. Palgrave Macmillan, pp. 126-142; Joe Bandy, 2000. 'Bordering the future: resisting neoliberalism in the borderlands.' *Critical Sociology* Vol. 26, No. 3, pp. 232-267.

> The movement was the great stimulus for research. Still, this intimate connection between movement and research has had its costs. Political agendas not only motivated; they subsequently determined researchers' *horizon*—what questions would be asked and how they would be asked would be largely determined by American race politics.[823]

In Tijuana and San Diego, this racial framing makes sense at a cross-border regional level as a link to US discourses, but does not have a reliable cognate in Tijuana itself, in part because Mexican narratives about racism are largely centered around indigenous movements which are proportionately more powerful at the southern Mexican border.[824]

Despite this mismatch, even harsh critics of many mainstream American attitudes toward preservation and resource economics such as Catalan economist Joan Martinez-Alier have sought to incorporate the potential power of justice rhetoric, if in a revised form. Martinez-Alier claims 'the environmental justice movement is potentially of great importance, provided it learns to speak not only for the minorities inside the USA but also for the majorities outside the USA (which locally are not always defined racially) and provided it gets involved in issues such as biopiracy and biosafety, or climate change, beyond local instances of pollution.'[825] His challenge is to the scale of analysis which the environmental justice lens can provide and also the expansion of the scope of perspectives to include the developing majority of humans in the world.

The goal of such environmental justice activism, however, has historically been improving on a national narrative, usually related to Civil Rights in the United States. Such narratives have long called on the government to fulfill its promises of equal

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[823] Andrew Szasz and Micheal Meuser, 1997. 'Environmental Inequalities: Literature Review and Proposals for New Directions in research and Theory.' *Current Sociology*, July, Vol 45, No. 3, pp. 99-120; p. 114.
[824] Jordi Diéz, 2006. *Political Change and Environmental Policy Making in Mexico*, Routledge, NY.
[825] Joan Martínez-Alier, 2002. *The Environmentalism of the Poor: A Study of Ecological Conflicts and Valuations*. Edward Elgar Publishing. Northampton, MA, p. 14.

protection, but rarely envisioned the construction of new or parallel institutions through which to fight the battles themselves. In the border region such fights have been brought through the Council on Environmental Coordination, a side agreement of NAFTA, but these institutions have proven costly and slow, despite some limited successes, as detailed by Carruthers in the case of Chilpancingo and *Metales y Derivados*.

Martinez-Alier insists that the struggles of local communities all over the world are a broader tradition of social justice, of which the environmental justice movements of the US, highly associated with urban and racial politics, were one expression. His definition of environmental justice is broader and more inclusive, composed of 'spontaneous movements and organizations that resist extractive industries and organize against pollution and climate change anywhere in the world,' which specifically includes 'the networks or coalitions they form across borders.'[826] He challenges the idea that movements for social justice are not also concerned with environmental justice, and looks to the beginnings of more global perspectives focused on flows of energy and metabolism to address both intragenerational and intergenerational distribution as well as the legitimacy of social protest and inclusion of diverse perspectives.

In making his claim about the social nature of environmental justice and its relation to the developing context, however, the urban context is rather lost, which is important in the context of urban populations equaling and surpassing rural ones globally in recent years. He claims:

> In the USA, a book on the environmental justice movement could well carry the title or subtitle 'The environmentalism of the poor and the

[826] Joan Martinez-Alier. 2012. 'Environmental justice and economic degrowth: an alliance between two movements.' *Capitalism Nature Socialism* Vol. 23, No. 1, pp 51-73; p. 51.

> minorities,' because this movement fights for *minority* groups and against environmental racism in the USA, but the present book is concerned with the *majority* of humankind, those who occupy relatively little environmental space, who have managed sustainable agroforestal and agricultural systems, who make prudent use of carbon sinks and reservoirs, whose livelihoods are threatened by mines, oil wells, dams, deforestation and tree plantations to feed the increasing throughput of energy and materials of the economy within or outside their own countries.[827]

Martinez-Alier does not address the urban context directly here, in a way which exposes the rural framing of his alternative vision. What it means for an urban area like Tijuana and San Diego, thus, is more difficult to interpret. This oversight is unfortunate, because the critique of what Martinez-Alier named the 'post-material hypothesis' is powerfully illustrated in the relationship between the cities of San Diego and Tijuana.

Figure 15: Border graffiti, Colonia Libertad. Author's picture, 2014.

[827] Martinez-Alier, 2002; p. 13.

Environmental justice, in its early forms, positioned the injustices of the poor and minority communities within the US as a challenge to this progressive narrative, but still believed in its reflexive improvement. Martinez-Alier is trying to add a different voice to this conversation which starts from the intertwining of social and ecological systems and the consideration of global perspectives. His efforts and associated literatures in political ecology and ecological economics drive to expand the histories and examples of activism to include those which do not explicitly phrase their rhetoric in the terms of the US social movements or sustainable development.

This 'post-material' bias, in context, implies that calls to see both San Diego and Tijuana as subjects of regional debates over environmental justice are premature, since the people of Tijuana are too poor to be environmentalists. Addressing this assumption, Martinez-Alier claims: 'my objection to Inglehart (who is a political sociologist, not an anthropologist) is not that he forgot about the 'environmentalism of the poor,' but rather that he has not considered the material roots of the environmentalism of the rich.'[828] His point is that post-material societies are can only conceive of themselves as so because they have forgotten the source of the materials that make up 'developed' lifestyles.

Augmented by the information challenge at the border, this attitude is a severing force between regional partners with an interest in collaboration—it does not see connections between 'post-material' developed societies and the 'material' societies which provide their goods and absorb the consequences of their appetites.[829]

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[828] Joan Martínez-Alier, 1995. 'The environment as a luxury good or 'too poor to be green'?' *Ecological Economics*, Vol. 13, pp. 1-10; p. 2.
[829] Ken Conca, 2001. 'Consumption and environment in a global economy.' *Global Environmental Politics*, Vol. 1, No. 3, August, pp. 53-71.

3. Aggregating to Collective Political Agency

This distance created by the border wall is accentuated where environmental justice actors seek allies who narrowly self-identify as 'environmental.' While in the US the environment is often generalized as a lobbying special interest in national policy debates, such a distinction is less useful where struggles for environmental justice are tied up in workers' rights, indigenous autonomy, or democratization. This has two effects, mirrored again across the border wall. First, it inhibits self-recognition of movements as 'green' or 'ecological,' and second, it inhibits relatively well-funded US environmental justice actors from finding appropriate partners in their own region.

In this search, traditional reliance on racial themes and dependence on national policy strategies will likely need to be modified for binational activism and scholarship. The promotion of an overarching binational identity and institutionalization of collective forums for regional deliberation and governance could greatly enable any efforts for environmental justice in this context, and open up fruitful research programs. I will suggest later that the insights of environmental political theory, especially regional democratic theories like bioregionalism, are particularly interesting resources for building such a cultural identification based on shared membership in the land community.

The effort to apply environmental justice in the borderlands is usually concerned primarily with unequal distribution of risk, itself based heavily on economic factors.[830] Carruthers and others have expanded this distributive focus to include recognition and

[830] Timothy W. Collins, 2009. 'The production of unequal risk in hazardscapes: An explanatory frame applied to disaster at the US-Mexico border.' *Geoforum*, Vol. 40, pp. 589-601; Sarah Grineski and Patricia Juárez-Carrillo, 2012. 'Environmental Injustice in the US-Mexico Border Region.' In (Ed) Lusk, Staudt, and Moya. *Social justice in the US-Mexico border region.* Springer Netherlands, pp. 3-38.

group justice through an application of Amartya Sen's capabilities theory.[831] David Schlosberg goes further in the search for ecological justice by insisting also on a biocentric recognition of non-human entities and natural systems, normally outside the purview of human welfare ethics, as subjects of justice.[832]

Such an expansion in binational environmental justice movements and scholarship, however, will have to confront a unique co-linearity of regional and global forces. Needing to both interpret the specific consequences of global change on local systems (which is itself a global puzzle) and to create a flow of information and set of potential examples to draw on for regional change, the border wall itself complicates what is already a complicated project in those areas ruled by a single national government. Thus, calls for expanded communal identity and shared forms of regional governance are difficult in a way they are not where existing social identities are stable and long-standing. Together San Diego and Tijuana lacks a reliable collective subject or institutionalized form of democratic agency. Without the shared cultural substrate, attempts to analyze the region or govern effectively will be consistently hamstrung by divergent interests and unreflective assumptions like the post-material hypothesis.

What seeking a kind of shared cultural foundation makes clear is the need to address the terms of development underlying regional disparities in a meaningful and genuine way. National policies which seek to address environmental degradation within US borders while encouraging the deleterious policies in the Mexican side of the industrialized border region will continue to generate fragile conditions for both human

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[831] David Schlosberg and David Carruthers, 2010. 'Indigenous Struggles, Environmental Justice, and Community Capabilities,' *Global Environmental Politics,* Vol. 10. No. 4, November, pp. 12-36.
[832] David Schlosberg, 2007. *Defining Environmental Justice: Theories, Movements, and Nature*, Oxford University Press, NY.

welfare and ecological systems on both sides of the wall. Perceiving these consequences as steps towards a middle-class green future rather than the injustices that they may represent is perverse in this sense, since it defends existing comfort (the assumed 'post-material' context of middle class environmental politics which people like Martinez-Alier are at pains to reject), while still privileging the 'developed' lifestyle as the goal for developing areas experiencing acute environmental health problems.

Where, in the assumed national policy context of traditional EJ, the task was to affirm local struggle as part of an overarching national narrative, such common ideals to reference are not as obvious in San Diego and Tijuana's divided region. This lack is accentuated, not by conflict, but by relative indifference—without a common language, developmental context, or set of meaningful cultural touchstones (whether historical or more forward-looking), both communities continue to for the most part perceive themselves as functionally separate, despite the ligaments of money, proximity, and ecology pushing through the holes in the border wall.

4. Governance and displacement: Material and Mental

Finally, the border region complicates environmental justice and adaptive management schemes because it produces two kinds of powerful 'distances' or forms of 'remoteness.' First, it obscures the relative transfer of waste, environmental, and health problems to Tijuana as a consequence of the economic integration or 'complementarity' of the region. Second, it creates a form of mental displacement to match the first more material kind, meaning that there is little consideration of the other city in our binational conurbation in ethical or political terms. This is especially true in San Diego, where

regional weather reports do not report Tijuana or Mexicali but report Oceanside and Borrego Springs, more than twice the distance from downtown.

This same local news in San Diego reports only on murders and protests in Tijuana, cultivating a sense of paranoia and danger that is reinforced by the sporadic but serious bouts of violence in Mexico and in Tijuana in particular. It is commonly remarked that San Diegans sit with their backs to the wall, but this lack of transparency is not unique—it is matched at some level by misperceptions and hopes about the US side from the residents of Tijuana, many of whom have lived in or plan to cross to the US at some point, or who have family living in the US. A significant port for deportation, Tijuana receives over 30,000 people a year who may have never lived in Baja California or even in Mexico, as well as countless (literally, INEGI officially claims Tijuana has about 1.5 million people, but many estimates from credible sources rise as far as 4 million) people in transit or without regular housing.

The sum of the two distances is powerful—material producing unjust environmental contamination and labor policies, and mental hiding this fact from the relatively well-off US part of the region. The mental form of this distance is not necessarily conscious, but rather it is a powerful set of assumptions about how and why ecological degradation happens, as well as who bears political and ethical responsibility for its consequences. Many natural hazards and more scientifically-oriented approaches bracket social adaptation to avoid messy ideological hang ups, but this seeming 'neutralization' of policy makes implicit ideas about the relationship between economic development and the ability to conserve nature both more hidden and more damaging to any sense of regional identity or shared decision-making.

The benefit of a traditional environmental justice approach, in contrast to global economic and ecological systems analysis, is its scale and imaginability. At the same time, in many places the reduction to the regional scale may inhibit generalization in frustrating ways, and in some places may dramatically reduce the perspectives considered due to their homogeneity, limiting the parallel to the most important and vexing debates occurring at global levels. This fear of 'reducing' perspectives to the regional level, however, is clearly not a primary concern in the case of San Diego and Tijuana, where a lack of shared regional identity may mean that the expansion of binational governance and institutional forums for exchange offers much greater democratic pluralism.

Allowing debates over the political adaptation to social-ecological crisis to proceed as if merely selecting techniques for adaptation to changing conditions is disingenuous at its core because it leaves the problem generalized, obscuring normative debate over the justice of habits in the 'developed' world in contrast to the conditions of life for the majority of people in Tijuana. That these debates have not occurred and are not on the agenda, especially in San Diego, is clear proof of the displacing power that the national boundary splitting the shared ecoregion wields. Discussing the border community, David Carruthers notes the gravity of the insights revealed in the border region when viewed through the lens of environmental justice:

> Globalized production parcels out costs and benefits unfairly, accruing special benefits to international capital, domestic subsidiaries, and local elites. Consuming classes enjoy a profusion of inexpensive manufactures and foods while the 'poor neighborhoods' of the global south pay disproportionate human and environmental costs in the form of low-wage labor and environmental exploitation.[833]

[833] Carruthers 2008; p. 564.

Rather than simply nested, these local decision-making bodies are simultaneously empowered in overlapping and complicated ways.

While the seemingly stark differences between the US and Mexico are constant refrains in national politics in the US, the border region, of which around 5 million reside in the municipality of Tijuana and San Diego County, is much more of a blend of the two cultures, with substantial Mexican-American and immigrant populations living in the US and a curious blend of California and Mexico which takes place in the city of Tijuana. It is in harsh contrast to this relative similarity and higher levels of local trust that Tijuana and San Diego are still characterized by material and mental displacement, punctuated by the wall between them and the regional inequality that it obscures.

III. Environmental Justice in Territorio Dividido?

Environmental justice theory insists that educating local people and empowering them to make changes will spur active engagement to confront shared challenges. Tijuana-San Diego is a challenge to the specificity of this claim, a call to recognize that in places like the border between the US and Mexico calls for expanded community rights may seem premature. In Tijuana, many informal and underserved communities have little sense of themselves as communities, and remain effectively unincorporated politically, without mechanisms for collective agency. The most vulnerable settlements, often appearing suddenly from former ejidos and ranches, and sprawling along the city's periphery below business parks owned by foreign companies, are largely composed of newcomers from other parts of Mexico and Central America. Many have come originally to make money in the low-paying maquiladoras or arrange to cross to the US, and their

temporary and at times illegal status makes political incorporation and appeals to shared cultural norms exceedingly difficult.

Considering the natural environment in such a region without understanding the kinds of regional, national, and global flows concentrated in the area is confusing and in the worst case can lead to a naïve fatalism when the local effects observed are tied in with processes occurring at much higher scales of agency. This fatalistic attitude is often used as justification for continuing inaction on many regional issues by relatively comfortable residents of San Diego, and underlines a general lack of appreciation for conditions of life in Tijuana. The American lifestyle, in contrast, is tantalizingly visible in Tijuana, through media permeation, transmigration, and sheer physical proximity. It is in part this image, if not its reality, which drives the hopeful migration from all over the world to the border region. Surveying the informal settlements in the canyons where I work one thing is remarkable: even where people lack basic sewage services they almost always have a satellite TV dish.

Applying environmental justice to Tijuana and San Diego, which Kevin Lynch and Donald Appleyard once labeled a 'temporary paradise,' is thus, of necessity, a challenge to many of the assumptions underlying US policies in the developing world about the independence of natural and social systems, and to the assumed scale of effective analysis and action. In the face of accelerating change and increasing social risks, environmental justice discourses seeking relevance in the border region must preserve the strength of their local engagement, but also begin to think with a broader focus capable of identifying complicated problems and addressing them flexibly at appropriate scale.

Decisions made at various geographic and temporal scales are visible at the border, and often in starkly unjust ways. The effect of Mexican economic crises in the early 1980s and mid 1990s, and the opening of exports through the NAFTA agreement in 1994 have had a clear effect on both partners and made Tijuana the center of global economic flows made concrete in vast industrial parks, or *maquiladoras*, throughout the city. Many of these parks have profited from lax enforcement of Mexican environmental and labor laws to pass on industrial externalities to local residents.[834] This displacement has been, ironically, in some part due to the successes of local environmental justice and labor movements which made polluting industries more expensive in the US.

Applying global climate justice or national immigration debates in a generic way here may increase frustration where it cannot be reliably imagined as a form of democratic power capable of taking on global corporations, national economic strategies, and regional governments to create change. Here I presented four interrelated puzzles for traditional environmental justice narratives based on work in the binational region at the Western tip of the US-Mexico border. This is not a rejection of the theories or movements promulgating environmental justice, but rather a consideration of how these traditional strategies are challenged by application at the borders of national sovereignty.[835] These four challenges are bound up with but not limited to the physical barrier dividing the region. They are also studies in miniature of global relations through the microcosm of development and globalization debates which it represents.

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[834] Kathryn Kopinak, 2002. 'Environmental Implications of New Mexican Industrial Investment: The Rise of Asian Origin Maquiladoras As Generators of Hazardous Waste**.'** *Asian Journal of Latin American Studies*, Vol. 15, No. 1 June, pp. 91-120.

[835] For an example of another exceptional research program in this respect see the work on El Paso and Juarez pursued in several places by Sara Grineski, Timothy Collins, and coauthors.

Lacking meaningful environmental or labor law enforcement, multinational companies around the world send their oldest, most polluting machines to Tijuana. Although often cast as a 'mega-region' of CaliBaja by business interests, the functional complementarity of the Tijuana and San Diego economies means that the bulk of polluting industry remains on the Tijuana side. The influence of Asian multinationals in the dramatic rise of *maquiladoras* is evident, with a profusion of plants assembling audio and entertainment goods (parts of Otay Mesa still bear signs declaring it 'Television City'). Recent decline of the aerospace industry as it relocates to other areas of Mexico has been largely offset by the production of medical devices and communications equipment destined for 'developed' markets in the 'post-industrial' US.[836]

Figure 16: 'Bienvenidos a Tijuana, la capital Mundial de la Television.' Otay Mesa. Author's picture, 2015.

[836] Alejandro Brugues, M. Combs, M. Cox, A. Díaz Bautista, D. Flyte, NA Fuentes, C. Luhn, C. Mason, DA Shirk, and T. Wright, 2014. 'Jobs Without Borders: Employment, Industry Concentrations, and Comparative Advantage in the CaliBaja Region.' *CaliBaja Mega-Region Initiative*; Center for U.S.-Mexican Studies, UC San Diego and El Colegio de la Frontera Norte.

Ecologically as well as economically interdependent, San Diego and Tijuana share concerns for the changing conditions implicated in global ecological issues like climate change and the expansion of the cross-border window into the global economy. Astride the busiest land port of entry in the world, San Diego-Tijuana is a focal point of migration and commerce, producing both accelerating, interdependent flows of people, money, and material, and also performing an extraordinary act of closure in the fortification of the national border in response to national domestic discourse on immigration in the United States.

Figure 17: Across to the Tijuana Estuary from Mirador, Tijuana. Author's picture, 2014.

Political rhetoric in the US has continually returned to the symbol of the border wall as a cure for insecurity stoked by instability and economic downturn. Only first built in the 1970s, the US border wall now dominates the northern edge of Tijuana,

flanked by surveillance and a judicially-sanctioned suspension of the Bill of Rights for citizens and foreigners alike for US border enforcement, mocking the lines of natural systems and obscuring the immense inequality of living conditions between the two cities. Political theorist Wendy Brown has argued that the rise of borders is a response to the fears of redistribution in the developed world and the waning of the exclusive sovereignty of the nation-state, that 'the US barrier responds mainly to US popular anxieties about the effects of an impoverished Global South on the American economy and culture.'[837]

It performs national sovereignty in ever more forceful ways as migration, global economic flows, and ecological problems change the terms of its existence. Reflecting on this response to neoliberal economics, she claims that:

> What we have come to call a globalized world harbors fundamental mental tensions between opening and barricading, fusion and partition, erasure and reinscriptions. These tensions materialize as increasingly liberal borders, on the one hand, and the devolution of unprecedented funds, energies, and technologies to border fortification on the other.[838]

Her point is powerfully figured in the context of the US-Mexico barrier between Tijuana and San Diego. At once, the binational region is torn between conflicting tendencies, caught in national wars on drugs, security fears, and anti-immigrant populism in the US, and also inexorably economically integrating at the regional level. The challenge for environmental justice in this context is to understand the linkages between communities sharing the natural landscape as a prerequisite for successful ecological interventions. It will require getting beyond the mental distance felt in the northern part of the region to

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[837] Wendy Brown, 2010. *Walled States, Waning Sovereignty*. Zone Books, NY; p. 28.
[838] Brown 2010; p. 7.

recognize the unequal social conditions which economic complementarity capitalizes on and may reproduce.

Brown's identification of two fundamental tendencies in tension follows Foucault in the lecture following the one quoted above regarding the local character of criticism. In the second lecture, Foucault remarks:

> [The analysis in discussion] should be concerned with power at its extremities, in its ultimate destinations, with those points where it becomes capillary, that is, in its more regional and local forms and institutions. Its paramount concern, in fact, should be with the point where power surmounts the rules of right which organize and delimit it and extends itself beyond them invests itself in institutions, becomes embodied in techniques, and equips itself with instruments and eventually even violent means of material intervention.[839]

Like Brown, Foucault is not concerned with central nodes of power, like the sovereign state Brown insists is in battle with neoliberal market forces, but with power at its extremities, where power surmounts and reinvests limits, a focus which has productive parallels with Agamben's reviving of Schmitt's concept of the 'state of exception.'[840].

Figure 18: Border fading into the Pacific Ocean, Playas de Tijuana. Author's picture, 2016.

Foucault wants to 'try to locate power at the extreme points of its exercise, where it is always less legal in character.' Brown's analysis of the border wall does exactly this,

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[839] Michel Foucault, 1980. 'Two Lectures.' In *Power/Knowledge: Selected interviews and other writings 1972-197*. Pantheon, NY; p. 96.

[840] Juanita Sundburg, 2015. 'The state of exception and the imperial way of life in the United States-Mexico borderlands.' *Environment and Planning D: Society and Space*, Vol. 33, pp 209-228.

it studies power in 'its external visage…where it installs itself and produces its real effects.'[841] At the border of US and Mexico dividing San Diego and Tijuana, the real effects of such an 'external visage' of power are clear and jarring, perhaps never more than the absurd fence dividing the beaches of Imperial Beach and Playas de Tijuana. For Foucault, the shift to understanding power in this new disciplinary rather than sovereign way required beginning from the local, or what he called 'conducting an *ascending* analysis of power,' that stressed the histories and tactics of specific places to understand more general trends involved in global domination.[842] As Brown theorizes, this ascending process reveals two tendencies in tension, the liberalization and opening of the border and the urge for radical closure to contain the proximate instantiations of unjust systems of global circulation.

A product of the liberalizing tendency, a new generation of increasingly binational youth, especially in communities of deportees in Tijuana and in Mexican immigrant communities in San Diego, is gradually coming to political maturity, becoming exposed to higher education, and thinking of themselves as residents of a single region rather than two countries. That this identity is stronger on the Tijuana side and in the southern half of San Diego County is also clear, pointing to a greater level of complexity than is evident in the increase in national level discourse trading on bigotry and blatant fear-mongering. This contrary tension finds its instantiation in the increasingly militarized border 'Enforcement Zone' surrounding the at times three-fence-

[841] Foucault, 1980; p. 97.
[842] Foucault, 1980; p.99.

thick barrier between Tijuana and the communities of Imperial Beach, San Ysidro, and Otay Mesa in California.

This enforcement zone extends into the Tijuana River Estuary, an area protected by the State Parks of California, the National Estuarine Research Reserve system, San Diego County Parks and Recreation, the cities of San Diego and Imperial Beach, and local civil society groups. This presents a challenge to the national narratives embraced by both environmental justice and adaptive governance regimes, because the entrance of the nation state as one of many actors in the milieu of local adaptation rather than a central sovereign final decision identified by Brown needs to be accounted for by environmental justice. She claims:

> The US-Mexico barrier stages a sovereign power and control that it does not exercise, is built from the fabric of a suspended rule of law and fiscal non-accountability, has multiplied and intensified criminal industries, and is an icon of the combination of sovereign erosion and heightened xenophobia and nationalism increasingly present in Western democracies today.[843]

This 'staged' power, for Brown, indicates the decline of central government in the neoliberal era. For EJ activism and scholarship in the context of Tijuana-San Diego, this decline, even staged physically by the wall and CBP, requires looking for connections between local actors and global, national scale power, rather than interpreting all struggles in the lens of national policy debate.

The border wall continues to serve as an effective tool of mental displacement to match the material consequences of the binational economy if it maintains or augments the fundamental problem of free information, a puzzle which, if not overcome, will

[843] Brown 2010; p. 38.

prevent both the stewardship of natural areas and a sense of responsibility for social outcomes related to development policies. It does this by blocking transparency between the two sides and inhibiting the production of solidarity between vulnerable communities, straining the search for partners. I showed above how information, solidarity, and identification puzzles follow from the lack of attention to difference in the application of environmental justice strategies, both in the history of developed nations and the expansion of voices and perspectives in institutions of shared regional governance. I believe this project at the border between the US and Mexico offers lessons for the expansion of the influence of environmental justice narratives in developing, urbanized, and non-English speaking parts of the world.

San Diego–Tijuana can do this because it sits in an intermediate zone on the ideal continuum between developed and developing, Latin America and the US, and global haves and have nots, but is separated by only a matter of miles and minutes rather than the physical distance between more homogeneous communities. While displacement is still produced, what is left without the perception of great physical distance is rather a mental kind of displacement, an imaginative gap between the self-visions of each political community, proportionately more opaque from San Diego to Tijuana than the other way.

Thus, we see both of Brown's tensions the opening and mixing of economies and people, alongside the wall of bad consciousness and militarization putting strict limits on the scope of those individuals and communities which will be recognized as subjects of justice. The transformation of institutional hierarchies produced by market shifts and environmental change, as well as the emergence of bilingual children of immigrants and

deportees to political maturity in each country, offer resources for disrupting processes of mental and material displacement in a context characterized by increasing economic fluidity while the flow of people and ideas remains severely limited.

IV. Conclusion

The history of environmentalism is impossible to tell without attention to paradoxes, as many important environmental decisions have been made (both good and bad) with other goals in mind. Environmental justice is no different in this respect. This insight can be understood in two ways. One, decisions about fairness in the environmental justice tradition have almost exclusively been pursued, argued, and challenged through the interpretive and rhetorical lens of human welfare, especially differential health effects and the mapping of these vulnerabilities onto social cleavages of race and class (which in the US are at times exceedingly hard to pry apart). Few have addressed the concept of justice to the environment, nonhuman entities, or natural systems themselves, which can result in concentration on a long-held argument which opposes green regulations and economic livelihood in a zero-sum way.

Health often serves as a key mediator in this supposedly zero-sum argument, insisting that work health, which is dependent on environmental conditions, is intimately related with productivity—a kind of social capital argument with the express intent of maximizing *both* human welfare and economic production, often leaving out the ecological systems and nonhuman entities as if they are not the kinds of subjects which deserve fair treatment (Stone's 'Should Trees Have Standing'). This is especially

awkward in Tijuana, where *maquiladoras* employ young immigrant women and fire them as age, serving as an entry point rather than a career in the Tijuana economy.

The second paradox is visible only from a higher scale of analysis than is performed in local tales of degradation and response by civic groups or charismatic green leaders. Many urban theorists have noted the paradox where ameliorating conditions in an area leads to higher real estate prices and eventually the forcing out of the original residents to other areas still in need of rehabilitation, in a process known as gentrification. This process, which displaces people in response to the elimination of environmental externalities, at times can force politicians to argue against local improvement for fear of larger processes of real estate and fashionable rich youth culture. A parallel process occurs when communities are successful at regulating environmental bads and polluting industries are relocated in areas with fewer restrictions. Nowhere is this second process of displacement more starkly visible than at the border between San Diego and Tijuana.

The border region contains many of the most problematic issues in global ecological and development debates. As Carruthers writes, 'the border offers a microcosm of north-south relations, revealing the forms, consequences and tensions of global economic and cultural integration.'[844] The questions generated at the border are thus important for understanding higher-scale debates in the adaptation to global-scale ecological change. Carruthers incorporates narratives about communities struggling against pollution, liberation theology, and indigenous movements as unconscious cases of environmental justice into his article on the San Diego-Tijuana border. He writes: 'many

[844] Carruthers 2008; p. 557.

of these activists might not identify themselves first as environmentalists, yet all are increasingly mobilized by interlinked social, economic, and environmental injustices.'[845]

This is a common move in discourses which perceive themselves as young, and I do not think it is especially unfair.[846] It is, however, interesting that it is in clear contrast to many traditional definitions of ecological politics like Andrew Dobson's 'ecologism,' which identify 1960s and 70s movements in the US and Europe as the first environmental movements in large part because *they were conscious of themselves as such.*[847] The strength of environmental justice narratives is their potential for activating and informing attempts to create appropriate levels of accountable and democratic collective agency for confronting inequalities. This is potentially an important contribution to movements in border regions with the US, where being able to talk in traditionally powerful US rhetoric can gain media exposure and assistance for foreign actors on from sympathetic non-governmental organizations in the US.

This is an added bonus, since environmental justice rhetoric is accomplished in analyzing and exposing environmental injustice. In areas as highly unequal and rife with environmental injustice as the Tijuana-San Diego region, however, this rhetoric needs to be adjusted to be persuasive and effective on the Tijuana side. I suggested above that, as part of this challenge, environmental justice narratives adopt insights from political ecology and bioregionalism. The challenge to expand environmental justice is important for generating authenticity on the Mexican side of the border.

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[845] Carruthers 2008; p. 563.
[846] Geographer Paul Robbins does much the same, reaching back to Kropotkin for the roots of another young discourse, political ecology.
[847] Andrew Dobson, 1991. *Green Political Thought*, 2nd edition, Routledge, NY.

Consider for a moment the perspective of the Colorado Delta tribes. What counts as fairness to these people may be much different than to the perceptions of San Diego County. Teaching environmental justice in the border context, water is often illustrative. Water from the Colorado travels through the desert in long aqueducts to make Imperial Valley and Ensenada fertile, but also to sate the fetish with green lawns in San Diego. Balboa Park, the jewel of green space and culture in the center of San Diego, uses immense amounts of water a day maintaining expansive lawns and beautiful fountains and pools. Mission Bay, a recreational paradise literally built from the ground up out of what was a wetland with critical ecological functions maintains the same expansive lawns, privileging the image of the city as a tourist and recreational destination over the other uses for such long-traveled water.

After showing pictures of Balboa Park and Mission Bay Park, I ask my students a challenging question: How would one explain such wasteful lawn-watering habits to the indigenous peoples of the Colorado Delta, their territory split by an arbitrary line drawn by dueling orders of monks, who have only seen the Colorado fully run to the Sea of Cortez *once in a lifetime* (and that once a spectacular experiment and monumental achievement)? The role of displacement is clear here: the opacity of the border allows for a kind of freedom from other perspectives on just ecological conditions in San Diego which would be hard to achieve between communities within the US.

A bioregional framework incorporates these diverse perspectives and embeds them in a local community built around shared ecological context. Now, through exposure gained in large part by an intrepid kayaker, the Colorado is allowed to pulse more frequently. Yet the Imperial Valley is also still the main supplier of water

intensive, low nutrition lettuce to the US during the winter, and much of the Mexican side is still watered through super-inefficient flooding techniques. One need not be as far away as the Colorado River Delta to see the usefulness of this analysis. Where I do my field work, the piles of scrap tires and illegal dumping adorning the hillsides of the informal housing of *maquiladora* workers in the edges of Tijuana often litter areas with a clear view across the fences and roads, across the estuary, all the way to the harbor and shining towers of San Diego. The predicament of the Tijuana River Estuary, and its interconnection with the struggles in these largely informal communities, is a case study in the need to expand perspectives and increase the scale of analysis.

The expansion of environmental justice literature to consider concepts like Global and Climate Justice is both intriguing and problematic in this light, since these debates, like climate change itself, often appear as abstract and ideal debates over fairness when unanchored from local struggles that characterized environmental justice narratives. The regional complexities of applying such global rhetoric modeled on examples from the US in a nearby but foreign and 'developing' context can serve as examples, not to generalizations of rules or typologies, but, instead, to show where assumptions behind US narratives may have to be critically renovated through experiences of 'hard cases' like the divided bioregion of San Diego and Tijuana.

Global-scale environmental justice pursues the expansion of information, identification of new partners, aggregation of local movements into national networks, and draws attention to inequality and vulnerability. Environmental justice actors must complement this with an ascending analysis that interprets these trends through the perspective of local communities, a task which is more difficult in areas of divided

sovereignty. Sharing both ecosystems and stakes in the effects of global crises, Tijuana and San Diego do not evenly share the social and environmental vulnerability produced by the border economy or have equal resources to adapt to the changing conditions to come. Tijuana, with its concentration of business parks and privileged location near the lucrative markets of the US, has been a powerful attractor for rural out-migration, and many of the ecological problems in the region as a whole are complicated and intensified by the exponential and unplanned nature of population growth and informal development on the Mexican side of the border.

Exclusive focus on these local issues, however, is misleading. What adding a 'developing' perspective to environmental justice reveals, as Martinez-Alier claimed, is that achieving regional resilience is necessarily linked to development decisions on each side of the US-Mexico border. The regional puzzles I presented show the need for meaningful translation between languages and global and local levels, that influential biases in the US that understand environmental as a special interest are inadequate for identifying partners in the developing world and establishing new forms of collective deliberation and agency, and that blanket refusal to think in terms of 'developed' ways of life protects material and mental displacement.

To the bilingual, binational citizen, this displacement appears at moral and political complexity unmatched by national debates. The cultivation of regional identity and forms of shared governance, thus, should be the central task of democratic governance in the face of global crisis. Addressing problems of information, identification, aggregation, and displacement can begin adapting environmental justice to developing contexts where it encourages an explicit disavowal of the patronizing 'post-

material hypothesis' and commits to establishing regional cross-border forums for deliberation and trust identified as necessary for successful adaptive governance in our age of global ecological change.

The increasing economic integration and functional division of labor established between industrial Tijuana and 'post-material' San Diego pushes back at the national-level movement towards closure and anticipates further decentralization and fluidity within the region as a productive boon to unlock great wealth. In this complicated process, characterized by both economic and ecological imperatives to greater regional integration in spite of increasingly toxic national debates, the return to the study of environmental justice, with its focus on exposing inequality and building networks of scholars and activists, may prove pivotal for addressing the mental and material displacements produced by the border wall.

This is a very clear opening for environmental justice research, and is being actively pursued by recent initiatives between global health, urban studies, and other disciplines at UC San Diego.[848] The region's problems, however, are not confined to the challenges in rapidly-developing Tijuana. San Diego faces severe challenges as well, although for apparently different reasons. While enforcement and baselines are better funded and more effective, many key issues remain undiscussed because they violate assumptions about what it means to lead a modern flourishing life. Water, as above, is a particularly illustrative example, as it has to travel at great cost from the Colorado River

[848] Keith Pezzoli, J. Kozo, K. Ferran, W. Wooten, G. Rangel Gomez, and WK Al-Delaimy, 2014. 'One Bioregion/One Health: An Integrative Narrative for Transboundary Planning along the US-Mexico Border.' *Global Society*, Vol. 28, No. 4, pp. 419-440.

and other distant sources, and natural drought cycles and population growth combine to make increasing demands on limited supplies.

The persistent lack of action in San Diego, until very recently, to recycle water or decrease the immense amounts of water wasted on ornamental lawns emphasizes the continued need for higher scales of analysis—in this case understanding the extended geography of water consumption in an area which averages less than ten inches of rain per year, and where long cycles of ocean currents related to the Southern Oscillation in the Pacific Ocean, commonly referred to as El Niño, bring much of the decadal totals in concentrated storm events.[849] Tijuana uses far less water per capita than San Diego and has storage in local mountains. Infrastructure, however, remains limited for things like erosion control and treating waste water, especially on the periphery. The ever-expanding canalization of the Tijuana River provides an efficient conduit for that waste to reach the Tijuana Estuary and eventually the Pacific Ocean.

The estuary, on the US side of the border, receives high concentrations of toxic solids during heavy rain events, delivering sewage to the beaches of Imperial Beach and Playas de Tijuana immediately down current.[850] At the same time, the natural filtering services performed by the wetland are inhibited by the growing influx of eroded sediment from the canyons between, where informal *colonias* denude the coastal sage beneath paved business parks encouraged by flows of commodities spanning continents.[851]

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[849] Tereza Cavazos and David Rivas, 2004. 'Variability of extreme precipitation events in Tijuana, Mexico.' *Climate Research*, Vol. 25, pp. 229-243.
[850] Richard Gersberg, Daniel Daft, and Darryl Yorkey, 2004. 'Temporal pattern of toxicity in runoff from the Tijuana River Watershed.' *Water Research*, Vol. 38, pp. 559-568.
[851] Kathleen Farley, Lina Ojeda-Revah, Emily Atkinson, and Ricardo Eaton-González, 2012. 'Changes in land use, land tenure, and landscape fragmentation in the Tijuana River Watershed following reform of the ejido sector.'*Land Use Policy*, Vol. 29, pp. 187-197.

Environmental justice literature focused on local struggles here can at times appear dishearteningly out of scale with the kinds of sources of unequal development patterns and the interaction of larger-scale systems with local environmental and social effects. For many of the local community mobilizations envisioned by environmental justice theorists to function, communities will have to become knowledgeable regarding local natural processes and become capable of monitoring and enforcing existing laws. This need is especially pronounced in places like San Diego and Tijuana, where most residents have little if any historical memory tied to the land due to recent immigration, leaving few historical markers or scientific baselines as anchors for assessing rapidly changing landscapes. Focus on understanding natural processes can potentially supplement a lack of social memory in communities of immigrants and inform political identity and local democratic participation.

Parts of this chapter were published as: Kyle Haines, 2015. 'Resilient Development and Environmental Justice in Divided Territory: Political Ecology in the San Diego-Tijuana Bioregion.' *Glocalism: Journal of Arts and Culture*, Spring Issue on Global Cities. I was the only author on this publication.

13 Social-Ecological Resilience at the US-Mexico Border: Adaptive Governance in Divided Context

I. Introduction: Environmental Politics in SD-TJ

> All borderland residents are enveloped in a space of exception […] The sediments of imperial ventures run deep and, as happens with hurricane season flooding in the valley, deposits from previous eras are brought to the surface to (re)configure the present. – Juanita Sundburg

The epigraph of this chapter begins from the context of the wholesale waiving of environmental laws by director of Homeland Security Michael Chertoff to expedite the construction of the border fence in 2008. The first of such waivers was used in 2005 after the Safe Fencing and Real ID acts mandated to build a fence through the canyons feeding into the Tijuana Estuary. Like Sundburg, my study begins from this zone of exception, the site of my field work over the past five years. This chapter works out from this experience in and perspective on the San Diego-Tijuana bioregion to assess important concepts of resilience and adaptive governance of social-ecological systems.

I will make the case here that these ecological-political strategies can be improved by hybridization with the traditions of thought of political ecology and bioregionalism, which emphasize political economy and local identity with the land respectively. This is important because resilience thinking, and adaptive governance in particular, has several key institutional traits that make them difficult to implement in divided national and cultural contexts. I lay out some of the major challenges before making the case for political ecology and bioregionalism, then reflect on the insights produced by this new perspective produced through discussion of my sites of field research between the Los Laureles Canyon of Tijuana and Tijuana National Estuary in the US.

This chapter does not claim scientifically-framed political schemes like adaptive governance are inherently flawed and should be discarded, but rather that they are limited in their effect in trans-border regions by several particular problems related to spreading information, identifying partners, lack of formal methods of collective decision-making, and material and mental forms of displacement. Initially reflecting on these challenges as they apply to resilience thinking, I shift to the perspective of adaptive governance for cross-border social-ecological systems, much of which not only recommends collaborative local governance of joint social-ecological systems, but which also predicts the necessity of such institutions in a future characterized by global Earth System change.[852]

Adaptive governance, like environmental justice activism, seeks to bring diverse groups into informal and formal alliances between scientists and government to enable learning. As Liverman, Varady, and Chavez note: 'the United States-Mexico border provides a useful venue for analyzing several theoretical questions in environmental research, such as the role and effectiveness of environmental social movements and binational institutions, the political ecology of economic globalization, and the impacts of decentralization and democratization on environmental practices of local governments.'[853] This usefulness is complicated, however, since the border also 'provides

[852] Fikret Berkes, 2010. 'Devolution of environment and resources governance: trends and future.' *Environmental Conservation*, Vol. 37, No. 4, pp. 489-500; Carl Folke, Thomas Hahn, Per Olsson, Jon Norberg. 2005. 'Adaptive Governance of Social-Ecological Systems.' *Annual Review of Environmental Resources*, Vol. 30, pp. 441-473.

[853] Diana Liverman, Robert Varady, Octavio Chávez, Roberto Sánchez, 1999. 'Environmental Issues Along the United States-Mexico Border: Drivers of Change and Response of Citizens and Institutions.' *Annual Review of Energy and the Environment*, Vol. 24, pp. 607-643; p. 609.

tremendous challenges for public policy in terms of designing effective institutions, resolving conflicts, and understanding public responses to free trade.'[854]

Contemporary resilience-based adaptive governance schemes acknowledge Elinor Ostrom's insight, and, instead of making abstract normative arguments for universalized ideological or economic arrangements, look for flexible institutions capable of adapting both to specific local stressors and broader global change. Resilience-based theories, influenced by adaptive management experiments in resource bureaucracies and common pool institutions theories, demand with a scientific rigor that the best scale be selected to confront a particular crisis. That they do so as scientists is obvious and at times problematic—the objectively determined scale set by experts, even 'uncontroversially' modeled on ecosystems, may not always match up with the messy world of politics.

Application at the border is complicated for traditional decentralization narratives, because the reliance on national policy to which it normally appeals needs to be complemented with a meaningful commitment to deliberation and shared institutions of governance at the regional scale in Tijuana and San Diego. These kinds of outcomes however remain contingent on the cultivation of a regional consciousness and free movement of people and ideas, both of which are more seemingly more limited in contemporary times. Here I interpret theoretical work on adaptive governance through the experience of the *fronterizo* citizen of San Diego-Tijuana. My conclusions, although critical and depressing, also include a note of optimism from my experiences working with students and community members in Tijuana over the past five years. Their dedication reminds me of Gunther Anders' dictum: 'Our despair is none of our business.'

[854] Liverman *et al* 1999; p. 609.

In a contemporary age of dire warnings concerning the global environment, it is important to understand the local effects of global processes, both in order to prepare for distinct regional issues arising from global change and also to find effective channels for communicating the urgent need for collective habit change in the particular vocabulary and rhetorical tropes of specific places. Lacking a clear global public to address, much of the outreach regarding global-scale social-ecological issues like climate change has remained frustratingly abstract, probabilistic, and un-motivating. Translating such trends to regional or local effects, however, is also highly uncertain. Predicting future events at more granular levels highlights the uncertainty of looking forward in a complex world, and risks exposing the expert to disconfirmation and humiliation.

I am suggesting here that such a perspective informs the emerging concepts of resilience and preparedness now organizing many debates over social-ecological change, and in particular that it is important to understand the tension between rebound and transformation which many preparedness theories ignore, following work by CS Holling elaborating 'panarchy' models of nested ecological systems and their extension to adaptive governance and co-management schemes. Finally, I return to think about the concept of adaptive governance and the metaphor of the 'great fire' in the context of communicating the urgency of the problem at a level where people have meaningful political agency and actively experimenting with local adaptation to provide diverse sets of institutional lessons in largely unprecedented circumstances.

II. Tijuana and San Diego Context

> Reinhabitation means learning to live-in-place in an area that has been disrupted and injured through past exploitation. It involves becoming native to a place through

> becoming aware of the particular ecological relationships that operate within and around it. It means understanding activities and evolving social behavior that will enrich the life of that place, restore its life-supporting systems, and establish an ecologically and socially sustainable pattern of existence within it. Simply stated it involves becoming fully alive in an with a place. It involves applying for membership in a biotic community and ceasing to be its exploiter. – Peter Berg and Raymond Dasmann

The city of Tijuana and its relationship with its sister city San Diego is an object study in the paradoxical themes of interconnection and separation, a place where natural systems are bisected by barriers imagined by humans. These barriers are no longer simply symbols, as the stone obelisks first installed along the border from the Rio Grande to the Pacific may have once been, and their consequences are far from imaginary—today, the barriers are physical, linguistic, cultural, and distributional, bisecting two communities grown to millions of inhabitants, with different development patterns, densities, infrastructures, incomes, and access to natural resources. Liverman *et al* note:

> The long border strip separating the United States from Mexico is a region like no other in either of the two countries. On the one hand, the zone features a high degree of cross-national cultural and commercial integration and a tradition of transboundary ties. But on the other hand, the international boundary separates nations having vastly disparate political systems and levels of economic strength, with both capitals distant from the region.[855]

Considering the environment as a shared binational concern is complicated by the lack of long-term historical memory and rapid formal and informal growth. This story of migration is common throughout the border region as a whole, where total population of US and Mexican sides increased from just 2.4 million people in 1950 to over 12 million in 2000. While the US side of the border grew 8.3% per year in this period, Mexican *municipios* along the border have grown a startling average of 13.5% per year, summing

[855]Liverman *et al* 1999; p. 637.

to an increase of 677% over the period.[856] Following relocation of military bases after WWII San Diego County doubled in population in the 1950s. Today, population growth has leveled off, but San Diego County still represents close to 3 million people. This means that just under half of border residents in the US live in San Diego County.

Growth in Tijuana has been more recent and even more exponential in nature. In 1900 there were less than 250 people living in Tijuana. By 1980, this number was still around 450,000, less than half that of San Diego County. By 2010, 1.3 million people officially lived in Tijuana in highly dense conditions, with many estimates rising much higher to account for transient populations of deportees and migrants to the US. The dramatic rise in Tijuana's population over the last 30 years is in large part due the restructuring of the Mexican economy, crises in many parts of Mexico and Central America, and the intensification of *maquiladora* investment. *Maquiladoras,* large assembly plants located in tax-exempt business parks, in 2000 employed close to 1/3 the workforce of Tijuana, and their expansion throughout the 1990s resulted in an employment increase of over 250% in Baja California.[857]

Researchers have found that recent shifts to Asian multinational companies has 'reterritorialized the generation of hazardous waste. […] South Korean, Japanese, and Taiwanese owned *maquiladoras* have caused their cities to more than triple the amount of hazardous waste generated anywhere else, and theirs are the riskiest materials.'[858]

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[856] Joan Anderson, 2003. 'The US-Mexico Border: a half century of change.' *The Social Science Journal*, Vol. 40, pp. 535-554.
[857] Change-Hee Christine Bae, 2005. 'Tijuana-San Diego: Globalization and the transborder metropolis.' *Globalization and Urban Development*, Springer, Berlin, pp. 181-195.
[858] Kathryn Kopinak, 2002. 'Environmental Implications of New Mexican Industrial Investment: The Rise of Asian Origin Maquiladoras as Generators of Hazardous Waste.' *Asian Journal of Latin American Studies*, Vol. 15, No.1 , June, pp. 91-120.

Figure 19: Tijuana's Colonia Libertad west along the border wall. Author's picture, 2015.

The concentration of industry in Tijuana has left a legacy of toxic waste unmatched even in other industrial cities along the US-Mexico border like Matamoros and Ciudad Juarez. Research by Kopinak and others has highlighted the fact that the riskiest *maquiladoras* are actually located in more dense areas with higher concentrations of children. This follows research by Grineski, Collins, and coauthors from UT El Paso, which finds that Juarez has both elevated and more widely spread risk throughout neighborhoods of the city.[859] This is due to the preference of workers to live nearby their places of work, poor public transportation, lack of enforcement of existing environmental laws, and the informal nature of many of these settlements. Kopinak stresses that:

[859] See: Sarah Grineski and Timothy Collins, 2010. 'Environmental injustices in transnational context: urbanization and industrial hazards in El Paso-Ciudad Juárez.' *Environment and Planning A*, Vol. 42, pp. 1308-1327.

> The fact that more hazardous waste has been generated in Tijuana maquiladoras than in any other border city is consistent with the fact that in 1998, Tijuana was home to two thirds or more of the plants, employees, and value added produced by maquiladoras in the state of Baja California. In 2000, Tijuana was home to approximately 22% of the country's *maquiladoras*.[860]

This vast toxic legacy of industrialization of the border region is reinforced by the consistent lack of funding and enforcement from various levels of government, especially on the Mexican side, where natural resource agencies have been subject to chronic understaffing and unfunded mandates. This makes relatively strong Mexican environmental laws unenforceable.

Tijuana, like many major Mexican cities (and, indeed, many cities in the US), is in a state of triage, shuffling money to cover immediate necessities from a tax base undercut by low state capacity for collecting taxes and delivering public goods, constant civil service turnover, and changes in policy at the more powerful federal level in Mexico City. The incentive to grow the tax base has encouraged utilization of NAFTA provisions for free movement of assembled goods, resulting in a massive *maquiladora* industry with spotted (to be very, very conservative) labor and environmental records. Both providing employment and contributing to the city, these business parks have come to dominate the eastern part of the city, Otay Mesa, also known as the *Ciudad Industrial*, and areas of the periphery in the rapidly expanding south east and the coastal western canyons between playas and the center of Tijuana along the hard border wall.

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[860] Kopinak, 2002; p. 14.

Figure 20: Uncollected trash in Terrazas San Bernardo, Laureles Canyon, Tijuana. Author's Picture, 2017.

The UCSD Cross-Border Initiative field site in Los Laureles Canyon, in the western coastal canyons of Tijuana, is dominated by one of these large business parks, as well as *jonkes* (a 'Spainglish' word for junkyards), and garbage disposal services. The development of the canyons has been allowed due to very lenient Mexican laws regarding squatting and property title, as well as a tacit acknowledgment from the city that they did not have to resources to evict or deliver adequate services like trash collection to those areas. That residents still live without fire or police stations and the fragile coastal canyon ecosystems remain piled high with uncollected trash, despite growing to over 80,000 people in some estimates, is testament to this blind eye.

These canyons, rapidly developing in the most informal fashion, are now stripped of native vegetation, crumbling, and literally flowing to the sea, along with the accumulated wastes and plastics of the informal communities living there. Regional

consciousness, many green theorists have claimed, is promoted by shared understanding of natural systems, but here at the edges of cultures this natural understanding needs a dedicated social component.

Thinking regionally does not collapse these distinctions, but rather place them in relation as a challenge to distributional equity and recognition of legitimate shared governance, a concept which I explore further below through the nested systems theories of governance known as adaptive governance. This nested perspective is necessary, and the insistence of both environmental justice and resilience theory (on which adaptive governance is formally modeled) is that these human and natural systems were intricately entwined. Unlike past iterations of green theory, this analysis does not depend on spiritual or cultural conversion, but rather on modeling natural and social systems together with the tools developed by resilience theory.

There are deeper questions here. Environmental political theories have sought simple living and reduction of consumption for decades, but where do people live this way already? are they happier than us? do their lives mean less? can we imagine a future where we use our technology to live healthy, comfortable, and free lives without destroying the ecological systems that our lives are inevitably embedded within? Taking seriously the political implications of global ecological change now increasingly accepted in scientific and public discourse means also critically assessing the traditional panaceas of green political thought. Here at the edge of national sovereignty, the Tijuana River Watershed is split by the border wall. Recommendations of increased participation and collaborative institutions are weakened by the strength of the national narratives pushing separation and cultural conflict, and made more challenging in practice by the simple fact

that one bioregion is inhabited by two very different cities surreptitiously linked together despite the linguistic and physical barriers in constant performance at their extremities.

Radical bioregionalists believed that such detached societies needed reconnection with the natural world and their communities and claimed that local-scale institutions with meaningful democratic decision-making and 'human-scale economies' would inspire societies to care for their natural inheritance and each other. The basic argument, while cultural, is thus pragmatic as well, related to old debates in democratic theory and to newer ones in fiscal federalism and adaptive management. The answer made popular by Elinor Ostrom in response to Garrett Hardin's 'tragedy of the commons' is flexible centralization and self-government. Even if this balance between responsiveness and efficiency (urgency) is set in an iterated game over time, challenges still remain, related to the ability to match bioregion with global-scale problems like climate change. These challenges are amplified in divided territory.

Challenges in the Borderlands

While historically anchored to near-equilibrium or first-order systems theory as expressed by early ecologists, recently environmental political theory has been modulated by the shift to complex systems understandings of social and ecological systems and their interactions. Rather than interpreting the political world through the lens of negative feedbacks and normative goals of harmony, 2nd order systems theory, influenced by chaos and emergence theories, understands the natural world and (nested) human systems as inevitably subject to change and surprise. The unsettling of harmony metaphors provided

impetus both to postmodern geographers' expansion of political ecology across disciplines and to social-ecological versions of 'resilience' metaphors.

Resilience theory is a body of research now spanning many disciplines which places social-ecological systems in nested, temporal and geographic 'panarchies' or scientifically annotated adaptive cycles interacting at various scales.[861] This terminology has spread across financial, normative, and security discourses due to overlaps with Hayekian neoliberal thought and hazards-response research. Enabled by this critical ambiguity, its originators are today at pains to both distinguish 'ecological' forms of resilience (that include both return to form and transformation) and less reductionist ways of nesting human systems to understand and exploit their differences from other systems and acknowledge their own internal variety. This is especially important due to two things: 1) the power of human systems to affect others, and 2) the potential for social memory and collective change to alter outcomes.

Initiated by CS Holling in the early 1970s, and based on large scale time series studies of predation involving multiple actors, resilience theory insists on the existence of multiple stable equilibria where three or more processes acting at different temporal rates and spatial levels were set in motion.[862] Using advances in complex systems theory (2nd order cybernetics), Holling was mostly dismissed as untested and *avante garde* by the broad consensus regarding unique equilibrium theory (1st order systems theory). Rather than focusing on return to state and the maintenance of stability, Holling's 'ecological' and 'social-ecological' resilience models drew attention to the ability to remain cohesive

[861] See: CS Holling, 2004. 'From Complex Regions to Complex Worlds.' *Ecology and Society*, Vol. 9, No. 1, pp. 10-20.
[862] CS Holling,1973. 'Resilience and Stability of Ecological Systems.' *Annual Review of Ecology and Systematics*, Vol. 4, pp. 1-23.

under extreme conditions, including the ability to resume form as one amongst other more transformative possibilities. Resilience, panarchy, and state shift provide the conceptual vocabulary for making the shift in understanding demanded by environmental political theory, i.e. seeing the human as embedded in various, nested and at times overlapping social-ecological systems. The logic of local experimentation used by resource managers and some democratic theorists, however, is the only real hint as to the kinds of institutions, ideologies, or scale of action such models prescribe.

Lack of normative content in the original form of resilience theory is part of why the concept has traveled so well between important contemporary discourses, but can also be, ironically, a source of rigidity and even collapse where short-term stability is privileged over long-term adaptation. The reception of resilience theories by political theorists and other social scientists is thus not necessarily a boon from the perspective of democratic or radical theory, as it is sometimes assumed by the most 'social' elements of the academic milieu. This is because the use of the concept and framework are subject to widely different goals and purposes. The chief danger of such a definitional gap is the possibility that focusing on the return to form in the short term will create a rigidity trap, i.e. make it impossible to adapt to longer-term change.

Adaptive governance takes the perspective of 'social-ecological resilience' theory, which intermingles social and natural systems in nested scalar relationships, to organize political responses to ecological change into a scientific policy program. This system is supposed to socially-learn and broaden participation. This attempt to incorporate diverse institutional and civil society players into bioregional conversation is happening in the Tijuana-San Diego border region, if without urgency. Ongoing bi-

national coordination through the Border Environmental Cooperation Commission (BECC), the Commission on Environmental Cooperation (CEC) side agreement to NAFTA, the Good Neighbor Environmental Board (GNEB), North American Development Bank (NADB), and the Border 2012 and Border 2020 initiatives ties institutions from the US and Mexico to each other and, in a limited but important sense, to local organizations, but remain underfunded and without real mandates to build local political institutions.

The difficulties of this capacity-building task in Tijuana-San Diego are brought into stark relief by the dual Trump-era shift in environmental policy and funding at the national level in the US, as well as the promise to renegotiate NAFTA and build the continent-wide border wall. The promise of institutions like the BECC created by NAFTA has been largely unrealized after initial pressure on the agreement in 1994 to include the side agreement and to equip this binational institution with a mandate to carry out a Transboundary Environmental Impact Assessment (TEIA).[863] As Roberto Sanchez points out, many of the environmental provisions, including qualifications in the legal language of the preamble and Chapter 1 to include that actions must be taken in 'a manner consistent with environmental protection and the promotion of sustainable development.'[864]

Although there are notable successes, such as the *Metales y Derivados* case detailed by Carruthers and others, the practical impact of these institutions has been limited, the evidence of which sits accumulated throughout the folds and cracks of the

[863] Josephine Hilliard, 2014. 'Unintended Consequences: A study of federal policy, the border fence, and the natural environment.' Unpublished Dissertation, University of Arizona.
[864] Roberto Sanchez, 2002. 'Governance, Trade, and the Environment.' *American Behavioral Scientist*, Vol. 45, No. 9, May, pp. 1369-1393.

terrain in Tijuana.Built on the back of the La Paz agreements in 1983 allowing federal cooperation between the US and Mexico, the Border 2020 initiative(known in Mexico as COCEF) currently underway uses the agreed need for resilience-style planning at a regional level to create an integrated planning infrastructure for the challenges of environmental protection and sustainable development in the border region. This initiative is threatened by the degradation of EPA authority in Washington and the continued lack of appropriate funding for scientific baselines and enforcement of environmental laws in Mexico, as well as dramatically underfunded given their mandate to solve cross-border environmental issues like the problematic sediment and trash flowing from the Los Laureles Canyon to impair the Tijuana Estuary and waters of Imperial Beach and Playas de Tijuana on which my work has focused.

The avenues for collective agency that includes everyday residents of Tijuana and San Diego in a regional discussion and that can make meaningful decisions with appropriate funding remain scarce to nonexistent, a sad reality made more complicated in practice by the information and identification challenges identified above. While formal channels exist through the State Department's border liaison mechanism, consultative mechanisms between Mexican Consulates and the US Immigration services, as well as a wealth of state, local, and regional initiatives, the participative forum and environmental focus of these connections has been limited, underfunded, and suffers from a lack of serious scientific baselines.

David Carruthers notes the gravity of the insights revealed in the border region when viewed through the lens of environmental justice:

> Globalized production parcels out costs and benefits unfairly, accruing special benefits to international capital, domestic subsidiaries, and local elites. Consuming classes enjoy a profusion of inexpensive manufactures and foods while the 'poor neighborhoods' of the global south pay disproportionate human and environmental costs in the form of low-wage labor and environmental exploitation.[865]

Rather than simply nested, these local decision-making bodies are simultaneously empowered in overlapping and complicated ways. While the seemingly stark differences between the US and Mexico are constant refrains in national politics in the US, the border region, of which around 5 million reside in the municipality of Tijuana and San Diego County, is much more of a blend of the two cultures, with substantial Mexican-American and immigrant populations living in the US and a curious blend of California and Mexico which takes place in the city of Tijuana.

Figure 21: Double fencing at the 'Friendship Park' in Border Field State Park where it butts against Playas de Tijuana. Author's picture, 2017.

[865] Carruthers, 2008; p. 564.

It is in harsh contrast to this relative similarity and higher levels of local trust that Tijuana and San Diego are still characterized by material and mental displacement, punctuated by the wall between them and the regional inequality that it obscures. Patrolled by an organization that refers to migrants as 'bodies,' living or dead, the set of fences dividing Tijuana from San Diego are also roads, raised berms bridging and blocking the natural and social flows alike.[866] The publicity produced by building walls in urban areas makes San Diego's wall, along with El Paso's bridges, a source of national focus. In the last presidential election, Mike Huckabee, Donald Trump, and Bernie Sanders all visited the wall, each drawing on its symbolism to the national community as a source of protection.

The difference it highlights is, of course, weakened in San Diego and Tijuana themselves, which are more of a curious hybrid. The murals and hopeful artwork adorning the wall on the Mexican side, from the lighthouse at Playas to the edges of Otay are a stark contrast to the US side, where an 'enforcement zone' includes a twenty-foot buffer approaching the wall and the constant presence of Customs and Border Patrol agents in running cars along the long road shadowing the US side of the border. Unable to actually build a wall across the continent that keeps people and drugs out (and perhaps, more seriously, assuages white victimization), we stage national theater in a region whose interconnection belies the national narrative.

Pointing to the work of Mark Salter, Roxanne Doty, and Reece Jones, Juanita Sundburg makes the case that borders are the archetypical place where laws are

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[866] I heard this in person. For clear documented proof see the NatGeo series 'Border Wars.'

suspended.[867] She quotes the ACLU's designation of a 'constitution-free zone' to describe the 100 mile buffer around the border, drawing on Foucault and Agamben's insights that power would reveal itself at its extremities. Recall the quote from the epigraph which began this chapter:

> All borderland residents are enveloped in a space of exception. […] The sediments of imperial ventures run deep and, as happens with hurricane season flooding in the valley, deposits from previous eras are brought to the surface to (re)configure the present.[868]

Sundburg's challenge is to see a way of life itself as something that can be imperial, an insight which is jarring in the relatively comfortable context of San Diego. Both a symbol and physical manifestation of boundaries produced between people, the wall, surveillance, and constant Border Patrol presence at the edges of Tijuana and San Diego distances the consequences of the cross-border economy from the neighborhoods of average San Diegans and effectively from meaningful political and moral debate.

III. Local reference for Global Issues in divided context

It is perhaps impossibly hard to imagine global-scale processes from the vantage point of an individual perspective. Many global-scale social-ecological crises appear to float above their realities, abstracted to such a level that they no longer make sense at the everyday, human scale at which most people make decisions and live their lives. Trends like species loss, ocean acidification, desertification, and climate change which have

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[867] Mark Salter, 2008. 'When the exception becomes the rule: borders, sovereignty, and citizenship.' *Citizenship Studies*, Vol. 12, No. 4, pp. 365-380; Roxanne Doty, 2011. 'Bare life: border-crossing deaths and spaces of moral alibi.' *Environment and Planning D: Society and Space*, Vol. 29, No. 4, pp. 599-612; Reece Jones, 2011. 'Border security, 9/11 and the enclosure of civilization.' *The Geographical Journal*, Vol. 177, No. 3, pp. 213-217.

[868] Juanita Sundberg, 2015. 'The State of exception and the imperial way of life in the United States-Mexico borderlands.' *Environment and Planning D: Society and Space*, Vol. 33, pp. 209-228. 223

come to characterize our modern landscape of catastrophic global-scale crises are often difficult to break down into regional and local contexts for a variety of reasons relating to the complexity of the processes involved, the immense timelines of slow violence, and the lack of funds for local investigation.

Global level governance institutions like those surrounding the climate change meetings of the UNFCCC admit that the adaptation to these global trends will inevitably be local. This has generated widespread agreement in ecological politics of subsidiary government and co-management schemes, because, as Neil Adger notes:

> Research on the political economy of adjustment to hazards and natural change demonstrates that there will always be winners and losers from extreme events. Managing the consequences of the distribution of impacts and the reinforcement of the status quo, requires responsive governance at the appropriate subsidiary level. An explicit consideration of the intergenerational and present day equity issues surrounding impacts and adaptation to climate change is therefore required in debates on climate policies.[869]

Adger goes on to warn that 'the greatest single equity issue, and the specter which overshadows all mitigation debates, is that of the differential impacts of climate change and the highly skewed costs of adaptation at global and local scales.'[870]

In places like San Diego and Tijuana which already hold extremes in terms of economic inequality and social vulnerability to droughts, fires, earthquake and other regionally relevant natural disasters, making hard choices about the costs of regional adaptation could fruitfully be pursued through a shared lens of environmental justice to be effective linking social and ecological crises, whether through the traditional medium

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[869] Neil Adger, 2001. 'Scales of Governance and Environmental Justice for Adaptation and Mitigation of Climate Change,' *Journal of International Development*, Vol. 13, pp. 921-931; p. 922.
[870] Adger, 2001; 922.

of differential health analysis[871] or through more holistic social ecological systems theories like resilience or adaptive management.[872] While both of these approaches focus on local issues and the need for effective democratic participation in the processes of local adaptive governance, the social-ecological perspective that characterizes adaptive governance regimes insists on viewing livelihood and ecological health as more than losses of productivity or tragic statistics, but rather as intimately connected through shared inhabitation and many levels of policy concentrated in a specific place.

The emphasis on local understanding and community building reflects a broad turn to subsidiary power. Michel Foucault, in identifying the shift from universal to specific intellectuals, asserted the 'the essentially local character of criticism' thus:

> The main point to be gleaned from these events of the last fifteen years, their predominant feature, is the *local* character of criticism. That should not, I believe, be taken to mean that its qualities are those of an obtuse, naïve or primitive empiricism; nor is it a soggy eclecticism, an opportunism that laps up any and every kind of theoretical approach; nor does it mean a self-imposed asceticism which taken by itself would reduce to the worst kind of theoretical impoverishment. I believe that what this essentially local character of criticism indicates in reality is an autonomous, non-centralized kind of theoretical production, one that is to say whose validity is not dependent on the approval of the established regimes of thought.[873]

The 'ascending analysis of power' which this local character of criticism demands for Foucault is the chief advantage of environmental justice literature, given that it ascends to consider multi-level and cross-level connections like those in evidence throughout the

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[871] Keith Pezzoli, Justine Kozo, Karen Ferran, Wilma Wooten, Gudelia Rangel Gomez, and Wael K. Al-Delaimy, 2014. 'One Bioregion/One Health: An Integrative Narrative for Transboundary Planning along the US-Mexico Border.' *Global Society*, Vol. 28, No. 4, pp. 419-440.
[872] Folke *et al* 2005.
[873] Michel Foucault, 1980. 'Two Lectures.' In *Power/Knowledge: Selected interviews and other writings, 1972-1977*. Random House LLC.

border region. As theorist Robert Brulle notes, 'democratic civic engagement is core to successful social change efforts.[874]

In the section that follows I look at some of the potential contributions and chief challenges in the border region context for cultivating such a shared sense of regional ecological fate, before suggesting the improvement of environmental justice and adaptive governance theories through hybridization with political ecology, with its focus on scale, interrelationship, and political economy, and bioregionalism, through its intense focus on reinhabitation of local places and the creation of regional identities based on shared ecosystems. In the final section I will look in particular at the Tijuana Estuary and Coastal Canyons of Tijuana and explore some of the repercussions of the themes blended here for considering the controversial claim that Tijuanense are 'too poor to be environmentalists.'

The argument presented here tries to include the 'developing' world in the implied we of resilient communities as a supplement to the potential for lack of historical connection to drive preparedness logics to protect the sources of larger scale and longer term change. The intuition here, pursued in different academic streams, is that for the 'developing' world a simple return to conditions before the shock is not enough to solve the problems connected by the interconnection of social and natural systems. To understand that, we need history and a pluralistic vision which drops developmental hierarchies that disqualify equal global conversations and poison inter-cultural deliberation on change and 'modern' ways of life.

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[874] Robert Brulle, 2010. 'From environmental campaigns to advancing the public dialogue: Environmental communication for civic engagement.' *Environmental Communication*, Vol. 4, No. 1, March, pp. 82-98.

Beginning to imagine the consequences of global debates is crucial for all local communities, and inhibited by the border wall. Exposing the physical proof of such a mental block is the chief goal of expanding the analysis of waste siting to the global level, as theorists like Ken Conca and John Dryzek argue.[875] It is key, in this situation, to seek out the places where heteronomy rules, where there many perspectives sharing a common ecological foundation. Without such policy development at relevant regional levels, local areas will be vulnerable to both changing global ecological conditions and to recentralization to national levels which will cripple forms of promiscuous alliance like those needed to adaptively govern the Tijuana-San Diego bioregion.[876]

Figure 22: Looking across Colonia Chilpancingo from the site of the *Metales* disaster. Author's picture, 2014.

The case study explored in Carruthers' 2008 piece applying environmental justice to Tijuana is just such a case of economic opportunity turned into toxic legacy. Carruthers follows the efforts of local communities to clean up massive lead smelting operation abandoned by a California company, which left 24000 tons of mixed hazardous

[875] See also: Kate O'Neill, 1998. 'Out of the backyard: the problems of hazardous waste management at a global level.' *Journal of Environment and Development*, Vol. 7, pp. 138-164.
[876] Malcolm Goggin, Brian Gerber, and Samantha Larson, 2014. 'US Local Governments and Climate Change: Examining the Acquisition and Use of Research-Based Knowledge in Policy Development.' *Risk, Hazards and Crisis in Public Policy*, Vol. 5, No. 2, pp. 156-178.

waste behind, including 7000 tons of lead slag. This toxic legacy was found to be leaching cadmium, arsenic, and antimony into the Chilpancingo community of Tijuana. For Carruthers, cases of injustice indicate the analysis must be expanded to include larger-scale political and economic concerns in the region. He says 'the economic imperatives of economic globalization establish a critical context for understanding much of the contemporary environmental justice mobilization in Latin America.'[877]

In the conclusion of his paper detailing struggles of the Chilpancingo community in Tijuana affected by abandoned toxic waste, Carruthers notes 'local victories and cross-border collaborations have fueled a sense of community power.'[878] This optimism, however, is tempered by his analysis in the article itself, where a disappointing campaign to the courts set up in the NAFTA CEC side agreement results finally in the state of Baja California taking control of the site and seeking funding for its rehabilitation, largely gained from the EPA. Today, the hill above Chilpancingo is capped with concrete and often eerily empty.

This is a clear victory, but while the strengthening of social connections between Mexican and American civil society groups detailed is encouraging, it also appears vastly out of scale with the sources of the problems confronted. One page earlier, Carruthers' claims appear more dour:

> Globalized production parcels out costs and benefits unfairly, accruing special benefits to international capital, domestic subsidiaries, and local elites. Consuming classes enjoy a profusion of inexpensive manufactures and foods while the 'poor neighborhoods' of the global south pay disproportionate human and environmental costs in the form of low-wage labor and environmental exploitation.[879]

[877] Carruthers 2008; p. 564.
[878] Carruthers 2008; p. 565.
[879] Carruthers 2008; p. 564.

It is not clear how the narrative he told about local struggle, regardless of self-identification as environmental justice movements, addressed the more complicated, multi-level causes of the social-ecological effects they document.

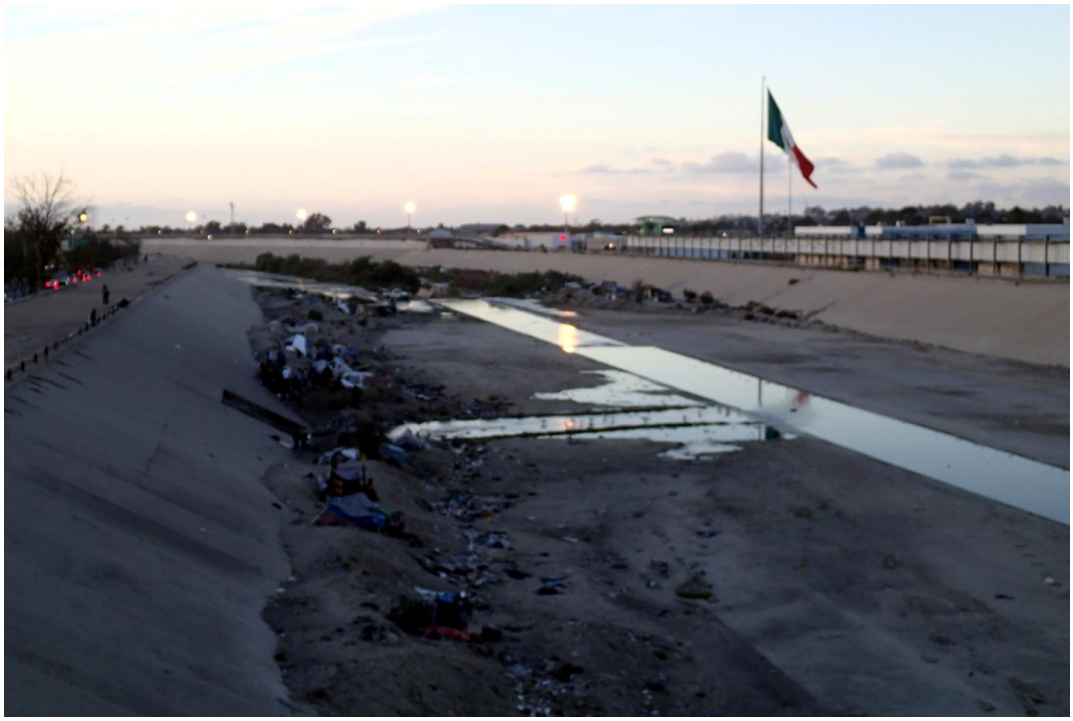

Figure 23: Homeless encampments in the Rio Tijuana Canal at the Chaparral Bridge with the Californias Mall in the distance. Author's picture, 2014.

The physical proximity of Tijuana and San Diego is a constant reminder of the stark economic inequality in the region; *maquiladora* workers making around 700 pesos (~$45) a week, living in the margins of Tijuana's fragile canyons, look down the canyon at a wall of sewage and trash, a towering fence, and a distant city which does not seem to know they exist. The televisions and biomedical gadgets pass quickly through the border. Foreign products are assembled by poor immigrant women, help pass global commodities through a border they cannot themselves freely cross. Imagining resilient outcomes for the region as a whole, in this context, requires more than the application of traditional

American social movement rhetoric, it requires a willingness to question the big and understand the small, while acting at and cultivating the kind of flexible governance identified as the target of adaptive management and resilience analysis.

IV. Resilience and the Politics of preparedness: transformation or collapse?

Paradoxes of urgency and precaution are omnipresent in the debate over global-scale social-ecological crises like climate change. At once, precaution demands a kind of tentative experiential learning. But at the same time, it also requires urgent and collective action. One political response to this paradox is the popular concept of adaptive governance, a scientific approach to policy which attempts to learn through iteration and respond flexibility to sudden disturbance. Modern strands of this idea draw heavily on the path-breaking ecological theories of resilience promulgated by ecologist CS Holling and his students, and increasingly being adapted across disciplines and discourses as a model which embraces complexity and still attempts to actively learn and adapt.

Resilience, as formulated by CS Holling in 1973, is a measure of the ability of systems to 'bounce back' or return to recognizable form after disturbance.[880] Holling , influenced by complexity theory, showed that animal ecology surveys displayed nonlinear behavior, critical threshold values, and the presence of other major variables, folding the near-equilibrium dynamics of first order theories into a nested set of systems with multiple possible stable equilibria.[881] In simplest form, Holling imagines resilience as movement in basins. Single basin or unique equilibrium systems (the model for

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[880] CS Holling, 1973. 'Resilience and Stability of Ecological Systems.' *Annual Review of Ecology and Systematics*, Vol. 4; pp. 1-23.
[881] CS Holling, 1996. 'Surprise for Science, Resilience for Ecosystems, and Incentives for People.' *Ecological Applications*. Vol. 6, No. 3, August, pp. 733-735.

nature's perfect harmony, socially translated by economists like Herman Daly and Nicolas Georgescu-Roegen into 'steady state' economics) graft a set of particular strategies and concerns on any translation to management or politics, i.e. how to return to balance, the threat of catastrophic departure, reinforcement of feedback, and minimization of human influence on 'natural' harmony.

Holling shows instead the existence of nonlinear behavior and possibility of multiple stable states, which can potentially be better or worse relatively for human flourishing. This entails a different set of bureaucratic and political translations. First, it questions the older approach to maintaining equilibrium conditions by asking an empirical questions about how close to state shift coupled-systems might be and, crucially, whether greater resilience stabilizes preferred conditions or enhances the possibility of collapse and irreversible change. It is appropriately, a very flexible metaphor, which explains its conceptual adoption across network-oriented financial, hazards, and security discourses, as well as its more straightforward applications in ecosystem management.

Influential and overwhelmingly dire theories of ecological politics from the 1970s had pinpointed the developing world as the chief perpetrator exponential population rise. Seeing the political world through the eyes of population biologists, many of these theories supported regressive aid policies and abandonment of the developing world to its own disaster, retiring to rich enclaves where 'rational' population rates prevailed. The increase in population, for these theorists, meant that important limits to the carrying capacity of the earth had been passed by the human species, and ruthless checks of disease, war, and even forced sterilization were inevitable (and necessary) negative

feedbacks. Blind to lifestyles and historical responsibility, Survivalist narratives like these saw the human species as a kind of generalized problem, which meant that anywhere that population increase was high was proportionately more responsible for ecological crises and resultant social upheaval.

It is this simple translation of ecological themes to politics which people like Holling strive to avoid. Although beginning as a population theory, resilience was adapted by Holling and coauthors over the last forty years to include social systems.[882] This complication, what they termed 'social-ecological resilience' has been elaborated by the interdisciplinary publications of the Resilience Alliance as a kind of fractal-inspired set of nested panarchy spirals. In contrast to the two dimensions of the adaptive cycle, these adaptations of the idea of 'panarchy' project systems into three and even four dimensions, and nest them according to their size and speed rather than component parts. This has been taken up many researchers from different disciplinary backgrounds, including food systems, disaster response, climate adaptability, and others.[883]

'Social-ecological resilience' approaches recommend adopting experimental management principles in policy-making through an idea of 'adaptive governance' and creates projections of potential state-switches of vital systems and their critical thresholds. The ambiguity of the resilience definition, i.e. the rationale for why Holling felt the need to emphasis transformation and social systems, however, illustrates how

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[882] CS Holling, 2001. 'Understanding the complexity of Economic, Ecological, and Social systems.' Ecosystems. Vol. 4; pp. 390-405.

[883] For a sample of these many applications see: Johan Colding and Stephan Barthel, 2013. 'The potential of 'Urban Green Commons' in the resilience building of cities.' *Ecological Economics*, Vol. 86, pp. 156-166; Neil Adger, Terry Hughes, Carl Folke, Stephen Carpenter, and Johan Rockstrom, 2005. 'Social-ecological resilience to coastal disasters.' *Science*, Vol. 309, pp. 1036-1039; JC Gaillard, 2010. 'Vulnerability, Capacity and Resilience: Perspectives for Climate and Development Policy.' *Journal of International Development*, Vol. 22, pp. 218-232.

resilience principles can be tools for transformation or create problematic forms of lock-in, how its lack of a normative center means those utilizing its models have to look hard for underlying long-term causes to complement existing techniques focused on rapid shifts and shocks.[884] Unanchored from a vision of a future to be worked towards, such techniques do not provide the political or ethical purchase to make decisions about when return or transformation is required.

Drawing on both common pool and democratic theoretical sources, Fikret Berkes and coauthors have pushed complex systems analysis to recommend values based on co-management, or joint governance of natural resources.[885] Berkes wants to revalue and reincorporate traditional forms of ecological knowledge into co-management schemes, which requires two innovations on the standard development/environment narratives. First, it requires focusing on actual institutions at the community level, incorporating local knowledge and ways of life and looking for alternative narratives of development. Second, it makes a similar normative claim to back the standard resource efficiency arguments—it implies that power should start at the regional or local levels in order to respect cultural and ecological diversity, collapsing assumed hierarchies between societies into a dispersion of places and cultures.

This provides alternative empirical evidence to debates dominated by national and international scale analyses. Berkes' 'sacred ecology' is not a reversion or noble savage metaphor, as many modernists have taken it—it is a collapsing of scientific and 'traditional' (indigenous, subjugated, etc) forms of knowing the world with the express

[884] Brian Walker, CS Holling, Stephen Carpenter, and Anne Kinzig, 2004. 'Resilience, Adaptability, and Transformability in Social-ecological Systems.' *Ecology and Society*, Vol. 9, No. 2, pp. 5-14.
[885] Fikret Berkes, 2004. 'From Community-Based Resource Management to Complex Systems: The Scale Issue and Marine Commons.' Millennium Ecosystem Assessment Bridging Scales Conference, March.

purpose of improving both environmental and social conditions.[886] Theories of co-management and shared governance maintain a normative scalar argument based on the assumption that shared decision-making and deliberation on even power-terms between world views and ways of life improves outcomes.[887]

Holling's definition of social-ecological resilience is more conservative, and remains focused on critical moments of transition and measuring the stress necessary to flip between resilient equilibria. This has a built in normative concerns, given the assumption of human special responsibility—it is likely the choice between possible states follows form the decider's idea of who the community is and what the future should look like.[888] Such political and ethical questions are minimized (if at times understandably) in bureaucratic settings like environmental resource management, financial forecasting, and hazards/security planning, and have varying effect on cognitive science, psychology, engineering, and other disciplines using resilience in a narrow sense or as a trendy buzzword/euphemism for 'sustainability.'

Concepts of adaptive management can, at times, accentuate political passivity where they remain highly technical and ostensibly politically neutral—they enable a response that learns and focuses on managing shocks, but lacking a true social theory at its core, many questions about the shape and rhythm of everyday life and the historical legacy of responsibility and the justice of contemporary ways of life given global context of ecological change. The focus on preparedness in recent security, hazards, and

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[886] Fikret Berkes, 2012. *Sacred ecology*. Routledge, NY.
[887] Fikret Berkes, 2007. 'Community-based conservation in a globalized world.' *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 104, No. 39, pp. 15188-15193
[888] Fikret Berkes, 2010. 'Devolution of environment and resources governance: trends and future.' *Environmental Conservation*, Vol. 37, No. 4, pp. 489-500.

increasingly financial discourses, brought in a set of metaphors from both ecology and nuclear war planning, centered around resilience.

Others have traced resonances with this tradition back to the local, creative destruction of Hayekian economics. In such a piece, Walker and Cooper assess the use of resilience in risk management and associated securities and insurance studies within major global institutions like the World Bank and IMF, as well as within national governments and distributed down to local environmental adaptations. They call resilience, a 'methodology of power,' or a way of translating between Cold War management based on balance of nature assumptions to methods which emphasize change and engage second order cybernetics.[889]

9/11 reveals the key moment in the security paradigm transferring to other parts of governance. Many noted at the beginning of the War on Terror a kind of perverse nostalgia for the Cold War, as compared to terrorism, that:

> The Soviet Union seemed to be knowable and manageable through the logic of containment. With the end of the Cold War, US national security thinkers were almost nostalgic for a time when, however dire the threat of nuclear catastrophe might have been, it was at least clear what one was supposed to be preparing for.[890]

The shift to the wars on Poverty, Terrorism, and Drugs reflected that 'the key change in the nature of threat was from the stable enemy to the no-specific adversary.'[891] Former Secretary of State Donald Rumsfeld is instructive here: to paraphrase, he claimed 'the

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[889] Jeremy Walker and Melinda Cooper, 2011. 'Genealogies of Resilience: from systems ecology to the political economy of crisis adaptation', *Security Dialogues*, Vol 14 No 2, Advanced draft; p. 1.
[890] Andrew Lakoff, 2006. 'Preparing for the Next Emergency.' Working Paper, Laboratory for the Anthropology of the Contemporary; p. 23.
[891] Lakoff 2006; p. 35.

challenges of the new century are not predictable,' and therefore not subject to the old rules of prediction and compensation.

The virtues of the preparedness approach in the context of natural disasters are clear: it provides actionable evidence of vulnerabilities in advance of catastrophic events without needing to generate clear predictions about times or dates. It is, however, also limited in nature. As frequently cited, New Orleans had a scenario for a hurricane in 2004 and it appeared far from coordinated the next August. In order to regularize the response to unpredictable events, military and social protection agencies have long done drills and protocols to organize a response to low-probability but high-danger events. Such coordination drills have helped countless communities to avoid worst case possibilities by ironing out details and inefficiencies in the interagency coordination process, rationalizing a certain hierarchical command structure, and expanding breadth by giving everyone non-duplicating jobs.

For Walker and Cooper, resilience analysis has become the bridge between scenario planning and a new, less structured international political and economic environment. In this context, they insist that the late work of Hayek, written in the early 1970s, shows a remarkable resemblance to Holling's concepts as they evolved into 'complex adaptive systems,' famously including Schumpeter's famous creative destruction of capitalism. Walker and Cooper note that both resilience scholars and Hayek himself firmly rejected the Limits to Growth rhetoric and the resigned political analysis it inspired, and 'argue that the two perspectives, originally informed by antagonistic concerns, have ended up merging in the contemporary discourse of crisis response through resilience.

It is the *tacit union* of Hayek and Holling that has emerged in contemporary discourse, which means that green theory has become also a legitimating conduit for neoliberal socio-political regimes. At stake in this tacit union is a governmental philosophy of Nature and Society so all-encompassing and resilient to critique that the effects of political interventions (and non-interventions) made in its name, even when catastrophic, seem as inescapable as the weather.'[892]

Adaptive Management… of People?

The concept of adaptive governance was created by scholars from the Resilience Alliance to adapt ecological management ideas like adaptive management and indigenous co-management to politics. The focus on governance over government stresses the more holistic character of this attempt to reorganize local and regional conservation politics—it requires more than institutions with long time horizons (the central need for any scientific policy evaluation or social learning scheme), but also robust forms of regional information dissemination, public debate (in this case binational and bilingual), and shared decision-making.

The ideal model of adaptive governance incorporates experiential learning and creates a structure for assessment and adaptation in the context of surprise and nonlinear change occurring at multiple temporal and geographic scales.[893] For Holling, 'panarchy' describes the play between hierarchies and adaptive cycles, reflecting both internal system dynamics and cross-scale interactions with other cycles moving at different

[892] Walker and Cooper 2011; p. 3.
[893] Carl Folke, S. Carpenter, B. Walker, M. Shceffer, T. Elmqvist, L. Gunderson, and CS Holling, 2004. 'Regime shifts, resilience, and biodiversity in ecosystem management.' *Annual Review of Ecology, Evolution, and Systematics*. Vol. 35.

speeds and geographic scales. He says 'each level is allowed to operate at its own pace, protected from above by slower, larger levels but invigorated from below by faster, smaller cycles of innovation.'[894] These dynamics, for Holling, follow an 'adaptive cycle' with both creative and conserving aspects. This dynamic model of system behavior required a new definition for the buzzword sustainable development. Holling claims:

> Sustainability is the capacity to create, test, and maintain adaptive capability. Development is the process of creating, testing, and maintaining opportunity. The phrase that combines the two, 'sustainable development,' thus refers to the goal of fostering adaptive capabilities and creating opportunities. It is therefore not an oxymoron but a term that describes a logical partnership.[895]

Following the logic of complexity theory, Holling is insisting that the seemingly chaotic conflict between social and natural systems obscures a simple logic of change underneath the confusion produced by the multiplication of factors considered by complexity theory-based frameworks like resilience. Holling believes instead that in most cases a few longer, slower cycles are most important and identifiable, an insight that is powerfully expressed in the nine 'Planetary Boundaries' identified in his coauthored work with Johan Rockstrom and the Resilience Alliance.

All of these models are built on a concept of panarchy which is extremely interesting to consider in the context of the divided social systems of the Tijuana-San Diego bioregion. Holling's metaphor is intended to be holistic and still maintain granularity—by applying the adaptive cycle heuristic to both social and ecological systems (and really their place-based hybrids), Holling believes the directionality of the hierarchical ordering can be disregarded and the complexity of the larger systems

[894] Holling 2001; p. 390.
[895] Holling 2001; p. 390.

embraced more fully. Each of these systems, for Holling, passed through similar stages of growth, accumulation, restructuring (collapse), and renewal, taking place 'in nested sets at scales ranging from a leaf to the biosphere over periods from days to geologic epochs, and from the scales of a family to a sociopolitical region over periods from years to centuries.'[896] Holling's panarchy thus closely resembles theories of polycentricity emerging from common pool resource theory, and does so for a similar reason. This is because it rejects the top-down or bottom-up debate and instead links together semi-autonomous communities in a messy, nested, and overlapping ecological metaphor.

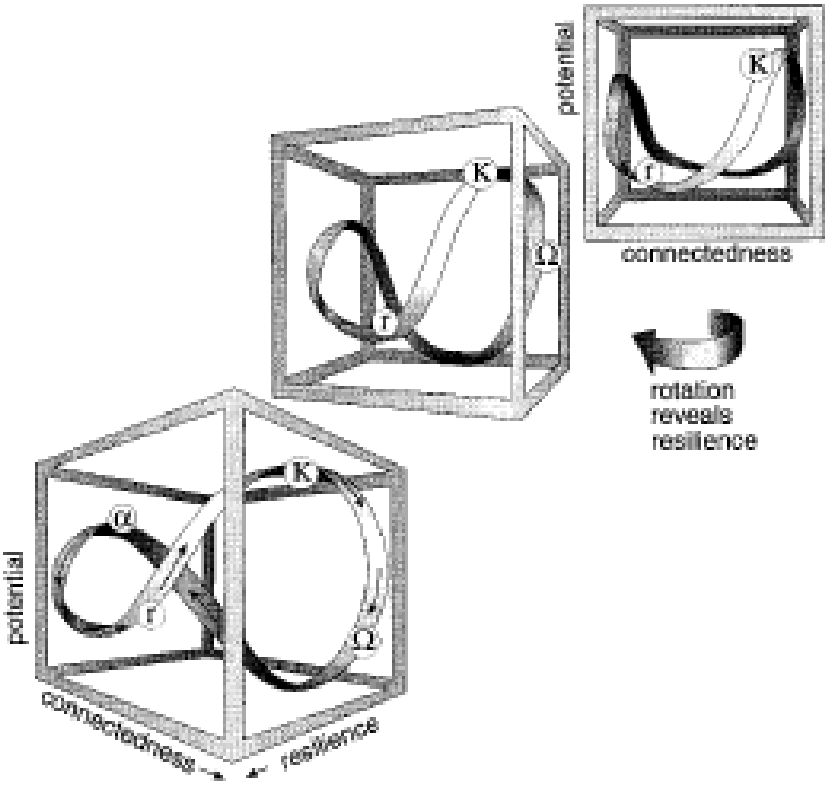

Figure 24: Holling's Panarchy diagram. Source; Holling 2001.

A key functional part of the social extension of this metaphor is the idea that social memory (i.e. history, culture, and institutions) found in human communities can

[896] Holling 2001; p. 392.

mitigate or exacerbate serial failures. One technique seeking to exploit this realization is the Planetary Boundaries outreach, which identifies the key slow processes that maintain human living conditions. Another is focusing on the way that cycles interact across levels, a key research topic for multilevel governance, resource co-management, and fiscal federalism studies.

Social memory implies the ability to revolt or remember, both to change and to maintain resilience in the face of external shocks. The answer is 'strengthening' the adaptive cycle, i.e. allowing for periodic small shocks and incorporating their lessons through social learning. Since resilience in many ways relies on redundancy to reduce vulnerability to shocks, human influence which increases the fragility of systems by reducing habitat, biodiversity, and changing the climate threatens larger failures that 'can overwhelm the sustaining properties of panarchies, destroying levels, and triggering destructive cascades down the successive levels of a panarchy.'[897]

The practical application of resilience model, for scientists and social scientists alike, is thus the identification of critical thresholds. More socially-minded versions (including an ironically exclusive reduction to 'social ecology' used with no reference to the larger body of Social Ecology and work of Murray Bookchin), also attempt to use nested systems and the language of nonlinearity to construct normative and pragmatic arguments—one, that resilient (healthy) systems were an appropriate goal for governance and management,[898] and the other that concepts of ecological resilience had direct

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[897] Holling 2001; p. 397.

[898] See: Brian Walker, Jeff Sayer, Neil Andrew, and Bruce Campbell, 2010. 'Should enhanced resilience be an objective of natural resource management research for developing countries?' *Crop Science*, Vol. 50, pp. 10-20; also: Fikret Berkes, 2007. 'Understanding uncertainty and reducing vulnerability: lessons from resilience thinking.' *Natural Hazards*, Vol. 41, pp. 283-295.

correlates in institutional and local terms, i.e. could equate the stability produced in ecosystems by overlapping functions and wide biodiversity in ecological systems with institutional proliferation ('polycentricity' as Ostrom called it) and greater democratic pluralism and respect for traditional knowledge.[899]

Holling himself was less clearly normative in his single-authored works. Even in his work with Fikret Berkes and other clear advocates for cultural and institutional decentralization Holling was careful to avoid reductionist grafting of ecological buzzwords onto politics by distinguishing human systems by two key attributes: 1) the ability to coordinate and affect the world at planetary scale through technology; and 2) the relation of social memory and collective choice to adaptive cycles. Laying society into panarchic systems conceptually nests humans within planetary systems and reinforces a special responsibility based on the capacities for memory and coordination opposite the destructive potential of human technology and industry.

The uniqueness of human systems to apply foresight intentionally, to communicate information across cultures and generations, and to create technology, both inspires responsibility and humility, embedding the human endeavor in a global envelope of natural systems and moving through scales like a Mandelbrot plot in fractal geometry—nested, complex systems both self-similar and path dependent. These special skills can lead to special challenges, as technology and human industry have made many systems brittle through extraction and degradation, the ubiquity of which means that 'the

[899] See: Oran Young, 2010. 'Institutional dynamics: Resilience, vulnerability and adaptation in environmental and resource regimes.' *Global Environmental Change*, Vol.20, pp. 378-385; also: Lance Gunderson, 2000. 'Ecological Resilience—in theory and application.' *Annual Review of Ecological Systems*, Vol. 31, pp. 425-439.

slope of the decision panarchy for humans…now angles sharply upward, intersecting and dominating other panarchies of nature.'[900]

This concern for human dominance is, again, both a warning and a call to responsibility. One active way of taking this responsibility up has been pursued by Holling's coauthors in greater detail: the concept of adaptive governance. These theories, moving explicitly into a more complicated social vocabulary, attempt to dissect governance through the lens of panarchy, adaptive cycles, and resilience. Gunderson and Holling, together in 2002, identify several ways that such resilience thinking can be applied, detailing three generic properties any complex system must have: wealth, connectedness, and adaptive capacity, i.e. stocks of material that set limits, some description of how much control over a system is possible, and the possibility to absorb shock and return to form or change to something else when return is no longer possible.[901] Sustainable social policy, in this framework, requires conservation, reembedding, and building of capacity.

The need to critique the underlying assumptions behind the vulnerability exposed by scenario testing appears conspicuously lacking, both in initial natural hazards approaches, which rarely questioned human factors producing vulnerability before the unpredictable event, and in security studies, which were firmly anchored to Cold War ideological commitments. The question was not how to avoid the disaster, but rather how to survive it in a recognizable state. The unpredictability of such events was such a

[900] Holling 2001; p. 397.
[901] CS Holling and Lance Gunderson, 2002. 'Resilience and adaptive cycles.' In *Panarchy: Understanding Transformations n Human and Natural Systems*, pp. 25-62.

problematic factor that it was rather dismissed—the world was unpredictable, it accepted, how can we maintain our way of live given these realities?

Prospects in TJ/SD?

Garry Peterson and others have stressed the importance of biodiversity for resilience, and this metaphor is not grossly wrong for political institutions either: a key tenet of theorists as diverse as Hayek, anarchists, and adaptive governance is the need for experimentation and a pluralistic, diversity of perspectives.[902] These do not exist at the local level in a vacuum, and simple bioregional fit between ecosystems and political institutions must be expanded to a polycentric, nested scale. At a larger level, however, it represents a real resource for self-organization and resilience of our national community and perhaps a world scale community still nascent, in that it adds to diversity of institutional experiments from which to draw in conditions which are rapidly deteriorating and perhaps bordering on release and reorganization.

Although often beginning with a treatment of distance, such theories are not simply theoretical. In many clear ways the natural resource regimes of the US and other 'developed' nations have adopted ecosystem management and bioregional mapping. The suggestion to bring scientific method to policy, however, is rather messier. In its simplest form this would seem to recommend decentralization of resource rights and political power alike to smaller, more numerous units, where shared concern with local problems drives a political commitment to act on the best information available.

[902] Garry Peterson, 2000. 'Political ecology and ecological resilience: an integration of human and ecological dynamics.' *Ecological Economics*, Vol. 35, pp. 323-336.

What ecological resilience adds is that adaptive managers must be able to humbly say when things have not worked out and need to be changed. Such an ideal clearly does not come from those trained in social sciences or humanities, who recognize human political systems as more problematic and richly (if also frustratingly) complicated. If the true difference between existing engineering resilience and idealistic ecological resilience is the ability to transform where an old equilibrium is problematic, a more dedicated analysis of politics and the kinds of cultural assumptions which drive problematic trends has to take its place alongside such theories. Regions with binational ecosystems like Tijuana-San Diego only accentuate this need for specificity.

The concept of adaptive governance is designed to address these needs by paying greater attention to the response to external shock and by creating a framework for learning from it. Folke, Holling, and coauthors claim that 'adaptive governance is primarily concerned with understanding ecosystem dynamics, utilizing diverse epistemological sources to develop management in a learning process, building capacities for response to crises, and supporting multi-level governance systems composed of flexible, local, and overlapping institutions.'[903] 'Flexible' institutions, in this sense, are those institutions which can identify change and initiate a self-correcting process to learn, not unlike the popular concept of 'reflexive modernization.'[904]

This expands the original models of resilience based on observations of natural systems to include knowledge and community capacity as forms of 'social resilience.' Holling claims that if resilience is the key strategy for understanding and responding to

[903] Folke et al 2005; p. 261.
[904] Ulrich Beck, 2007. *World at Risk.* Polity, Malden.

ecological crisis, 'then useful and usable knowledge and the social trust to apply that knowledge represent the sustaining foundations for social development.'[905] Each of these presents complications in San Diego and Tijuana, where the kinds of information necessary may not be available, and the trust essential to effective implementation, may be low or effectively isolated on respective sides.

Applying adaptive governance in the context of a natural region divided into heterogeneous political communities is difficult, and particularly hard where these divisions are national. Progress towards adaptive governance, in this setting, requires active cooperation of both national partners and local actors. These kinds of efforts have been accelerated in recent history as states, cities, and non-governmental actors move to address the evidence of increasing social-ecological challenges, and have culminated in a historic series of plans for climate adaptation, military contingency, and hazard mitigation in both the US and Mexico. The City of San Diego has created a Climate Action Plan, as mandated by the state of California, and Baja California has also recently completed a similar document.

This common stress on adaptation needs to be historically grounded for resilience theory to avoid reproducing the same paradoxes of first order systems theories of ecosystem management, and in order to learn progressively and adjust institutions accordingly to both the past lessons and changing conditions to come.[906] Social extensions of resilience theory insist on treating decadence and reorganization as

[905] Holling 1996; p. 735.
[906] See Cote and Nightingale, Folke 2011

inevitable parts of social-ecological systems, and opportunities for renewal and reorganization.

A much greater problem for adaptive governance models exists in the relative time horizons of politicians on each side of the border. Where US politicians have fixated on the border wall and illegal immigration at the national level, it has a wealth of overlapping and at times conflicting authorities at the local level and several levels and kinds of political bureaucracies, legal resources, and local engagement strategies built around the National Environmental Protection Act and the authority of the national and state Environmental Protection Agencies. The key part of these regulatory victories was the Environmental Impact Assessment requirement, a clause which is reproduced almost verbatim in the framework *Ley Ecológico* passed in 1988 in Mexico.

While resource bureaucracies in the US have followed the trend in 'developed' countries across the world, including Canada, Australia, and the more complicated processes in the EU and its member states, Mexico remains largely governed from the center, with partial devolution of mandates to state and municipal levels without matching sources of funds or administrative capacity to match them. Adaptive management, as a kind of model for the adaptive governance idea, was premised on policy entering into a benevolent cycle of social learning, of reducing 'coin-flips' to rational experiments. To do this one needs both a functioning civil society capable of creating baselines, monitoring experiments, and meaningfully enforcing the new rules.

These requirements are tested in the US, where science and policy realms are often widely separating, but disturbingly absent in Mexico, where laws limiting reelection, lack of meaningful local tax bases, and low governance capacity for

monitoring and enforcement make the long time horizons of experimental policy efforts seem idealistic at best. The lack of coordination between the two national communities is accentuated by national narratives on each side, and meaningful sites of cross-border deliberation and collective decision-making are almost completely absent.

Accepting the panarchy model and challenge to create a binational constituency presented by environmental justice and adaptive management alike means that communities like San Diego and Tijuana, despite their differences in terms of human systems, are commonly embedded in a nested set of ecological, economic, and social systems in a way that belies the symbolic separation produced by the border wall and the more pragmatic challenges presented as information, identification, aggregation, and displacement in detail above. Thus, there are many challenges to applying such a holistic and nested framework in a pragmatic and politically relevant way, including lack of trust, physical boundaries, the time horizons of politicians, and weakness of civil services tasked with regulating environmental harms.

While decentralization has happened in principle, it has often resulted on both sides in unfunded mandates, which in the US are often buffered by the wide range of institutional and civil actors empowered to manage natural spaces, but in Mexico often leaves very few people covering a lot of ground with very little money, adrift in a great river of economic and human flows concentrating briefly at the border. Adaptive management insists that small disturbances must be allowed at times to strengthen resilience to larger ones, that there must be critical backburns to prevent fires of the century. In the divided bioregion of Tijuana-San Diego, it is not clear what form any resilient response would return to, the critical component of social-ecological theory,

social memory, is profoundly missing in a historical sense, and divided by the language and physical barriers at the national border.

California and the Logic of Wildfires

In a paper detailing how the concept of adaptive governance responds to this paradox, Carl Folke and coauthors (including Holling) directly address the example of wildfire. Resilience theories see small disturbances as strengthening rather than weakening ecosystems, a perspective which casts small fires as productive and possibly preventing 'megafires' (over 100,000 acres). If Folke's fire metaphor is right, the accumulated fuel of half a century of deterrence now sits at our feet, smoldering issues never resolved about inequality linked to race, class, gender, and sexuality persisting in the midst of the comfort that conquering natural necessity.

The threat is that in the rush to avoid ecological collapse we may make our political systems fragile in their hardness rather than flexible and resilient to changing conditions, encouraging the great fire, emergency centralization and fundamental change to the fabric of democratic liberties. Setting many small critical back-burns requires lowering the level of the appeal from the global to the scales at which people identify with their environments and feel capable of acting collectively in meaningful ways. One such local fire would be encouraging the use of regional histories to craft rhetoric for outreach aimed at political activation, harnessing the particularities of the targeted institutional scale rather than the perceived universality of the global trend in order to move past simple returns to pre-existing conditions in the face of disaster.

This is the same insight learned experientially by firefighters in the American West, that small fires must be allowed to avoid catastrophic ones, and that the governance of social and ecological systems alike must learn from inevitable mistakes. It means that where old ways of doing things increasingly deliver the catastrophic conditions they must be transformed rather than protected. The perverse-seeming image of the firefighter setting back-burns, changing the meaning of their profession in the process, guides my call for what may appear to be an untimely social and ecological critique of contemporary disaster frames used to discuss environmental crisis.

In California, the threat of wildfires presents a clear example of how slow violence like global climate change can translate into rapid and more vivid versions in local context. The 'State of Emergency' now declared every year to pay for massive firefighting efforts provides an urgent backdrop for institutional innovation and interpreting global-scale trends. As a lifelong resident of California, this metaphor has special significance for me. My dad spent summers throughout my childhood on long-term strike teams in the backcountry of California. These fires, once lit, burned for months, and given unfavorable winds, threatened major population centers.

The stakes for my family were high. We lived in the Santa Ynez Valley, just north of Santa Barbara and the edge of the Los Padres National Wilderness, and witnessed a series of dangerous fires from close range. During the Painted Cave fire in 1990, a young firefighter from my dad's station died in the backcountry, and introduced a somber and anxious atmosphere to the extended family of firefighter families. Living in Santa Ynez and working with my sister at the Gaviota coast State Parks, I witnessed the immense 2007 Zaca Fire firsthand, watched it crawl over the mountains to the east of the

valley and into the hills directly north of Santa Barbara. Every morning I would clean a light dusting of snow-like ash off my car before driving to my job at the coastal State Parks. There, the purple stain of smoke pushed out over the Pacific by sundowner winds provided eerie sunsets. Downtown in Santa Barbara, the smoke occasionally pushed directly over the city, blanketing it in an ill-smelling fog. People kept mentioning how 'just like the movies' it was.

Natural disaster, in this case, brought a flexible centralization of dispersed resources. That California has such a system, tied as it is into the bureaucracies of multiple different and sometimes overlapping levels of government, is not surprising given that the state has been battling against drought and wildfires for years. Many of the crews on these fires had seen summers on strike teams battling large wildfires every year for more than a decade. Previous close calls had created the urgency necessary in the state and vulnerable urban centers such as the city of Santa Barbara for an aggregating system of adaptive management able to flexibly match the scale of the problem faced with a coordinated response.

One of the unpredictable but catastrophic conditions such preparedness techniques are created to address, drills for exactly this sort of situation were common, and an all-agency simulacrum was performed earlier in the same year before the 2008 Tea Fire, which also crossed the ridge into the foothills of Santa Barbara. Part of this urgency was the enormous Zaca Fire I witnessed firsthand in 2007, which consumed much of the Los Padres National Forest in the wilderness to the north and east of Santa Barbara, burning for over two months undeterred. At one point, the Zaca Fire had threatened to sweep over the hill into Santa Barbara, but favorable winds and well placed

backburns and air drops turned it east. The near miss of the Zaca Fire revealed that Santa Barbara was not prepared, and the catastrophic possibility a fire like it in the future presented organized scenario planning and flexible centralization.

Figure 25: View of Mount Laguna from Santa Ynez during the Zaca Fire. Author's Picture 2007.

While the media focus is traditionally focused on the heroic containment efforts—on the firefighters battling the forces of nature, the potential health hazards of smoke inhalation, and the running tally of property damage and cost—the reality is that these fires were linked both directly and indirectly to human interference. In the Santa Barbara backcountry, as in many places in the western United States, over a century of suppressing wildfires in areas ecologically tailored to natural wildfires from lightning strikes and adapted to the burning practices of Native Americans created an abnormally

dense plant growth.[907] Combined with unseasonably hot weather and drought conditions, both indirectly linked to climate change, this fire suppression technique ironically produced the conditions for the fires of the century. [908]

Figure 26: View from the San Marcos Pass over Cachuma Lake, Los Padres National Forest. Author's Photo 2007.

The responses to these fires show that that both good organizational preparation and a willingness to critically assess assumptions which appear natural (in this case, the *a priori* vocation of a firefighter to fight *all* fires) are both necessary to guard against worst-case scenarios upon entrance to disastrous conditions. Sometimes, it turns out, fires need to be left to burn, a fact which modern firefighters have come to accept through

[907] See: Richard Brown, James Agee, and Jerry Franklin, 2004. 'Forest Restoration and Fire: Principles in the Context of Place.' *Conservation Biology*, Vol. 18, No. 4, August, pp. 903-912.
[908] For one examination of the connections between climate change and wildfires see Donald McKenzie, Ze'ev Gedalof, Devid Peterson, and Philip Mote, 2004. 'Climate Change, Wildfire, and Conservation.' *Conservation Biology*, Vol. 18, No. 3, August, pp. 890-902.

rigorous experiential learning. The change of heart in modern wildland firefighting shows that an explicit focus on human safety, without consideration for the natural conditions within which that human environment was embedded, could lead to conditions where fires would threaten human cities on a scale which once seemed unimaginable.

It may be only in the shadow of near misses, like the months of smoke pouring over Santa Barbara during the Zaca Fire, where a critical detachment from day to day comforts may be strong enough to stoke change in fundamental assumptions, to set critical backburns on the accumulated fodder protected by short-sighted suppression regimes. It is fitting, if sourly ironic, that California's potential as a state to confront ecological crises mimics the strong fireproof seeds of its great forests, even if these forests are disappearing, not unlike the Grizzly Bear on our flag.

Disaster Preparedness and Transformation

Today security logics have come to dominate and organize even environmental discourse, both in obvious ways here at the foot of the new monument to our own fragility, the continent-wide border wall, and also through a conceptual framing and set of strategies for mitigating vulnerability referred to as 'preparedness.'[909] I'm arguing here that preparedness exposes a powerful example of the dangers of the so-called 'rigidity trap,' a lesson which can be extended through the promiscuous spread of resilience thinking to hazards, banking, and security studies. My argument is that preparedness on its own, like the narrow definitions of resilience, lacks transformative content—it is transparently a tool, a novel kind of technical rationality that focuses on

[909] Stephen Collier and Andrew Lakoff, 2008. 'Distributed Preparedness: the spatial logic of domestic security in the United States.' *Environment and Planning D: Society and Space*, Vol. 26, pp. 7-28.

current vulnerability rather than future risks, passed down from Cold War atomic war planning and now repurposed for terrorist threats and 'natural disasters.'

This perspective had originally been focused solely on security issues, but became stretched to natural disasters in the course of the 1990s, finally cementing together the FDA, EPA, and security agencies under the Department of Homeland Security following the shock of the 9/11 attacks. From preparedness point of view, the source of the catastrophe was unimportant. Instead, they assumed the catastrophe in order to work back to the kind of drastic, 'tragic' decisions necessary to made in contemporary times, and conduct simulacra to identify vulnerabilities. In fact, these drills were never supposed to be successful, but rather meant to expose failures; as Andrew Lakoff notes:.

> In contemporary preparedness planning, the lesson of a successful simulation based on a scenario is typically the same as the one that Anderson Cooper gleaned from Hurricane Katrina: 'we are not prepared.' However, such exercises are focused on experts and leaders rather than the public. They are an incitement to action: hold meetings, develop plans, release funds.[910]

Many have and continue to use the same tactic in green politics, focusing on the future event to try and generate urgency for the present moment and focus the attention to elite decision-makers rather than on cultural tasks, which they consider hopeless.

This tactic works where it creates urgency—as Lakoff notes: 'the actual performance of the exercise pointed to a key function of simulation as a preparedness technique: its ability to produce anxiety in participants.'[911] Revealing non-readiness allows decision-makers to assess their 'engineering resilience,' or ability to bounce back to something resembling their old form in the event of catastrophic, unpredictable events.

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[910] Lakoff 2006; p. 33.
[911] Lakoff 2006; p. 25.

These strategies are thus predicated on unavoidable change and irreversibility, exposing an outdated single-equilibrium model which cannot consider multiple possible stable states or generate political and ethical questions about what modernity or development (the assumed target of bounce-back to form) will entail. Instead, preparedness accepts unpredictability and performs drills to expose weaknesses rather than calculate the probability of chaotic events. This means techniques for identifying causes and modeling future states, the historical sense of insurance, are effectively stripped, leaving only the problem of continuity in the face of extreme events.

To become 'prepared' in this case is in opposition to the precautionary principle largely adopted in Western Europe after the Wars. Francois Ewald linked this difference to the development of the welfare state in Europe and the military-industrial state in the US, as 'from the vantage of preparedness, the conditions of existence of members of the population are not a political problem.'[912] As Andrew Lakoff explains:

> In its mode of future orientation and in its way of approaching threats, preparedness can be usefully contrasted with another form of rationality for dealing with possible dangers—insurance. As Francoise Ewald points out, insurance is an 'abstract technology' that can take actual form in a variety of institutions, including mutual associations, private insurance firms, and state –based social welfare agencies. It is a technology of risk. Here the term 'risk' does not refer to a danger or peril, but rather to a 'specific mode of treatment of certain events capable of happening to a group of individuals.[913]

For Lakoff, 'the precautionary principle has been an influential response to certain novel forms of threat in Europe, especially those linked to 'the environment.' It should be noted

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[912] Andrew Lakoff, 2006. 'Preparing for the Next Emergency.' Working Paper, Laboratory for the Anthropology of the Contemporary; p. 34.
[913] Lakoff 2006; p. 4.

that although it is addressed to the limit point of insurance, precaution still operates within a problematic of insurability—that is, it concerns the problem of calculability.'[914]

Precaution does not assume the catastrophe, it tries to mitigate it. Preparedness, rather than mitigating against future events which are unlikely but disastrous as in the European precautionary principle (also enshrined in most radical green theory) creates 'vulnerabilities to be mitigated,' it uses catastrophic rhetoric to elicit an active response, which requires different expertise and a different kind of focus. The scenario allows one to avoid the way that Luhmann describes catastrophe: 'the occurrence that no one wants and for which neither probability calculations nor expert opinions are acceptable.'[915]

This is in contrast to traditional ways of giving value to, and thus domesticating in some way, potential threats through insurance or risk technologies. Lakoff writes insurance is 'a way of reordering reality: what had been exceptional events that disrupted the normal order become predictable occurrences.'[916] The insurance paradigm, however, was not well-equipped to deal with issues of irreversibility or extremely slight but extraordinarily disastrous consequences like a surprise nuclear attack on critical infrastructure. In contrast:

> Preparedness becomes a salient approach to future threats when they reach the limits of a rationality of insurance. These are threats that cannot be managed through a logic of risk-calculation: preparedness approaches potential events whose probability is incalculable but whose consequences could be catastrophic.[917]

Born with atom bomb, preparedness is predicated on seeing uncertain threats and bringing them into space for action now, and for eventually creating single category of

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[914] Lakoff 2006; p. 9.
[915] Niklas Luhmann, 1998. *Observations on Modernity*. Stanford University Press, Stanford; p. 70.
[916] Lakoff 2006; p. 5.
[917] Lakoff 2006; p. 1.

'national security threats' to be managed with a central strategy, where it becomes common to talk about terrorist attacks and natural disasters in the same rhetoric. Thus 'preparedness names both an ethos and a set of techniques for reflecting about and intervening in an uncertain, potentially catastrophic future.'[918]

Rigidity and Preparedness—Resilience for What and for Who?

The problem with such preparedness strategies is that in their hurry to assess the capacity of systems to return to form they may obscure the ways that human agency interacts with natural disasters. The return to form may, in the longer-term, be deeply problematic if the assumed state of equilibrium is responsible for the crisis in the first place. This is why Holling is at pains in his 1983 piece to mark out engineering resilience as only a part of a greater framework which saw the world in a dynamic and radically interconnected way, utilizing new tools from complexity theory. He takes the time because by 1983 he is willing to transition from zoologist studying food chains and population numbers to begin offering a perspective for interpreting the natural world as radically interconnected with the human.

Resistance to this kind of move, to the decentering of human agency and recognition of surprise and radical change, has kept more 'practical' forms of resilience (as practiced in modern discourses of finance and military security) from examining its roots. The neglect of politics is symptomatic of a debate which is focused on scientific authority rather than historical responsibility or active adaptation. Preparedness doctrines, developed in response to the growing uncertainties involved in modern nuclear

[918] Lakoff 2006; p. 2.

standoff, share this historical myopia, a kind of insistence not only that the balance of nature is in fact true, that we have arrived at the end of history, but that this system as we know it today must be defended at any cost, that resilient bulwarks must be erected to protect its future ability to return to this form.

Without the shocking emergency event occurring on a hair trigger the way nuclear war seemed to be causing the world to teeter on the edge of human extinction, preparedness has a hard time mitigating causes and may not be able to predict novel threats if used in an uncritical way. Essentially, it may generate the conditions for its own failure out of the rush of urgency to act by prioritizing short-term return to form over long-term transformation. By suppressing all smaller fires in the short-term, in essence, it may create the conditions for the fires of the century. Again, this begs the question: What is the political equivalent of 'letting small fires burn'? Fires in the forests of California awaken the processes of rebirth and reorganization. These are not purely 'natural' in the sense of being absent of human influence, as they were cultivated by the edge civilizations of Native Americans and now influenced by anthropogenic climate change.

Letting little fires burn could suggest decentralization of decision-making which allows political battles to be fought at many levels simultaneously, under the auspices of a declared need for experiments in self-organization. It also utilizes a powerful image, especially here in California, the potential for 'fires of the century' as have been witnessed in most of the forested states of the American West in recent years. Resilience theory warns that this fire may overwhelm the old reorganizational capacities of the social and ecosystem and contribute to a flip, a shift to a different state, which may be in equilibrium but persist in a stable state in a way which is less amenable to human life or

biodiversity. In some narratives, this may entail the end of humans altogether as a historical and physical being. In the San Diego backcountry, the Cedar Fire in 2003 did just that—it shifted forever a forest regime into one dominated by brush like the Manzanita by burning too hot for the normally fire-resistant forests to resist.

These references to locally-meaningful images are important. The institutional analysis at the heart of adaptive governance is at heart *only* a form of technical reasoning, since it wants to rationalize chains of authority from local to global levels. It needs to be filled out with a cultural effort to first identify the community they belong to, then act to protect it against elites and larger scale capital and state institutions. In this sense, complementing analysis of ecological and social factors with political economy seems imperative for social-ecological resilience theory if it is to be fruitfully translated into local contexts as complicated as the Tijuana-San Diego bioregion.

The vast inequalities exposed by economic and political analysis, performed at a more aggregate level than typical environmental justice narratives about local groups in struggle has the potential to display in clear terms the conditions of gross injustice across the San Diego-Tijuana region by linking consumption choices to the health and environmental vulnerabilities of the people producing those goods. That practice requires a kind of joint management of social and ecological systems across multiple scales, a project of great complexity, radically challenged by the time horizons of democratic elections, concerns of powerful economic interests, inertia of large bureaucracies, and welfare legitimations of national governments of many ideological and geographical stripes. Understanding the challenge in this way changes the tenor and pitch of debates

over outreach, especially those concerned with the use of fear appeals and those continuing to rely on scientific authority for rhetorical authority.

V. Post-Material Economics vs. the Local Politics of Place

The ultimate threats of universalizing global binding frames like climate change are the persistence of passive attitudes in the face of accelerating change, and, eventually, the possibility of failed attempts to manage the global climate system through hubristic technological experimentation. These problems are compounded by the internal conflict faced by 'developed' societies built on fossil fuel use, who must begin refashioning problematic habits which are largely naturalized as conditions of 'modern' or 'developed' life. Lack of commitment to changing comfortable but deleterious collective habits is compounded by the ahistorical way in which climate change is often presented in rich countries. The comforts which have been naturalized into perceived needs in the rich world remain largely inaccessible to most of the world's population, although they still potentially serve as internalized goals for 'developing' countries.

Jesse Ribot makes this argument in his important 2014 piece examining the Anthropocene through the eyes of a resource economist and geographer.[919] Analyzing the much-lauded 'Adaptation Fund' created by the parties to the UN Framework Convention on Climate Change, Ribot notes how the money spent on adaptation in developing countries was tied directly to experiencing natural disasters or acute crisis, and could not be spent to address pre-existing vulnerability, even where such investments would be far cheaper, more gradual, and potentially reduce acute human suffering.

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[919] Jesse Ribot, 2014. 'Cause and response: vulnerability and climate in the Anthropocene.' *Journal of Peasant Studies*, Vol. 41, No. 5, pp 667-705.

Treating the danger of climate change as a purely natural force, Ribot suggests that such misguided policies miss the ways that climate and social vulnerability are interwoven and permeated by economic and political factors.

For Ribot, ignoring such factors meant a continual state of emergency and the reneging on promises of technology transfer and direct investment in the most vulnerable areas of the world. This 'concession' of technology transfer is crucial to global climate negotiations, and is meant to counter claims from 'developing' countries that the less-vulnerable industrial world had been responsible for burning the bulk of historical emissions which have led to current crisis conditions. Treating climate adaptation as an emergency procedure takes this pre-existing precarity off the table, a move which both Ribot suggests both wastes money and increases future suffering. Meant as a concession to developing nations being asked to cut their energy use and slow their economic growth, dedicating such funds only to cleaning up disasters if they could be causally linked to a highly uncertain and politically fractious global trend only increases focus on the actions of the less-vulnerable 'developed' world.

This produces resentment where the industrial nations are seen dangling the hope of an alternative, sustainable development pattern without choosing it themselves. The fear, for the 'developing' world, is about losing this history in the urgent rush to act, and risking losing sense of the kinds of responsibility for changing conditions in the developed world which might encourage a more equitable and just global adaptation. Seeking comfort at any cost in the short-term, many in the 'developed' world (those with the capabilities and resources to actually devote time and energy to making real change) approach the coming catastrophe as either dubious or tragically inaccessible to human

agency. This tendency generates a pair of suboptimal passive responses, either dismissal or acceptance. These outcomes are influenced by the complicated relationship between the manipulation of the supply of information by interested economic and political parties, as examined in many theories of non-response, and also by the demand for system-justifying information which allows problematic habits to persist.

Political ecology is focused on examining the interrelated roles of power and economics in ecological crises. Drawing on Foucault, many recent political ecologists have sought to problematize one-sided ecological visions of the developing world, answering a call for specific intellectuals able to inform their abstract theory with dedication to expert analysis of empirical cases.[920] Without such an attention to the relationship between economic, political, and ecological change, it hard to understand the kinds of issues encountered at the border between Tijuana and San Diego, and, likely, impossible to confront at an effective scale.

Political ecology, by focusing on global economic flows and power at multiple levels, is thus a potential response to criticism within 'Northern' or 'Western' scientific policy discourses. The translation of scientific frameworks like ecology to social analysis, however, has encountered firm criticism, and this is important to note in connection to both political ecology and to adaptive governance frameworks based on resilience. Many critics have questioned the 'political' or 'ecological' nature of the discourse,[921] even caricaturing it as a jargon-filled version of resource economics or an ill-fitting ecological

[920] Dianne Rochelau, Barbara Thomas-Slayter, and Esther Wangari (eds), 2013. *Feminist political ecology: Global issues and local experience.* Routledge, NY, Raymond Bryant, 1998. 'Power, knowledge and political ecology in the third world: a review,' *Progress in Physical Geography*, Vol. 22, No. 1, pp. 79-94; Erik Swyngedouwe and Nikolas Heynen, 2003. 'Urban Political Ecology and the Politics of Scale.' *Antipode*, Special Issue, pp. 898-920.
[921] Zimmerer and Bassett 2003; Peterson 2000; Walker 2005, 2006.

metaphor laid over complex and particular social and economic issues.[922] This second objection is important in the history of political ecology, as crude biological metaphors were the source of many distasteful survivalist works of the 1970s which firmly blamed the developing world for ecological crises. These studies are not claimed in the retrospective genealogies created by environmental justice or political ecology, even though they were some of the first to insist on the radically interconnected nature of social and ecological systems.

This is true for adaptive governance as well. Paralleling the insight above, Muriel Cote and Andrea Nightingale insist that resilience theories need to pay more attention to social and economic factors. They claim that while resilience is useful for understanding human and natural systems as coupled, 'its applications as a stand-alone formal theoretical framework are more problematic,'[923] asserting that a resilience framework is inadequate because it overemphasizes the role of external shock and because it 'undertheorizes' political and economic factors. In a passage broadly applicable to the other discourses discussed, they explain:

> The treatment of ecological and social dynamics with a single epistemology is an important challenge. More specifically, the reliance on ecological principles to analyze social dynamics has led to a kind of social analysis that hides the possibility to ask important questions about the role of power and culture in adaptive capacity, or to unpack normative questions such as 'resilience of what?' and 'for whom' when applied to the social realm.[924]

For Cote and Nightingale, amongst others, adding the analysis of power, knowledge, and political economy contained in discourses like political ecology to ecological metaphors

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[922] See Vayda and Walters 1999.
[923] Cote and Nightingale 2012; p. 478.
[924] Cote and Nightingale 2012; p. 479.

like resilience 'opens up issues around values, but also about equity and justice, which allows us to formulate questions about which resilience outcomes are desirable, and whether and how they are privileged over others.'[925] This is also a common critique of political ecologists informed by post-structuralist philosophy, who assert the need to 'put politics first' (i.e. Bryant 1991).

One way of evaluating the debate internal to political ecology over the relative weight of either subject, and thus also cognate debates in social-ecological system theories like resilience, is through the lens of urgent need for collaboration between natural and social scientists. Peter Walker, defending political ecology as adequately focused on the natural world, admits that if 'those who practice biophysical ecology perceive that their contributions are not highly valued in political ecology, this may represent a serious threat to the long-term success of the field, *especially* for recruiting younger scholars with training and interests in the natural sciences (it should be a cause for considerable concern that few of the young scholars entering political ecology today have extensive scientific or ecological training).'[926] Utilizing the connections made between social and ecological issues to reassert the centrality of traditional subjects of social science, thus, is unlikely to be convincing to natural scientists and leaves ambiguity about what exactly is meant by ecological analysis.

Treating ecology as a kind of empirical measurement of social and economic actions is a potentially valuable critical frame for social scientists, but limiting the role of ecology to generating scientific proof of these social analyses misses the potential for

[925] Cote and Nightingale 2012; p. 480.
[926] Walker 2005; p.79.

things like local education aimed at understanding natural systems to potentially serve as the foundation for regional collaboration. It also limits the perceived role of natural scientists in this process, and has the potential, through increasing the ambiguity of the scientific concepts they study, of appearing dismissive towards the complexities of the natural systems which scientists devote their lives to uncovering. Welding adaptive governance to political ecology as simply a synthesis of social and economic analyses could continue to relegate ecology to this simplified role as 'scientific' proof or an abstract binding logic of interconnection.

This is a real threat, not only to the extension of environmental justice to developing contexts and the continuing development of political ecology, but also to the kinds of collaboration across disciplinary boundaries on which each discourse depends for generating social resilience. Confronting the problematic tug of war of social and ecological experts for the master frame of interpretation in political ecology is illuminating and also frustrating in many ways. Paul Robbins avers in both directions, acknowledging the divide but challenging each to work towards a middle ground:

> It is clear that environmental researchers with an interest in politics and political geographers with an interest in the environment are on parallel, but distinctly separate tracks. The possibilities for cross-fertilization of concepts, theoretical tools, and methods remain strong, but under-realized therefore… [P]olitical geographers might benefit from the development of better accounts of the role of non-human agents in producing political outcomes and from a richer engagement with the political ecologies of everyday life, while political ecologists must work to better understand state institutions that are too often treated as "black boxes" in their accounts.[927]

[927] Robbins 2003; p. 641.

Tim Forsyth, advocating for a more reflective 'critical political ecology,' acknowledges this debate in much the same manner as Robbins does, and insists that critics not ask whether political ecology is 'sufficiently political or not, but rather seek ways to apply this form of politics more successfully,' which would require critiquing many of the foundational assumptions in uncritical environmentalism.[928] It also points out a possible set of lessons to be learned from environmental justice movements.

Forsyth, fearing the distraction and potential for summary dismissal of political ecology presented by critics focused on one term or the other, claims: 'Political ecology should not adopt separate understandings of politics or ecology, or see one as a guide to the other. The challenge for political ecology lies in understanding both environmental and political change in ways that *enhance social justice*, but which do not impose *a priori* notions about each.'[929] I think this is an important insight for the profusion of green theories endlessly critiquing each others' theories of non-response to social-ecological problems. Although it remains abstract, Forsyth's return to justice as an organizing theme reactivates many who might have been turned off by the abstract or ideological nature of analyses of political economy or highly technical ecological research.

The tendency to privilege one kind of analysis over the other has been criticized in political ecology from both sides, both by critics seeking greater engagement with ecology and others broadly seeking more complicated social analysis than allowed by strict translation of ecological concepts. Each of these perspectives is right, and finding a balance between them is difficult, especially when negotiating the kinds of collaboration

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[928] Forsyth 2008; p. 762.
[929] Forsyth 2008; p. 763. My emphasis.

necessary between social and natural scientists. This discussion is instructive for pursuing a similar revaluation of environmental justice, which I suggest can be addressed through local education and bioregional identity. Political ecology has been utilized as an explicit method in Tijuana by very few, often local scholars.[930] Unlike many kinds of academic environmental scholarshp, however, political ecology has a strong base in developing contexts. Its emphasis on livelihood avoids some of the pitfalls of unreflective US environmentalism, which is often accused of neglecting the role of livelihood and local expertise in ecological management.

Political ecologists emerged to challenge pervasive environmental critiques which had placed the blame for poor ecological outcomes in the 'developing' world, such as arguments about population popular in the 1970s or the 'post-material hypothesis' popular in the late 1980s and early 1990s. Garry Peterson describes political ecology as 'a trans-disciplinary attempt to integrate natural and social sciences approaches to understanding the relationship between human and ecological systems.'[931] He sees it as 'an approach that combines the concerns of and political economy to represent an ever-changing dynamic tension between ecological and human change, and between diverse groups within society at scales from the local individual to the Earth as a whole.'[932]

Predicated on seeing development from the eyes of the developing world, political ecology does not require the cognate of racism which environmental justice often uses to translate its insights to developing contexts. This allows political ecology the possibility of a critical, reflexive circumspection on urban and border areas which can be highly

[930] Dedina 1995; Herzog 2000; Lydgate 2010; Sundberg 2011; Lusk, Staudt and Moya 2012.
[931] Peterson 2000; p. 323.
[932] Peterson 2000; p. 324.

useful for expanding the appeal and effectiveness of adaptive governance regimes and environmental justice activism alike. This is because it reconsiders many of the unconscious assumptions about nature and preservation which are often seen as particular to the American experience and therefore unsuited for other contexts.

What seeking a kind of shared cultural foundation makes clear is the need to address the terms of development underlying regional disparities in a meaningful and genuine way. National policies which seek to address environmental degradation within US borders while encouraging the deleterious policies in the Mexican side of the industrialized border region will continue to generate fragile conditions for both human welfare and ecological systems on both sides of the wall. Perceiving these consequences as steps towards a middle-class green future rather than the injustices that they may represent is perverse in this sense, since it defends existing comfort (the assumed 'post-material' context of middle class environmental politics which people like Martinez-Alier are at pains to reject), while still privileging the 'developed' lifestyle as the goal for developing areas experiencing acute environmental health problems.

The danger in practice of political ecology has been an overfocus on political economy at the expense of the kinds understanding of social-ecological systems needed to create resilience at a regional level. The danger is outlined by Foucault—critiquing the 'universal' intellectual Foucault notes that one of the principal dangers for specific intellectuals was staying at too low a scale of analysis.[933] Others, more strictly focused on social concerns, have attempted to create parallel environmental justice narratives regarding local struggles over waste and health differentials, but as Foucault warns, these

[933] Foucault 1980; p. 126.

efforts can suffer from remaining at too low a scale to engage the kinds of global processes involved, and many make category mistakes transposing important (and in the US context very powerful) rhetoric about racism and social movements onto different cultural and developmental contexts.

Bioregionalism and the Problem of Fit

What joins all of the approaches consulted here in this long chapter is their addressing of the problem of fit between ecosystems and political institutions. Bioregionalism was the original response to this problem, the idea that political boundaries should be redrawn along watershed lines to spiritually and practically reconnect people to their natural contexts. The idea of 'bioregionalism,' or a kind of political and social organization based on the unique attributes of the environment in which people live (the textbook example here is watersheds, but could also be something like soil type), began perhaps with Peter Berg although arguably with more fundamental source in the spirituality of the Deep Ecology movement and the writings of Gary Snyder. The intuition here was that the boundaries of political authority should match the boundaries of the ecosystem in which these politics were seated.[934]

Developed by Kirkpatrick Sale and others in the 1980s, the original localist strain was drawn out into a more elaborate metaphor based on the nesting of great watersheds like the Colorado or Mississippi. The idea is that ecological issues should be matched with a kind of local level sovereignty which could more adequately protect their

[934] Whether watersheds, soil types, species difference gradients, an especially important resource like water or food, natural markers, or self-sufficiency.

surrounding ecosystems and inspire a kind of 'nearness' or micro-level accountability with diverse, diffuse feedback mechanisms.

The point of the rest of this closing section is that there may be other resources for confronting this problem, in particular the tradition of 'bioregionalism' emerging in the Western United States in the 1960s. With roots in the 19th century excursions of John Wesley Powell (who believed the arid West was not suitable for development due to lack of water) and the philosophical musings of Aldo Leopold and John Muir, bioregionalism was developed by Gary Snyder and Peter Berg in the 1960s as a philosophical dedication to living a different kind of everyday life. Snyder, a poet and student of Zen Buddhism, advocated a 'revolution of consciousness' to be fought not in national policy battles but on the cultural field of 'the key images, myths, archetypes, eschatologies, and ecstasies' to create a positive and achievable revolution of everyday life.[935]

Drawing on powerful American themes of Wilderness and self-sufficiency alongside Buddhist and Native American cosmovisions, Snyder attempted to make a very literal and practical experiment, moving to a communal farm. His attack was directed at Western culture itself, it was a warning—he claimed that 'a culture that alienates itself from the very ground of its own being—from the wilderness outside… and from that other wilderness, the wilderness within—is doomed to a very destructive behavior, ultimate perhaps self-destructive behavior.'[936] Bioregionalism, to Snyder, was not a technical effort, but rather a battle on the terrain of consciousness, reflected in his identification of bioregions as a state of mind rather than any one institutional formula.

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[935] Gary Snyder, 1968. 'The Wilderness Statement.' In 1969. *Turtle Island*. New Directions, San Francisco; p. 101.
[936] Snyder 1969; p. 106.

Jim Dodge, following this logic, would later call bioregionalism 'biological realism,' i.e. the recognition of the natural components of our biological and aesthetic needs and the direct connection between human physical and psychic health and the health of natural systems.[937] Dodge was more interested in the practical details of identifying the ecosystem-based boundaries, considering biotic shift, land form, cultural, spiritual, and watershed proposals. Each was predicated on the assumption that returning meaningful political sovereignty would reinvigorate local and regional levels, that:

> Obviously one way to make government more meaningful and responsible is to involve people directly day by day, in the processes of decision, which only seems possible if we reduce the scale of government. A bioregion seems about the right size: say close to a small state, or along the lines of the Swiss canton system or American Indian tribes.[938]

Dodge thinks that this reduction in scale will deliver a qualitative shift from concern with the standard of living to pursuing better quality of everyday life. Bioregionalism, defined by its own residents, pushes this transition by implementing autonomous and decentralized social organization, an environmentally conscious and active culture, and a society which honors the spiritual rather than economic development of fellow residents.

Frustrated with the squishiness of the term, Kirkpatrick Sale created a more technical set of nested regions and established several ways of differentiating between them, amidst musings about breaking up major cities.[939] More technical accounts also emerged from the work of Santa Cruz ecologist Raymond Dasmann and his collaboration with Snyder's more urban counterpart, Peter Berg of the Planet Drum Foundation. Berg and Dasmann stressed 'reinhabitation' and 'living in place,' adding an ecological rigor

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[937] Jim Dodge, 1981. 'Living by Life: Some Bioregional Theory and Practice.' *Coevolution* Quarterly, Vol. 32; p. 356.
[938] Dodge 1981; p. 358.
[939] Sale 1986.

and urban focus which was often lacking from the predominantly rural focus of the 'back to the land' wing of the movement.[940] Their identification of a bioregion as a terrain of consciousness, however, was likely just as frustrating to theorists like Sale more interested in making the transformation appear practical and possible by laying out roadmaps for the units it would create and empower.

Berg's Planet Drum published 'bundles' of maps, stories, songs, and pictures based on the ecological and cultural heritage Northern California, foregrounding the cultural task in their own way as a project of education and generational learning.[941] This may be a first starting point for places like Tijuana and San Diego, focusing on the shared natural and social histories of common bioregional place as a kind of preliminary solution to the problems of information and identification pursued above. This promise of bioregionalism for the challenges presented in the analysis above is identified clearly by Lynch *et al* in a recent article: 'by foregrounding natural factors as a way to envision place, bioregionalism proposes that human identity may be constituted by our residence in a larger community of natural beings—our local bioregion—rather than, or at least supplementary to, national, state, ethnic, or other more common bases of identity.'[942]

The insight here is important and can be easily overlooked by many dismissing these ideas as local boosterism or naïve romanticism. Bioregionalism suggests that, without losing sight of larger-scale processes and systems, residents of common territory

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[940] As noted by Aberley 1999, Dasmann was contracted on a seven year UN project mapping interconnected biogeographical territories, an early version of the USGS and Forest Service Ecoregion Mapping Initiatives.

[941] The most expansive of these being the wonderful bioregional readers like Berg and Dasmann's *Reinhabiting a Separate Country: A Bioregional Anthology of Northern California*. 1978.

[942] Tom Lynch, Cheryll Glotfelty, and Karla Ambruster (ed), 2012, *The Bioregional Imagination: Literature, Ecology, and Place*, University of Georgia Press, Athens; p. 4.

must draw down governance to an effective local level. It thus stresses awareness of connection between human communities and individuals with the land, 'by foregrounding natural factors as a way to envision place, bioregionalism proposes that human identity may be constituted by our residence in a larger community of natural beings—our local bioregion—rather than, or at least supplementary to, national, state, ethnic, or other more common bases of identity.' Creating this kind of parallel identity means accepting the responsibility to care for the place one lives and those one shares it with, both human and nonhuman, 'such shifts in perspective, bioregionalists propose, can have a major and ecologically positive influence on how we choose to relate to the world around us and, indeed, for who we imagine ourselves to be.'[943]

This doesn't solve the more practical matters about the institutional processes necessary to create urgent change, but it does foreground the fact that if such institutions are to be democratic they will have to be wielded by a society which values nature. By creating fit between the geographical and mental terrains, bioregionalism proposes they are interrelated and that their connection is strengthened by everyday practice and active political contestation. While the initial wave of bioregional thought extending from the 1960s to the early 1980s was profoundly anti-statist, more recent versions are arguable more informed by resilience and polycentricity theories, positing nested metaphors.

This does not, however, mean that the local level is no longer key—in fact, within these networked systems, the local level is both more vulnerable to extreme events and presently has less capacity to respond. By making 'natural systems a reference for human agency,' first wave bioregionalists like Jim Dodge preferred loose anarchic

[943] Lynch *et al* 2012; p. 4.

federations, preferring to reimagine society completely rather than adapt what exists. The profound ambivalence towards the urban environment, most powerfully expressed by Sale's commitment to breaking up and dispersing all cities over 500,000, makes these philosophical arguments less appealing in an increasingly urban world.

Important questions remain for empirical investigation: How would this kind of lifestyle, which would require a certain degree of fixed-ness to the land, affect the exchange of cultural ideas? Would it fragment policy that must first intend to be global? What level should something like bioregionalism take place? What is the value of having a national standard for civil service, currency, and education? Bioregionalists must contend that the reduction of sovereignty to 'human-scale' and cooperation between regions will be enough to change the way people think about their relationship to the land. If regions can create alliances formed organically around the land they inhabit and their common environmental interests in good health, aesthetic and spiritual values, and sustainable growth, this will lead to a kind of confederacy of regions within the nation.

The definitions of what count as bioregions would become the question of the greatest importance. But these too are contested and amorphous kinds of contests, prey to political and economic interests inevitable in politics. This has to question the nation state itself, though, too, since each national border splits at least a grey zone of biological coherence. The localism of the project precludes some overarching institutional arbiter, but this is perhaps a necessary element to prevent the overarching powers of now-global business, capital, ethnic, and non-governmental groups. The optimistic hope of the bioregionalists, as well as many others descended from Schumacher's seminal *Small is Beautiful* (although his term 'Buddhist economics' never caught on), was that delivered

responsibility of government of local resources, democratic institutions could deliver better ecological outcomes.[944] This institutional element was secondary, however, to the search for a cultural identity with the land.

Radical strains of anarchist and social ecologist thought were often preoccupied with this search for identity, at both individual and collective levels. Deep Ecologists preached a mystical conversion to the 'ecological' view of the world, a kind of personal rebirth which commanded ethical obligations to defend nature on principle to the collective.[945] Bioregionalists, in general, were more practical and slightly more material. They believed that relationships with the land were developed through practice and familiarity. Like resilience thinking and political ecology, bioregionalism focuses on natural and human systems as intimately connected. Rather than relying on more abstract economic processes or symbolic uses of ecology as a generic logic of interconnection, bioregional theorists apply the insight of this interconnection through a dedicated emphasis on shared membership in natural and social communities.

Bioregional green theory, thus, must toe an awkward line between its belief that localizing control will create a greater sense of responsibility and greater government responsiveness, and the potential this devolution of powers may have to ossify pockets of resistance to necessary environmental reforms and how it may decentralize the very decision-making power needed to confront system-level problems like pollution displacement and global warming. Confronted by the potential for atomization and isolation, bioregions could reproduce other social inequalities and limit or even actively

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[944] EF Schumacher, 1973. *Small is Beautiful: Economics as if People Mattered.* Harper and Row, NY.
[945] See: George Sessions, 1987. 'The Deep Ecology Movement: A Review.' *Environmental Review: ER,* Vol. 11, No. 2, Summer, pp. 105-125.

impede the extension of basic, universal protections for the environment. Bioregional theorists believe that this potential is a necessary sacrifice for changing cultural attitudes and habitual ways of life which endanger human and nonhuman survival.

The problem of fit is thus a much more complicated problem in light of nested ecological systems. It is complicated further by the divided context of San Diego-Tijuana, where even if a rational and sincere national government redrew their counties or municipalities along ecosystem or watershed boundaries the bioregional community, based on shared ecological context, would still be radically divided. This cultural challenge is reflected even in the more scientifically-framed accounts of resilience thinking. Carl Folke, in a paper otherwise concerned with 'self organized multilevel governance systems' places the challenge of mental displacement into critical light: 'some of us have argued elsewhere that a fundamental reason for the lack of fit between institutions and ecological processes is the mental separation from nature that has arisen in modern societies.'[946]

This cultural barrier means that regardless of the fit of institutions a similar 'fit' must be achieved between humans and nature. The spatial mismatches between ecosystem boundaries and political borders are mirrored by 'temporal mismatches' in the time horizons of politicians and the long term needs of resilient and flourishing social-ecological systems. Mexico's three year local election terms and stark division of ecosystems by the physical wall produce, arguably, a kind of perfect form of these mismatches. Folke sees the possibility of mental displacement that this produces:

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[946] Carl Folke, Lowell Pritchard Jr, Fikret Berkes, Johan Colding, Uno Svedin, 2007. 'The problem of fit between ecosystems and institutions: ten years later.' *Ecology and Society,* Vol. 12, No. 1, pp. 1-30; p. 12.

> The modern world creates and tightens intersystem linkages, hierarchies, and interdependencies between local resource users and the wider society through the market, political control, and social networks. Interestingly, the result of the tightening is to distance resource users from the resource base, to disconnect production from consumption and to disconnect the production of knowledge from its application.[947]

Because adaptive governance requires an array of capacities for monitoring, managing, and responding to disturbance, the cultural and institutional gaps compound, creating a real challenge to building resilience across scales where they cross national boundaries, and related goals of protection of species and participatory ecological politics.

Social ecological theory in divided territory

San Diego and Tijuana are linked inexorably, despite the national border scarring the space between them, and thus could be a special kind of local node in these relationships between national societies and planetary systems. Creating awareness of this connection is a predicate for democratic forms of adaptive governance and other well-intentioned efforts in the border region. Approaching the issues of water quality in Imperial Beach or ecological health in the estuary requires a vision which sees beyond political boundaries, and in this sense can profit from focusing on the shared environment as a binding force for related analyses of economics and health disparities. Predicated on local awareness building as a method for reattaching individuals to ecological systems and the establishing a sense of community based around biogeophysical commonalities, 'bioregional' principles can potentially reattach social and economic critiques to the ecological processes they approach.

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[947] Folke *et al* 2007; p. 12.

I argued here that such a theory could serve as a structuring narrative for theories of environmental justice and political ecology seeking broad regional resilience in those natural ecosystems divided by human boundaries, economic inequality, and cultural remoteness. One of the chief problems in bi-national collaboration in this region is widespread ignorance of the conditions of life in Tijuana in San Diego County. Mexican framework environmental laws, passed more recently than their US counterparts (on which they are largely modeled), are quite specific and even potentially more powerful laws, as the Mexican federal government controls much of the national economy, and thus more impact assessments across wider swathes of economic sectors are possible.

Their enforcement, however, is not good for a series of reasons which are apparent in Tijuana, including the need for passage of specific local codes, chronic underfunding and understaffing of enforcement agencies, and a lack of scientific baselines and reliable ecological knowledge.[948] Without adequate scientific baselines compliance is very difficult to monitor and enforce. These baselines, however, are costly to construct and potentially threaten lucrative development decisions. Underfunded and subject to corruption, well-written framework laws have yet to be enforced in earnest.

In Tijuana, this lack of effective enforcement is coupled by the relative lack of historical memory of a largely immigrant binational community region-wide, making monitoring and participation more difficult, and expensive legal challenges extremely costly to mount or sustain in a meaningful way. Persistent low-funding for environmental enforcement and low fines for illegal development encourage deleterious behavior by large offenders, which is often tolerated in return for anonymity by

[948] Jordi Diéz, 2006. *Political Change and Environmental Policy Making in Mexico*. Routledge, NY,

vulnerable communities burdened with the waste produced. Relative lack of services and weak incorporation into political decision-making make many recently established informal communities especially vulnerable to uneven health and pollution externalities from industrial parks and toxic waste disposal.

If making a shift toward more resilient local governance requires, as many analysts have posited, a renewed focus on adaptive social learning and long-sighted active intervention, a sense of common identity at the regional scale will be imperative for learning from the experiences of other localities as well as addressing larger scale issues in effective collaboration. For bioregionalists, where the land is disturbed it requires an ethic of care, or what Berg and Dasmann call 'reinhabitation.'[949] San Diego and Tijuana are a provocative case in this respect. As Aberley explains, '*reinhabitation* means learning to live-in-place in an area that has been disrupted and injured through past exploitation. It involves becoming native to a place through becoming aware of the particular ecological relationships that operate within and around it.[950]

In places like San Diego and Tijuana which lack easy reference to clear binding identities, the bioregional commitment to subsidiary power and identification with local landscapes may serve as a powerful glue in necessary collaboration and social learning between two national sides which often view each other as distant, and potentially between academic disciplines studying the same phenomena from different disciplinary silos. It could be seen as a form of the expansion which Schlosberg and others saw as necessary to extending environmental justice rhetoric—one which is grounded in the

[949] Peter Berg and Raymond Dasmann, 1978. 'Reinhabiting California.' *Reinhabiting a Separate Country: A Bioregional Anthology of Northern California*. Editor Peter Berg. Planet Drum Foundation, San Francisco.
[950] Aberley 1999; p. 23.

organizing frame of the local environment and which requires widespread social learning about local conditions and ecosystems.

Bioregionalism suggests that, without losing sight of larger-scale processes and systems, residents of common territory must draw down governance to an effective local level. Creating this kind of parallel identity means accepting the responsibility to care for the place one lives and those one shares it with, both human and nonhuman, 'such shifts in perspective, bioregionalists propose, can have a major and ecologically positive influence on how we choose to relate to the world around us and, indeed, for who we imagine ourselves to be.'[951]

The Tijuana Estuary and Coastal Canyons of Tijuana

In the context of widespread destruction of wetlands throughout the US and Mexico, the Tijuana River Estuary serves as a vital stopping point for global migrations of birds, performs essential filtering services for water entering the Pacific Ocean, and houses some of the last remaining habitat for several local endangered species. The particular strangeness of the Tijuana estuary is that a watershed proportionately larger on the Mexican side of the border delivers water, trash, sewage, and sediment to a protected wetland directly on the US side of the border. This binational entanglement requires theoretical models which see connections between science and policy, but also between the different authorities keeping the watershed and the people living in it healthy.

The estuary is fed by the Tijuana River, the watershed of which is quite large, straddling the border. The Tijuana River ends its run in Mexico as a massive concrete

[951] Lynch *et al* 2012; p. 4.

channel feeding into a treatment plant and eventually freed into the dirt of the estuary. Storm events overwhelm the water treatment plant and deliver heavy doses of sewage and toxic run-off from the Tijuana River into the estuary to be ejected into the Pacific Ocean.[952] The beaches of Imperial Beach, just north of the estuary outlet, are consistently closed for pollution throughout the year.

At the South-Western edge of the estuary, the canyons west of the city center of Tijuana slope down from south to north from several hundred feet and empty into the estuary near its terminus at the ocean. These canyons are now blocked by a freeway, multiple fences, a separate road for border patrol, and, most recently, two large basins constructed to catch trash and slow sediment. Recent studies have found increased sediment from these coastal canyons to threaten the health of the estuary. The area near the base of the coastal canyons is raised and dusty with extra sediment, pushing the salt marsh north, killing native vegetation, and eliminating vital habitat for many species, including several on the Endangered Species list. Experiments have shown that volunteer creeks are unlikely in this raised environment, requiring active excavation to prevent the build-up of fresh water and the transformation of the salt marsh.[953]

This problematic sediment starts, however, in the recently denuded canyons of Tijuana, where large industrial parks run by multinational companies have encouraged the haphazard development of sprawling informal settlements. To intervene in these kinds of settlements to prevent sediment and trash from reaching the estuary means also

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[952] Richard Gersberg, Daniel Daft, and Darryl Yorkey, 2004. 'Temporal pattern of toxicity in runoff from the Tijuana River Watershed.' *Water Research,* Vol. 38, pp. 559-568.
[953] Katy Wallace, John Callaway, and Joy Zedler, 2005. 'Evolution of Tidal Creek Networks in a High Sedimentation Environment: A 5-year experiment at Tijuana Estuary, California.' *Estuaries,* Vol. 38, No. 6, December, pp. 795-811.

understanding the patterns of regional development. Raising public concern is hampered by the lack of community cohesion and political representation of impoverished immigrants seeking a better life, but also seeking anonymity for a series of reasons .[954]

Since close to three quarters of the Tijuana Watershed is in Mexico, addressing concerns in the estuary without a cross-border vision is confusing and ultimately unproductive. The risk of extreme sewage or sedimentation events to the estuary is mirrored in the canyons, where in even moderate rain events roads wash out, channeled creeks full of trash and sewage overflow, and large sections of former sage and chaparral denuded by ranching and development of *colonias* break off and threaten housing. The vulnerability to an extreme event in the canyons is accentuated by the lack of police, medical, and fire services in the area to respond in case of a situation like in 2008 where they become effectively cut off by road damage.

While extreme precipitation events are infrequent, they are regular. The climate of both San Diego and Tijuana is in large part affected by the Southern Oscillation cycles in the Pacific, or El Niño. Average rain fall totals of less than ten inches conceal the fact that much of the total is accrued in extreme wet weather associated with El Niño.[955] This means that years can pass in the rapid development of many areas of Tijuana where critical infrastructure is not tested. It also means higher susceptibility to extreme sewage events when the canalized Tijuana River runs too high for the Interational Border Water Commision treatment plant at the border. A similar problem exists in the canyons, where the pace of conversion of former ranches into settlements has left many areas yet untested

[954] Kathryn Kopinak and Rosa Maria Soriano Miras, 2013. 'Types of Migration Enabled by Maquiladoras in Baja California, Mexico: The Importance of Commuting.' *Journal of Borderlands Studies*, Vol. 28, No. 1, pp. 75-91.
[955] Cavazos and Rivas 2004.

by El Niño, in an area of already low ecological resilience due to land use patterns which encourage fragmentation and loss of native vegetation.[956]

All these natural and social factors add up to a general decline in species in the estuary and increasing vulnerability of human settlements in the canyons. The estuary is considered the region's least disturbed, which is sobering. Recognized in 2005 by Ramsar as a 'Wetland of International Importance,' protected as a US Fish and Wildlife Service Wildlife Refuge, a California State Park, a county protected area, and a National Estuarine Research Reserve, and overseen by many concerned civil society groups on both sides of the border, multiple scales of governance overlap.

However, conditions in the estuary remain precarious. In a 30 year study published in *Restoration Ecology* Zedler and West observed the loss of several native plants, intrusion of hardy succulents, and continued degradation due to sedimentation.[957] The insight produced through engaging ecological research here is that the many overlapping scales of governance recommended by adaptive governance theories are not enough by themselves to solve ecological problems if they do not focus equally on social, political, and ecological issues. Few people think about the sediment flowing from Los Laureles Canyon into the Tijuana Estuary when they buy a plasma TV in San Diego, but the two are intimately connected in a way which the post-material hypothesis obscures.

The perceived distance created between communities by the physical border dulls the sense of responsibility of consumers in the developed world for the social and ecological outcomes of their developing partners. The challenge for adaptive governance

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[956] Farley *et al* 2012.
[957] Joy Zedler and Janelle West, 2008. 'Declining diversity in natural and resotred salt marshes: A 30-year study of Tijuana Estuary.' *Restoration Ecology*, Vol. 16, No. 2, pp. 249-262.

and environmental justice alike in this context is to understand the linkages between communities sharing the natural landscape as a prerequisite for successful ecological interventions. It will require getting beyond the mental distance felt in the northern part of the region to recognize the unequal social conditions which economic complementarity capitalizes on and may reproduce.

IV. Conclusions

The increasing economic integration and functional division of labor established between industrial Tijuana and 'post-material' San Diego pushes back at the national-level movement towards closure and anticipates further decentralization and fluidity within the region as a productive boon to unlock great wealth. In this complicated process, characterized by both economic and ecological imperatives to greater regional integration in spite of increasingly toxic national debates, the grafting of political ecology and bioregionalism onto adaptive governance theory may prove pivotal for addressing the mental and material displacements produced by the border wall.

In Tijuana, the stark discrepancy in income ratios which attracts US and Asian companies to invest in assembly plants along the US-Mexico border is the primary cause in the rapid growth of the region. By 1999, only five years after the NAFTA agreement was signed, San Diegans earned roughly six and a half times as much per capita as their counterparts on the Tijuana side of the border.[958] This was one of many tradeoffs Baja California, Tijuana, and Mexican federal politicians willingly made to increase employment rates, which remain high relative to the rest of Mexico, and this availability

[958] James Gerber and Sergio Rey, 1999. 'The employment dynamics of regional economies on the US-Mexico Border.' San Diego State University.

of employment, even at low wages and in vulnerable social conditions, has drawn people from all over Mexico and Central America.

I've argued here that the real testing points for adaptive governance will be around the edges of borders between cities, regions, states, and countries where sovereignty is divided but ecosystems are not—the particularly hard cases. The canyons in Tijuana are a perfect example of this kind of challenge, operating across a series of institutional, linguistic, and physical barriers, as well as very real differences in identity, nationality, wealth, health, education, and opportunity, all while sharing a watershed which dumps into an ocean which crosses the border freely. In San Diego and Tijuana, despite sharing a physical location, this nascent bioregional collective lacks a reliable collective agent—communities perceive themselves as remote from each other.

Adaptive governance can be a powerful factor in the construction of collaborative institutions, but to be effective in San Diego and Tijuana it must pay attention to differences in culture, history, and political institutions. Although border areas blur cultural barriers more than more distant areas of their respective countries, the potential for misunderstanding and ignorance of unequal distributions of environmental vulnerabilities is heightened by the physical and cultural ramifications of the border wall. Part of the remoteness produced is due to the inability or unwillingness of San Diegans to reflect on the consequences of their lifestyle, an infirmity reinforced by a general lack of familiarity with Mexico and the obscuring force of the border fence on global commodity chains moving through the border region.

I showed in this section how nested systems theories like resilience can lead to social theories which, by accepting change, disturbance, and reorganization, are broadly

aligned with EPT concerns, or, where drained of critical or reflexive capacity, can reinforce existing patterns of degradation and political stagnancy predicted by dour authoritarian theories from the 1970s. Such uncritical forms of resilience and preparedness are brittle, unprepared to take on difficult cultural and political changes to authentically respond to the calls for pluralization and reterritorialization in EPT and other social theories of the environment.

At this point, the border serves is a microcosm of many of the most problematic issues in global ecological and development debates, brought to a fine-grained point at the edges of national sovereignty. The developed side appears blind to the deleterious effects of their lifestyle on the lives of those in the developing world, yet continues to call for environmental preservation, often based on prejudices which do not see livelihood or social issues as linked to ecological ones. Instead, linking ecological governance to developing contexts must be done in a more reflexive and hybrid way, at the risk of continued irrelevance or profound gaps in credibility.

I think this process can be hastened in places like Tijuana and San Diego by renewed focus on shared ecological systems and their interrelationship with social and economic factors. A bioregional perspective demands that this be done with the express intent of creating stewardship and a sense of shared community, beginning at local levels and ascending to higher scales when necessary to meet the scale of the challenges represented. This is not a simple diagnosis. San Diego and Tijuana, however, share a common natural inheritance and deep history of human residence preceding recent migration, despite being arbitrarily separated by human barriers, and this particularity is both a cause of many problems and also an opportunity to profit from cross-border

visions which see ecological commonalities as central binding forces rather than focusing on cultural, linguistic, and economic disparities.

I argued that is only from the base of a regional community with an understanding of their shared context, awareness of the multiple-scales of ecological and economic flows involved, and focus on building local capacity that pleas for environmental justice or binational adaptive governance will be more than simply aspirational rhetoric.

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14 Conclusions: Anti-Apocalyptic Criticism in Warmer Times

The appeal to order alone, without concrete specificity, is futile. – Theodor Adorno

If a man who wants to create greatness uses the past, then he will empower himself through monumental history. On the other hand, the man who wishes to emphasize the customary and traditionally valued cultivates the past as an antiquarian historian. Only the man whose breast is oppressed by a present need and who wants to cast off his load at any price has a need for critical history, that is, history which sits in judgment and passes judgment. – Friedrich Nietzsche

I. Critical Political Ecology: Hatchets and Seeds

Recognizing that many contemporary catastrophic narratives insist on the newness of our era of social-ecological crisis and radical interconnection, I worked in detail in sections of this project on debates over global-scale catastrophic scenarios related to nuclear weapons and overpopulation which also saw their era in catastrophic terms. These discourses, like many modern narratives addressing climate change, approached the challenge of acting in unprecedented circumstances, whether beginning to imagine the scale of the effects which human societies are capable of producing, the need to act on the realization of unintended responsibility, or the temptation to externalize or despair for the agency necessary to avoid the catastrophes predicted.

Throughout the first section of this project I argued that catastrophic predictions which displace human agency and reanimate Gaia to exterminate the species (in search of universal appeal, as Thompson animated the bomb itself), *and* passive belief in technological progress may result in the immobilism they sought to avoid: one inspires resignation, and the other, in its desperation to be palatable, inspires an indifferent return to problematic habits. Analyzing the popularizing attempts of Carl Sagan and others in

the early 1980s, including several of the same characters who appear in both the nuclear weapons and climate debates, I argued, could provide a meaningful critical perspective for reassessing calls for technological mastery of the weather and the structure of public outreach campaigns built on scientific authority.

Allowing contemporary debates to settle into the cynical delaying tactics of doubt campaigns and 'neutral' countering apocalyptic predictions risks continuing to produce passivity in both its indifferent and resigned form. I argued earlier in this project that the key activating force of fear appeals is not the fear itself, but rather the perceived self-efficacy of the actor and its mediation in meaningful cultural terms and achievable scale. This means that contemporary ecological crisis literatures need to turn away from endless technical verification debates and inspiringly inadequate technological determinism and begin earnestly approaching the problem of collective efficacy, of *political capacity*, in a more concentrated way.

This is not to insist that political theory is the master narrative of environmental crisis, but rather to acknowledge that without attention to creating effective collective change there is no way of avoiding resignation. I have suggested here that any 'critical political ecology' needs to move beyond contemporary, often febrile debates over empirical veracity or exhausting theories of non-response jockeying for authority, and begin turning to examples of institutions for collective agency and co-management that already exist in non-ideal forms throughout the world. A so-called 'critical political ecology,' instead, should focus on the interconnections between joined complex social and ecological systems, and, I argued in later chapters, encourage the consideration of meaningful decentralization of political power to lower scales of governance.

The expansion to perspectives from ‘less developed’ areas of the world is not arbitrary even if it is over-general. It is safe to say that many ‘pre-modern’ civilizations have lived in greater balance with their natural surroundings than modern industrial cultures. But the implicit designation of a return to ‘pre-modern’ standards is telling. This return entails a regression to prior social conditions, the exacerbation of inequality, regional feudalism ruled by rich lords, and raised inter-regional violence—essentially, a return to a pre-modern feudal Europe. Often, when we look to the rest of the world for inspiration in the face of this surge of resignation I think we interpret their conditions through our temporal lens, finding in the modern the conditions of our own eventual decline, rather than considering the productive possibilities of learning from other moderns and finding arrangements that can allow our cultures to prosper in a way that does not also threaten their foundations.

From this perspective, perhaps as great a potential threat for warmer times as the unintended effects of large-scale geoengineering techniques is the pacifying effect that a generic belief in technological progress as a silver bullet for all problems allows the public in comfortable countries to push the urgent adaptation necessary—assuming that technological gains will re-legitimate current ways of life that people aspire to. Entering an era of unprecedented change in global ecological systems, the hopes that the entire world would join in consumption and comfort at the ‘post-material’ edge of history are invalidated. The assertion of limits to key ecological services like water, food, and air means that the uncomfortable and polluting ‘transition’ period to a ‘developed’ society threatens the tip the planetary scales of survival.

Ignoring any redistributive politics, many have stressed the urgency of the crisis alongside the unintended nature of the carbon emissions blanketing the planet as a pragmatic plea to *start now* without messy reference to history or time-consuming democratic capacity-building. The end point of such rationales is nuclear power and climate geoengineering, a technological future leveraged against great planetary risk. This new global risk is mobilized by many ideologies in our contemporary era as a call for urgent change. Typically, the debate in the US, even amongst those agreeing on the novelty of our era, falls along the lines of 'modernists' and 'romantics,' i.e. between those who believe in a technologically redeemed future where contemporary Western lifestyles can retain hard fought progress and the leisure of 'modern' life, and those who believe that economic growth must be curtailed and simpler living instituted at local levels, often at the impetus of catastrophic ecological conditions.

This debate is not very useful, however, in much of the world that does not have the same numbing affluence as many debating responses to global ecological crisis the US and Europe. It is puzzling, in this sense, that many of the modernist and romantic debates in the US each refer to examples from the 'developing' world as proof that another way of life is possible. On the modernist side, the developing world is often an implicit threat, the idea that naïve romanticism will return the world to 'feudal' or 'pre-modern' conditions.

I argued here in several places that this conceit is based on a historical prejudice in the so-called 'developed' world which temporally ranks all societies on an implicit continuum of progress, with the lifestyle, markets, and liberal institutions in the industrial west as the endpoint of all human civilization, what Francis Fukuyama smugly named

'the End of History.' This bias in the understanding of the increasingly globalized industrial lifestyle which has placed world ecological systems in crisis both obscures the responsibility to for deteriorating global systems in the 'developed' world and disqualifies potential examples of alternative ways of living in the 'developing' world.

Thus what Nietzsche called in the *Untimely Meditations* 'the epigone problem,' or temptation to see one's culture as the culmination of all past progress, in 'developed' societies obscures the urgent responsibility to act, both to change deleterious lifestyles and to acknowledge the need to turn outward, to see the repercussions of the globalized consumer lifestyle in the farthest corners of the earth. Many of these unseen places, now connected to the economies of the industrialized world through global trade and communications networks, are both less able to act and more vulnerable to changing conditions. The rise of oceans, death of coral reefs, decline of fish stocks, logging of rainforests, damming of rivers, and exponential expansion of resource extraction characteristic of the modernity proclaiming itself 'the end of history' threaten the very basis of human and nonhuman life in the aspiring periphery.

It is perhaps especially cruel, in this sense, that romantic rejections of industrial modernity often remain naïve and patronizing to the societies and cultures they idealize as 'closer' to the earth. The implicit bias remains—their narrative often calls for 'developed' societies to *return* (in a temporal and historical sense) to a prior relationship with the land where traditional norms of decentralized authority and local communal values will inspire a cultural purification that will enable sustainable democratic politics. Searching for an alternative to the status quo in the 'developed' world, romantic theorists often make the same mistake as the modernists they oppose, assuming that reproducing

the culture of subaltern systems will constitute a return to a prior, pre-modern, even *pure* state of Western society before the corruption of modernity.

Frequent citations of indigenous political systems of autonomy in Bolivia and Southern Mexico by such romantic critiques draw together these rival interpretive frameworks in complicated ways. Many scholars across social science and humanities disciplines are drawn to the idea of indigenous political autonomy as a source of potential examples of alternative ways of living—these areas are seen as representing relatively un-globalized societies with ancient roots to the territory itself, and their territories constitute some of the worlds' last great outposts of biodiversity. Bolivia's new constitution granting rights to Pachamama, the earth deity, the Zapatista revolt in Chiapas, and indigenous autonomy regimes in Oaxaca are often perceived as proof that counter-discourses and resistant practices of sustainable life still exist.

Latour calls such subaltern discourse 'amodern' (assumedly 'post-modern was already taken), and believes, with Viveiros de Castro, Gudynas, Descola, political ecologists, and EPT, that such real places present alternatives beyond modern and anti-modern. The autonomy regimes instituted in Oaxaca in the 1990s and the 2010 granting of several levels of indigenous sovereignty in Bolivia do provide potential examples of decentralized resource governance, but are much more complicated when examined closely. The diversity and heterogeneity of groups termed together as 'indigenous' in western environmental scholarship explicitly belies the simple noble savage conceit in the romantic argument.

This is patronizing, obscuring both the very real, often fractious, nature of deliberations between and within indigenous groups over the future in Mexico and the

potential lessons that the experiments with local sovereignty represent for the shift to nested adaptive governance regimes in the 'developed' world. This sense of being 'in-process' was clear in my field work in Oaxaca and Chiapas, Mexico. In Oaxaca, where state law allows traditional forms of governance at the municipal level, community-managed forests have been touted by many as scalable solutions to global deforestation. At the international level, the REDD+ program (UN Environmental Program and Food and Agriculture Organization with other partners sponsor the Reduce Emissions from Deforestation and Degradation) is seen by many as the mechanism of the future, a trading scheme where industrialized countries pay local farmers to plant and maintain forests in tropical areas struggling for livelihood in the 'developing' world.

Using GIS to flesh out my field work, I analyzed relationships between indigenous autonomy and forest outcomes in Oaxaca and Chiapas. What such an analysis reveals is a diversity of experiences, with the most successful efforts resulting from long-standing inter-municipal relationships where trust and collaborative institutions existed prior to the return to formal *usos y costumbres* in 1994. In other areas, however, the difference in expectations for the future and visions for how to get there are evident, whether along the coastal region now sold as ecotourism or in the industry of carvings which slowly marches its own source of wood to extinction.

My point is not that such systems are inappropriate for comparison with the US, but rather that such a comparison needs to be done in a much more reflective and self-critical way, one which recognizes the 'developing' world as co-moderns with complicated political and social inheritances, not as 'peasants' or some other reference to a prior state (idealized or pilloried) of western history. My research attempts to move to

a more complicated assessment of decentralized political governance based on its credentials for delivering quality of life and positive ecological outcomes. I attempted to do this by working continuously in an interdisciplinary register, even moving empirically to turn the tools of fiscal federalism and GIS analysis on indigenous systems in Mexico, supplementing political theory approaches with quantitative studies focused on economic growth and public goods procurement with consideration of ecological factors. This 'undisciplined' method, as I reflected on in the introduction some six hundred pages ago, was both intentional and frustrating, as the reader no doubt has found out.

Section I Summary: The Hatchet

In the first chapters, I began with an analysis the use of catastrophic rhetoric, and using the framework of insights generated, attempted to learn from the historical debates surrounding atomic weapons and population collapse. First connecting nuclear and climate problematics, I organized this analysis around the contributions of three very different viewpoints in the nuclear debates: Gunther Anders, Reinhold Niebuhr, and EP Thompson. My argument was that many of the lessons gleaned from these past debates could be fruitfully applied to the dire rhetoric in our new survivalist epoch, increasingly referred to as 'The Anthropocene,' or age where humans as a species begin overwhelming the great forces of nature. I tried to use the critical purchase of parallel debates over nuclear weapons, the prospect of nuclear winter, and the 'population bomb' to tease out historical tropes into the contemporary Anthropocene debate.

The play between indifference and resignation is not unique to the climate debate. Anders recognizes it as well in his outreach campaign against nuclear weapons, and his

thought is interesting for environmental political theory because it helps us understand the technological underpinnings of the Promethean opposition to the radical change and the sense of survivalist resignation of those accepting the reality of ecological crisis. I argued that this is important given the relative disconnection of emerging environmental crisis paradigms like the Anthropocene from their historical moorings. Importantly for climate catastrophe narratives outlined above, often marked by indifferent denial or resigned fatalism, Anders' lifelong campaign against nuclear weapons was also conceived as a campaign *against despair* over the prospect of human extinction.

I then considered the work of Garrett Hardin, famous for his coining of the 'Tragedy of the Commons' (1968), through the critical lens of Reinhold Niebuhr's famous Christian Realist work *The Irony of American History*. I insisted, with Niebuhr, that adaptations of Hardin's tragedy currently proliferating the climate debate are really a story about irony, about the fact that many of those in the developed world were unaware of the damage done by coal and cars, and yet, as Niebuhr insists irony entails, were *still responsible* for the deleterious effects produced by their unknowing action. Niebuhr insists on both humility in the face of the atomic threat and paradoxical need to hold such weapons to confront the specter of Soviet global dominance. I used this calibrated position to assess the increasing calls for climate geoengineering, attempting to understand the influence and potential of Christian narratives of humility and original sin for augmenting climate outreach which is primarily secular and scientific.

Often, survivalists in the 1970s epoch of speculation on imminent disaster drew on atomic metaphors to give a sense of the overpowering gravity of the crisis. The sense of a total loss of agency haunts the nuclear debate in Europe, and provides the context of

EP Thompson's catastrophic imagery in 'Notes on Exterminism.' I argued in this section that today a similar climate exterminism has begun to cede agency to the weather and attempted to reread contemporary crisis narratives surrounding climate change through the lens of the debate between EP Thompson and Mike Davis about nuclear 'exterminism.' This analysis, I argued, reveals that the over-generalization of agency and responsibility may distract from awareness of current deteriorating conditions in vulnerable places around the world.

Today, many approaching climate change compete to name the correct disease causing the symptom of increased carbon, bidding tacitly (and at times quite explicitly) to organize the necessary adaptation in the case of emergency. In the case of the Anthropocene literature, I argued in several chapters, this has the potential to drive either generalized pleas for things like research into global-level geoengineering or for projects of intense granularity aimed at understanding how specific interconnections between phenomena occurring at different geographic and temporal scales create the global-level crises. The width of the gap between these possibilities, given a shared acceptance of linked social and ecological systems in critical condition, should encourage a critical pause. That these pauses appear untimely is a sign of their relevance.

The urge to restrain critical analysis is a reaction to the frustrating inertia produced by denialist indifference and survivalist resignation, an attempt to universalize the threat and make it subject to political action, as shown clearly in the arguments of climate geoengineering proponents. This urgency which denies critical pause, however, can serve as a way to sidestep questions about the course and destination of development, and sober reflection the kinds of destructive habits which have become naturalized in

everyday life. This requires more contextual and less general view of the problems, which may weaken the universality of the appeal, but also may make possible an urgent but critically-informed reaction.

I argued here that this broadly encourages the critiques pursued by people like Jesse Ribot, Dipesh Chakrabarty, others who reconnect political economy, history, and responsibility to the Anthropocene discourse. These theories insist on causal analysis which enables the kind of 'common but differentiated responsibility' which has been enshrined in global climate institutions. Following these critiques, I recognized that the urgent task of reflexively evaluating current regimes and possible future trajectories is not possible without critical perspective from places of the world long considered to be pre-modern or 'developing.' It is perhaps no coincidence that these places are the ones with the most remaining resources, biodiversity, and relatively intact ecological systems. It is also clear that these places often bear little to no historical responsibility for deteriorating global trends, yet are, in a cruel twist of consequence, often disproportionately affected.

Many of these places and peoples have been warned that developing in the model of the industrialized world will deliver the species as a whole to the edge of extinction, yet those in the nations most responsible for those same trends appear unwilling to change their lifestyles. These unseen others, true subalterns of the global system, will see their island nations washed over, coral reefs depleted, droughts deepen, and weather intensify without any buffer. While the Anthropocene literature, and others becoming increasingly popular as awareness of ecological deterioration becomes more widespread, potentially seeks out these kinds of difficult debates, it also potentially becomes over-general in the rush to gain universal urgency. This over-generality, I suggest throughout

the exterminism section in particular, is at the heart of hubristic strategies to engineer the weather, survivalist resignation in the face of population growth and resource scarcity, as well as hopeful but passive beliefs in benign technological advance.

This attitude is largely reproduced in many of the more dire contemporary debates, a grudging sense that while action was necessary it was not possible, which invites either de-prioritization or perverse hopes for the arrival of catastrophic conditions. Each is a passive response, in the end. The first waits for innovation without insuring their attempt with active collective change. The second inspires resignation and system justification, and threatens to produce the very thing it predicts by depoliticizing and demobilizing efforts for cultural and institutional change.

For an interesting contrast consider Anna Tsing's Matsuzaki mushroom project tracing the path of a food commodity from forests in Japan and elsewhere to their consumption through the description of the ecosystems in which they are grown, transported, and consumed against the pleas of people like Paul Crutzen or David Keith who insist that global-scale geoengineering with uncertain effects must be researched and potentially utilized to prevent great suffering. One burrows into the specifics to understand, the other uses the global threat like a club to push for morally dodgy research programs in the backwash of the fear and resignation produced by the global scale.

The same is true for many diagnosing the sources of the same political inaction that drives modernists and scientists to active-sounding technological interventions. Where this critical hatchet leads to the dismemberment of the universal appeal, it often asks for very little in detail about the resulting political and economic choices to be made once the traditional lessons of their particular discipline or favorite thinker are revealed to

be useful for such new times. That these end in hand waving is part of the problem. These serve as signals, both to individuals in the 'developed' world weighing the possible costs and benefits of transformative cultural change and to more vulnerable and less responsible places in the 'developing' world being asked to forgo industrialization and potentially freeze existing economic and social precarity at a level where increasingly volatile ecological conditions make them progressively more vulnerable.

Section II Summary: The Seed

The seemingly universal threat of climate change and other global-scale social-ecological crises, I argued throughout this project, is not 'wicked' or 'tragic' because it is slow or hard to see, but because it is fundamentally about the trajectory of world progress, the perceived end-point of developed and developing nations alike. In the second part of this project I tried to take this insight to heart and begin searching for lessons from various traditions, particularly through the lens of my research on Mexico. In particular, I looked at practical experiments in local governance to critique familiar Western themes of decentralization and ecosystem management, as well as query newer concepts of nested institutions, co-management, and adaptive governance.

As a political theorist researching contemporary social-ecological crisis, in the more positive and institutionally-minded sections of my project, I was looking for ways of organizing political power which provide sustainable alternatives to traditional nation-state bureaucracies and seemingly-ineffective current international regimes. In a sense, I was scattering seeds in the space opened by the critical hatchet, only to reassess them as well. Thus, I follow the insight from the first chapters that contemporary crises have

created a gap between the understanding of the crisis and the kinds of meaningful collective action necessary for avoiding the catastrophe predicted, contending that this gap has led ecological theorists to recommend an abstract 'closeness' between natural and political systems, operationalized as decentralization or indigenous co-management.

The second part of this effort thus attempts to combine environmental political theory with a comparative analysis of decentralization policy and environmental outcomes at the US-Mexico border and in indigenous autonomy regimes in the Mexican state of Oaxaca as possible sources of insight in comparison to the seeming lack of imagination of effective political agency in the 'developed' world. These examples are particularly relevant to consider the insights of decentralization arguments across different academic literatures—the binational region of San Diego-Tijuana is perhaps the least likely candidate for successful decentralization, lacking common institutions across national communities that share vital ecosystems, populated primarily by recent migrants without a historically- and ecologically-conditioned set of traditional practices or social memory of important baseline condition; the southern Mexican state of Oaxaca, by contrast, is perhaps the most likely place where such decentralization should work, ruled in many places by long-standing (if reinterpreted) indigenous norms, which include local democracy, communal property rights, and community autonomy.

Considering the prospect for democratic politics in the US, I showed in the first section of how increasing calls by scientists and popularizers for designation of a new era of interconnection between social and natural systems, packaged as secular and global appeals, can be profoundly pacifying, both by making the crisis appear beyond human control and by severing ties with historical experiences which could provide useful

lessons for public outreach and adaptive political institutions in an era of novel risk. In the second part I explore several examples of such historical experiences in the US and Mexico that offer useful lessons to political ecology and critical political theory in warmer times. Retaking responsibility through critical history, I argued, means genuinely engaging in debates about the concept of 'development' itself and the assumed teleological order of civilizations which often dictates sustainable development strategies. Seeing contemporary debates from this perspective emphasizes both the need for active everyday engagement and flexible experiments in ecological governance, which suggests adaptive models of local governance.

That decentralized systems lead to environmental benefits has been a common refrain in green literatures since the 1960s at least, a fact which has prompted calls for bioregionalism, or the redrawing of meaningful political boundaries on the lines of watersheds or other natural systems. The autarchic strain of early bioregional theory, I argued, cannot reliably be sustained in a world characterized by global economies and global climate crisis. That the restructuring of local bioregional power would fall along national lines is assumed due to the dominance of the nation state (even if diminished in contemporary times) and its ability to take effective, sovereign action. Such an approach is especially disruptive at the edges of natural sovereignty, where nations share ecosystems but not political agency and deliberation.

Nowhere, perhaps, is the proximity of 'developed' and 'developing' life more powerfully set than in the San Diego-Tijuana region. Sharing natural ecosystems and economically interdependent, San Diego and Tijuana have the busiest border in the world and are radically different in how they are socially, culturally, and politically organized.

Sharing both ecosystems and stakes in the effects of global crises, they do not evenly share the social and environmental vulnerability to degradation produced by the border economy or have equal resources to adapt to the changing conditions to come.

In ideal form, 'adaptive governance' would privilege social learning, active engagement, and local political participation. This theoretical form is tempered by existing conditions, and potentially produces its own uncritical consensus that small is *always* beautiful, that the panacea for ecological crisis is local politics. Confronted with the possibility of problems at the global scale, such localist theories may be woefully inadequate and even counter-productive, and, paradoxically, increasingly empowered to respond to natural disasters. While seemingly remote, global change instantiates at the local level, whether through economic globalization, political decision-making, or the social management of natural disasters and rapid ecological change.

A powerful potential source of insight for these debates, I argued, is the ongoing experience of Oaxaca, Mexico, attempting to decentralize political and fiscal responsibility and decolonize cultural and economic relationships. It would be facile to claim that the indigenous institutions analyzed in the second section are somehow polar opposites of contemporary or 'modern' industrial or consumer culture, to play on the otherness of the indigenous and seemingly pre-modern. If there is an inherent opposition between 'Modern' and 'Indigenous' systems, it is likely overplayed by the imaginations of 'developed' world idealists and doomsayers alike. Taking this disclaimer seriously, I argued, does not mean the examples of their struggles over local identity and resource politics are moot. In fact, I hopefully demonstrated, they deserve critical attention.

The Mexican experiment with granting local indigenous sovereignty to 4/5 of the municipalities in the Southern state of Oaxaca now spans over 20 years. Ecological outcomes are used as proof that local governance inspires responsible stewardship, with the most cited example being community forestry efforts. Through a mixed-methods approach I critiqued dominant narratives of indigenous otherness and examine the prospects for indigenous forest policy through remote sensing and statistical analysis utilizing Mexican census data and fifteen years of highly granular forest loss data. Utilizing the rugged terrain which creates rich, diverse ecological biomes as well as cultural enclaves in Southern Mexico, I compared areas with recognized indigenous customary governance against other communities within Oaxaca to evaluate some rival theories such as preexisting economic inequality and distance from major roads.

Using GIS mapping, field research, and literature on fiscal federalism and public goods provision, I tried to deepen and contextualize the decentralization bias in environmental political theory by considering other cultural, economic, and political contexts in Mexico. This is to gain specificity, not to generalize a universal theory. It is also, however, a chance to provide a critical and empirical register for the more abstract seeming debates in political theory, as well as draw the empirical literatures into a deeper conversation with environmental and theoretical debates ongoing in the more humanistic and theoretical social sciences. My intention was not to straddle each field of the discipline, but to engage both on their own terms in a synthetic effort, the success of which the reader will undoubtedly decide.

II. Politics of Nature: Survivalism or Post-Growth?

The turn to politics inspires many in our contemporary US to turn off, to become cynical and despairing. If there is such a loss of confidence in political institutions already, it should be no surprise that many today both accept climate change and make it the lowest priority for active effort. Seeing the personal cost of lifestyle change measured against the perceived inertia of political and bureaucratic institutions, it is much easier to control the fear of a climatic emergency with indifference or resignation than it is to confront the source of it. It allows individuals to think 'the problem is too big, I'm just one person' and to continue living in ways that deteriorate natural and social systems in the comfort of knowing that their effort would not have mattered.

The starkness of the real choice presented by the evidence of planetary change is theological in its resonance—it recalls that things like Reinhold Niebuhr's Christian Realism: once the ironic realization is had, one has to choose between good and evil. Abdicating the choice despite the uneven consequences on more vulnerable places and generations to come, for Niebuhr, was succumbing to evil as surely as actively choosing to continue living as before. Making such a choice, however, will not be as simple as buying sustainable products or paying for the individual ecological indulgences we undertake out of guilt. It will have to be a process of adaptive policy which enables social learning and critically examines problematic but at times unconscious habits.

Lacking this collective work, this *political* effort, technological faith, market pragmatism, and apocalyptic predictions all potentially deliver society into the ecological state of exception, lacking the capacities to adapt without massive centralization and the loss of basic freedoms. For Hardin in particular it meant the need to reevaluate the right

of individuals to have children and the explicit rejection of the UN Universal Declaration of Human Rights. For the political theorist Ophuls, increasing environmental degradation revealed by the Club of Rome was object proof that Hardin's tragic logic was correct and the unintended consequences of rational individual behavior had *already* added up to disastrous externalities for the environment and feedback systems.

Ophuls' fear was that any gradual transition in the collective imagination to catch up with the scale of problems faced would take too long, that rigid bureaucratic systems tied to increasing standards of living would pervert and sabotage the process. Interpreting the political and economic ramifications of the scientifically-revealed crisis in the 1970s, Ophuls predicted that neither major ideological system dominant during the Cold War would survive. The need for great authority measured against the inertia of modern industrial culture, for him, meant that the often maligned concept of coercion required revaluing—juxtaposing coercion against the possibility of total chaos, he made the case that far-reaching government control, despite its normative evil, was preferable to this chaos, which he magnified exponentially from the early modern Hobbesian state to the scale of the species through nuclear Armageddon.

The danger of entering a new era of emergency like the one the survivalists predicted was that such a mentality will prioritize the urgent need to respond at the expense of the collective good of the species. In answer, critical political ecologists from across disciplinary backgrounds in academia and popularizers in public outreach campaigns have insisted on the expansion of time horizons and the incorporation of diverse existing geographic perspectives. This project, broadly, follows these insights. For instance, the geoengineering debate, like the survivalist literature, is premised on the

inability of people to change their habits or institutions fast enough to avoid ecological disaster. The beginnings of the geoengineering debate is being given real consideration because of the scale of ecological challenges to be solved. It is likely in the future it will become more important as the climate changes and areas of the world are unevenly exposed to the vulnerability it produces.

The catastrophic threat sits in the back of eco-modernist and survivalist narratives alike, a part of the perceived *universal* urgency of the global ecological problematic. But spread evenly on the species in the population debate or transferring agency onto Earth processes (Gaia's revenge, the Anthropocene, etc) as in many past and current exterminist arguments, the responsibility for active change, the possibility of Gunther Anders' 'anti-apocalyptics' who were bound by 'burning conscience' to reject despair and passivity, seem dim. Arriving at the point of urgent critical assessment, at the declaration of *krisis* and urgent need to defend vitality, means turning a critical eye back on the most 'modern' ways of life, flattening developmental hierarchies lingering in 'end of history' narratives which continue to place the particular societies of the world on a generic timeline of modernization. This is not only to *help* such places, but to consider their specific histories and experiences as *critical perspective and potential positive examples for application in our own 'developed' societies.*

The survivalist narratives common in the 1970s considered for lessons here clearly did not consider such a change possible, and it is no surprise that they run aground on the Promethean 1980s, characterized by market fundamentalism and technological determinism, without inspiring radical change. Instead, critical political ecologists must break down the abstract, global problem into local contexts and begin to actively

undertake the political work necessary to make communities resilient to possible transformation of conditions change around them. It is this reminder of responsibility, activity, and agency which I think can powerfully benefit critical approaches to contemporary social-ecological crisis literatures now integrating disciplines and approaches through the potential for universal appeal.

Rather than remaining stuck in a delaying, comfortable limbo until crisis conditions deliver rapid change, the task of critical political ecology is to begin instigating reflection on some of the most enduring but unspoken debates surrounding development and technology. This may be painful, and, indeed, may involve perceived sacrifice, which is why it needs to be actively undertaken with a sense of responsibility and collective agency rather than piecemeal market and individual approaches that end in system-justifying indifference or apocalyptic resignation. Resetting the historical telos of an epoch from one of apocalyptic ends to one able to adapt to survive and persist in new conditions is a daunting, even singularly disheartening, task. The practical difficulties of doing given the particularities of the slow violence of climate change likely explains the explosion of theorists from many distinguished disciplinary backgrounds now centering their analysis on the problem of climate change.

The potential for universal appeal which attracts these theorists, entailed by the global nature of the problem, is belied, however, by the complexity of the interactions in different geographic areas and the uneven effects of climate change, both on relations between human communities and also less anthropocentrically conceived indicators like biodiversity. For contemporary debates it is thus critical to return to the messy, even uncomfortable assertion that the habits of ‘developed’ life need critical reexamination, in

contrast to the survivalist pessimism that political and cultural institutions could act in time. This is necessary to build a bridge between local responsibility, which can be effectively imagined and acted upon, and more abstract global trends. The need to turn to consider everyday habits and connections to global distributions of crisis as a way of informing an active process to control the use of geoengineering and reevaluating nuclear power from a local ascending perspective.

Reflecting on Green Politics in Trump's America

This project began now 8 years ago when I came to San Diego in different times. In the US, the financial crisis in sub-prime mortgages had just put the world in a serious downturn and changed the complexion of the government. Delivered a majority in both houses and the presidency, Democrats were in ascendance but the recovery was fragile. Few of even the most outspoken green reformists spoke out—surely we must fix the economy first, all seemed to reason, or at least tackle healthcare, said the dominant party.

While important, health care became the chief expense of political capital. Environmental concerns, especially global warming, slid to the back burner—was there not a 'hiatus' in warming? skeptics asked hopefully. Slowing growth and emissions during the mortgage crisis and the debacle of the COP meeting in Copenhagen and subsequent releasing of emails between climate scientists ('ClimateGate' it was dubbed by the conservative media) had even true believers reeling and feeling both historically irresponsible and unable to affect the processes changing at an adequate scale.

This project began amidst this resigned milieu, riding the rapid transition from hopeful information and democratization campaigns activated by Katrina in 2006 and

often succumbing to resigned inevitability, a sense that mitigation was useless and the catastrophe had already begun. Seeing these traits, I began looking at a similarly resigned era, the 'survivalist' 1970s, represented by Hardin, Ehrlich, Ophuls, and Heilbroner. I thought, at the time, that we today are too becoming focused on individual survival rather than the wholesale cultural, institutional, and economic changes necessary to undertake to actually affect the problems at scale. Acknowledging that we have now entered a similar 'survivalist' epoch, I attempted to mine insights from the failed attempts of the outreach campaign addressing global population by considering them in the US historical context of apocalyptic rhetoric. If the first generation of survivalists were authoritarian and callous toward human life, the question was posed to our new generation—given that we have not yet lost our faith in technological salvation, how will our era of ecological politics evolve?

I argued throughout that the global trends identified in global ecological crises literatures need to be anchored in local experiences which are intelligible to average people, and that they need to be addressed with an urgent but humble collective responsibility. This responsibility cannot begin elsewhere—here in the US we will have to face up to the ironic realization that we are per-capita most responsible for climate change and perhaps many other uncomfortable awakenings. We can take that as an excuse to continue the destructive rhythms of our everyday habits, as an acknowledgement that the individual is too small to affect such processes and too busy to try, or as the urgent call to lead through action by generating effective collective agency in the most responsible country on Earth.

Presented with a historic chance to reflect on the cost of the American lifestyle, the US has been unable to match early leadership in the search for solutions to environmental problems. The success of growth rhetoric keeps alive an old threat, the fight against necessity, and this rhetoric grows stronger with the steady decline in real income and growing numbers receiving government assistance. Rather than take the mantle of pioneering green innovators, the US has stalled over a persistent unwillingness to make alterations in the habits of our lives. Our American way of life survives, then, by giving people a certain sense of anomie, a feeling of great powerlessness which forces us together. Today, few pragmatic green theorists call for mass action because the terms of the debate have been set such that it would be irrational to participate. The effort involved, the work time lost, the money sacrificed appears fruitless.

Unpracticed in anything but symbolic choice of leaders, the global environmental challenge confronts an American public which, in stark contrast, both is *most* responsible for resource depletion and environmental degradation, and also which is *least* able to think actively in collective terms. Rather, the US has created an elaborate security state focused on the production of scenarios and a form of engineering resilience, a concept which has spread throughout financial and other institutions worldwide. These scenarios, born from nuclear planning in the Cold War, focus on maintaining order and stability through disasters, in a thoroughly mingled goulash of terrorism, hurricanes, earthquakes, contagious disease, and now ecological crises like climate change. Preparedness doctrines lack a historical sense, focusing on unexpected events outside the agency of the institutions charged to manage it, seeking rationalization of flexible command structures and using simulacra to expose 'vulnerabilities.'

The analogy often used is triage care, where field doctors in the armed services have to make quick decisions to save who they can which often leave some further gone or less likely to their end. This kind of analysis looks at threats as a kind of instantaneous and spontaneous irruption, something outside any control, and seeks to reconstitute the prior form as quickly as possible to ensure order and economic stability (GW Bush said: don't let 911 interfere with your shopping, an echo of his father's assertion at Rio in 1992: the American lifestyle is not up for negotiation). The question is whether triage is the correct metaphor, indeed whether the security-inflected discourses of the Anthropocene or resilience are too indebted to old images and Cold War era rhetoric to approach contemporary problems with new solutions, many of which may violate the Bush doctrine: keep shopping.

Given the possibility that climate change and other global ecological crises are rather more like cancer than bullets or atom bombs in temporal scale begs questions about what would constitute a preventative care ethic rather than one of triage. Certainly decisions have to be made and some of these will be tragic, but ignoring proactive prevention (a twin of health care problems in the US, perhaps revealing common sources) only makes the tragedy seem more desperate. This is because, I argued, we have misunderstood tragedy. Tragedy, or the vain fight against forces too powerful to defeat, was meant to inspire humility and teach lessons about human frailty, and assumes that the agency of the punishing force is external.

With climate change, we have a clear example of how *the inadvertent consequence*, the unintended side-effect, of seemingly universal pleas for advancing human standards of living was the depletion of the natural world which once seemed

limitless in scale, and through the cars and oil that fueled the great expansion of the post-War era, a cloud of invisible responsibility would rise to blanket the planet and alter a feature of our global system which seemed impervious to human agency, the weather.

An unknowing responsibility denotes irony rather than tragedy. Tragic decisions in this context, are misrecognized, leading to solutions that are harsh and short-sighted. The triage may not be necessary if preventative means can arrest the crises. The disagreement here is about urgency and, connected to it, identifying the stage of the disease. The turn in medicine to preventative and sociological analysis mirrors the effort which green theory needs to also pursue, the acknowledgment of the long-term nature of the crisis faced and the need to critically reappraise what base goals preparedness doctrines are meant to preserve.

Without clear action on the side of the 'developed' countries, few claims about the need to stop building roads, buying cars, or amassing private wealth are going to be credible. Choosing to work in the developing world, as many of the perspectives drawn upon here do, exposes a rift in American and European cultures, and may appear to project this rift onto other places. Lack of attention to livelihood and local culture is a product of the projection of the growing economic changes as developing countries went through financial crisis and liberalization.

Agenda 21, the crowning document of the 1992 Rio Conference on Sustainable Development, is a good case study in this sense. By far the longest and most worked out sections of the document are those about trade liberalization. This is telling, not only because of the legalistic nature of these documents, but also because of the startling lack of enforcement and commitment that has accompanied Rio and subsequent international

environmental treaties. Ignoring this parallel problem with political economy makes environmental protection laws, accompanied by defunding across the federal government, become token in areas where local capabilities are not sufficient to effectively monitor, enforce, and care for ecological issues.

The 'post-material hypothesis' claimed that when societies became middle class and removed themselves from the struggle for day to day survival they would begin protecting nature for its own sake. This idea is naïve and rightfully unsettling to popular environmental movements in 'developing' countries. Political ecology and post-colonial history insist that history remains important and that meaningful changes need to be made to mainstream ideas of modernity and development. That European theorists like Ulrich Beck want a 'reflexive modernity' is a reflection of Beck's conviction that 'we have never been modern,' i.e. that 'modernity' is a future goal rather than an achieved state. Given that modernity has never actually existed, for Beck the blending of different ways of life is unproblematic. What this lacks, however, is the explicit revaluing of knowledge hierarchies which degrowth inverts and *buen vivir* attempts to move past entirely.

Constructing such a 'simultaneous' image of human agency, I argued in the first part of the later section of chapters, is crucial to rethinking both the historical responsibility debate and those over the way forward at a global level. The insight is that these debates are much more importantly entwined than they are usually treated by 'developed' nations, many of which now inform the 'developing' world that they must halt degradation and that they will become 'post-material' after industrialization, a recommendation which is both facile and insulting.

This is important because stark visions of environmental crisis have become common again in our era of social-ecological crisis. Lovelock's passage in *Revenge of Gaia* is reminiscent of Jonathan Edwards' 'Sinners in the Hands of an Angry God' sermon in many ways, but centrally that the unconverted were a burden on the planet. Lovelock refers to the earth, or at least the biosphere, as an intentional actor, mimicking the emphasis of Edwards on the will of God as supreme punishment. Lovelock is explicit: this actor, what he calls Gaia, is *not* conscious, and thus not intentional in the way that God is for Edwards. But Lovelock's rhetoric routinely discards his more scientific proviso about intentionality. Could something without intentions or agency seek revenge, as the title of his 2006 work implies? This is the return to the homeostatic mode which Micheal Barkun feared would obscure responsibility and effective agency.

Fukuyama's statements about environmental protection being a luxury echo the thrust of economic strategies throughout the 80s and 90s that such catastrophic prophets are responding to. Spread to the 'developing' world, such economistic and universalizing logics proclaimed the direction of human striving without consideration for cultural and individual difference. Today, a continued blanket refusal to think in terms of Western ways of life protects a comfortable numbness and cultivated anonymity in which 'mature,' 'developed' nations have learned to shelter themselves to avoid having to make costly changes to their own ways of life. This 'modernist' mentality continues to relegate potential examples from other parts of the world as anachronistic on our developmental timeline, protecting a powerful passive inertia.

As Beck notes, echoing Plumwood and Chakrabarty, organized irresponsibility flourishes where a scalar disconnect exists between perceived agency and catastrophic

trends. By recentering on the cultural mediation between local and global poles, Chakrabarty insists on the need for meaningful agency which incorporates the cultural task with institutional reformulation. Without such a cultural effort, even given reflexive, critical, and pluralist democratic institutions, how will we wield them?

Last words…

The prospects for entering an epoch defined by scarcity and crisis appear to be real, but the history of global outreach tells us that insisting on its imminence isn't enough. Uncomfortable conversations are already going on about historical responsibility, uneven vulnerability, and global justice that cannot be bridged from one perspective and must be accompanied by attention to the experiences of real people in real places. This project attempts to do that through my particular window into Mexican environmental politics, and reflexively into the analysis of the border region and US.

My central points are that critical political ecology must remain active in the face of a threat which in many ways remains unimagined in its full effect, that we must do so in a humble way which encourages social learning and flexible adaptation rather than grand narratives of technological salvation or catastrophic resignation to authoritarian systems. In order to engage this project sincerely, I argued that implicit development hierarchies be flattened in order to address the problematic trajectory of world 'development' which casts the most consumptive and degrading societies in history as the logical endpoint of the historical progression of the rest of the world.

This need to examine unreflective cultural assumptions is an invitation to learn to identify and transform those naturalized habits which now endanger globally distributed

communities unevenly and irrespective of their historical responsibility. The challenge is to pursue a pluralization of perspective and experience in a paradoxically urgent and humble way, and, by reversing old development hierarchies, maybe draw inspiration for our own future from the experiences of those once written off as peasants, third world, or 'developing.' Continuing to disqualify such cultural change as 'regression' or 'retreat' may ironically produce the conditions for just such a return, done in crisis conditions rather than as a project of collective social learning.

This attitude represents the greatest challenge to collective action on global-scale social-ecological challenges and should inform the next generations of critical political ecology. Confronting biased assumptions about development, modernity, and growth in Western/Northern narratives creates a distinct challenge to adapt and replace those narratives in unique local contexts. Many influential theorists have arrived at such conclusions today, that current conditions require critical reexamination of fundamental assumptions about the possibility of sustaining 'modern' ways of life, including influential climate activist Bill McKibben who has publically said 'it's time to harden and settle for decline.' The Anthropocene is only the most conspicuous of these strains, proliferating through many disciplines of academic literatures, drawn into the gravity of its integrating pull and potential universal appeal.

The lesson that theorists like Plumwood produce is not merely that there are powerful interests that benefit from passivity and non-action, but that consumer, 'remote' culture also may tend to seek out these cracks in disaster rhetoric, may be willing to passively place faith in a version of human ingenuity rather than having to experiment themselves. This mentality leads to a powerful silent consensus that our habits and

lifestyles are too important to give up—that the end of all life is preferable to the end of our way of life. Our ideas of development and progress are complicit in this surrender: as George HW Bush told the delegates at the UN Conference on the Environment in Rio de Janeiro in 1992, 'the American lifestyle is not up for negotiation. Period.'

The problem for the democratic 'consensus' emerging from 1989 which bolstered Bush Sr's contention that the commitments at Rio were not life-changing was that it was assumed that economic growth was the initial prerequisite to any kind of environmental consciousness in the 'developing' world. This is why *Agenda 21* and related documents from the Earth Summit often read more like trade treaties than collective mitigation of environmental harms. The fall of the Iron Curtain and the USSR created fertile ground, especially for re-packaged green versions of older ideologies. Today conceptual frameworks like resilience spread on similarly fertile grounds, becoming a master key for social systems, financial stability, and disaster preparedness.

Holling's call is far more radical than its adoption in security discourse. The threat he sees, I think, is that old metaphors still rule our discourse, and their renewal through different ideological and traditional lenses produces a kind of disorientation. It drives the most responsible and comfortable to interpret the end of a way of life, meaning a set of habits and structures of everyday life, as the *end of all life*. At abstract scale, perhaps it is easier to release oneself from the responsibility to make even minor changes to habits or challenge the unstated telos behind continued economic growth and consumer life, that to have more is better, whatever the cost. The radical effect of constant Malthusian warnings has coupled with the perceived threat to the material comforts of the

'developed' world to create a kind of surrendering denial, a defeated belief that catastrophe is unavoidable, and, strangely, that we somehow deserve it.

This feeling is classically American in that it takes on blame only superficially (since it accepts disproportionate responsibility for global environmental problems but does not also accept the duty to act on these responsibilities), and because it has little consideration of the rest of the world who will have to experience the catastrophe alongside us. The assumption is often that the world is so great and complex individuals will not take action unless they consider the crisis a threat to their survival. But it is the definition of the 'we' that will survive, both human and nonhuman, which lays the fundamental framework of ecological politics.

If we interpret past generations of survivalists and eco-authoritarians as failures today we must focus in on the reasons why, on the over-generalizing mistakes they made and the context of energy crisis and Cold War guiding their rise and fall from fame. Their attempts to globalize the fire and brimstone tactics of many successful movements in the US were too dire—by creating such overwhelming catastrophic scenarios whatever urgency was produced by their rhetoric had few if any channels to successful avoidance. Most ended, instead, with a resigned prescription of authoritarian 'soft landings' to manage the regress of modern civilization, a tragic logic echoed by Lovelock, in his endorsement of nuclear energy, and Crutzen, in a much more optimistic way in his advocacy for climate geoengineering research.

This kind of survivalist appeal, though, can justify anything—its adoption by pessimists in times of upheaval may usher in exactly what the survivalist resignation foretold: the rise of authoritarian government. I argued above that what simultaneity

reminds critical theory in the age of the Anthropocene is that there is a secret consistency between global urgency and local action necessary to mitigate the worst and adapt to what can't be avoided, and that this consistency is created through political debate and meaningful action in the developed world which acknowledges common responsibility at meaningful levels of political agency. This agency has to be created simultaneously, not sequentially, through individual preferences and cultural customs to arrive at solutions that reflect the growing global force of humans in the Anthropocene.

This cannot be done if the problem is purely a technical problem to be engineered away, nor if the nature of the consequences and the responsibility for creating them remain undifferentiated at an abstract global level. I believe this more complicated challenge validates the important role of both theory and evidence in political analysis in a way that bridges some traditional gaps between subfields in political science, and at the same time attempts to look to cognates in other disciplines for insights, debates, and critical perspectives. While the style and method may change, the overarching intention is the same: understanding political responses to environmental crisis critically and also as a call to active engagement. I hope this work of the past 8 years will guide someone else down some equally weird paths sometime in the future.

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